Jaguar

SERVICE MANUAL

FOR

MARK V

2½ and 3½ LITRE MODELS

ISSUED BY JAGUAR CARS LTD., COVENTRY

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SPECIFICATION

GENERAL. The chassis, engine, gearbox and body numbers are given on a plate fixed to the right hand of the scuttle. Push forward the bonnet lock control situated under the right hand side of the facia panel and open the bonnet top panel to read the plate.

The appropriate numbers are stamped directly on the components concerned as follows :–

Chassis Number. Stamped on chassis frame side member at left hand front jack socket.

Engine Number. Stamped on boss at right hand rear of cylinder block.

Gearbox Number. Stamped on a small shoulder at the top of the rear left hand side of the gearbox casing, and also on the rim of the core plug aperture in the top cover.

Body Number. Embossed on a plate at left hand of scuttle under bonnet.

Always quote the chassis number when communicating with the Factory in regard to a particular car.

ENGINE.

	2½ Litre.	3½ Litre.
Type	O.H.V.	O.H.V.
Bore.	2.8740″ (73 mm)	3.2283″ (82 mm)
Stroke	4.1732″ (106 mm)	4.3307″ (110 mm)
Number of Cylinders	6	6
Capacity	2663.7 cc. (2.663 litres)	3485.5 cc (3.485 litres)
R.A.C. Rating	19.84 h.p.	25.01 h.p.
Maximum B.H.P.	102 @ 4600 r.p.m.	125 @ 4250 r.p.m.
Compression Ratio :		
With decompression plate		6.75 : 1
Without decompression plate	7.3 : 1	7.20 : 1
Max. Torque lbs. ft. at r.p.m.	136 @ 2200	184 @ 2000
B.H.P./Sq. in. of Piston Area.	2.62	2.55
Peak Piston Speed Ft./Min.	3200	3070

The cylinder block and crankcase are an integral chrome iron casting with full length water jackets. The cast iron cylinder head is detachable and has machined combustion chambers and ports. The camshaft located on the left of the engine runs in five bearings. Operation of the overhead valve gear situated on the cylinder head is by push rods. The forged steel crankshaft is supported in seven thin steel shell main bearings. Connecting rods have thin steel shell bearings and force feed lubrication of gudgeon pin bearings.

Light alloy solid skirt pistons are used with fully floating gudgeon pins. One oil scraper and two compression rings are fitted. Overhead valves operated by push rods. Duplex chain with automatic tensioning device.

IGNITION. Coil ignition. Distributor with built-in centrifugal advance mechanism, also overriding vacuum control operated off front carburettor. Micrometer advance and retard adjustment at distributor. Champion sparking plugs Type N.8 on 2½ litre and L.10 on 3½ litre.

CARBURETTORS. Twin S.U. with thermo-electric auxiliary starting carburettor incorporated. Air silencer with gauze cleaning element connected to carburettors by elbow manifold. Carburettors on 3½ litre have hydraulic piston dampers.

LUBRICATION SYSTEM. Pressure gear type pump in crankcase sump forces lubricant through a Tecalemit full flow filter to crankshaft main line and connecting rod bearings, to camshaft bearings, gudgeon pin bearings and rocker gear. Sump capacity 20 pints (11.4 litres) measured by dipstick.

COOLING SYSTEM. Water is circulated by a centrifugal type water pump. Quick warm up from cold is assisted by a by-pass thermostat built on to the end of the water up-take manifold.

FUEL SYSTEM. An S.U. electric pump draws petrol from a large capacity petrol tank situated at the rear. A petrol level warning light situated in the petrol gauge indicates when the fuel is low.

CLUTCH. A flexible dry single plate Borg and Beck clutch is fitted.

GEARBOX. Four forward speeds and reverse with synchromesh on top, third and second. Short centrally disposed gear lever. Gearbox capacity 2½ pints (1.4 litres), measured by dipstick.

GEAR RATIOS

Top	1 : 1	Second	1.982 : 1
Third	1.367 : 1	First	3.375 : 1
	Reverse	3.375 : 1	

TRANSMISSION. Divided propellor shaft supported at the centre by a flexibly mounted bearing. Lubricating nipples fitted to needle bearing universal joints.

REAR AXLE. Hypoid spiral bevel three-quarter floating with offset pinion shaft. Rear axle capacity 3½ pints (2.0 litres). Axle ratios : 2½ litre, 4.55 : 1 ; 3½ litre, 4.30 : 1.

STEERING. Burman recirculating ball worm and nut. Left or right hand steering available. Steering wheel adjustable for reach.

SUSPENSION (FRONT). Independent with torsion bar springing. Wishbones supported on rubber bonded bushes. Control by hydraulic shock absorbers and anti-roll torsion bar.

SUSPENSION (REAR). Long semi-elliptic springs with rubber bushes at anchor bolts and shackles. Control by hydraulic shock absorbers.

BRAKES. Girling full hydraulic brakes operating on all four wheels. Pistol type hand brake operates mechanically on rear wheels only, through entirely separate linkage.

WHEELS AND TYRES. Pressed steel wheels with detachable chrome plated nave plates and five-stud mounting for each wheel. Tyres, Dunlop super comfort, 6.70 x 16. Spare wheel carried in separate locker at rear.

CHASSIS FRAME. Box section with cruciform centre bracing giving immense strength and rigidity.

JACKING. Easy-lift jack, supplied with tool kit, fits into sockets in chassis front dumb irons to raise front wheels and into sockets attached to the chassis frame under the rear doors for rear wheels. Access is gained to the rear sockets by raising the edges of the rear carpets.

ELECTRICAL. Lucas de Luxe throughout. Compensated voltage control. 12 volt set with ventilated dynamo. 64 amps capacity battery, 10 hour discharge. Built-in head lamps and wing lamps. Two fog lamps. Stop lights. Reverse lights. Twin rear lights. Two interior lights with extra door controlled interior illumination. Twin blended note horns. Twin bladed screen wiper. Cigar lighter. Electrical direction indicators. Built-in provision for Radiomobile Car Radio.

AIR CONDITIONING INSTALLATION. Fitted as standard equipment and provides air conditioning of body interior, demisting and defrosting of windscreen.

COACHWORK. All steel sound insulated body with steel floor. Upholstered throughout in finest quality Vaumol leather hide over Dunlopillo covered spring cases. Flat floor is thickly carpeted over felt underlay. Front bucket seats adjustable for height and reach. Heavily padded folding central armrest in rear compartment. Heavily padded head and shoulder rests.

Garnish rails, window frames and instrument panels are of fine quality polished figured walnut ; press button door handles ; capacious soft leather door pockets with zip fasteners ; large cubby lockers, one fitted with lock and key : ventilator windows in front and rear compartments. Spare wheel is carried in special compartment beneath luggage locker. Tools are housed individually in specially shaped sound-proof container in rear locker lid fitted with automatic light. The jack and wheel brace are carried in the spare wheel compartment. Ample accommodation is provided in the large rear locker, the lid of which may be lowered to form a platform for additional luggage. Platform and locker interior highly polished and fitted with raised rubber protector strips.

	2½ litre.	3½ litre.
Wheel Base.	10′ (3.048 metres)	
Track. Front	4′ 8½″ (1.435 metres)	
Track. Rear	4′ 9½″ (1.460 metres)	
Length	15′ 7½″ (4.763 metres)	
Width	5′ 9½″ (1.765 metres)	
Height	5′ 2½″ (1.59 metres) (Unladen)	
Turning Circle	35′ (10.67 metres)	
Ground Clearance	7½″ (190 mm)	
Weight	33 cwts. (1676.4 kgs.) (Dry)	

PERFORMANCE

	2½ litre	3½ litre
Piston Area. Sq. ins./ton	23.6	29.8
Brake Lining Area. Sq. ins./ton	111	111
Top Gear m.p.h. at 1000 r.p.m.	18.2	19.35
Top Gear m.p.h. at 2500 ft./min. Piston Speed	65	67.5
Litres per ton– mile dry	2710	3350

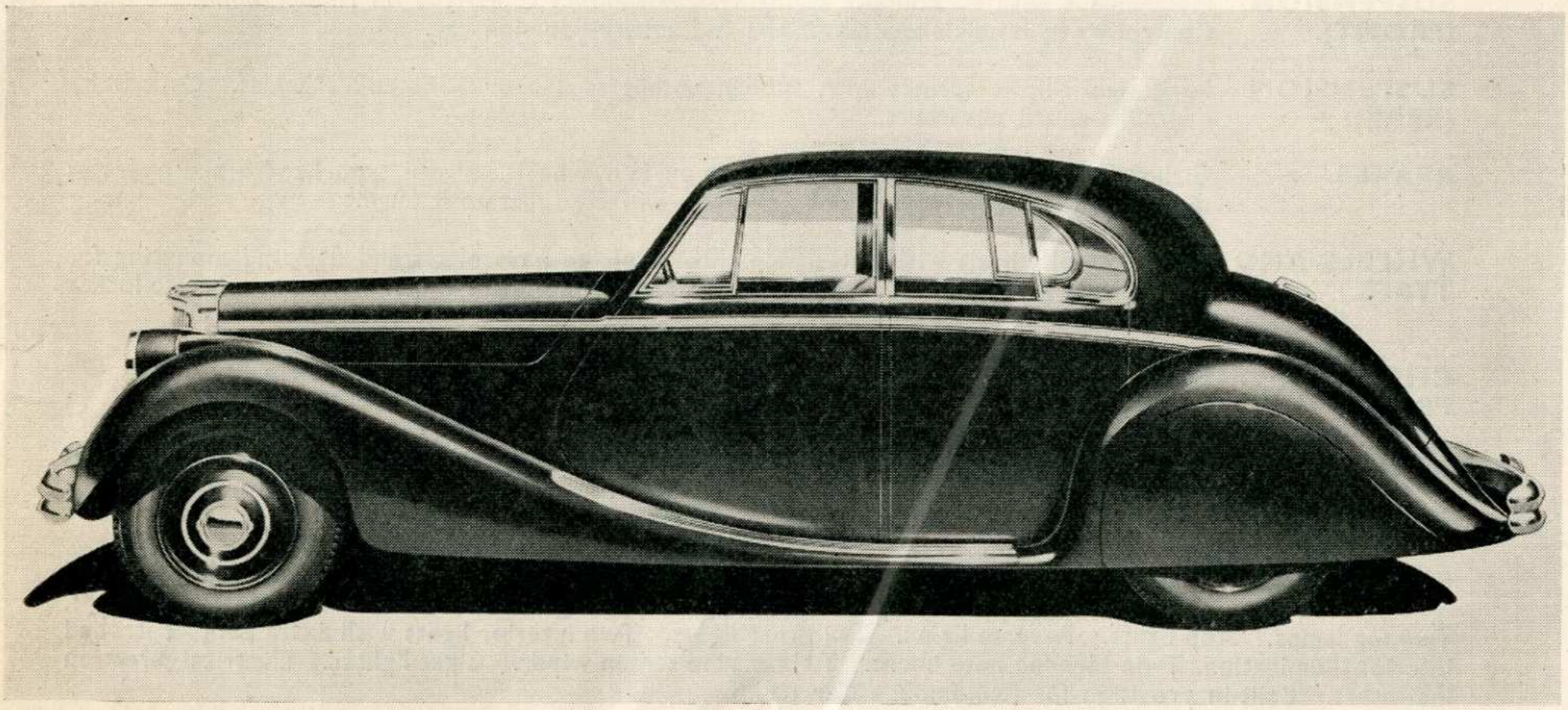


PLATE A.1. SALOON MODEL

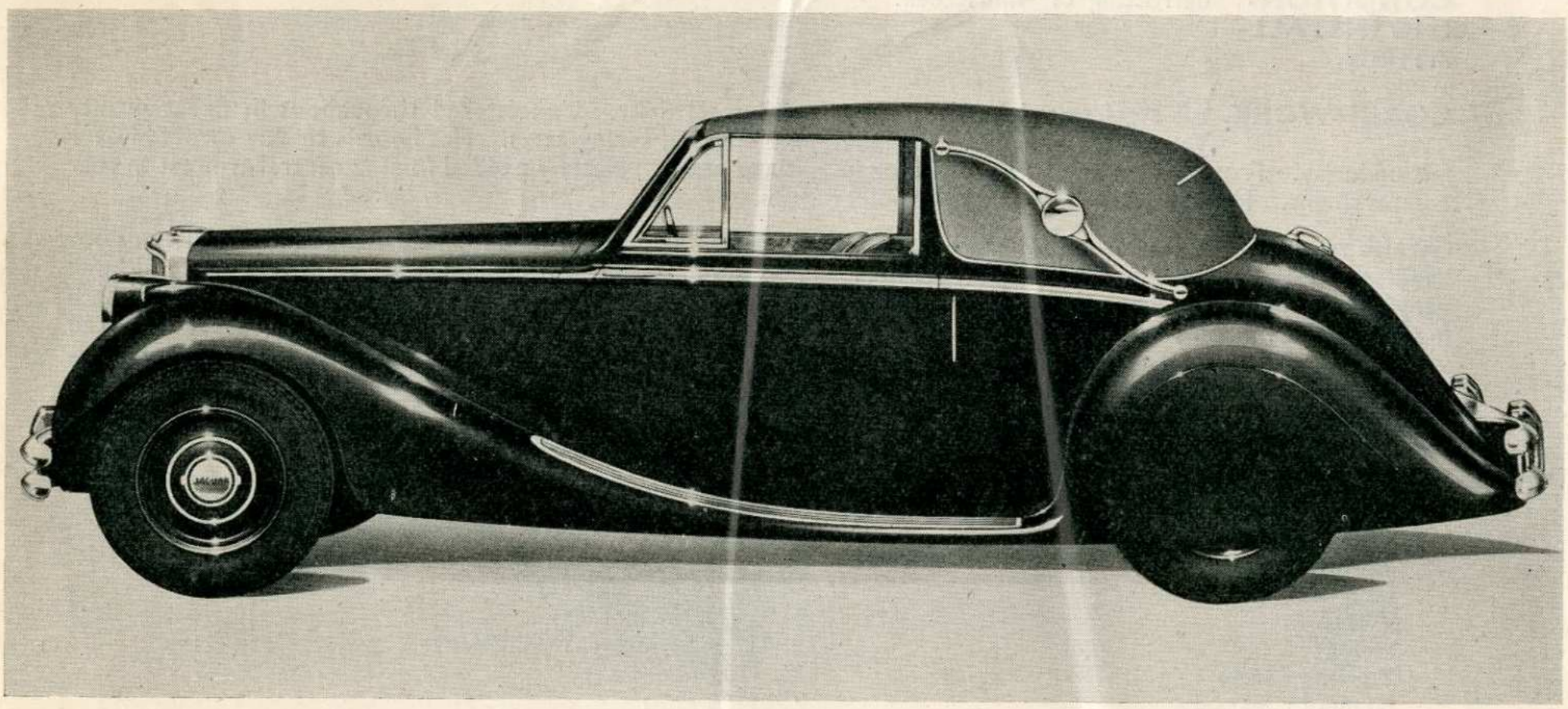


PLATE A.2. DROP HEAD COUPE MODEL

INSTRUMENTS AND CONTROLS

INSTRUMENTS

(Refer to Plate A.3)

AMMETER. Records the flow of current into or out of the battery. Since compensated voltage control is incorporated the flow of current is adjusted to the state of charge of the battery ; thus when the battery is fully charged the dynamo provides only a small output and therefore little charge is registered on the ammeter, whereas when the battery is low a continuous high charge is shown.

AIR CONDITIONING EQUIPMENT WARNING LIGHT. A green warning light situated between the air conditioning controls lights up and records " FAN " when the air conditioner motor is running.

HEAD LAMP WARNING LIGHT. An orange warning light is situated in the speedometer and lights up when the head lamps are in the full beam position and is automatically extinguished when the lamps are in the dipped beam position.

IGNITION WARNING LIGHT. A red warning light situated immediately above the starter switch lights up and records " IGN." when the ignition is switched " ON " and the engine is not running or when the engine is running at a speed insufficient to charge the battery. The latter circumstances are not harmful but always switch " OFF " when the engine is not running.

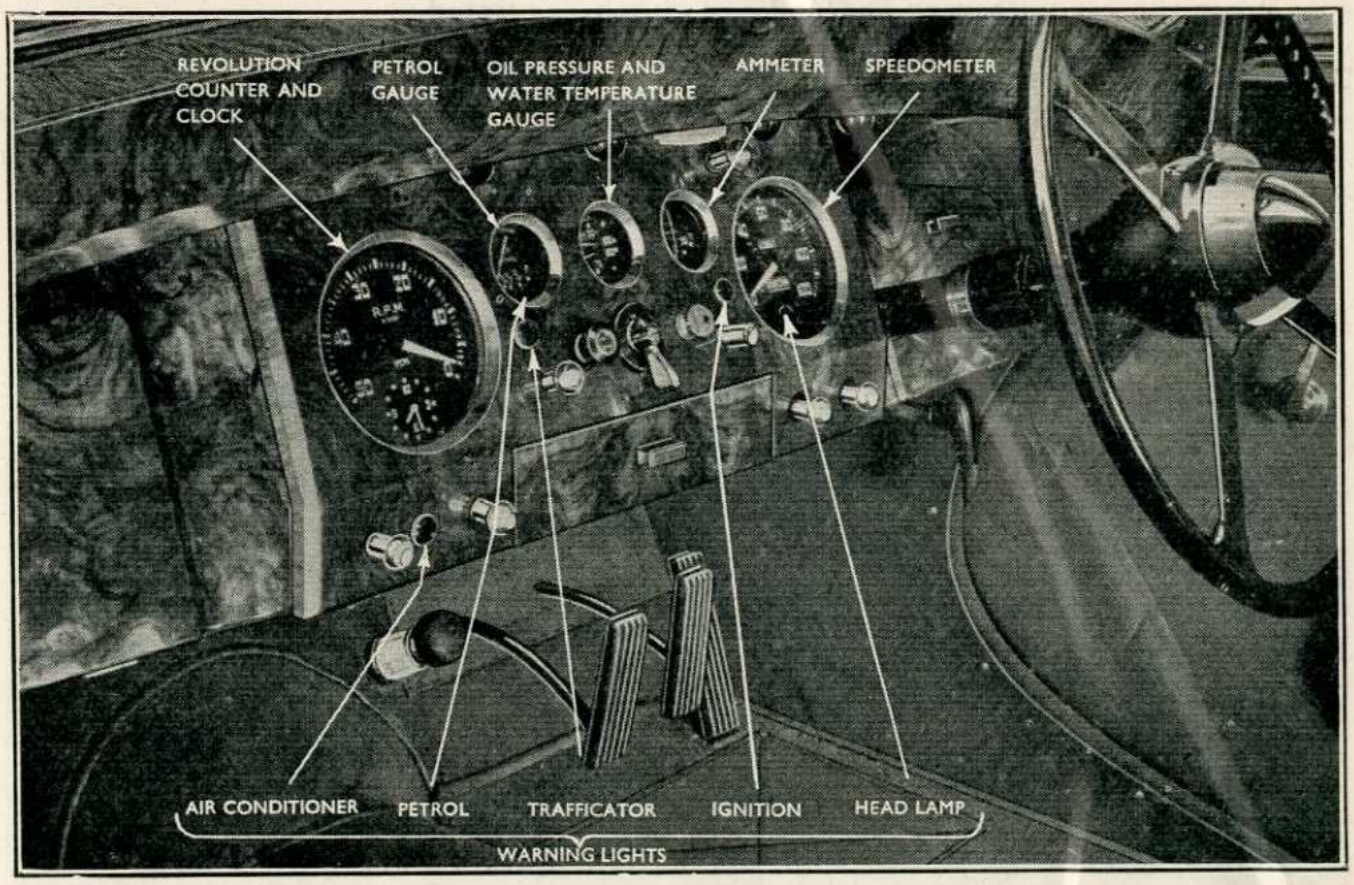


PLATE A.3. INSTRUMENTS

OIL PRESSURE AND WATER TEMPERATURE GAUGE. The oil pressure gauge records the oil pressure being delivered by the oil pump to the engine ; it does not record the quantity of oil in the sump. When the engine is cold a high oil pressure will be recorded and as the oil becomes warm the pressure will drop. The minimum pressure at maintained high r.p.m. when hot should not be less than 20lbs. per square inch. The water temperature gauge records the temperature of the coolant by means of a bulb screwed into the thermostat housing which is connected to the gauge by a capillary tube.

PETROL GAUGE. Records the quantity of petrol in the supply tank. Readings will only be obtained when the ignition is switched " ON."

PETROL WARNING LIGHT. A red light is situated in the petrol gauge and lights up intermittently when the petrol level in the tank becomes low. When the petrol is almost exhausted the warning lamp operates continuously.

REVOLUTION COUNTER AND CLOCK. Records the speed of the engine in revolutions per minute. The built-in electric clock is operated from the battery. The clock hands may be adjusted by pushing up the stem winder and rotating clockwise. Starting is accomplished in the same manner.

SPEEDOMETER. Records the vehicle speed in miles per hour, total mileage and trip mileage (kilometres on certain export models). The trip figures may be set to zero by pushing the knob under the facia upwards and rotating anti-clockwise.

TRAFFICATOR WARNING LIGHT. An amber warning light situated immediately above the fog lamp switch lights up and records "TRF." when the trafficators are switched "ON." Trafficators only operate when the ignition is switched "ON."

FOOT CONTROLS

(Refer to Plate A.4)

ACCELERATOR. The pedal on the right. Controls the speed of the engine.

BRAKE. The centre pedal. Operates the brakes on all four wheels.

CLUTCH. The pedal on the left. Connects and disconnects the engine and the transmission. Never drive with a foot resting on the pedal and do not keep the pedal depressed for long periods in traffic. Never coast the car with gear engaged and clutch depressed.

HEAD LAMP DIPPER. Situated on the toe boards and operated by foot. The switch is of the change over type and if the head lamps are in the full beam position a single pressure on the control will switch the lamps to the dipped beam position and they will remain so until another single pressure switches them to the full beam position again.

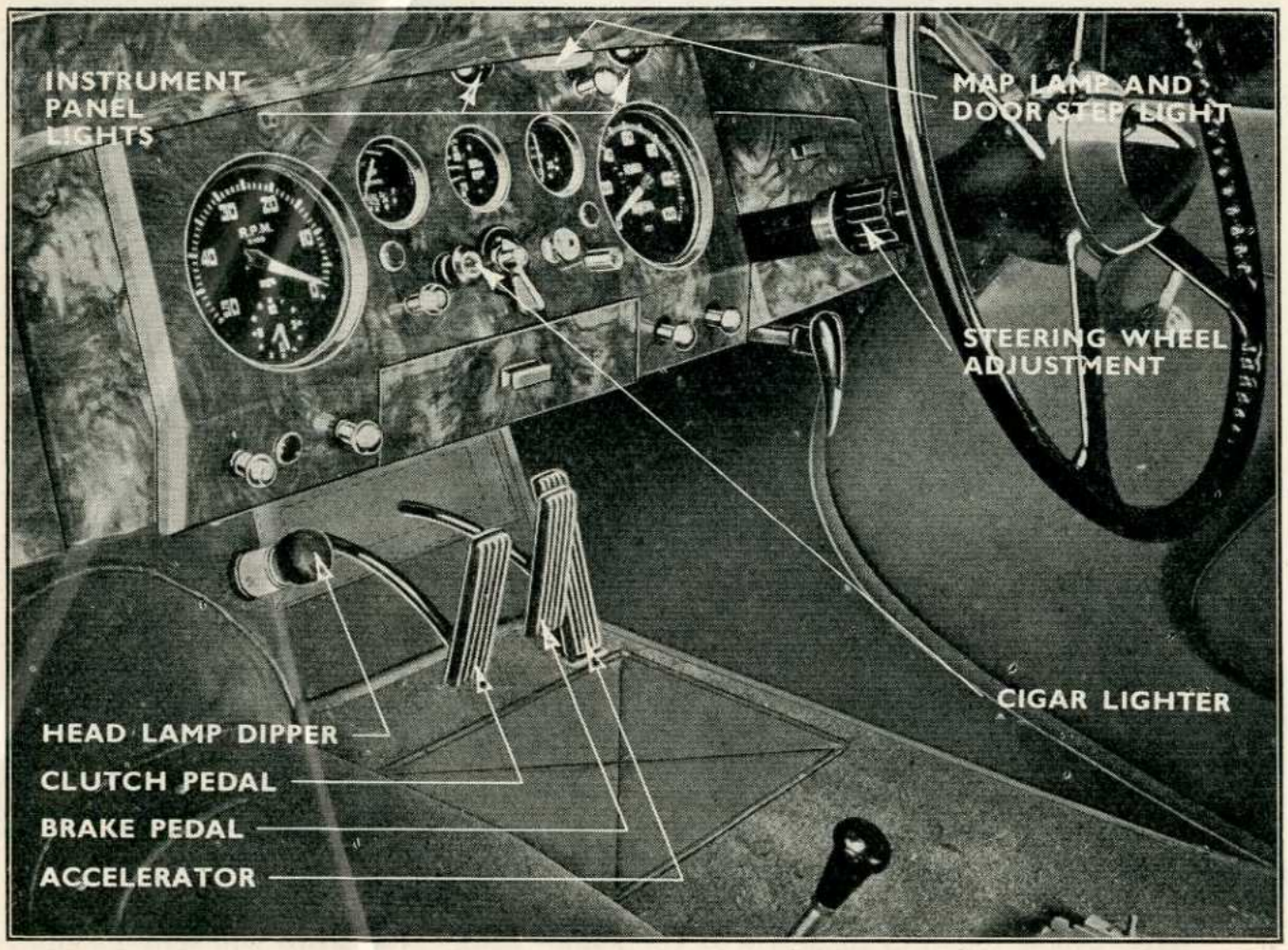


PLATE A.4. FOOT CONTROLS

HAND CONTROLS

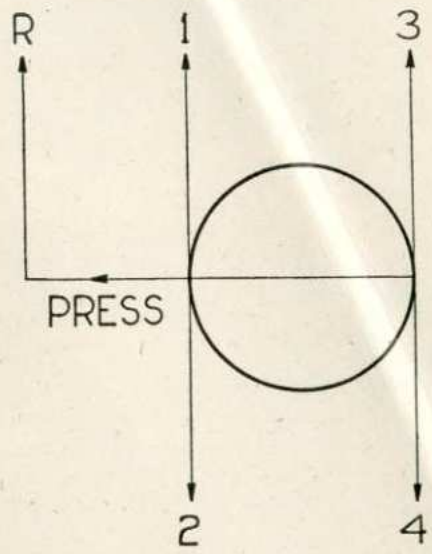
(Refer to Plate A.6)

AIR CONDITIONING CONTROLS. These are situated at the lower left hand corner of the facia board and consist of a fan " on-off " switch and a " hot-cold " control knob. Situated between these two controls is the warning light which indicates when the fan is running. Detailed operating instructions for the Air Conditioning Equipment will be found in Section " O."

BONNET LOCK CONTROL. The bonnet locks are controlled from the driving compartment. To open the right hand bonnet top panel push forward the control knob situated below the right hand glove box. To open the left hand panel push forward the knob below the left hand glove box. To lock the bonnet close the top panel and pull back the appropriate control knob until the catches engage.

FOG LAMP SWITCH. Operate the switch to obtain both fog lamps. Observe that fog lamps only operate when the side lamps are switched on.

GEAR LEVER. Centrally situated and with gear positions indicated on the control knob. Always engage neutral and release the clutch when the car is at rest.



GEAR POSITIONS

PLATE A.5

HAND BRAKE LEVER. Pistol type and situated under the dash. The hand brake operates mechanically on the rear wheels only and is provided for parking, driving away on a hill and when at a standstill in traffic.

HORN SWITCH. Situated in the centre of the steering wheel, it operates the twin horns when depressed.

IGNITION SWITCH. The key provided operates the switch when inserted and turned clockwise. Never leave the ignition switched on when the engine has stopped, a reminder of such circumstances is provided by the ignition warning light which will then light up and record " IGN."

INTERIOR LIGHT AND MAP LIGHT SWITCH. Situated at the lower right hand corner of the facia board. Pull out the switch for map light, rotate clockwise and pull again for interior lights.

PANEL LIGHT SWITCH. Operate the switch when it is desired to read the instruments in darkness. The panel lights only operate when the side lamps are switched on.

SIDE AND HEAD LAMP SWITCH. From " off " can be rotated clockwise into two positions, giving in the first location side and tail, and in the second location head, side and tail. Observe that fog lamps are not available when headlamps are switched on.

STARTER SWITCH. Press the switch, with the ignition switched on, to start the engine. Release the switch immediately the engine fires and never operate the starter when the engine is running. The starter only operates when the ignition is switched on.

TRAFFICATORS Operated by the knob situated at the top of the steering wheel centre. Normally the trafficators are self cancelling when the wheel is centralised after turning a corner. When only a slight turn is made it may be necessary to cancel the trafficators manually by returning the control knob to the central position. When the trafficator arms are up the warning lamp on the facia lights up and records "TRF." On cars for the U.S.A. trafficators are replaced by flashing side and tail lights, and operation is as described above.

WINDSCREEN WIPERS. The wipers are set in motion and parked following use, by operation of the switch. Do not endeavour to move the wiper blades across the windscreen by hand.

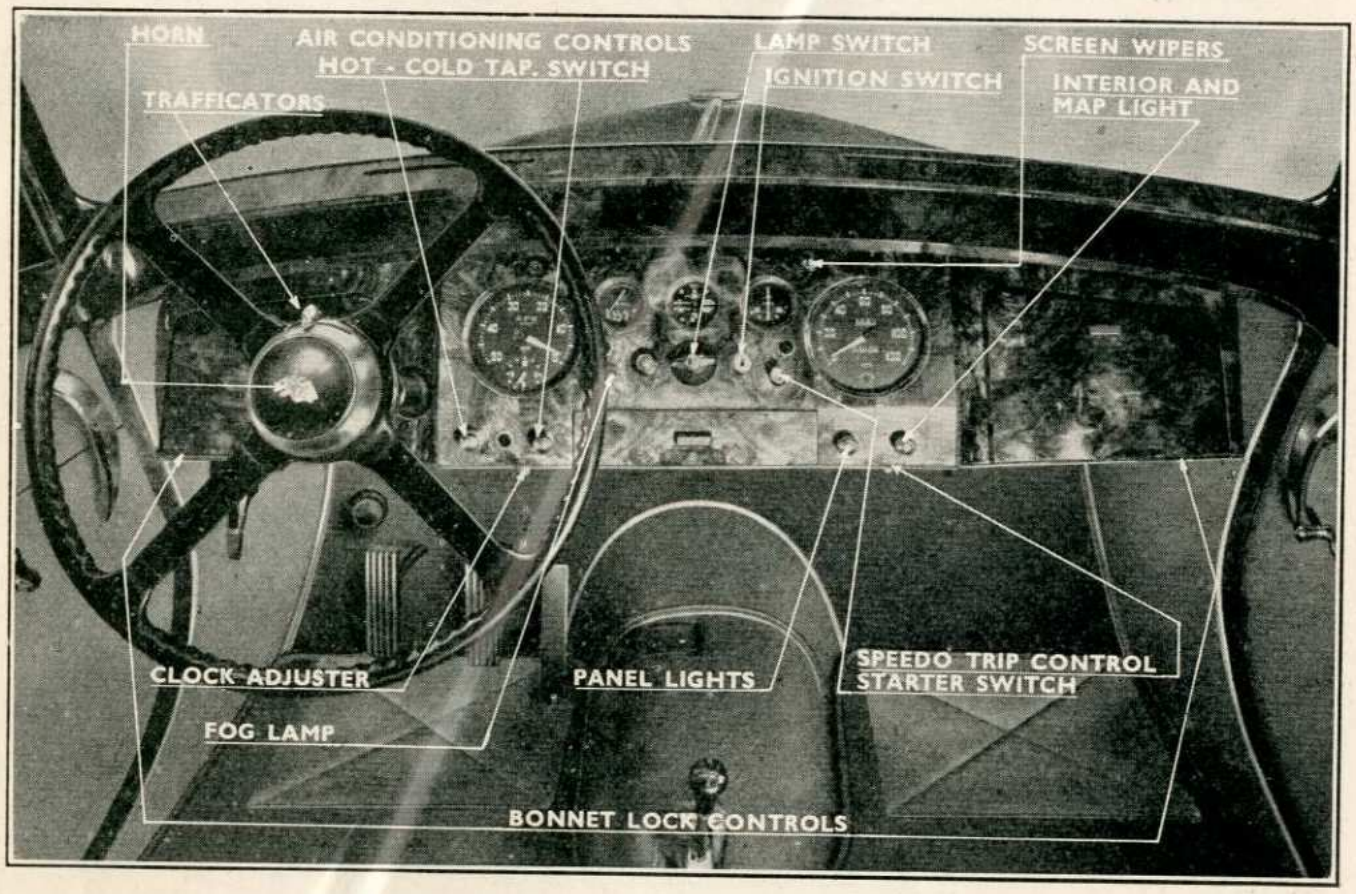


PLATE A.6. HAND CONTROLS

ACCESSORIES

ARMRESTS. A folding centre arm is provided in the centre of the rear squab. Pull forwards and downwards if required.

BONNET FASTENERS. The bonnet is hinged down the centre and the two individual top panels have locks operated by controls inside the body. To open a top panel, push forward the appropriate control knob situated underneath the facia board below one or other glove box.

BRAKE LIGHT. Twin combined tail and brake lights are provided, situated in the rear bumper on either side of the tail panel. These automatically light up when the foot brake is applied.

CIGAR LIGHTER. Fitted to the facia board. Press the holder into the socket against the spring pressure for approximately five to seven seconds and extract for use. Do not press in longer or the element may burn out.

DOOR LOCKS. Doors may be opened from outside by pressing the button situated in the door handle. The driver's door may be locked with the ignition key by inserting the key in the button and rotating clockwise. To open the doors from inside the car, press the trigger situated in the top of the interior handles. Doors may be locked from inside the car by rotating the small catches.

SEAT ADJUSTMENT. Front seats are adjustable for reach and height. To adjust for reach push down the lock bar, situated above the inside seat runner, and slide into the required position. Release the lock bar and slide until the mechanism engages with a click.
To adjust for height rotate the handle situated on the front face of the seat cushion until the seat is in the required position.

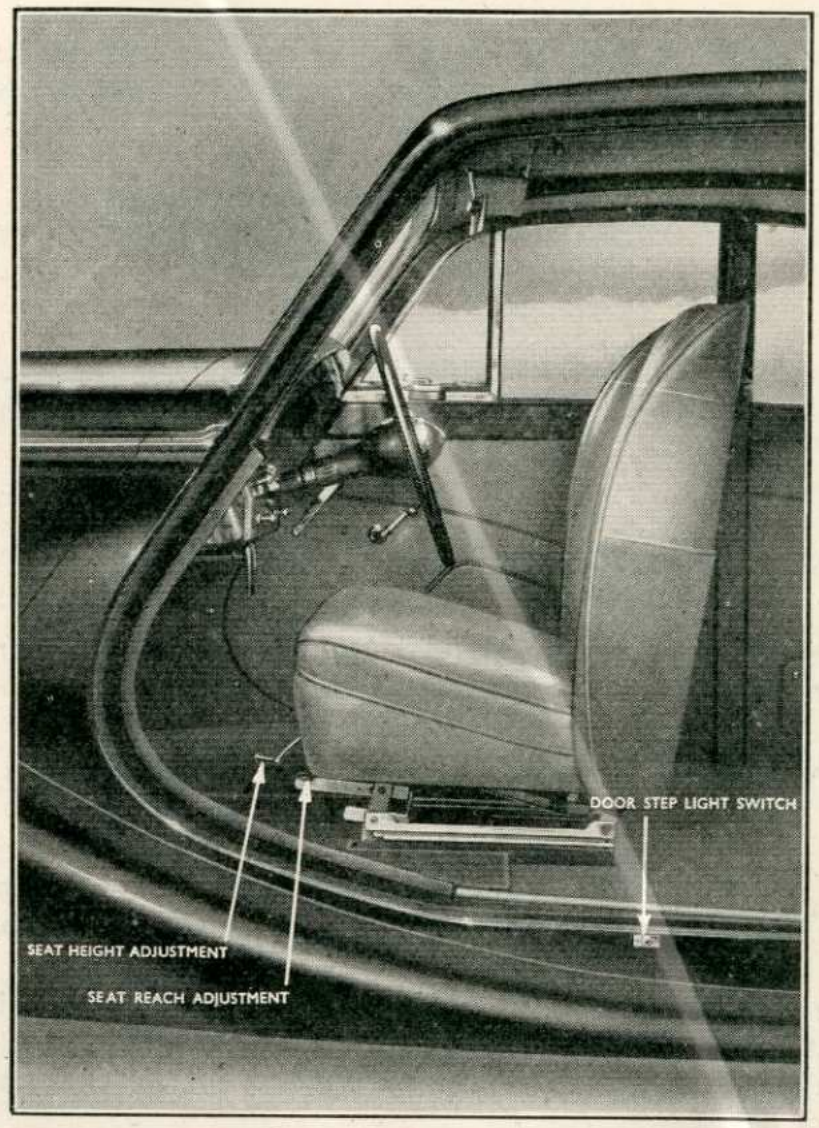


PLATE A.7. SEAT ADJUSTMENT

STEERING WHEEL ADJUSTMENT. Turn the knurled ring at the base of the steering wheel hub in a clockwise direction when the steering wheel may be slid into the desired position. Tighten up the knurled ring to lock the steering wheel.

SPARE WHEEL COMPART-MENT. The spare wheel is housed in a separate compartment underneath the boot lid. This may be unlocked with the special key supplied in the tool kit, which engages in the chromium plated budget locks, fitted one at either end of the panel. The spare wheel lid opens outwards and downwards, giving access to the wheel behind, together with jack and wheel brace which are housed with the spare wheel.

DOOR STEP LIGHT. The interior light in the front compartment is automatically illuminated when the front doors are opened.

NO DRAUGHT VENTILATION. All doors are fitted with no draught ventilation windows incorporating quick-locking catches.

PETROL FILLER. The petrol filler is situated in a recess above the left hand rear wing and is provided with a cover. This cover is unlocked with the key provided.

REAR BOOT. The boot lid opens backwards and downwards and may be positively secured in this position by rotating the two chromium plated lock screws in a clockwise direction. The boot handle may be locked with the key provided.

REVERSE LIGHTS. The reverse lights are automatically brought into operation when reverse gear is engaged and the side lights are switched on.

ROOF SLIDE. To open the slide turn the chromium plated locking handle anti-clockwise, pull to the required position and turn handle clockwise to lock slide in this location.

STARTING HANDLE. It should be observed that the track rod is cranked and the starting handle will only engage the crankshaft dog when the front road wheels are in the straight ahead position.

TOOL COMPARTMENT. The tools are housed in a special compartment in the boot lid. Release the two catches and raise the lid to gain access to the tools. When the tool tray is opened the tools are automatically illuminated if the side lights are switched on.

TWO-PIN SOCKET. Situated alongside the voltage regulator, under the right hand bonnet panel, is a two-pin plug, which may be used to " trickle charge " the battery or to illuminate an inspection lamp.

STARTING AND DRIVING

STARTING. (*a*) Before starting the engine the new owner should be familiar with the location and function of the instruments and controls, see page A.7.

(*b*) Ensure that the water level in the radiator and the oil level in the sump are correct. Check for sufficient petrol in the tank.

(*c*) Place the gear lever in the neutral position and check that the hand brake is applied. Switch on the ignition and press the starter. Release the starter as soon as the engine fires—this is important.

(*d*) It is not necessary to use any manual choke control when starting from cold, since the auxiliary starting carburettor is entirely automatic and controls the mixture strength without assistance from the driver. The starting carburettor automatically cuts out when the temperature of the water in the cylinder head reaches 35°C.

(e) Do not operate the engine at high r.p.m. when first started, but allow time for the engine to warm up and the oil to circulate freely. A thermostat is fitted to assist in rapid warm up.

DRIVING. (*a*) Careful adherence to the instructions given in Section " B " regarding " running in" will be amply repaid by obtaining the best performance and utmost satisfaction from the car.

(*b*) The habit should be formed of reading the oil pressure gauge, water temperature gauge and ammeter occasionally as a check on the correct functioning of the car. Should an abnormal reading be obtained an investigation should immediately be made.

(*c*) Always start from rest in first or second gear ; on a hill always use first gear. To start in a higher gear will cause excessive clutch slip and premature wear. Never drive with a foot resting on the clutch pedal and do not keep the clutch pedal depressed for long periods in traffic.

(*d*) The synchromesh gearbox provides a synchronised change into second, third and top. When changing gear the movement should be slow and deliberate. When changing down a smoother gear change will be obtained if the accelerator is left depressed to provide the higher engine speed suitable to the lower gear. Always fully depress the clutch pedal when changing gear.

(e) Gear changing may be slightly stiff on a new car but this will disappear as the gearbox becomes run in.

(*f*) Always apply the foot brake progressively, fierce and sudden application is bad for the car and tyres. The hand brake is for use when parking the car, when driving away on a hill and when at a standstill in traffic.

RECOMMENDED LUBRICANTS

Component	Vacuum	Wakefield	Shell	Essolube	Price's	S.A.E. Viscosity
Engine — Summer	Mobiloil A	Castrol X.L.	Double Shell	Essolube 30	Energol 30	30
Engine — Winter	Mobiloil Arctic	Castrolite	Single Shell	Essolube 20	Energol 20	20
Engine — Tropical	Mobiloil B.B.	Castrol X.X.L.	Triple Shell	Essolube 40	Energol 40	40
Gearbox Carburettor Hydraulic Piston Dampers Distributor Oil Can Lubrication	Mobiloil A	Castrol X.L.	Double Shell	Essolube 30	Energol 30	30
Rear Axle	Mobilube G.X.	Castrol Hypoy	Spirax 90 E.P.	Expee Compound 90	Energol Hypoid 90	Hypoid 90
Steering Gear Steering Idle Lever Housing Propeller Shaft Needle Bearings	Mobilube C	Castrol D	Spirax 140 E.P.	Gear Oil 140 (Heavy)	Energol 140	140
Water Pump Fan Propeller Shaft Splines All Chassis Nipples	Mobilgrease No. 4	Castrolease (Heavy)	Retinax R.B.	Essolube Grease	Belmoline C	
Wheel Bearings	Mobil Hub Grease	Castrolease (Heavy)	Retinax R.B.	Essolube Grease		
Upper Cylinder Lubrication	Mobil Upperlube	Castrollo	Donax U	Essomix	Energol U.C.L.	

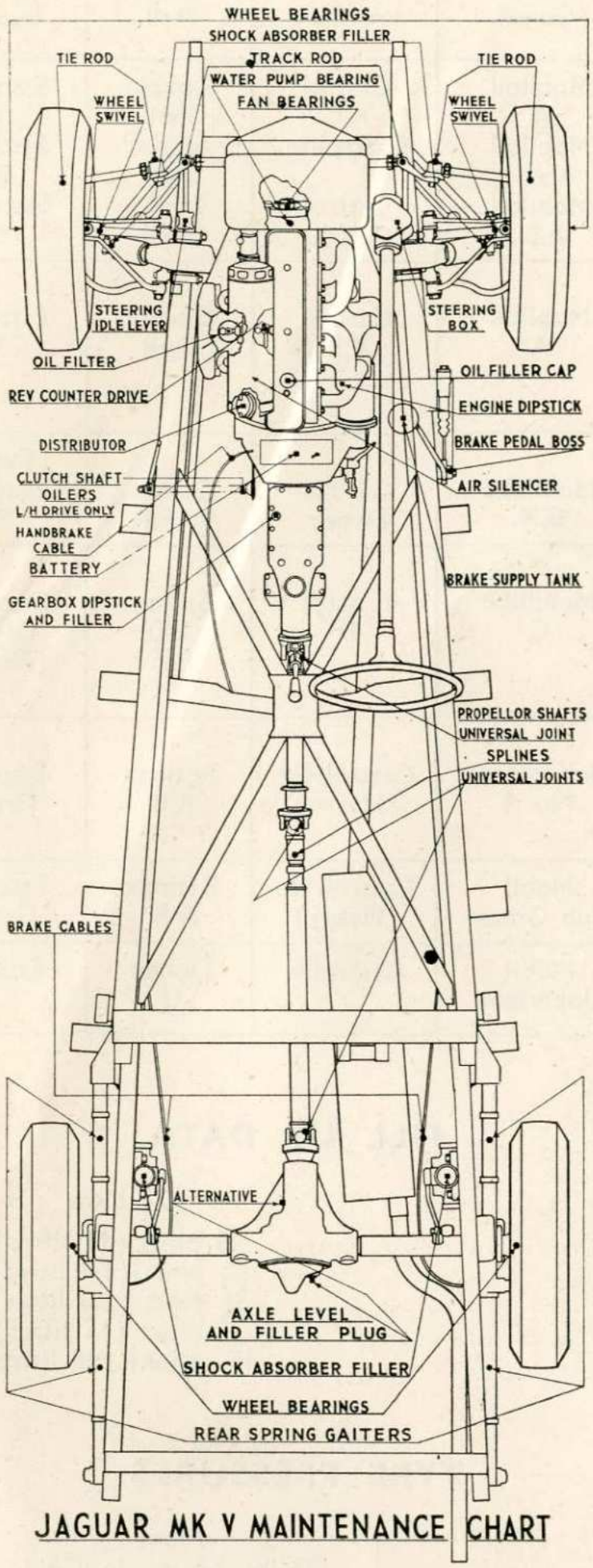
FILL UP DATA

	$2\frac{1}{2}$ Litre	$3\frac{1}{2}$ Litre
Engine Sump	20 pints (11 litres)	20 pints (11 litres)
Gearbox	$2\frac{1}{2}$ pints (1·4 litres)	$2\frac{1}{2}$ pints (1·4 litres)
Rear Axle	$3\frac{1}{2}$ pints (2·0 litres)	$3\frac{1}{2}$ pints (2·0 litres)
Cooling System	28 pints (15 litres)	26 pints (14 litres)
Petrol Tank	15 gallons (68 litres)	15 gallons (68 litres)

TYRE PRESSURES

	Front	Rear
$2\frac{1}{2}$ and $3\frac{1}{2}$ Litre	23 lbs. per sq. in. Cold (1·6 kg./cm.^{2}) 26 lbs. per sq. in. Hot (1·8 kg./cm.^{2})	25 lbs. per sq. in. Cold (1·8 kg./cm.^{2}) 28 lbs. per sq. in. Hot (2·0 kg./cm.^{2})

For fast driving when comfort is not of primary importance use 25 lbs. per sq. in. Front, and 27 lbs. per sq. in. Rear, Cold (1·8 kg./cm.^{2} and 1·9 kg./cm.^{2}).



JAGUAR MK V MAINTENANCE CHART

PLATE A.8

SUMMARY OF MAINTENANCE

(a) After the first 750 miles (1,000 kilometres) have the First Service carried out and after 1,500 miles (2,000 kilometres), the Second Service. See Service Vouchers issued with car.

Check Tyre Pressures Weekly.

Check Engine Oil Level and Radiator Water Level Daily.

(b) Every month or at 1,000 miles (1,500 kilometres):

1. Check and top up battery.
2. Lubricate all nipples, excluding wheel bearings.
3. Lubricate carburetter dash pot chambers.
4. Top up steering box and steering idle lever bearing housing.
5. Check and reset carburetter slow running.
6. Check and top up brake hydraulic supply tank.

(c) Every three months or at 2,500 miles (4,000 kilometres):

1. Carry out monthly or 1,000 miles, service (b).
2. Drain and refill sump. Clean oil filter element.
3. Top up gearbox and rear axle.
4. Lubricate distributor. Adjust contact points.
5. Adjust and centralise brakes.
6. Clean carburetter and fuel pump filters.

(d) Every six months or at 5,000 miles (8,000 kilometres):

1. Carry out monthly or 1,000 miles and three monthly or 2,500 miles, services (b) and (c).
2. Check and tighten all chassis and body nuts, screws and bolts.
3. Clean, test and adjust sparking plugs.
4. Clean and top up shock absorbers.
5. Lubricate all wheel bearing nipples.
6. Check and adjust clutch pedal free travel.
7. Check and adjust fan belt.
8. Renew oil filter element.
9. Wash air silencer cleaning element.
10. Check and reset tappet clearances.
11. Carry out oil can lubrication.

(e) Every 12 months or at 10,000 miles (16,000 kilometres):

1. Carry out monthly or 1,000 miles, three monthly or 2,500 miles, and six monthly or 5,000 miles, services (b), (c) and (d).
2. Drain, flush and refill gearbox and rear axle.
3. Check wheel bearings and adjust, if necessary.
4. Clean out brakes and examine liners.

The number of grease nipples and their location is as follows:

2 Nipples.	Steering track rod.	4 Nipples.	Rear spring gaiters.
2 Nipples.	Steering tie rod (right hand).	1 Nipple.	Universal joint. Front propeller shaft.
2 Nipples.	Steering tie rod (left hand).	1 Nipple.	Splines. Rear propeller shaft.
2 Nipples.	Wheel swivel (right hand).	2 Nipples.	Universal joints. Rear propeller shaft.
2 Nipples.	Wheel swivel (left hand).	1 Nipple.	Fan bearings.
1 Nipple.	Foot brake pedal boss.	1 Nipple.	Water pump bearing.
3 Nipples.	Hand brake cable.	4 Nipples.	Wheel bearings.
1 Nipple.	Revolution counter drive.	8 Nipples.	Door hinges.

FIRST AND SECOND SERVICE

GENERAL. It is of the utmost importance that the First and Second Services, due at 750 miles (1,000 Km) and 1,500 miles (2,000 Km) respectively, are carried out in a thorough manner.

PROCEDURE. Issued with each new car when it leaves the factory are two Vouchers which entitle the owner to obtain the service specified, without a charge for labour, from any Jaguar Distributor or Dealer on presentation of the Voucher.

Normally the owner will approach the Jaguar Dealer from whom the car was purchased and it is a condition of the Sales Agreement that the Service (First and/or Second) will be carried out and the labour charges accepted by the Dealer.

Should the owner not reside in the vicinity of the original supplier, or be temporarily absent when the Service is required, the Vouchers may be accepted by the nearest authorised Jaguar Dealer. In this case the Dealer carrying

out the Service should make no labour charge to the owner but send the completed Voucher, together with an account to cover labour expended, to the original supplier of the car. In all cases lubricants should be charged to the owner.

FIRST SERVICE VOUCHER. Set out below is a copy of the First Service Voucher.

Valid only if Car has been purchased from authorised Jaguar Dealer.

Chassis No.....

Mileage (at 1st Service).....

FIRST SERVICE on completion of 750 miles.

Jaguar Service Voucher

Owner's name and address :—

.....

.....

.....

Car purchased from :—

.....

.....

.....

*Presentation of this Voucher to any authorised Jaguar Dealer entitles the above-mentioned owner to free service as detailed below :—

1. General test of car and making of any necessary minor adjustments.
2. Drain sump and refill with new oil. Drain gearbox and refill with new oil. Check oil level in rear axle and top up. Clean oil filters.
3. Lubricate chassis throughout, including wheel bearings, steering box, etc.
4. Adjust brakes.
5. Tighten axle U bolts and bumper mounting bolts.
6. Check steering track and wheel bearing adjustment.
7. Tune up engine. Set carburetters, adjust tappets, clean and reset sparking plugs and distributor points. Clean petrol filters.
8. Check wiring and dynamo output. Test and top up battery.
9. Check tyre pressures.
10. Generally check over body for squeaks and rattles and tighten up where necessary.

I hereby acknowledge that the above work has been carried out to my satisfaction by :—

.....
(Name of Dealer)

Signature of Owner,

Date..... .....

Oil and grease will be charged for.

*These Vouchers are valid only if presented to the Jaguar Dealer by whom the car was supplied. Should the owner not reside in the vicinity of the original supplier, or is temporarily absent when service is required, the Vouchers will be accepted by the nearest authorised Jaguar Dealer.

SECOND SERVICE VOUCHER. The Second Service Voucher is identical to the First with the following exceptions.
(*a*) Service should be carried out on completion of 1,500 miles(2,000 Km).
(*b*) Drain rear axle and refill with new oil. Check gearbox level and top up. (Item 2 on Voucher).

Remove Watermark Wondershare PDFelement

ENGINE

MARK V

2½ and 3½ LITRE

ENGINE NUMBERS

(Stamped on a boss at right-hand rear of cylinder block)

2½ Litre	3½ Litre
H.2001 ONWARDS	T.5001 ONWARDS

The instructions in this section are presented under the following main headings which appear as sub-titles on the pages concerned and in the order shown :—

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Maintenance - - - - - - - Page B.16

Remove and Refit - - - - - - Page B.21

Dismantle and Reassemble - - - - - Page B.25

Overhaul (Engine removed from Chassis - - Page B.33

Components—Remove and Refit - - - - Page B.49
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GENERAL. The $2\frac{1}{2}$ and $3\frac{1}{2}$ litre engines of the Mark V are similar in design in that they are both six cylinder push rod operated overhead valve units with cylinder block and crankcase an integral chrome iron casting with full length water jackets. The detachable cast iron cylinder head has machined combustion chambers and ports. The camshaft located on the left of the engine runs in five bearings and the forged steel crankshaft is supported in seven thin steel shell main bearings.

The following brief specification, together with the exploded views shown on Plates B.1 to B.4, will give a picture of the general design and build-up of the two engines.

Pistons. Light alloy solid skirt pistons are used with fully floating gudgeon pins. One oil scraper and two compression rings are fitted.

Valves. Overhead, operated by push rods.

Timing Gear. Duplex chain with automatic tensioning device.

Ignition. Coil ignition. Distributor with built-in centrifugal advance mechanism, also over-riding vacuum control operated off front carburettor. Manual micrometer advance and retard adjustment at distributor.

Carburettors. Twin S.U. with thermo-electric auxiliary starting carburettor incorporated. Air silencer with gauze cleaning element connected to carburettors by elbow manifold.

Lubrication System. Gear type pressure pump in crankcase sump forces lubricant through a Tecalemit full-flow filter to crankshaft main line and connecting rod bearings, to camshaft bearings, gudgeon pin bearings and rocker gear.

Cooling System. Water is circulated by a centrifugal type water pump. Quick warm-up from cold is assisted by a by-pass thermostat built on to the end of the water uptake manifold.

The chief differences between $2\frac{1}{2}$ and $3\frac{1}{2}$ litre engines from a service standpoint are as follows :—

	$2\frac{1}{2}$ Litre.	$3\frac{1}{2}$ Litre.
Pistons.	The pistons are withdrawn downwards past the crankshaft. The cylinder head need not be disturbed for piston removal.	The pistons will not pass the crankshaft and must be withdrawn upwards following removal of the cylinder head.
Cylinder Head Studs.	Three rows of studs.	Two rows of studs.
Crankshaft Vibration Damper.	Not fitted.	Fitted as standard.
Revolution Counter Drive Bracket.	Fitted to left-hand top face of cylinder head.	Fitted immediately above tappet gallery plate on left-hand side.

GENERAL DATA

	$2\frac{1}{2}$ Litre.	$3\frac{1}{2}$ Litre.
Type	O.H.V.	O.H.V.
Number of Cylinders	6	6
R.A.C. Rating	19·84 h.p.	25·01 h.p.
Brake Horse Power	102 at 4600 r.p.m.	125 at 4250 r.p.m.
Maximum Torque	136 ft. lb. (18·8 m. kg.)	184 ft. lb. (25·4 m. kg.)
Compression Ratio : Without decompression plate	7·3 : 1	7·20 : 1
With decompression plate		6·75 : 1
Bore	2·8740″ (73 mm.)	3·2283″ (82 mm.)
Stroke	4·1732″ (106 mm.)	4·3307″ (110 mm.)
Firing Order	1.5.3.6.2.4	1.5.3.6.2.4
Cylinder Capacity (Piston Displacement)	2663·7 cc. 2·663 litres)	3485·5 cc. (3·485 litres)

PERFORMANCE DATA

The following tables show the relationship between engine revolutions per minute to vehicle speed in miles per hour and kilometres per hour for the various gear ratios.

It is recommended that engine revolutions in excess of the following limits should not be maintained for long periods :—

$2\frac{1}{2}$ Litre, 4500 r.p.m. $3\frac{1}{2}$ Litre, 4250 r.p.m.

$2\frac{1}{2}$ Litre.

AXLE RATIO 4·55 : 1

Kilometres per hour	Miles per hour	First and Reverse 15·35	Second 9·01	Third 6·21	Top 4·55
16	10	1,890	1,110	765	560
32	20	3,780	2,220	1,530	1,120
48	30	5,670	3,330	2,295	1,680
64	40		4,440	3,060	2,240
80	50		5,550	3,825	2,800
96	60			4,590	3,360
112	70			5,355	3,920
128	80				4,480
144	90				5,040

$3\frac{1}{2}$ Litre

AXLE RATIO 4·30 : 1

Kilometres per hour	Miles per hour	First and Reverse 14·5	Second 8·52	Third 5·87	Top 4·3
16	10	1,775	1,040	718	526
32	20	3,550	2,080	1,435	1,052
48	30	5,325	3,120	2,155	1,580
64	40		4,160	2,870	2,100
80	50		5,200	3,590	2,630
96	60			4,310	3,160
112	70			5,025	3,680
128	80				4,200
144	90				4,740

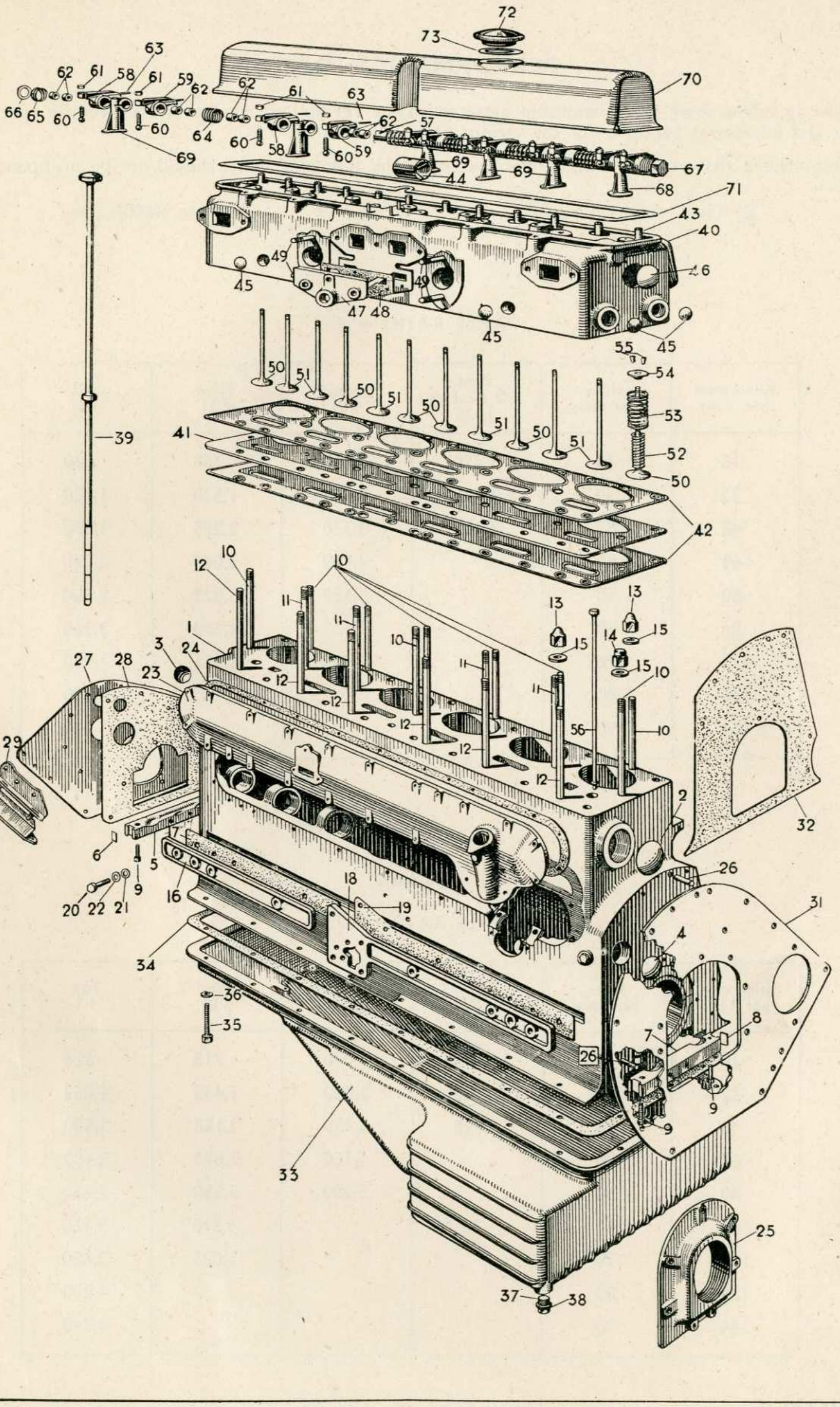


PLATE B.1. CYLINDER BLOCK AND HEAD ARRANGEMENT 2½ LITRE

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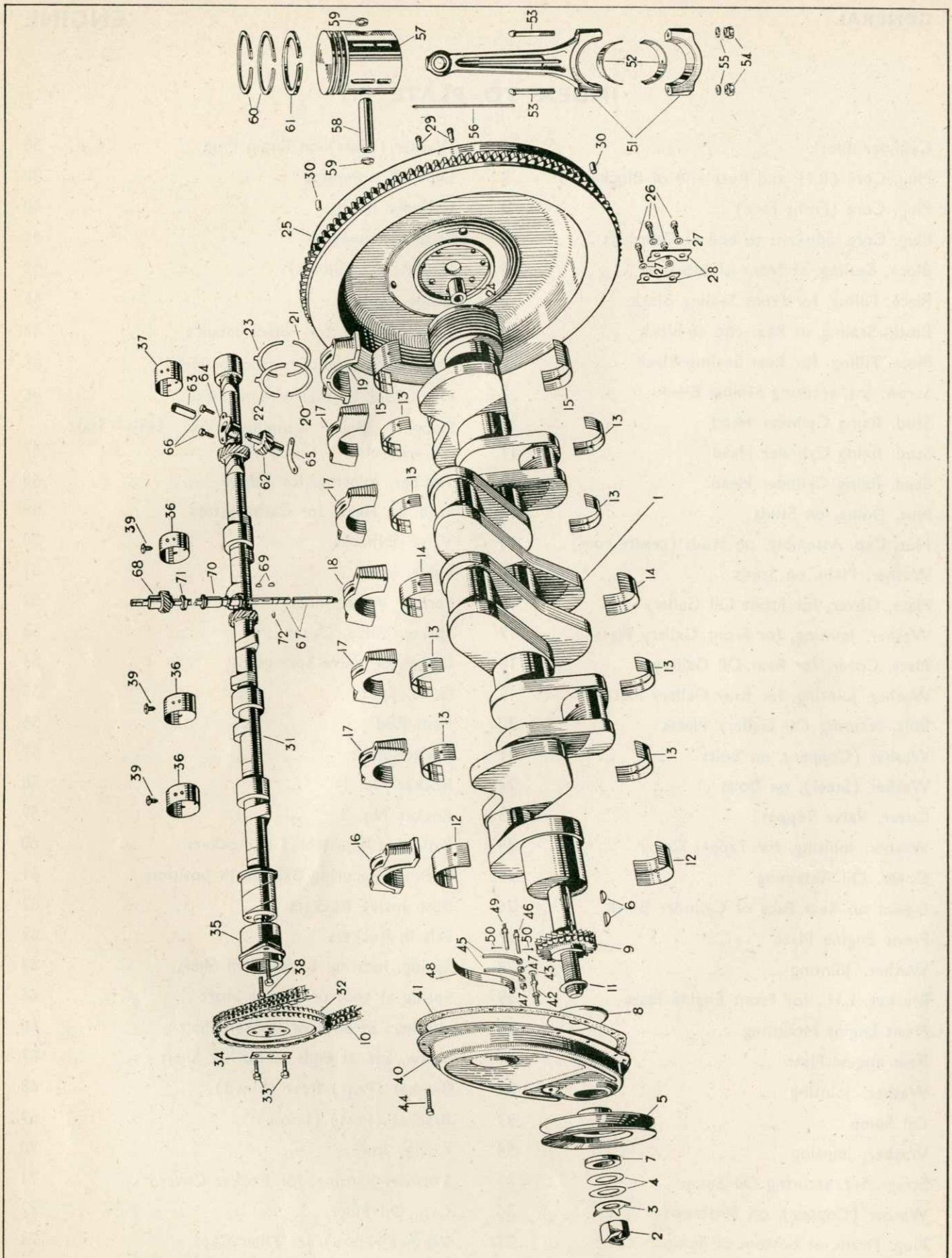


PLATE B.2. CRANKSHAFT, CAMSHAFT AND PISTON ARRANGEMENT 2½ LITRE

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Piece, Distance, behind Tab Washer 7
Deflector, Oil 8
Wheel, Chain 9
Chain, Timing 10
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Bearing, Main, Intermediate 13
Bearing, Main, Centre 14
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Washer, Plain, under Nuts 55
Tube, Oil, through Connecting Rod 56
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Pin, Gudgeon 58
Circlip 59
Ring, Pressure 60
Ring, Scraper 61
Gear, Driven 62
Bush for Driven Gear 63
Adaptor for Driven Gear 64
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Oil Pump and Rev. Counter Drive Shaft 67
Gear, Spiral 68
Key, locking Gear on Shaft 69
Bush at bottom of Shaft 70
Collar, under Spiral Gear 71
Circlip on Shaft 72

Remove Watermark
Wondershare PDFelement

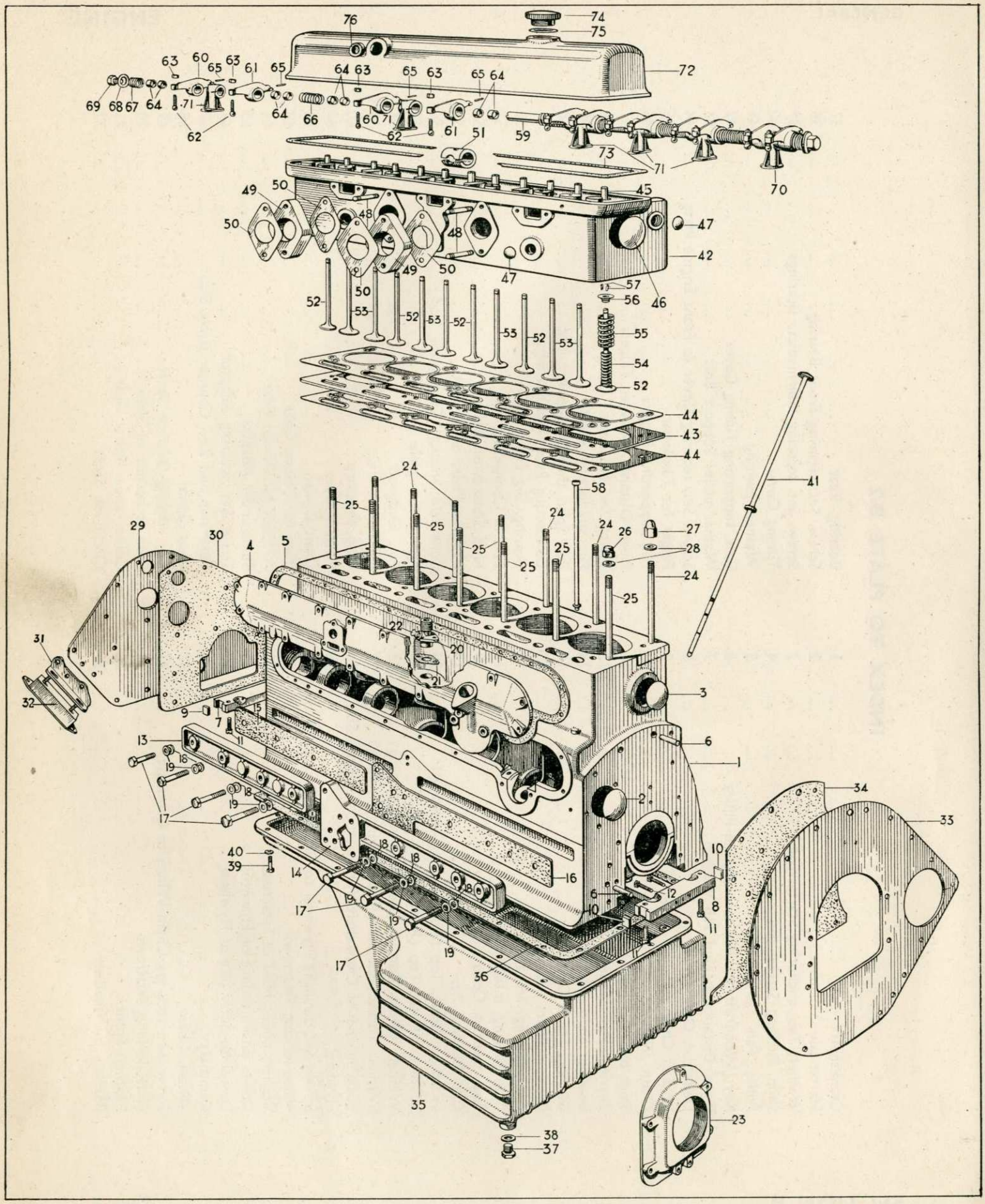


PLATE B.3. CYLINDER BLOCK AND HEAD ARRANGEMENT 3½ LITRE

INDEX TO PLATE B.3

Cylinder Block 1
Plug, Core, adjacent to end of Camshaft ... 2
Plug, Core (R.H. and rear end of Block) ... 3
Cover, Valve Tappet 4
Washer, Jointing, for Cover 5
Dowel 6
Block, Sealing (Front) 7
Block, Sealing (Rear) 8
Piece, Filling (Front) 9
Piece, Filling (Rear) 10
Screw, Set, securing Sealing Blocks 11
Screw, Set ($\frac{5}{16}$" x $2\frac{1}{8}$" long) 12
Plate, Cover, Oil Gallery (Front) 13
Plate, Cover, Oil Gallery (Rear) 14
Washer, Jointing, for Front Cover Plate ... 15
Washer, Jointing, for Rear Cover Plate ... 16
Bolt, securing Cover Plates 17
Washer (Copper) on Bolts 18
Washer (Steel) on Bolts 19
Adaptor for Rev. Counter Cable 20
Washer, Jointing, for Adaptor 21
Cup, Oil, for Adaptor 22
Cover, Oil Retaining 23
Stud, securing Cylinder Head 24
Stud, securing Cylinder Head 25
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Plug, Core, Gallery, Port 46
Plug, Core 47
Stud for attachment of Carburettors 48
Piece, Distance, between Carburettor and Cylinder Head 49
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Tube, Venturi 51
Valve, Inlet 52
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Rocker-Shaft 59
Rocker No. 1 60
Rocker No. 2 61
Ball-Pin (Adjustable) in Rockers 62
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Cover, Rocker 72
Washer, Jointing, for Rocker Cover 73
Cap, Oil Filler 74
Washer for Cap 75
Ring (Rubber) for Air Vent 76

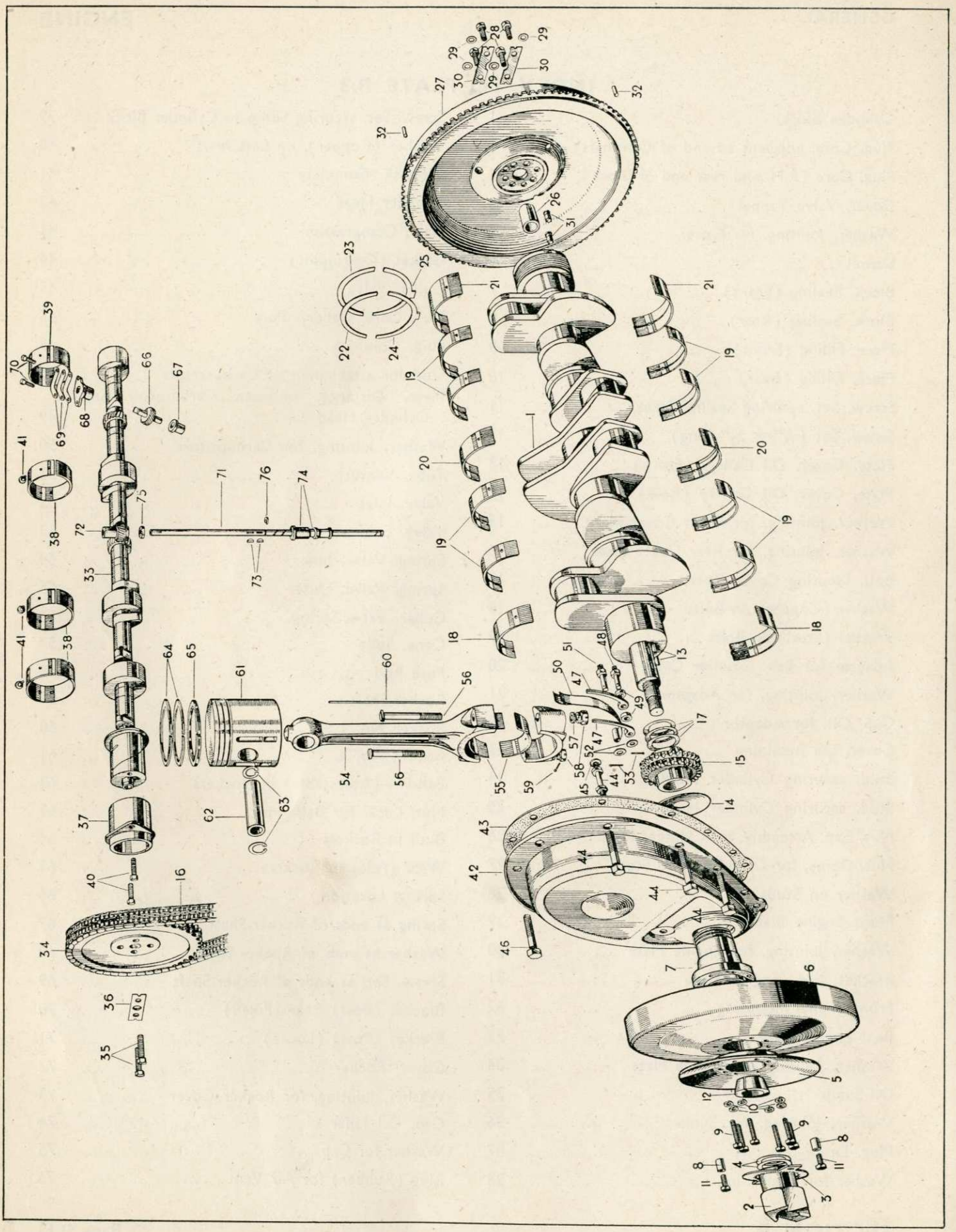


PLATE B.4. CRANKSHAFT, CAMSHAFT AND PISTON ARRANGEMENT 3½ LITRE

INDEX TO PLATE B.4

Crankshaft 1
Starter-Jaw 2
Ring, locking Starter-Jaw 3
Shim, Packing, for Jaw 4
Pulley, Fan 5
Damper 6
Centre for Damper 7
Piece, Distance, on Damper 8
Bolt, securing Pulley and Damper to Centre 9
Washer, Spring, on Bolts 10
Bolt, retaining Distance Tubes 11
Cone, Split, inside Damper Centre 12
Key (Woodruff No. 90) 13
Deflector, Oil 14
Wheel, Chain 15
Chain, Timing 16
Shim, behind Chain Wheel 17
Bearing, Main, Front 18
Bearing, Main, Intermediate 19
Bearing, Main, Centre 20
Bearing, Main, Rear 21
Washer, Thrust, Top 22
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Washer, Thrust, Bottom 25
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Bearing, Big End 55
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Pin, Split 59
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Piston 61
Pin, Gudgeon 62
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Ring, Pressure 64
Ring, Scraper 65
Gear, Driven 66
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Gear, Spiral 72
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Remove Watermark Wondershare PDFelement

ENGINE MAINTENANCE

Attention to the following points of maintenance will be amply repaid in satisfactory operation of the engine and will materially add to the life of the unit.

AIR SILENCER. Every 5,000 miles (8,000 kilometres), or more frequently in dusty conditions, remove the air silencer and thoroughly rinse the cleaning element in petrol. (Plate B.5.)

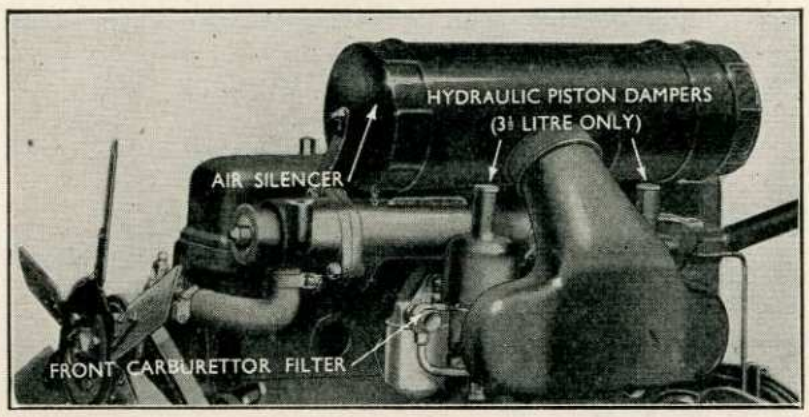


PLATE B.5. CARBURETTORS AND AIR SILENCER

CARBURETTOR AND FUEL PUMP FILTERS. Every 2,500 miles (4,000 kilometres) remove and clean filters situated at float chamber unions (Plate B.5) and at base of petrol pump. The petrol pump is situated on the chassis left-hand rear cruciform member. Since the petrol pump is below petrol tank level the following procedure is recommended to prevent draining the petrol tank when servicing the pump. Attach a suitable length of rubber tubing to the door pillar at a height above the petrol tank and pass the tube over the end of the nipple, as soon as it is detached, to avoid loss of petrol. Remove six cheese-headed screws and withdraw base plate to gain access to filter. (Plate B.6.)

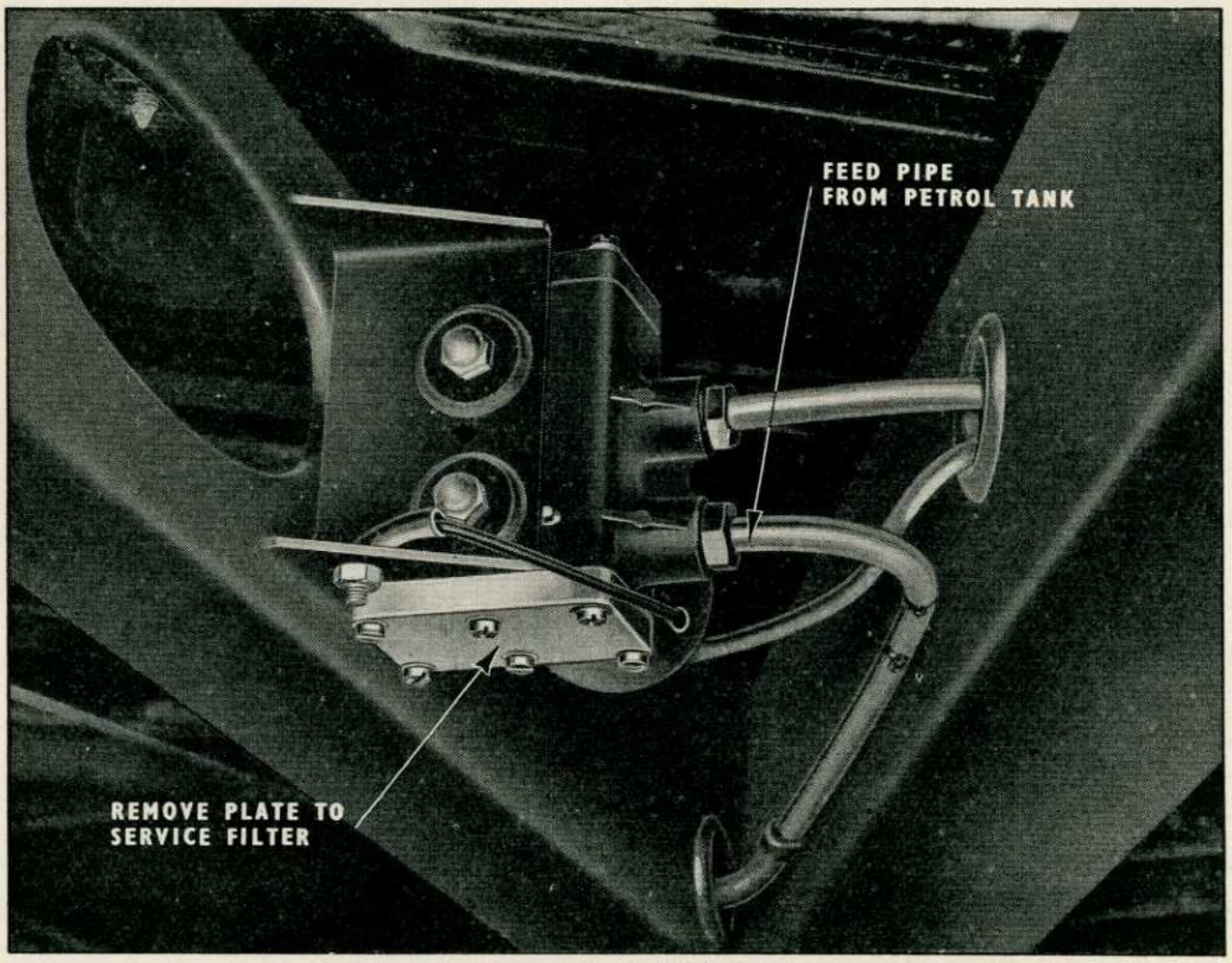


PLATE B.6. FUEL PUMP

CARBURETTOR DASH POT CHAMBERS. Every 1,000 miles (1,500 kilometres) remove caps on top of dash pots. On 2½ litre insert thin oil. On 3½ litre, which have hydraulic piston dampers, fill piston spindle chambers with recommended grade of engine oil. (Plate B.5.) Absence of oil in the hydraulic piston dampers will cause weakness of mixture on acceleration and poor performance. The correct level of oil is to the top of the hollow spindle chamber in the piston.

DISTRIBUTOR. Every 2,500 miles (4,000 kilometres) remove cover and rotor arm. Add one or two drops of engine oil in the centre hole on top of the shaft, and one drop to the contact breaker arm pivot. Give two or three drops to the centrifugal advance mechanism and test for free operation by rotating spindle with the fingers. Put a light smear of grease on the cam. Check the contact breaker point gaps and adjust, if necessary, to ·012" (·31 mm.).

Clean and refit distributor cover. Check tightness of all connections. Test operation of vacuum advance mechanism with the engine running. (Plate B.7.)

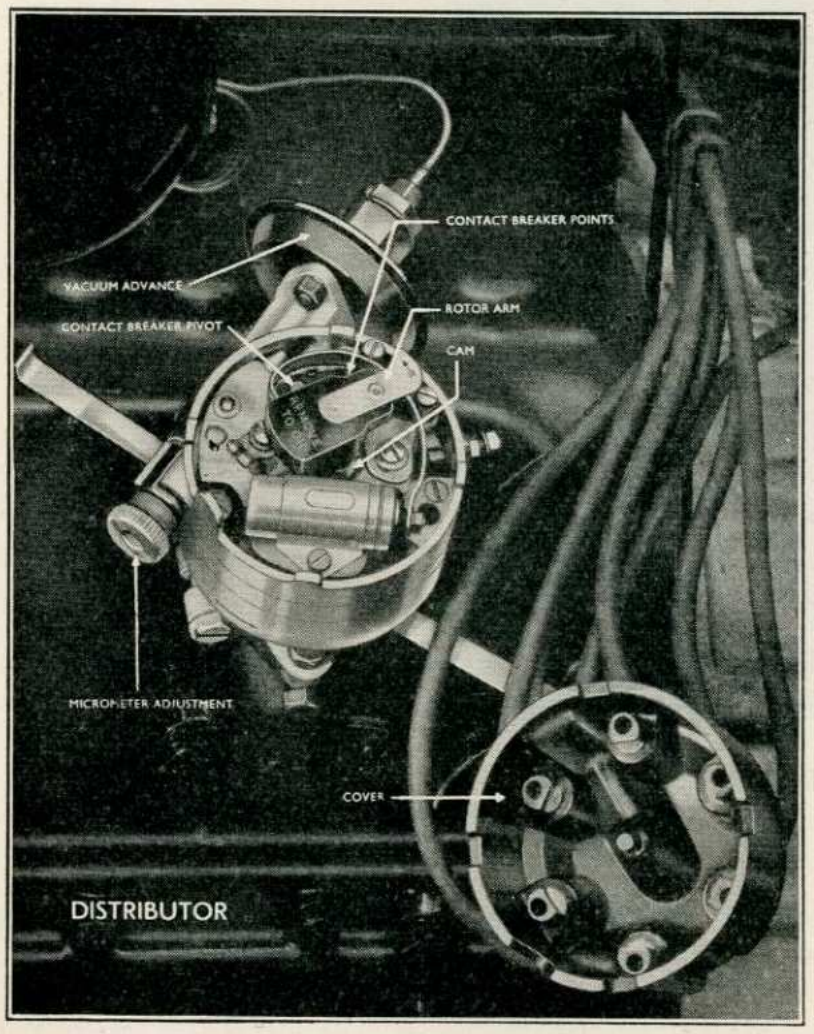


PLATE B.7. DISTRIBUTOR

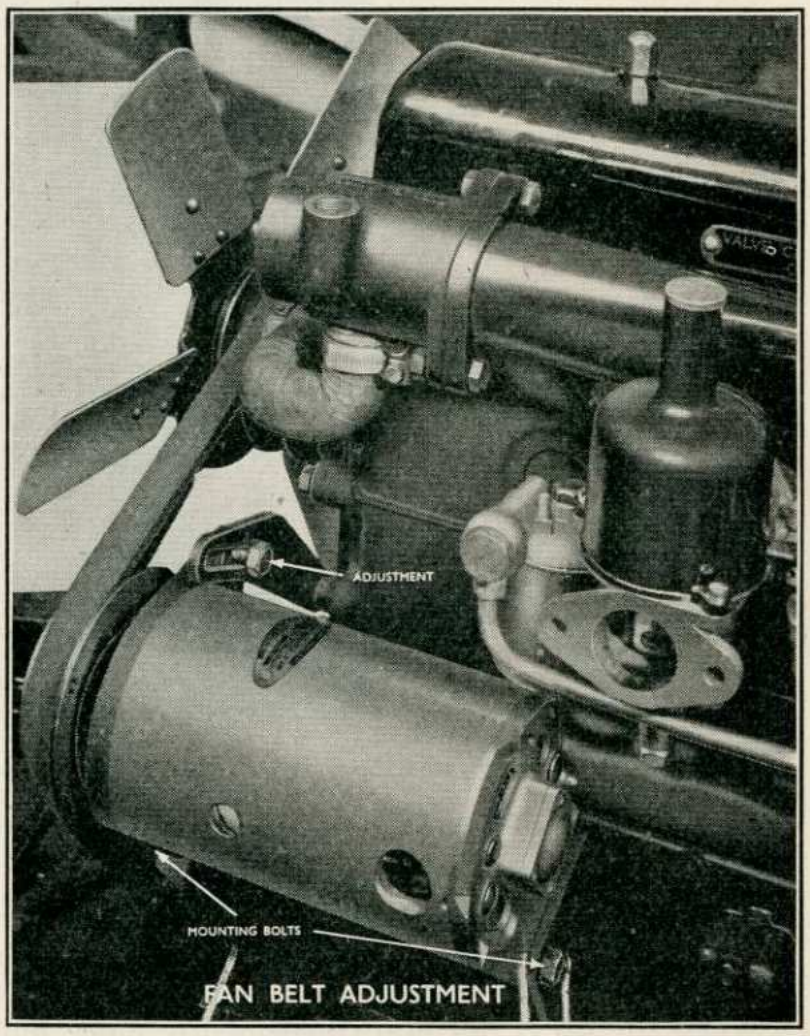


PLATE B.8. FAN BELT ADJUSTMENT

FAN BEARINGS. Every 1,000 miles (1,500 kilometres) sparingly lubricate bearings through nipple provided using recommended lubricant. (Plate B.10.)

FAN BELT. Every 5,000 miles (8,000 kilometres) check the tension of the fan belt and adjust if necessary. Adjustment is effected by loosening the dynamo adjusting bolt and both mounting bolts and levering the dynamo until belt tension is just obtained. Tighten bolts. (Plate B.8.) Undue tension will create heavy wear of belt, pulleys and dynamo bearings.

GENERAL. Every 5,000 miles (8,000 kilometres) check over all engine nuts, setscrews and connections, tightening where necessary. Clean down engine, check for oil leaks and rectify as necessary.

OIL FILTER. (Plate B.9.)

Every 2,500 miles (4,000 kilometres), when the engine oil is changed, thoroughly rinse the oil filter element in petrol. Renew the element every 5,000 miles (8,000 kilometres).

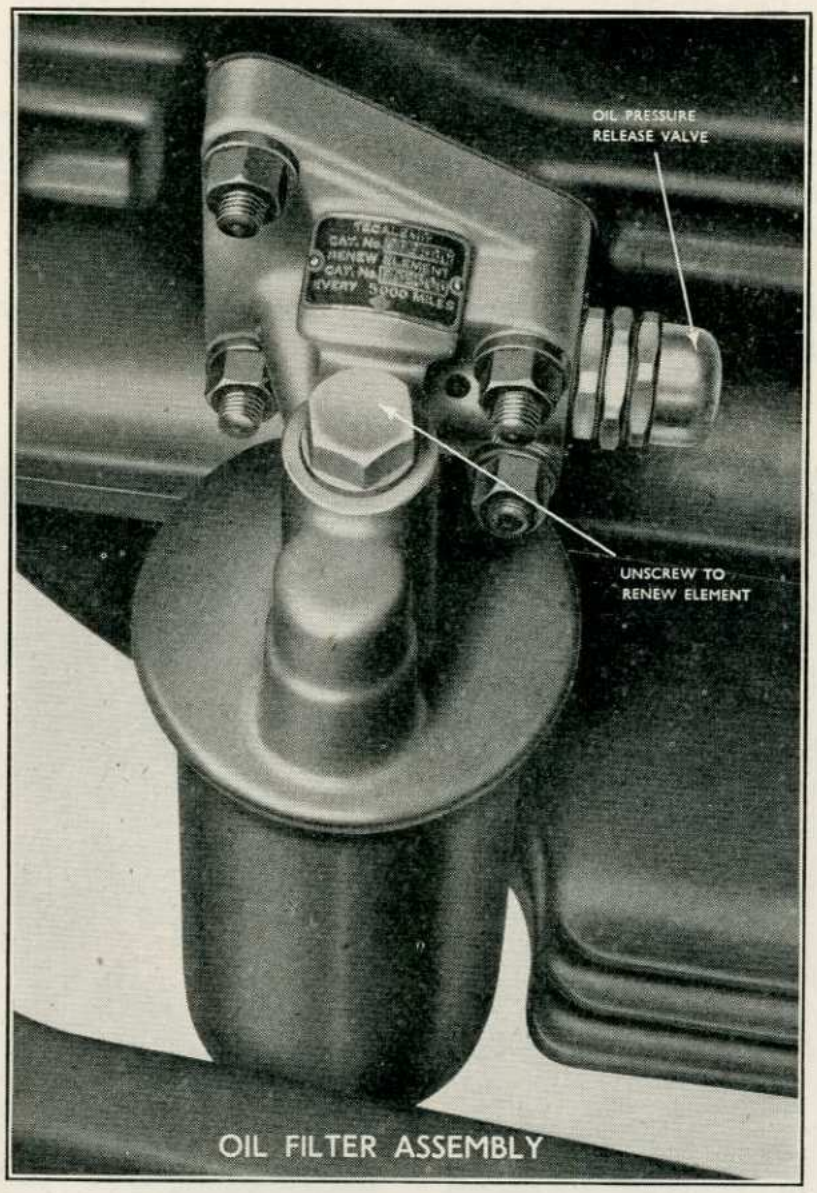


PLATE B.9. OIL FILTER ASSEMBLY

OIL SUMP. Every 2,500 miles (4,000 kilometres) drain and refill the sump. New and reconditioned engines should have the oil changed initially at 750 miles (1,000 kilometres), and at 1,500 miles (2,000 kilometres). See Service Voucher. It is advantageous to carry out draining at the end of a run when the oil is hot and consequently more fluid.

REVOLUTION COUNTER DRIVE. Every 1,000 miles (1,500 kilometres) lubricate through nipple provided, using recommended lubricant.

SPARKING PLUGS. Every 5,000 miles (8,000 kilometres) remove, clean and test the plugs, using Champion plug testing and cleaning equipment. Adjust gaps to ·025″ (·64 mm.).

THROTTLE LINKAGE. Every 1,000 miles (1,500 kilometres) lubricate all joints with engine oil.

VALVES. Every 5,000 miles (8,000 kilometres) adjust the valve clearances to Inlet ·012″ (·31 mm.) and Exhaust ·015″ (·38 mm.) cold. (See "Engine Tuning," page B.61, for recommendations in regard to adjusting clearances whilst the tappets are on the back of the cam).

WATER PUMP. Every 1,000 miles (1,500 kilometres) lubricate the water pump bearing sparingly through the nipple provided, using recommended lubricant. (Plate B.10.)

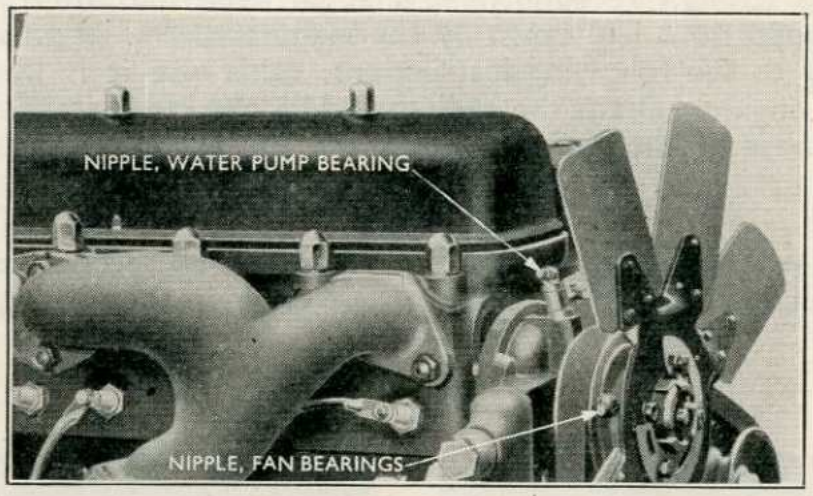


PLATE B.10. NIPPLES, WATER PUMP AND FAN

RECOMMENDED LUBRICANTS.

Component		Vacuum	Wakefield	Shell	Essolube	Price's	S.A.E. Viscosity
Engine	Summer	Mobiloil A	Castrol X.L.	Double Shell	Essolube 30	Energol 30	30
	Winter	Mobiloil Arctic	Castrolite	Single Shell	Essolube 20	Energol 20	20
	Tropical	Mobiloil B.B.	Castrol X.X.L.	Triple Shell	Essolube 40	Energol 40	40
Carburettor Hydraulic Piston Dampers. Distributor. Oil Can Lubrication.		Mobiloil A	Castrol X.L.	Double Shell	Essolube 30	Energol 30	30
Water Pump. Fan.		Mobilgrease No. 4	Castrolease (Heavy)	Retinax R.B.	Essolube Grease	Belmoline C	
Upper Cylinder Lubrication.		Mobil Upperlube	Castrollo	Donax U	Essomix	Energol U.C.L.	

	$2\frac{1}{2}$ Litre.	$3\frac{1}{2}$ Litre.
Engine Sump	20 pints (11 litres)	20 pints (11 litres)
Cooling System	28 pints (15 litres)	26 pints (14 litres)

RUNNING-IN INSTRUCTIONS

If the high performance of which the engine is capable is to be obtained it is most essential that the following running-in instructions are observed.

1. During the first 500 miles (800 kilometres) do not exceed 2,500 r.p.m.
   Do not overstress the engine. Use the gears so that the engine runs lightly with minimum of throttle opening.
2. Between 500 and 1,000 miles (800 kilometres to 1,500 kilometres) do not exceed 3,000 r.p.m.
3. After 1,000 miles (1,500 kilometres) and up to 2,000 miles (3,000 kilometres) do not exceed 3,500 r.p.m. and continue to drive without overstressing the engine.
   The use of an approved brand of upper cylinder lubricant is recommended during the running-in period.

On all new cars leaving the Factory a label, giving these recommendations, is affixed to the windscreen so that the driver may be aware of the instructions.

FROST PRECAUTIONS

During the winter months it is strongly recommended that an approved anti-freeze solution should be added to the cooling water in the proportions laid down by the manufacturers. If an anti-freeze solution is not used it is essential to adhere closely to the following instructions, otherwise it is likely that severe and expensive damage will be caused to the engine. Drain the radiator while the car is standing on level ground by opening the drain tap situated at the base of the radiator block, and the engine by opening the tap at the right-hand rear of the cylinder block.

When water has ceased to flow run the engine at 1,000 r.p.m. for 30 seconds to dry out any remaining water pockets. Observe that it is essential to open both drain taps to drain the cooling system completely.

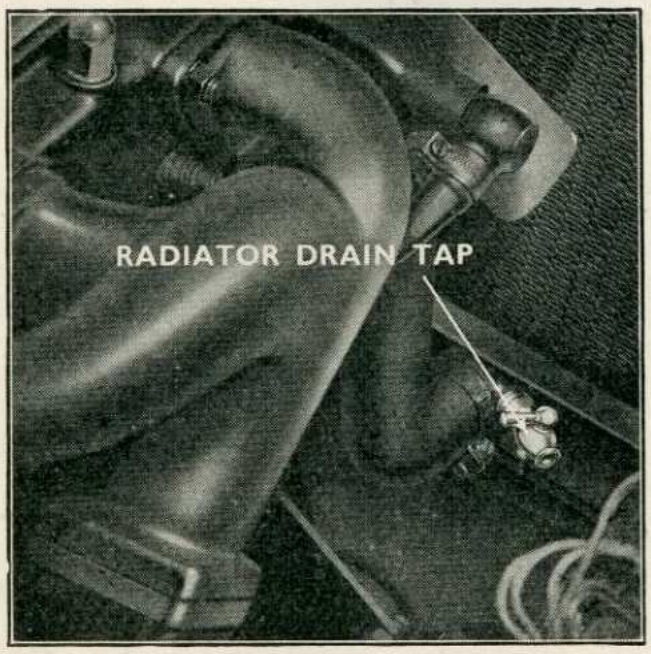


PLATE B.11
DRAIN TAP. RADIATOR BLOCK

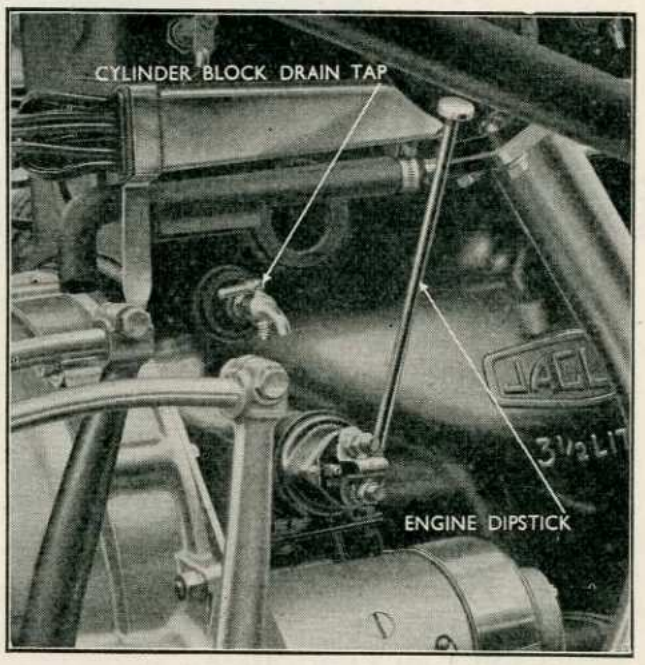


PLATE B.12
DRAIN TAP. CYLINDER BLOCK

ENGINE. TO REMOVE AND REFIT

The engine and gearbox unit is removed as an assembly, either by lowering it away from the car into a pit, moving the car and subsequently picking the assembly up again, or alternatively, raising the car on a hoist and lowering the engine and gearbox unit to the floor, whichever procedure is most convenient.
The description which follows applies to Right-Hand Drive cars and a note is given at the end in regard to alterations in procedure for Left-Hand Drive models.

REMOVE BONNET. Release bonnet catches by pushing forward the controls situated at either side under the facia board, and with both bonnet top panels open remove two screws from centre hinge front "T" piece. Raise front of bonnet and remove forward.

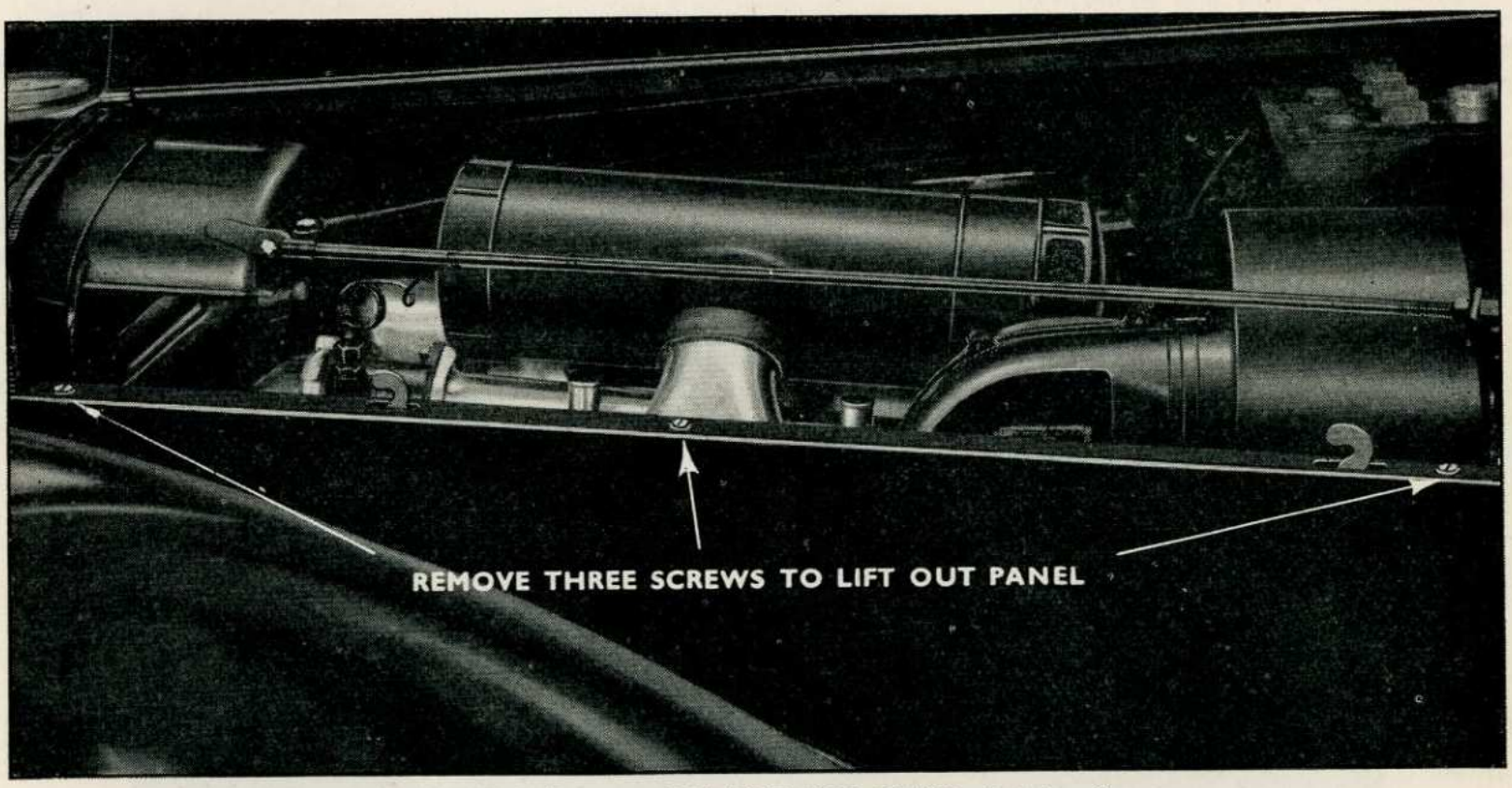


PLATE B.13. BONNET SIDE PANEL (left-hand)

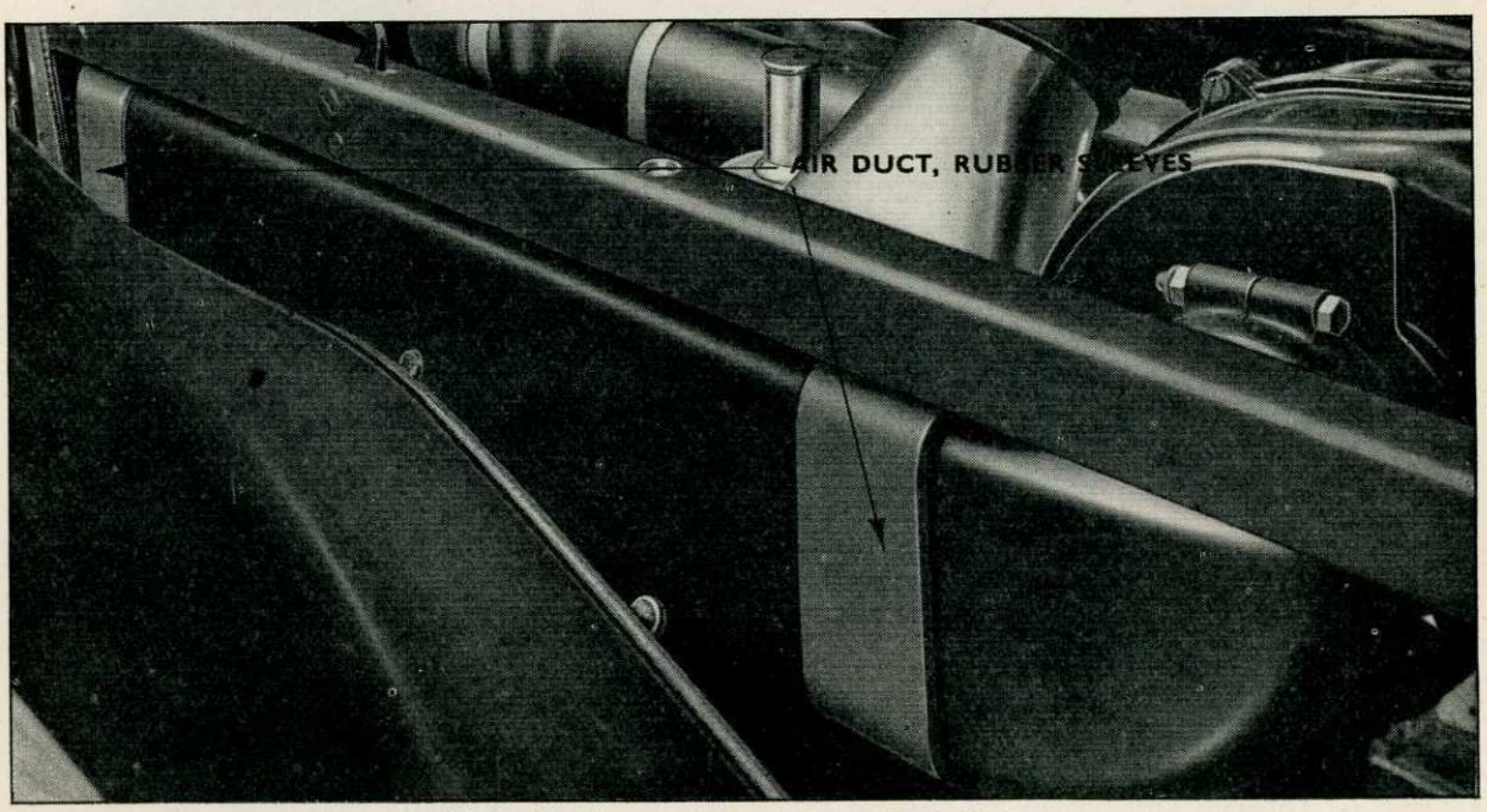


PLATE B.14. AIR CONDITIONER DUCT

Remove Watermark Wondershare PDFelement

REMOVE BONNET SIDE PANELS. Remove three countersunk screws from top face of each bonnet side panel and lift out side panels. (Slide rubber sleeves off adaptors at radiator block and air conditioner motor and lift out heater air duct. Fitted only to early cars.)

DRAIN COOLING SYSTEM. Drain radiator block and engine by opening tap at base of radiator and tap at right-hand rear of engine block. If anti-freeze mixture is in use conserve water. Disconnect top water hose from thermostat housing and remove bottom water hose completely.

REMOVE DYNAMO. Disconnect battery positive lead. Remove dynamo connections noting that "Yellow" wire is connected to terminal "D" (large terminal) and "Yellow with Green" wire to terminal "F" (small terminal). Remove adjusting bolt situated at top of dynamo and swing dynamo towards engine to free fan belt. Disengage fan belt from dynamo pulley, remove two securing bolts situated under dynamo and lift out dynamo.

REMOVE AIR SILENCER. Remove rocker cover centre dome nut and setscrew passing through steady bracket into front of silencer body and remove silencer.

DISCONNECT ENGINE CONNECTIONS. Remove thermometer element from thermostat and tie clear. Care must be exercised not to twist the capillary pipe from element to gauge or fracture may occur. Remove fan belt. Disconnect throttle linkage at rear flexible joint and remove coupling rod from bush on dash, together with lever and spring. Disconnect L.T. (Low Tension) feed from distributor and H.T. (High Tension) feed from coil. Disconnect petrol feed pipe from carburettors. Disconnect oil pressure gauge flexible pipe. Remove heater hoses and pipes from rear of engine. Disconnect wire to self-starting carburettor solenoid. Disconnect revolution counter cable at elbow drive. (Disconnect wiring to right-hand horn and remove horn and bracket. Early cars only.) Disconnect wiring from starter motor. Remove engine oil level dipstick. Remove exhaust down pipes by disconnecting at twin manifolds and at flange coupling to intermediate pipe. Disconnect earth strap from right-hand side of clutch bell housing.

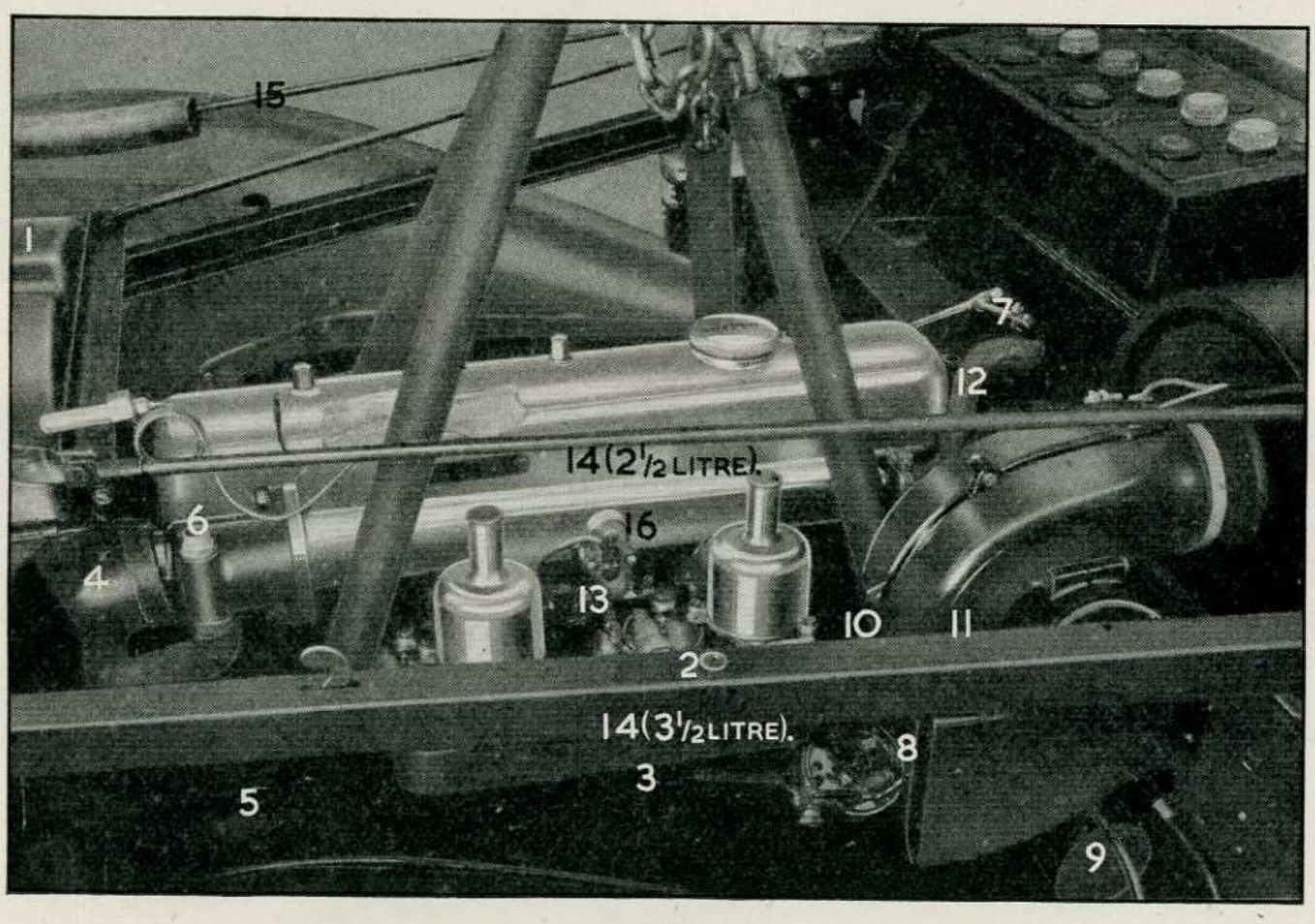


PLATE B.15. ENGINE REMOVAL (View left-hand side)

1. Bonnet.
2. Side Panel.
3. Air Conditioner Duct.
4. Top Water Hose.
5. Dynamo.
6. Thermometer Element.
7. Throttle Linkage.
8. Distributor L.T. Feed.
9. Coil H.T. Feed.
10. Petrol Feed Pipe.
11. Oil Gauge Pipe.
12. Heater Hose.
13. Starting Carburettor Wire.
14. Revolution Counter Cable.
15. Radiator Stay Rod.
16. Air Silencer Manifold.

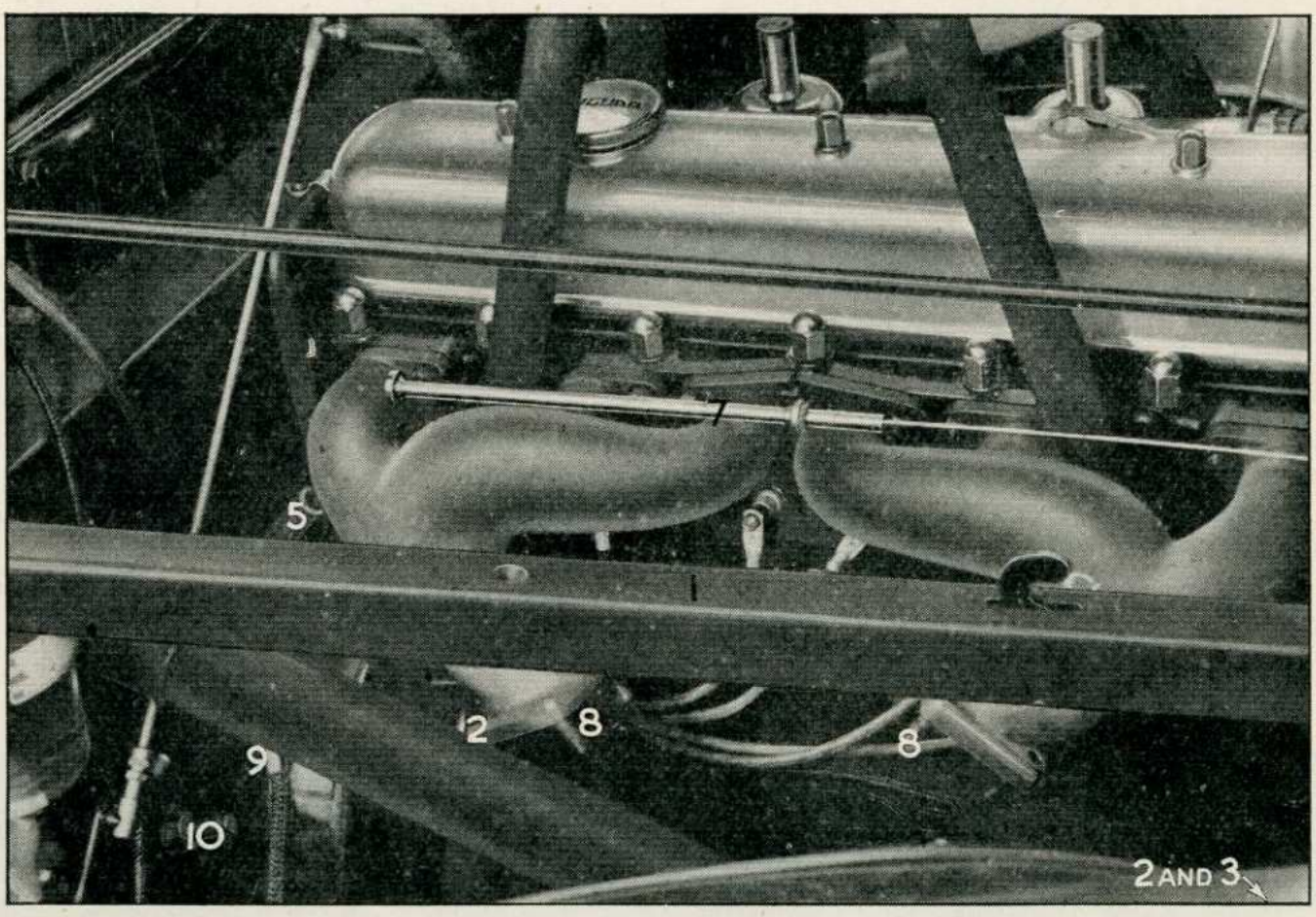


PLATE B.16. ENGINE REMOVAL (View right-hand side)

1. Side Panel.
2. Cooling System.
3. Bottom Water Hose.
4. Air Silencer.
5. Heater Hose.
6. Starter Motor.
7. Oil Dipstick.
8. Exhaust Down Pipes.
9. Earth Strap.
10. Clutch Pedal.

DISCONNECT GEARBOX CONNECTIONS. Remove both front seats and front floor carpets and place seats clear of car. Remove change speed lever knob and locknut. Remove gearbox and bell housing cover and carpets. Disconnect reverse light wires from switch on remote control. Remove dipstick. Remove gearbox cover (remote control) and fit blank to exclude entry of dirt. Remove clutch pedal and stem from clutch operating lever. Disconnect speedometer cable and place clear. Remove four bolts from propellor shaft companion flange at gearbox and spring shaft upwards from the spigot.

REMOVE ENGINE. Release radiator centre stay rod at front and place clear to provide clearance for slings. Arrange slings to come immediately behind the front engine bearer plate and in front of clutch bell housing mounting flange. Take weight of engine. Disconnect one earth strap and two earth wires from front mountings, remove bolts securing front mounting block angle brackets to engine bearer plate (three bolts per side). Remove bolts securing mountings to chassis brackets and remove front mountings. Observe that the engine and gearbox unit is positioned on the rear (gearbox) mountings, to align the front and rear propellor shafts in as straight a line as possible. It is therefore desirable to mark the position of the gearbox mounting support bracket to chassis frame members before disturbing the securing bolts. Withdraw four bolts (two per side) securing rear engine mounting support bracket to chassis frame. Lower engine complete with gearbox through chassis frame.

REFIT ENGINE. Refitting the engine is the reverse of the above procedure.

ENGINE. TO REMOVE AND REFIT

LEFT-HAND DRIVE CARS

The following additional operations are required on Left-Hand Drive cars.

Dismantle clutch operating linkage by removing split pin from clevis pin and withdraw clevis pin. Remove three bolts from support plate bolted to gearbox, tilt plate thus disengaging the spherical joint and lift plate clear of lever and shaft.

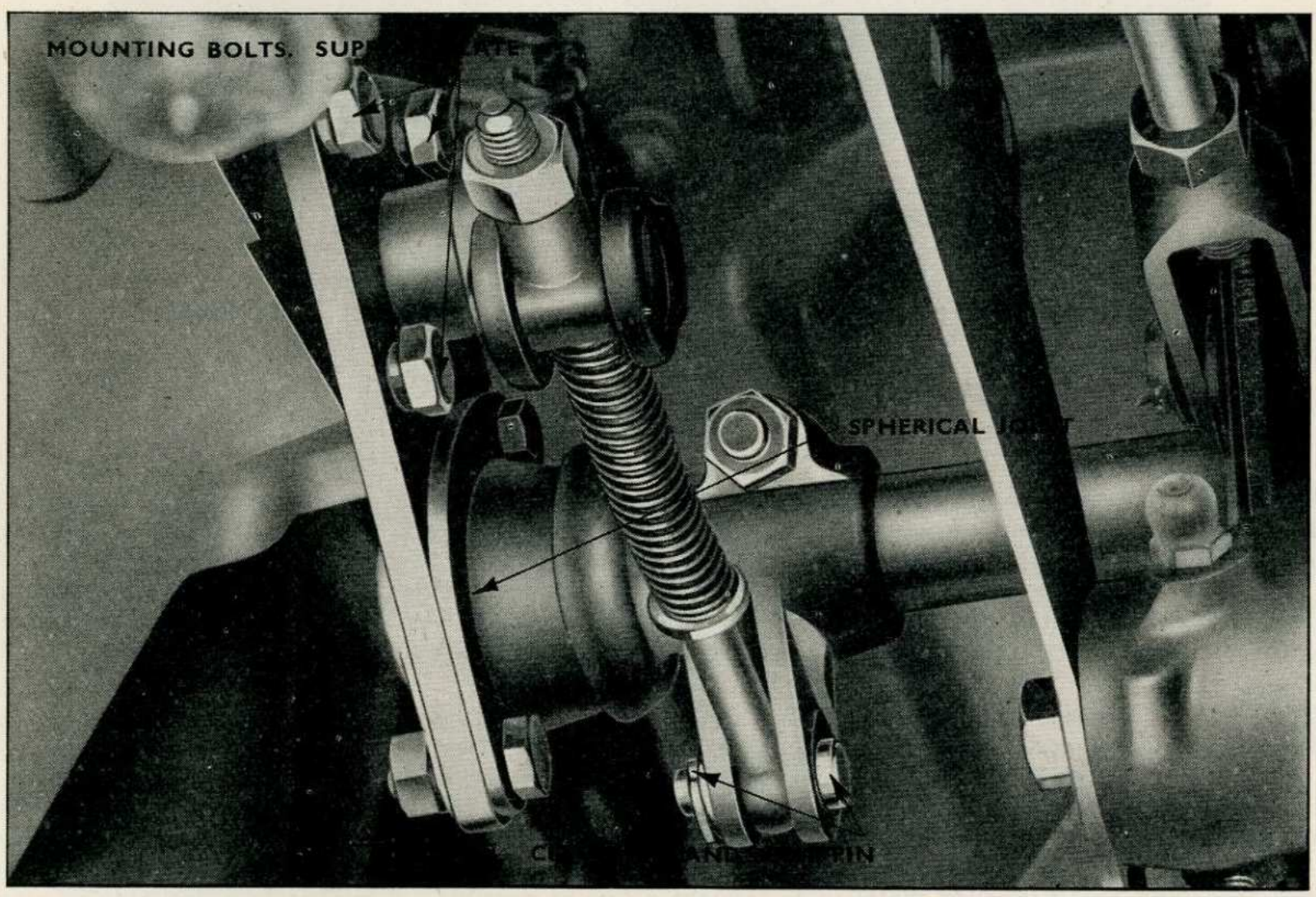


PLATE B.17

CLUTCH LINKAGE, LEFT-HAND DRIVE (Viewed from under)

Remove air silencer manifold by withdrawing four nuts securing manifold to carburettor flange.

ENGINE. TO DISMANTLE AND REASSEMBLE

The following instructions are those which apply when the engine components are removed in the following sequence and with the engine unit removed from the chassis. Dismantling of sub-assemblies and the removal of individual components when the engine is in the chassis frame are dealt with in detail in subsequent paragraphs.

REMOVE GEARBOX UNIT. Remove bolts securing clutch bell housing to engine unit and withdraw gearbox unit to rear. The gearbox must be supported during this operation in order to avoid strain on the shaft and distortion of the driven plate assembly.

REMOVE ROCKER GEAR. Withdraw three dome nuts and lift off rocker cover. Remove nuts from rocker shaft posts and lift off rocker assembly.

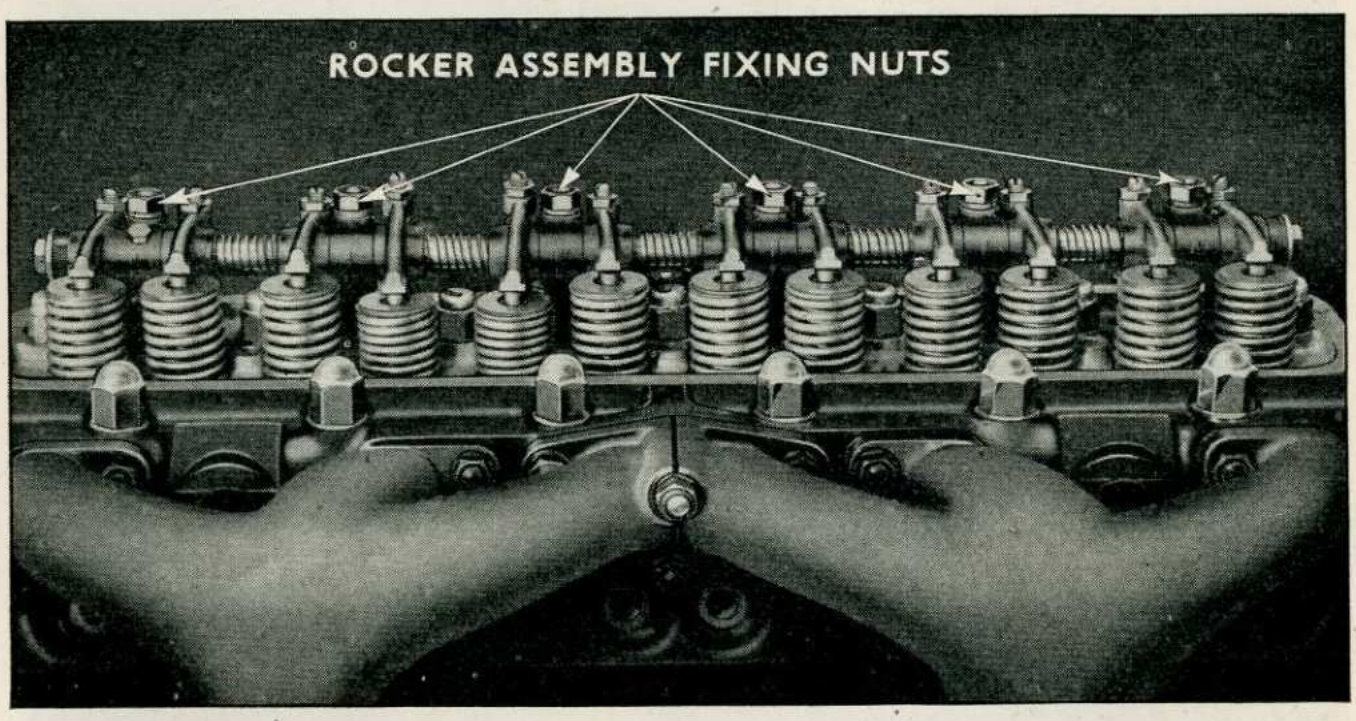


PLATE B.18. ROCKER ASSEMBLY

REMOVE CARBURETTORS. Disconnect distributor vacuum feed pipe from front carburettor by unscrewing union. Disconnect auxiliary starting carburettor solenoid wire at thermostat switch in water manifold. Unscrew auxiliary starting carburettor feed pipe union from cylinder head. Release overflow pipes. Remove four carburettor flange nuts and withdraw carburettors.

REMOVE SPARKING PLUGS. Remove high tension leads from plugs. Remove sparking plugs.

REMOVE ROCKER GEAR FEED PIPE. Disconnect pipe at unions situated at rear nearside (left hand) of cylinder head and at oil gallery plate.

REMOVE DISTRIBUTOR AND DRIVE GEAR. Disengage sparking plug high tension lead carriers from engine rear plate. Remove dowel bolt located under distributor in tappet cover plate boss. Release base plate setscrew and withdraw distributor. Remove twenty setscrews and withdraw tappet cover plate. Observe that this is located by dowels. Remove two setscrews passing through drive gear adaptor (thrust plate) now disclosed. Withdraw adaptor followed by gear observing shims fitted under adaptor. When assembling the drive gear it is essential to allow ·003" (·08 mm.) end float between drive gear and adaptor by correct shimming. The clearance can be checked with a pair of long-nosed pliers engaging the dog on the drive gear through the adaptor plate. If this clearance is not allowed, damage to the drive gear and camshaft will result.

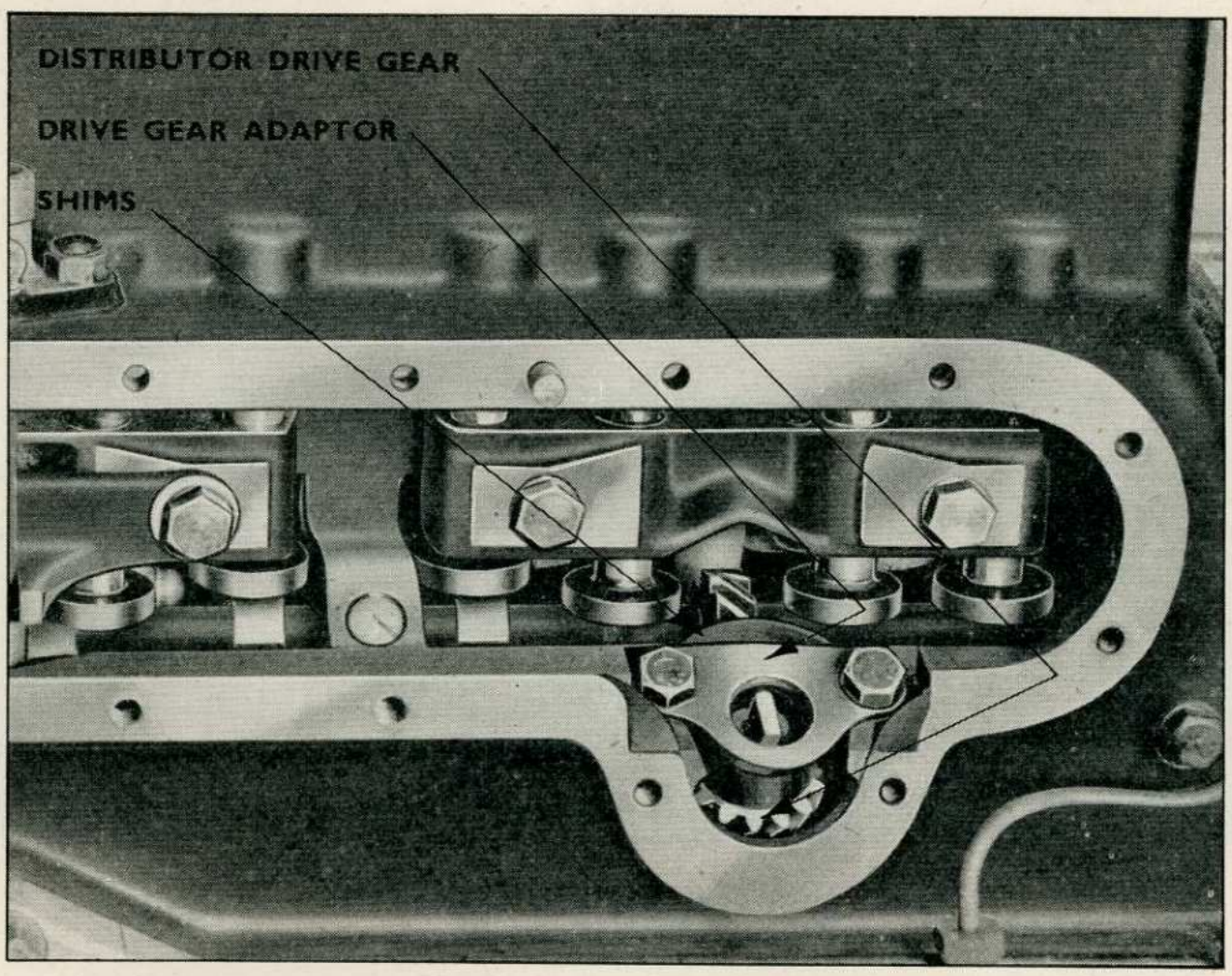


PLATE B.19. DISTRIBUTOR DRIVE GEAR

REMOVE OIL PUMP AND REVOLUTION COUNTER DRIVE GEAR. Remove revolution counter adaptor bracket situated on cylinder head of $2\frac{1}{2}$ litre and on cylinder block of $3\frac{1}{2}$ litre engines. Adaptor bracket is secured by three nuts on $2\frac{1}{2}$ litre and two nuts on $3\frac{1}{2}$ litre. Withdraw two bolts from centre tappet block passing through drive gear thrust plate and slide thrust plate up and clear. Slide drive gear up shaft. Remove circlip from under drive gear and two Woodruff keys securing gear to shaft. Withdraw shaft upwards.

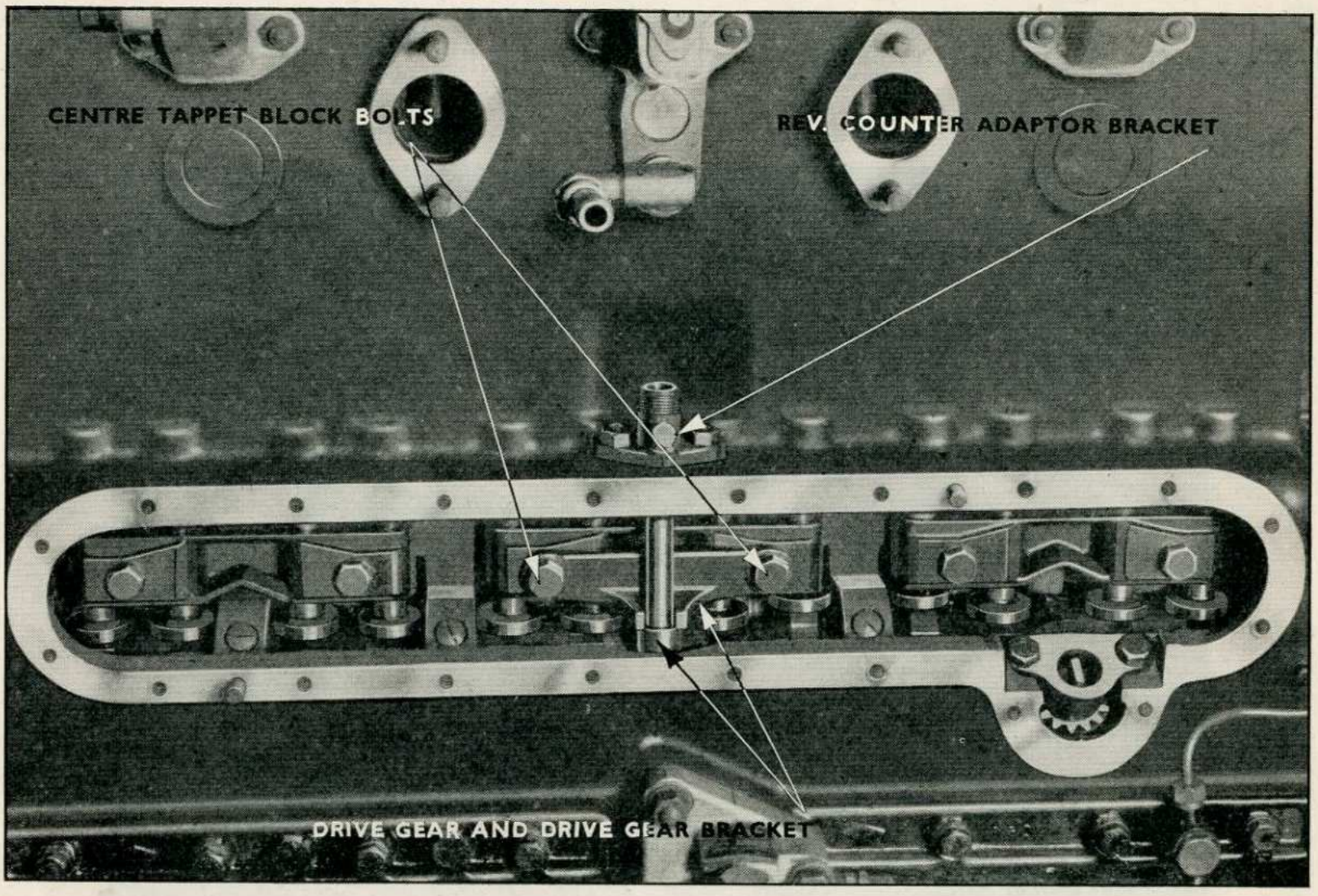


PLATE B.20. OIL PUMP AND REVOLUTION COUNTER DRIVE GEAR

REMOVE TAPPET BLOCKS AND PUSH RODS. Lift out push rods. Remove two setscrews securing each tappet block and remove blocks. On 2½ litre, observe that the tappet block bolts are not interchangeable, the two centre bolts being longer. If incorrectly fitted severe damage will be caused to cylinders and pistons.

REMOVE THERMOSTAT AND BYPASS HOSE. Disconnect the bypass hose at the water pump end and remove the thermostat assembly complete with hose by removing two bolts passing through flange of water manifold. Note air silencer support bracket attached to top bolt.

REMOVE CYLINDER HEAD. Remove cylinder head nuts starting at the centre and working outwards as indicated in Plates B.21 and B.22. Slacken nuts only a quarter of a turn each initially, until they become free, to prevent strain on studs and distortion of cylinder head. Remove cylinder head.

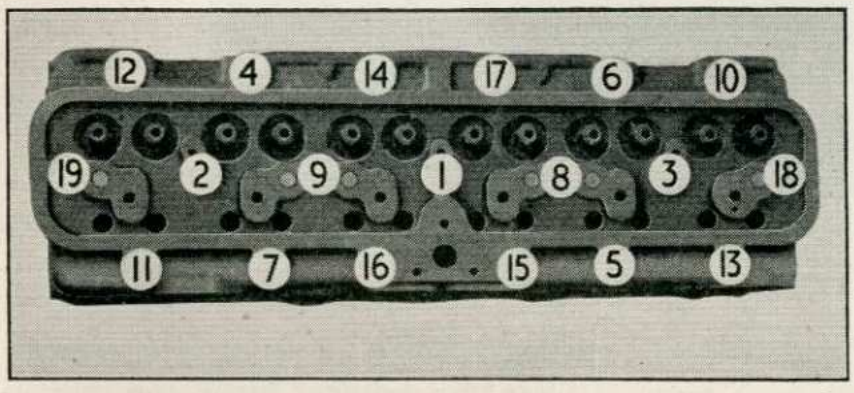


PLATE B.21
CYLINDER HEAD 2½ LITRE

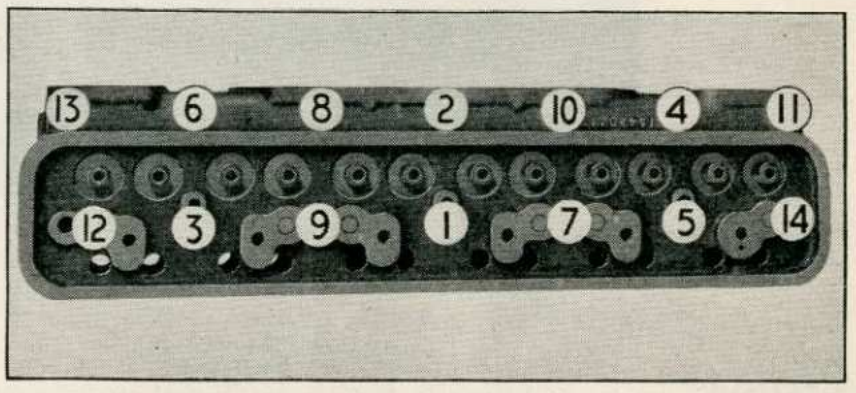


PLATE B.22
CYLINDER HEAD 3½ LITRE

REMOVE WATER PUMP AND FAN ASSEMBLY. Disconnect air conditioner delivery pipe from water pump. Remove five setscrews securing pump body to cylinder block and withdraw pump.

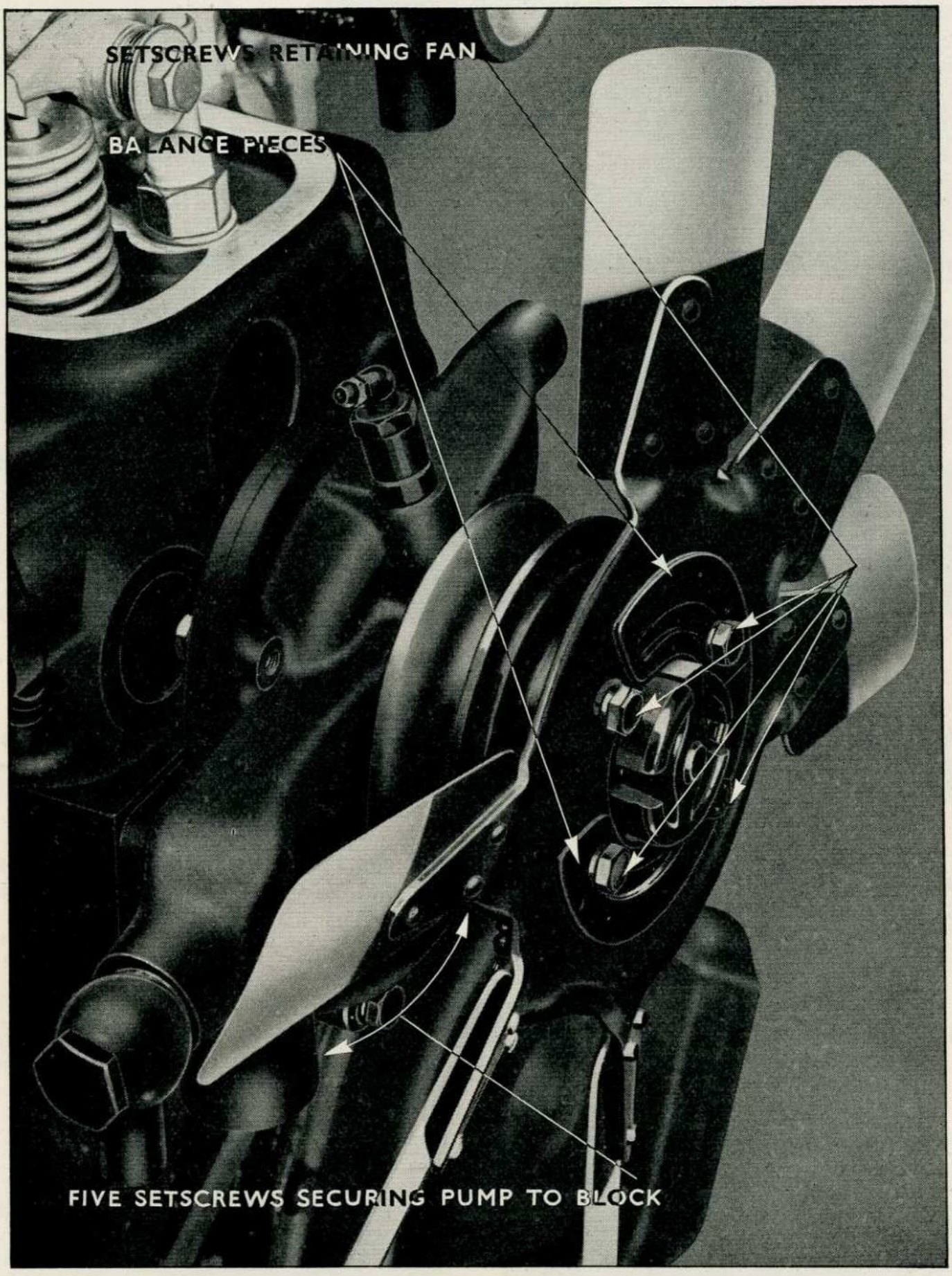


PLATE B.23. WATER PUMP

REMOVE OIL FILTER ASSEMBLY. Remove four nuts from studs passing through body of filter into cylinder block and remove assembly.

REMOVE TIMING CHAIN ASSEMBLY. On 2½ litre engines release starter dog lock plate and unscrew starter dog anti-clockwise. Remove dog, shims and distance piece. Draw off crankshaft pulley which is keyed to crankshaft. On 3½ litre, remove two vibration damper setscrews with distance pieces which pass through starter dog lock plate. Unscrew starter dog anti-clockwise, remove dog and shims. Remove six setscrews and withdraw outer flange of damper. Remove the rubber-loaded portion by fitting a suitable tube over the end of the crankshaft and tap tube sharply. This will release split cone and allow rubber-loaded portion to be withdrawn. Withdraw centre for damper which is keyed to crankshaft. Remove set screws securing timing cover flange to cylinder block and nut from central support stud. Withdraw timing cover. Remove tensioner device by withdrawing split pins and slide off spring blade and tensioner fingers. Observe timing marks on sprockets to facilitate correct assembly. Remove two setscrews securing camshaft sprocket to camshaft and remove sprocket. Draw off crankshaft sprocket which is keyed to crankshaft. After new parts have been fitted, if, when resetting the timing, it is found that with the wheels in position it is not possible to get the timing sufficiently accurate, one tooth movement of the chain giving too great a correction, the camshaft wheel should be removed and replaced with the setscrews in the other two holes which will set the wheel half a tooth out from the original position.

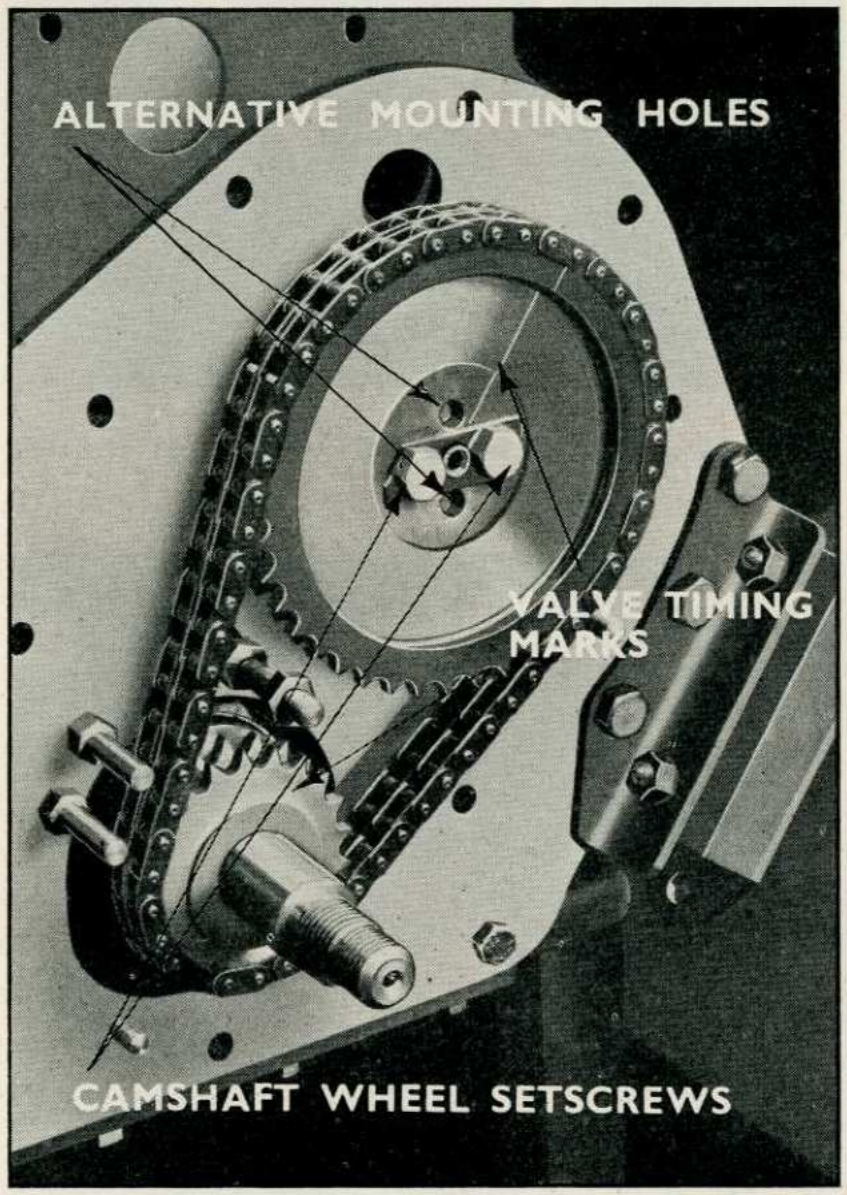


PLATE B.24. TIMING CHAIN

If this is still not correct the wheel may be reversed, which, owing to the manner of drilling, will give two further positions, making an adjustment to a quarter of a tooth.

The timing cover should be replaced in the following manner to ensure correct oil retention and quiet running. First replace the cover with the securing screws just holding, then place a drop of oil on the inside of the crankshaft pulley (centre for damper in the case of 3½ litre), and fit the pulley on the shaft but with the key

removed. The pulley (or centre for damper) will not rotate freely by hand if it rubs the hole in the timing cover, in which case centralise the cover until clearance is effected and then tighten the securing screws. It is advisable to recheck for pulley (or centre for damper) freedom after tightening the cover screws.

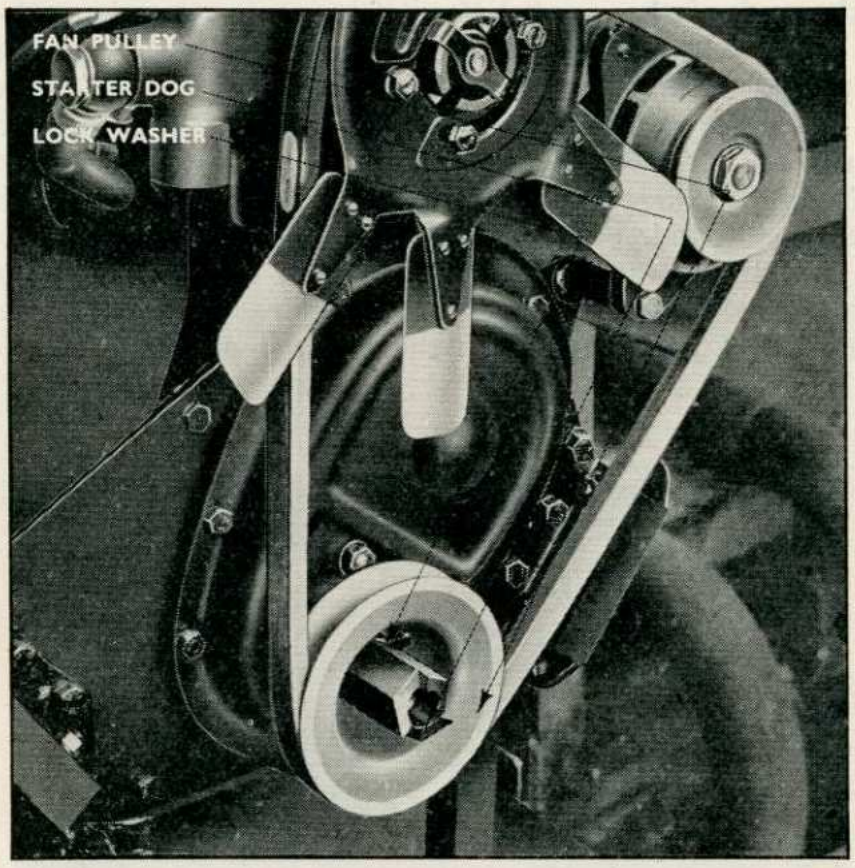


PLATE B.25. CRANKSHAFT FAN PULLEY 2½ LITRE

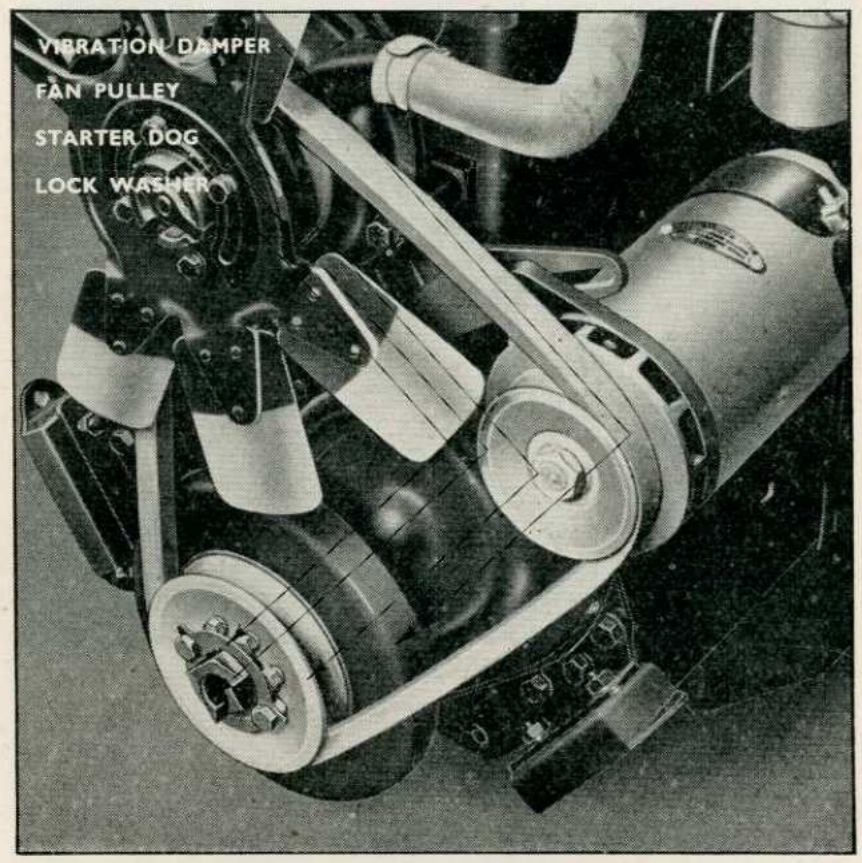


PLATE B.26. CRANKSHAFT VIBRATION DAMPER 3½ LITRE

REMOVE CAMSHAFT. Remove two setscrews securing camshaft front bearing and withdraw camshaft complete with front bearing.

REMOVE CLUTCH AND FLYWHEEL.

Remove six setscrews securing flange of clutch assembly to flywheel. Observe clutch to flywheel balance mark "B" and dowels to effect location in the balanced position. When refitting the clutch unit to the flywheel insert a $\frac{1}{4}$" (6·4 mm.) distance piece between each of the three release levers and the clutch body to facilitate assembly.

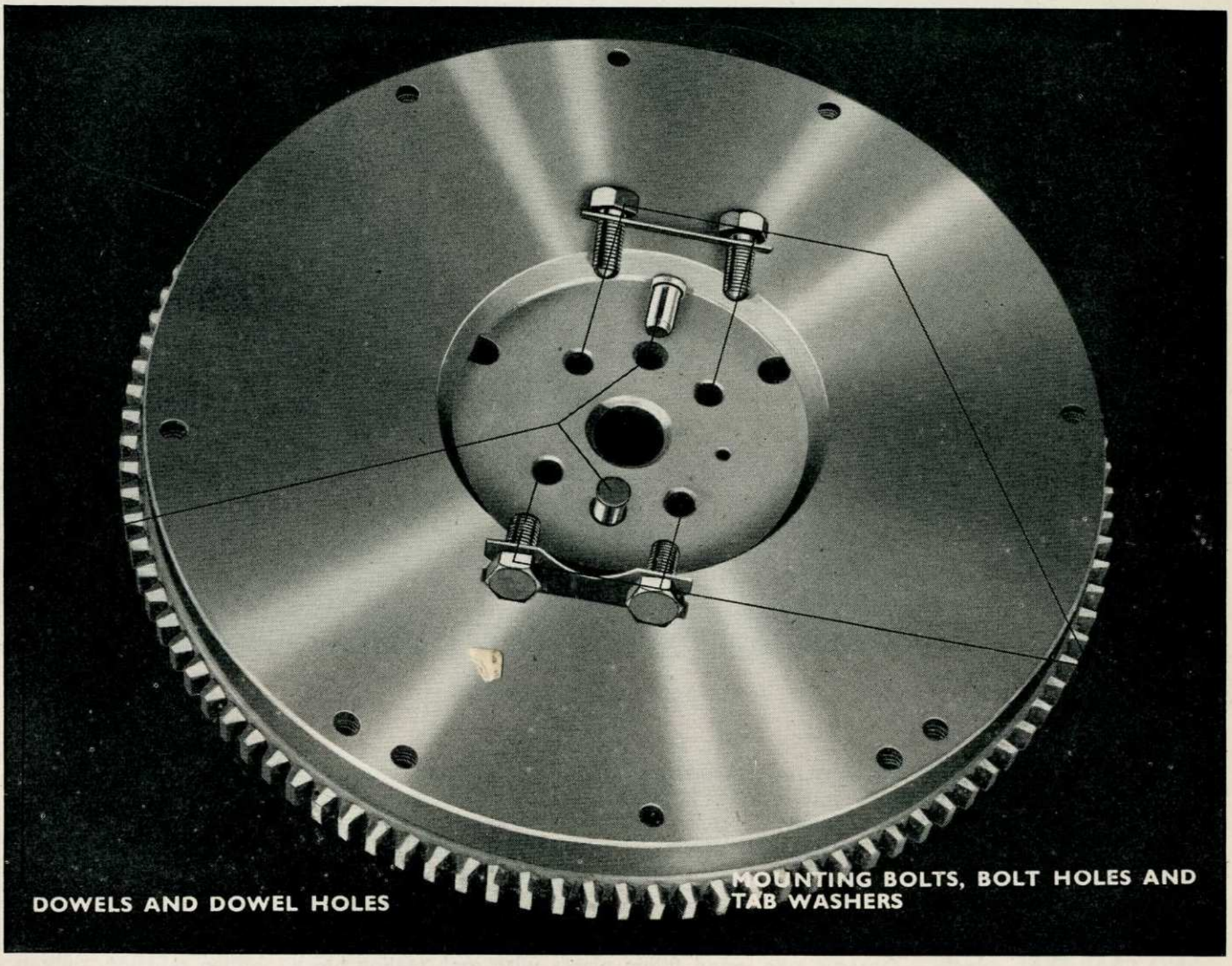


PLATE B.27. FLYWHEEL

Release flywheel bolt lock plates and four flywheel mounting bolts. Observe two mushroom-headed dowels locating flywheel to crankshaft boss disclosed by removal of mounting bolt lock plates. Examine the oilite bush fitted to the spigot of the crankshaft boss and if this shows signs of wear withdraw the bush. When the bush has been extracted a $\frac{7}{16}$" (11·0 mm.) round bar may be fitted through the flywheel into the crankshaft spigot and used with advantage to support the flywheel during removal. Press in a new bush on assembly.

REMOVE SUMP.

Drain engine sump. Remove cylinder head studs, reverse engine and support on top face of cylinder block. Remove twenty-two setscrews retaining sump and remove sump.

REMOVE FRONT AND REAR BEARER PLATES.

Remove three nuts and three setscrews to release front bearer plate and ten setscrews to release rear bearer plate. Remove plates.

REMOVE OIL PUMP. Remove three bolts securing flange of pump body to cylinder block and withdraw pump.

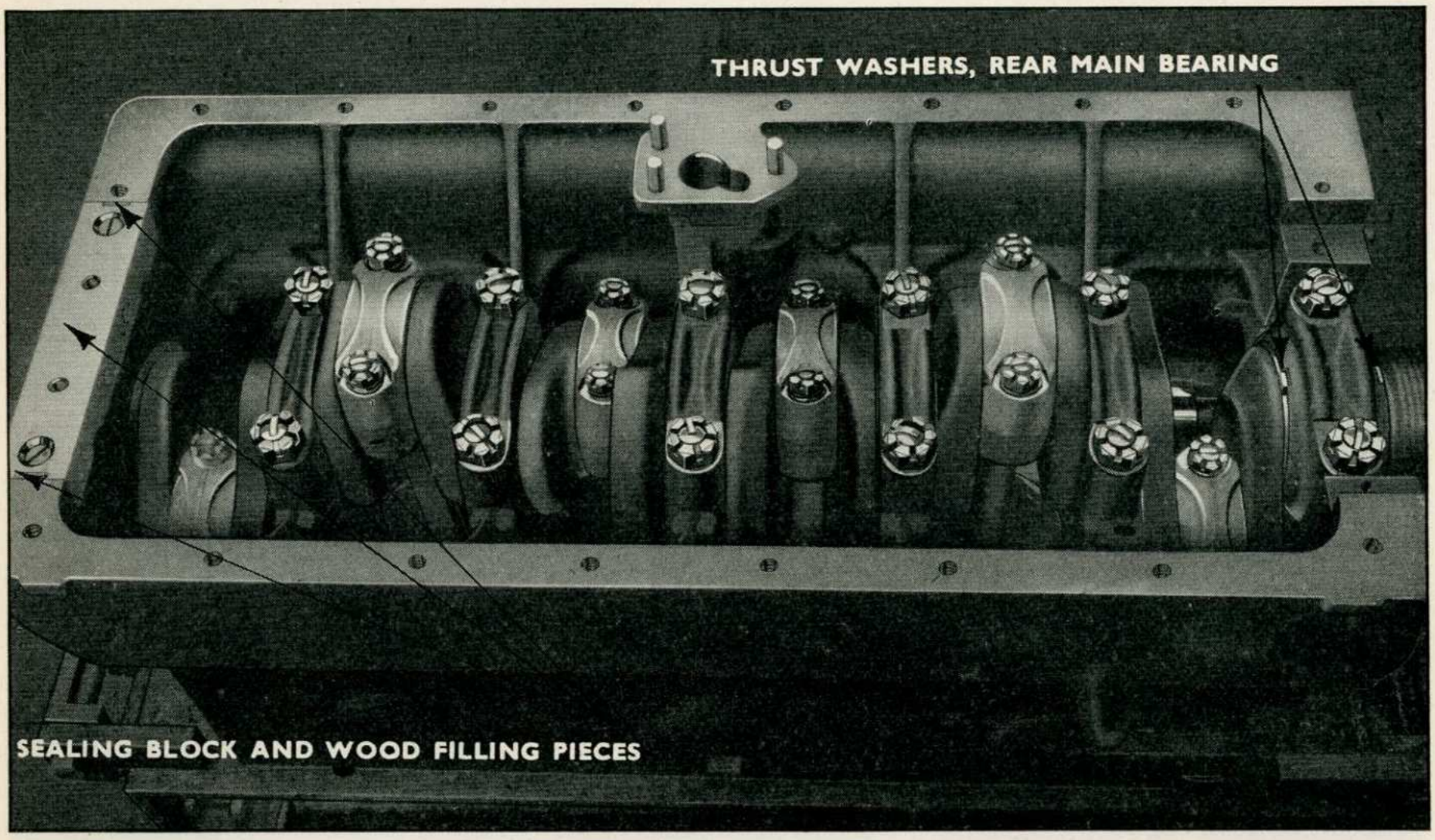


PLATE B.28. CRANKSHAFT

REMOVE OIL RETAINING COVER. Remove five setscrews securing oil retaining cover and two setscrews passing through rear sealing block into cover. Remove rear sealing cover. Note that on assembly the oil retaining cover must be centralised on the crankshaft. Release the setscrews and position the cover so that a ·003" (·08 mm.) feeler will pass between the cover and the crankshaft boss at all points of its circumference. If centralising is not carried out an oil leak at the sealing cover may be experienced.

REMOVE FRONT AND REAR SEALING BLOCKS. Remove two cheese-headed setscrews from both front and rear sealing blocks and remove blocks. Observe two wood filling pieces with each sealing block. When refitting, tighten sealing block setscrews until they are just holding, fit new wood filling pieces and finally tighten setscrews, ensuring that the sealing blocks are square to the bottom face of the cylinder block and to the bearer plate faces.

REMOVE CRANKSHAFT. Remove main line and connecting rod bearing caps observing that these are numbered for correct reassembly. Note that No. 1 cylinder is at the rear, that is, at the flywheel end. Lift out crankshaft. Observe crankshaft split thrust washer located at front and rear of rear main bearing.

REMOVE PISTONS AND CONNECTING RODS. Withdraw pistons and connecting rods.

REASSEMBLE ENGINE. Reassembly is the reverse of the above procedure. When refitting the gearbox to the engine it is important that these two units should be in alignment or jumping out of top gear may be subsequently experienced. When the clutch bell housing bolts have been entered, but when they are finger-tight only, engage top gear and operate the clutch approximately twelve times to effect alignment. Finally tighten bell housing bolts.

ENGINE. TO OVERHAUL

The dismantling of components when the engine is fitted to the chassis is dealt with in subsequent pages bearing the sub-titles "Components. To Remove and Refit," and the following comments assume the engine unit to be removed and completely dismantled as described in paragraph "Engine. To Dismantle and Reassemble," page B.25.

Thoroughly clean and degrease all parts, preferably by immersing in a degreaser. The importance of absolute cleanliness during examination and subsequent rebuilding cannot be over-stressed. Use only genuine factory spares.

CAMSHAFT. It is unlikely, except after very high mileages, to find wear in the camshaft and camshaft bushes. If the bushes are to be renewed these should be pressed into their housings and reamered in position. End float is controlled by the front bearing which should be machined to increase end float and renewed to reduce end float.

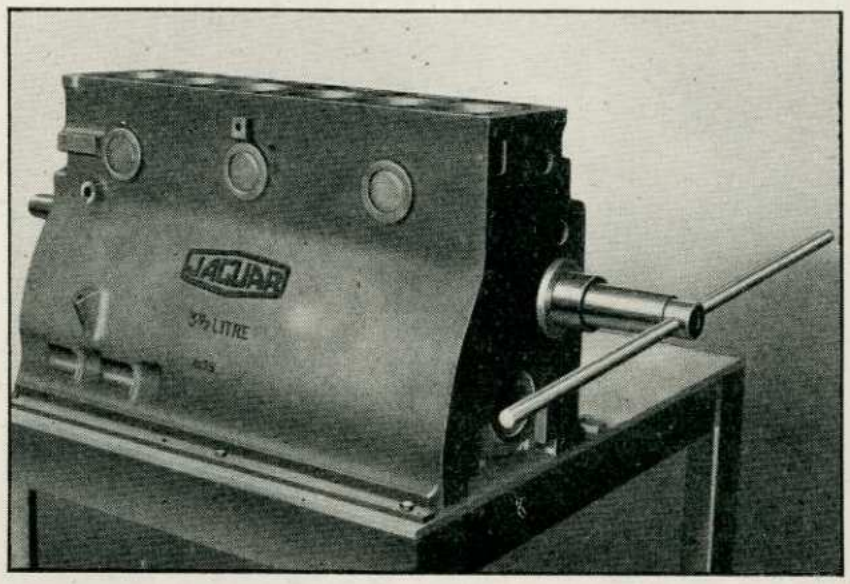


PLATE B.29. CAMSHAFT BUSHES—REAMING

CAMSHAFT DATA

		$2\frac{1}{2}$ Litre and $3\frac{1}{2}$ Litre
Number of Journals		5
Journal Diameter	Front	$1\frac{1}{2}$" (38·10 mm.)
	Centre	$1\frac{3}{4}$" (44·45 mm.)
	Intermediate	$1\frac{3}{4}$" (44·45 mm.)
	Rear	$1\frac{9}{16}$" (39·69 mm.)
Journal Length	Front	$1\frac{13}{16}$" (46·04 mm.)
	Centre	$\frac{13}{16}$" (20·64 mm.)
	Intermediate	$\frac{13}{16}$" (20·64 mm.)
	Rear	$1\frac{7}{32}$" (30·96 mm.)
Thrust Taken		Front End
Thrust Plate Thickness		·20" (5·08 mm.)
Permissible End Float		·003"—·006" (·08 mm.—·15 mm.)

CARBURETTORS. Factory reconditioned carburettors are available on an exchange basis and it is recommended that this service be utilised in preference to overhauling the existing carburettors. Full servicing details will, however, be found in Section C, "Carburettors and Fuel System."

CLUTCH. Factory reconditioned clutch assemblies are available on an exchange basis and it is recommended that this service be utilised whenever overhauls are undertaken. If a reconditioned assembly is not fitted ensure that the floating plate friction lining is not worn and is free from grease or oil. Examine clutch plate damper springs and pressure plate springs for fatigue or breakage. Replace graphite release bearing if damaged or worn.

Ensure that the pressure plate is parallel to the flange of the clutch body since misalignment of these two faces will cause fierceness of operation when taking up the drive.

If new parts have been fitted which would affect the adjustment the release levers should be set by using the gauge plate CG.192 for the 2½ litre clutch or CG.14322 for the 3½ litre clutch. (Section E, "Clutch and Flywheel").

The clutch and flywheel must be balanced as an assembly. This operation is carried out on initial assembly and the clutch dowelled to the flywheel with the location marked by the letter "B." Mount the clutch and flywheel on a mandril and set up this assembly on parallel knife edges when it may be found that varying positions of clutch to flywheel mounting give different conditions of balance. Bolt up the clutch in the position giving the best state of balance, marking this location clearly. If necessary, drill balance holes in the rim of the clutch body at the heaviest point. (Plate B.30.) Full servicing details will be found in Section E, "Clutch and Flywheel."

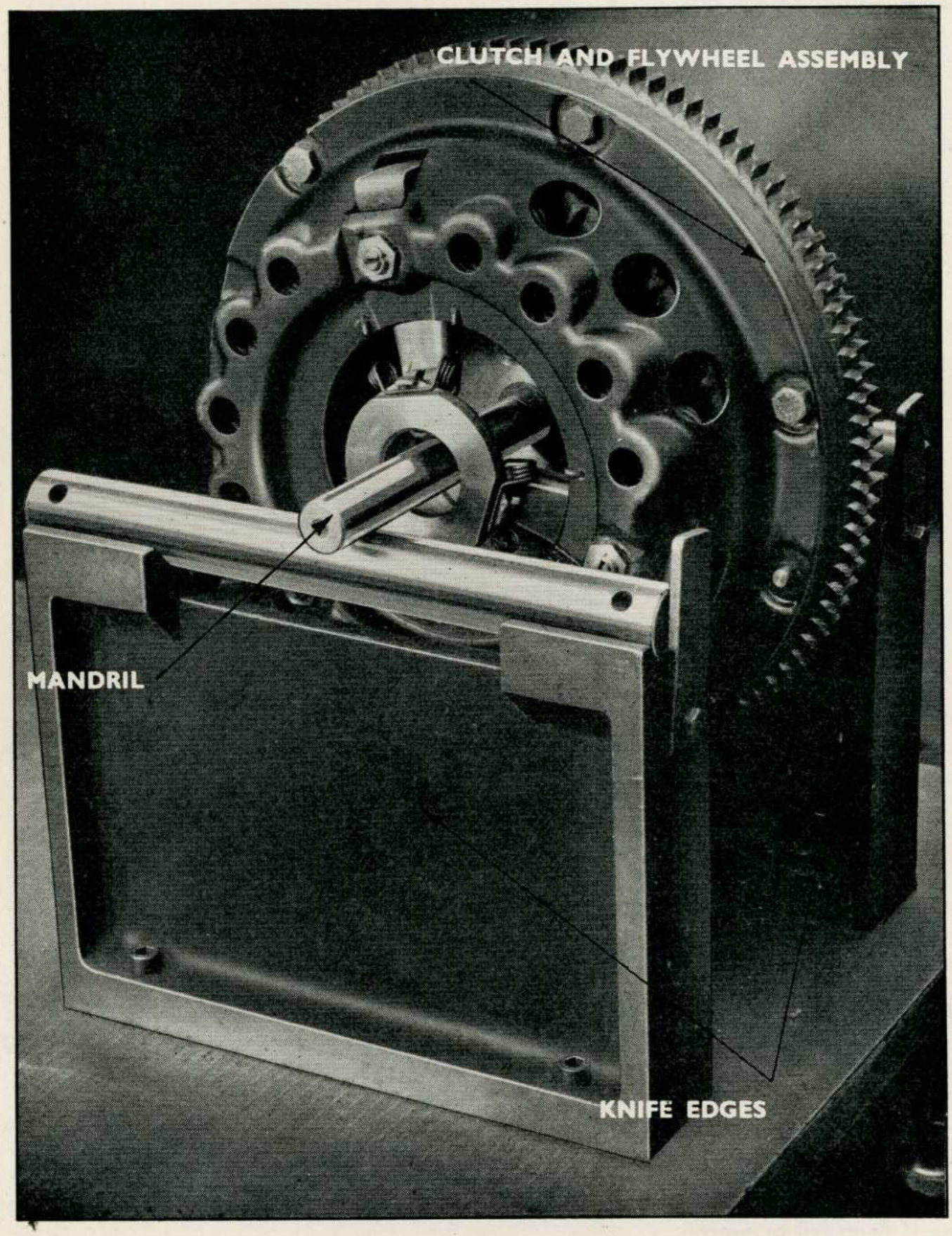


PLATE B.30. CLUTCH AND FLYWHEEL BALANCE

CLUTCH DATA

	2½ Litre.	3½ Litre.
Make	Borg and Beck	
Model	9 A6—G	10 A6—G
Outside Diameter	8⅞" (225·4 mm.)	9⅞" (250·8 mm.)
Type	Dry Single Plate	
Clutch Pedal Adjustment	Adjusting Screw	
Clutch Release Bearing	Graphite	

COIL. Test with approved coil testing equipment.

CONNECTING RODS. Should the small ends be worn or faces pitted, fit new rods. Duralumin rods cannot be satisfactorily reconditioned, and further, should the rods have been in use for a high mileage it is desirable to renew them due to the possibility that they may be fatigued. The connecting rods should be balanced to within the limit of 3 grams per set, and the alignment checked on an approved connecting rod alignment jig. Correct any misalignment as necessary. The big end bearings are of the precision shell type and under no circumstances should these be hand scraped or the bearing caps filed. Always check bearing nip on connecting rod journals before assembly which should be ·001" (·03 mm.) to ·0025" (·06 mm.).

The little ends are not bushed, the gudgeon pins being a palm push fit directly in the rods at 120°F. The gudgeon pins should be a palm push fit in the piston at 68°F Maximum tightening torque for connecting rod bolts, 350 lb. ins. Always use new connecting rod bolts and nuts at overhauls.

CONNECTING ROD DATA

	2½ Litre	3½ Litre
Length, centre to centre	7·75" (196·9 mm.)	7·75" (196·9 mm.)
Big end bore size	2" + ·0000" —·0005" (50·8 mm. + ·00 mm. —·01 mm.)	2·2327" to 2·2335" (56·71 mm. to 56·73 mm.)
Big end width	1 3/16" (30·16 mm.)	1 3/16" (30·16 mm.)
Big end bearing	White Metal Thin Steel Shell	
Diameter of bore	1·896" to 1·895" (48·16 mm. to 48·13 mm.)	2·089" to 2·087" (53·05 mm. to 53·01 mm.)
Clearance on Vertical Distance	·001" to ·0025" (·03 mm. to ·06 mm.)	·001" to ·0025" (·03 mm. to ·06 mm.)
Clearance on Horizontal Distance (Connecting Rod)	·006" to ·00875" (·15 mm. to ·22 mm.)	·006" to ·00875" (·15 mm. to ·22 mm.)
Small end bore size	¾" (19·05 mm.)	⅞" (22·23 mm.)
Small end width	15/16" (23·81 mm.)	15/16" (23·81 mm.)

CRANKSHAFT. Regrinding of the crankshaft journals is generally recommended when wear or ovality in excess of ·003" (·08 mm.) is found. Factory reconditioned crankshafts are available on an exchange basis, subject to the existing crankshaft being fit for satisfactory reconditioning, with undersize main line and big end bearings —·020" (·51 mm.), —·030" (·76 mm.) and —·040" (1·02 mm.).

Grinding beyond the limits of ·040" (1·02 mm.), is not recommended and under such circumstances a new crankshaft should be obtained.

New crankshaft thrust washers should be fitted, these being in two halves located at the front and rear of the rear main line bearing with the lower half secured by a keyway in the bearing cap. (Plate B.28.)

Ensure that oil passages in the crankshaft are clear and perfectly clean before assembly. Maximum tightening torque for main bearing nuts, 1,000 lbs. ins.

CRANKSHAFT DATA

	2½ Litre	3½ Litre
Number of main bearings	7	7
Main bearing journal diameter	2·479″ +·0005″ —·0000″ (62·97 mm. +·013 mm. —·000 mm.)	2·479″ +·0005″ —·0000″ (62·97 mm. +·013 mm. —·000 mm.)
Main bearing journal length		
Front	1⅝″ (41·28 mm.)	
Centre	1⅜″ (34·93 mm.)	
Intermediate	1 1/16″ (26·99 mm.)	
Rear	1¾″ (44·45 mm.)	
Crankpin diameter	1·894″ +·0005″ —·0003″ (48·11 mm. +·013 mm. —·008 mm.)	2·086″ +·0006″ —·0000″ (52·98 mm. +·015 mm. —·000 mm.)
Crankpin length	1 3/16″ +·0007″ —·0002″ (30·16 mm. +·018 mm. —·005 mm.)	1 3/16″ +·0007″ —·0002″ (30·16 mm. +·018 mm. —·005 mm.)
Thrust taken	At rear journal	
Thrust Washer Thickness	3/32″ (2·38 mm.)	
End Float	·006″ (·15 mm.)	
Main Bearing Type	White Metal Thin Steel Shell	
Length Front	1⅝″ (41·28 mm.)	
Centre	1⅜″ (34·93 mm.)	
Intermediate	1 1/16″ (26·99 mm.)	
Rear	1¾″ (44·45 mm.)	
Bore for main bearings	2·625″ +·0005″ —·0000″ (66·68 mm. +·013 mm. —·000 mm.)	2·625″ +·0005″ —·0000″ (66·68 mm. +·013 mm. —·000 mm.)
Clearance on vertical distance	·001″ to ·0025″ (·03 mm. to ·06 mm.)	

CRANKSHAFT VIBRATION DAMPER (3½ LITRE ONLY). Examine for wear on pulley flanges and deterioration of damper rubber. If appreciable wear is noticeable renew the assembly. (Plate B.26.)

CYLINDER BLOCK. Examine for any flaws in the casting and check the top face for truth. Check that the main bearing caps have not been filed. Check that the bores of the main bearing housings are in alignment. If the caps have been filed, or if there is misalignment of the bearing housings, the caps must be machined and the bearing housings line bored. Reboring is normally recommended when the bore wear exceeds ·006″ (·15 mm.). Reboring beyond the limit of ·030″ (·76 mm.) is not recommended and when the bores will not clean out at ·030″ (·76 mm.), liners and standard size pistons should be fitted.

Liners, standard pistons and oversize pistons +·005″ (·13 mm.), +·010″ (·25 mm.), +·015″ (·38 mm.), +·020″ (·51 mm.) and +·030″ (·76 mm.) are available.

Following reboring the core plugs should be removed and the cylinder block passages, oil ways and crankcase interior thoroughly cleaned. Assemble with new core plugs and paint the crankcase interior with heat and oil resisting paint.

CYLINDER BLOCK DATA

	2½ Litre	3½ Litre
Material	Chromium Iron	
Cylinder Bores. Nominal	2·875″ (73·025 mm.)	3·2283″ (82 mm.)
Machined	2·875″ +·0005″ —·00025″ (73·025 mm. +·013 mm. —·006 mm.)	3·2283″ +·0005″ —·00025″ (82 mm. +·013 mm. —·006 mm.)
Bore size for fitting liners	3·030″ to 3·031″ (76·96 mm. to 76·99 mm.)	3·347″ to 3·348″ (85·01 mm. to 85·04 mm.)
Cylinder Liners (when fitted) Overall length	6·880″ to 6·865″ (174·75 mm. to 174·37 mm.)	7·270″ to 7·255″ (184·66 mm. to 184·28 mm.)
Outside diameter	3·034″ to 3·033″ (77·06 mm. to 77·04 mm.)	3·381″ to 3·350″ (85·88 mm. to 85·09 mm.)
Interference fit	·002″ —·004″ (·051 mm. —·102 mm.)	
Outside diameter of lead in	3·030″ (76·96 mm.)	3·346″ (84·99 mm.)
Size of bore honed after assembly into block	2·875″ +·0005″ —·00025″ (73·025 mm. +·013 mm. —·006 mm.)	3·2283″ +·0005″ —·00025″ (82 mm. +·013 mm. —·006 mm.)

CYLINDER HEAD. Examine for any flaws or cracks in the casting and check the bottom face of the cylinder head for truth. Remove the core plug from either end of the induction passage passing through the head and withdraw the venturi tube which is a press fit in the centre of the passage. New core plugs must be fitted on assembly.

Remove all traces of carbon from the combustion chambers and deposits from the carburettor ports, exhaust ports and induction passage. Remove any pitting in valve seats using valve seat grinding equipment. Refit the venturi tube, noting that the cylinder head centre stud passes through the tube. Thoroughly clean the water passages and paint the well on the top of the head with heat and oil resisting paint.

See Plates B.21 and B.22 for sequence of tightening cylinder head nuts.

CYLINDER HEAD TIGHTENING TORQUE DATA

Model	Stud Size	Max. Tightening Torque
2½ litre	½″ B.S.F.	1,100 lbs. ins.
	½″ B.S.F. Waisted studs	750 lbs. ins.
3½ litre	7/16″ B.S.F.	750 lbs. ins.

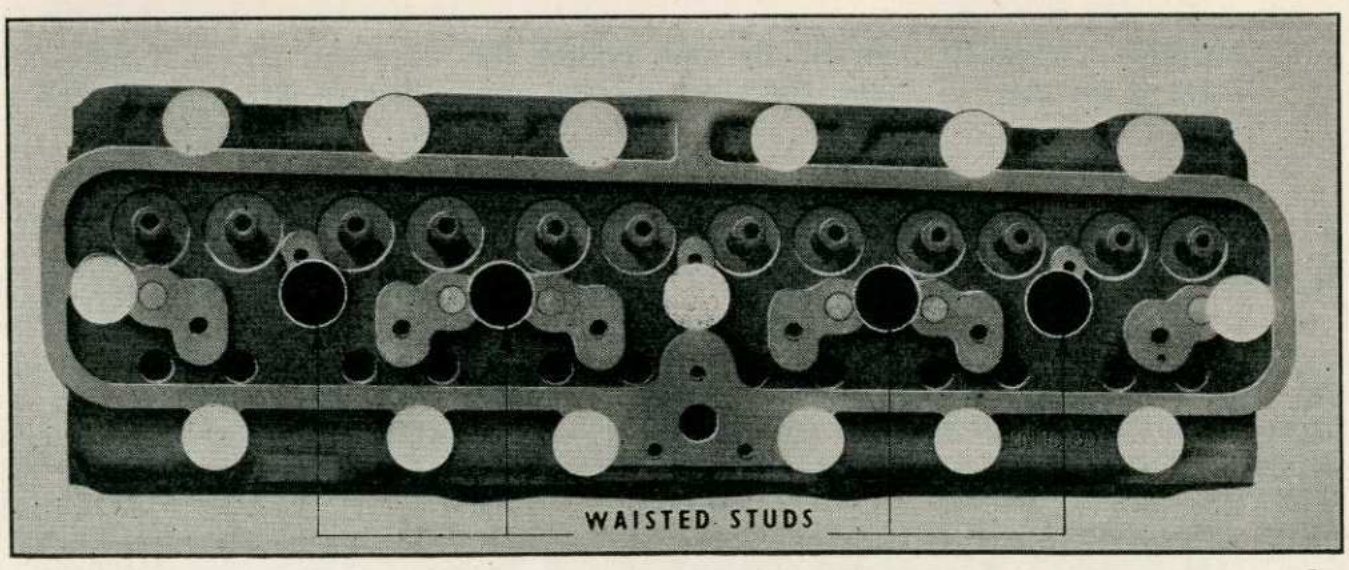


PLATE B.31. CYLINDER HEAD. 2½ LITRE. LOCATION OF WAISTED STUDS

CYLINDER HEAD DATA

	$2\frac{1}{2}$ Litre	$3\frac{1}{2}$ Litre
Material	Cast Iron	
Bore for inlet and exhaust valve guides	$\frac{5}{8}$" +·001" —·000" (15·88 mm. +·03 mm. —·00 mm.)	$\frac{5}{8}$" +·001" —·000" (15·88 mm. +·03 mm. —·00 mm.)
Valve seat angle	30°	30°
Valve seat width (maximum)	Inlet $\frac{11}{64}$" (4·37 mm.) Exhaust $\frac{9}{64}$" (3·57 mm.)	
Valve seat depth	$\frac{1}{32}$" (·79 mm.)	
Port size. Inlet	$1\frac{5}{16}$" (33·34 mm.)	$1\frac{3}{8}$" (34·93 mm.)
Exhaust	$1\frac{3}{16}$" (30·16 mm.)	$1\frac{5}{16}$" (33·34 mm.)

(Refer to page B.46 for Valve, Valve Guides and Spring Data.)

DYNAMO. Factory reconditioned dynamos are available on an exchange basis. Should it be desired to overhaul the existing dynamo, servicing instructions will be found in Section P, "Electrical."

DISTRIBUTOR AND DISTRIBUTOR DRIVE GEAR. Factory reconditioned distributors are available on an exchange basis. Instructions on servicing the distributor will be found in Section P, "Electrical." The main points to observe are as follows. Replace sparking plug high tension leads if insulation is cracked or oil soaked. Replace, or dress on an oil stone, the contact breaker points and accurately set the gap to ·012" (·31 mm.). Replace rotor pick-up arm if corroded and clean distributor cover segments. Replace carbon brush if worn and ensure that the brush is free to slide in its holder. Check the vacuum and centrifugal advance mechanisms for freedom of operation. If the centrifugal advance mechanism is sluggish the movement should be dismantled, thoroughly cleaned and assembled lightly lubricated. (Plate B.7.)

Examine the drive gear for wear and renew if necessary. Observe that end float of the drive gear is controlled by shims inserted under the drive gear adaptor plate. It is essential to allow ·003" (·08 mm.) end float by correct shimming or damage to the drive gear and camshaft will result. Check end float with a pair of long-nosed pliers engaging the dog of the drive gear through the adaptor plate. (Plate B.19.) Examine distributor drive dog, fibre thrust washer and dog securing peg. Replace worn parts. If the fibre thrust washer is worn excessive end float of distributor shaft will take place and affect ignition timing.

FAN BELT. Examine the belt for wear or deterioration and renew if necessary. Fan belt "V" angle 32°.

FAN BELT PULLEYS. Examine crankshaft, fan and dynamo pulleys for wear and renew if necessary. Note that drive is on the "V" faces, therefore discard any pulley on which a new fan belt bottoms.

FLYWHEEL. If the starter gear is badly worn a new flywheel should be used since the starter gear teeth are integral with the flywheel. Should the original flywheel be used again the starter gear teeth should be dressed up by filing and the flywheel clutch face faced up by grinding, provided that not more than $\frac{1}{32}$" (·80 mm.) is removed from the face. Under these circumstances the flywheel should be assembled to the crankshaft and rotated a quarter of a turn, to present fresh starter gear teeth to the starter motor pinion wheel on initial engagement. Check the flywheel balance by mounting on a mandrel and setting up this assembly on parallel knife edges. If necessary drill balance holes in the flywheel rim. Particular note should be taken to ensure that the flywheel is a sound fit on the crankshaft boss, the limits being ·0004" (·01 mm.) interference, ·0007" (·02 mm.) clearance. Observe that the flywheel is located by two mushroom headed dowels passing through the flywheel into the crankshaft boss, the dowels being positively retained by the mounting bolt tap washers. (Plate B.27.) Ensure that dowels are a good fit and that new mounting bolts and tab washers are used. Maximum tightening torque for flywheel mounting bolts, 650 lbs. ins.

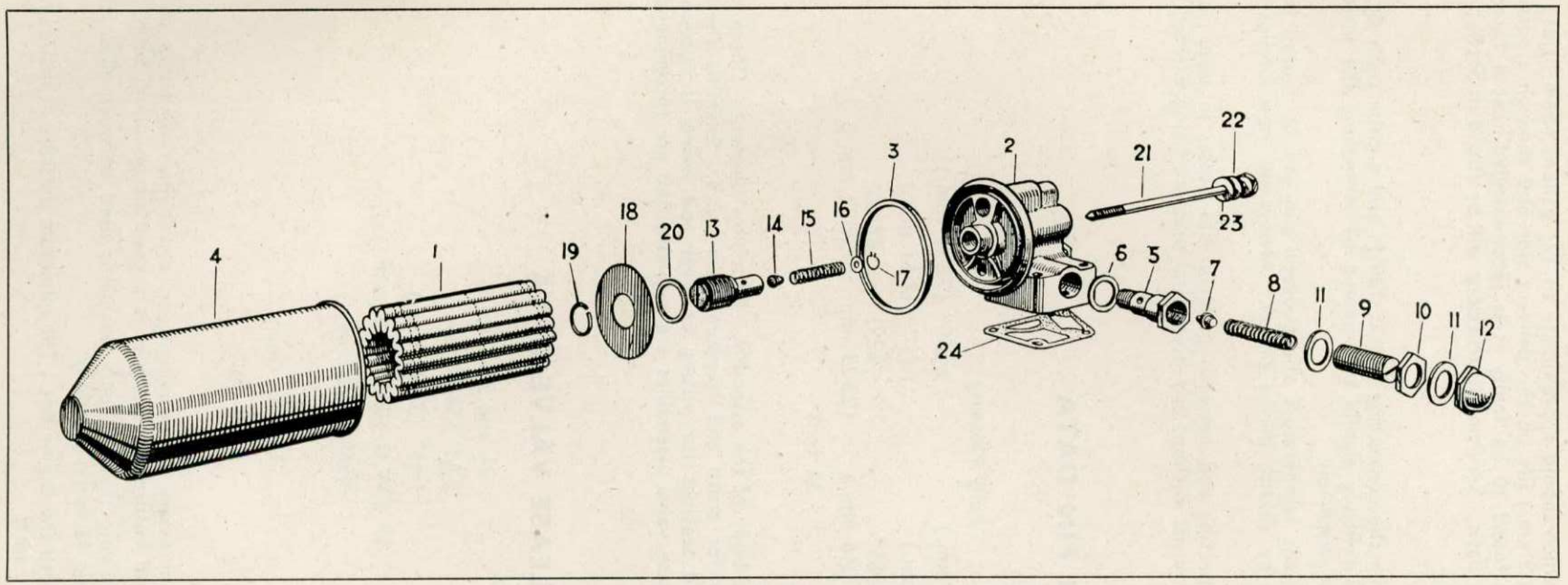


PLATE B.32. OIL FILTER AND RELEASE VALVE

Element	1
Body, Top only	2
Ring, Packing (Rubber, on Top Body)	3
Canister	4
Body, Relief Valve	5
Washer (Fibre) under Hexagon	6
Plunger, Relief Valve	7
Spring, Relief Valve	8
Housing for Valve Spring	9
Nut, Lock, on Housing	10
Washer for Locknut	11
Nut, Dome	12
Body, Balance Valve	13
Plunger, Balance Valve	14
Spring, Balance Valve	15
Washer, top of Spring	16
Circlip for Balance Valve	17
Plate at bottom of Top Cover	18
Circlip, securing Plate in position	19
Washer (Felt) under Plate	20
Bolt, through Top Body and Canister	21
Washer under head of Bolt	22
Washer (Rubber) on Bolt	23
Washer, Jointing, between Oil Cleaner and Oil Gallery Plate	24

FUEL PUMP. Test the output of the fuel pump which should approximate to 12½ gallons (56·8 litres) of petrol per hour against a 48″ (121·9 cm.) lift on the delivery side and through a suction lift of 33″ (83·8 cm.) from the tank. If the pump is found to be faulty it is recommended that a Factory reconditioned unit be fitted, available on an exchange basis. Servicing instructions will be found in Section C, " Carburettors and Fuel System."

GUDGEON PINS. Gudgeon pins are a palm push fit in the connecting rod at 120°F. and a palm push fit in the piston at 68°F. Removal and refitting should be effected by immersing the piston, gudgeon pin and connecting rod little end in a bath of warm oil.

When the piston and little end have reached a sufficient temperature the gudgeon pin can be moved into position. Location of the gudgeon pin is maintained by circlips in the piston. Always use new circlips on assembly.

When assembling engine centralise small end of connecting rod between gudgeon pin bosses in piston and ensure that connecting rod mates up with crankshaft journal without any horizontal pressure being exerted on the rod.

GUDGEON PIN DATA

	2½ Litre	3½ Litre
Type	Fully Floating	
Length	2·544″ (64·62 mm.)	2·850″ (72·39 mm.)
Inner diameter	29/64″ (11·51 mm.)	37/64″ (14·64 mm.)
Outer diameter	·7501″ to ·74985″ (19·053 mm. to 19·046 mm.)	·8751″ to ·87485″ (22·23 mm. to 22·22 mm.)
Core hardness	32 tons	

OIL FILTER. Thoroughly clean the container and body of the assembly. Fit a new element. Check the machined flange face of the body for truth and freedom from burrs. Examine the oil pressure release valve and balance valve plungers and seatings for pitting or wear and renew if necessary. Renew plunger springs if fatigued. Replacement release valve assemblies are available and are recommended in favour of renewal of individual parts.

OIL PRESSURE RELEASE VALVE DATA

	2½ and 3½ Litre
Spring Free Length	2 9/64″ (54·37 mm.)
Fitted Length	1·45″ (36·83 mm.)
Section	17 S.W.G. ·056″ (1·42 mm.)
External Diameter	·456″ (11·58 mm.)
Number of free coils	18
Rate per inch	11·7 lbs. inch
Pressure at fitted length	8 lbs.

OIL PUMP. Examine for wear and renew, if necessary, the driving gear, driven gear or pump body. Thoroughly clean gauge strainer and ensure that strainer is a good fit on pump body.

Check mating faces of oil pump body and cover, observing that no joint washer is used between these two parts. Jointing compound should be used on the mating faces on assembly.

Normal oil pressure 40 to 60 lbs. to the square inch with the engine hot. The minimum pressure at maintained high r.p.m. should not be less than 20 lbs. to the square inch.

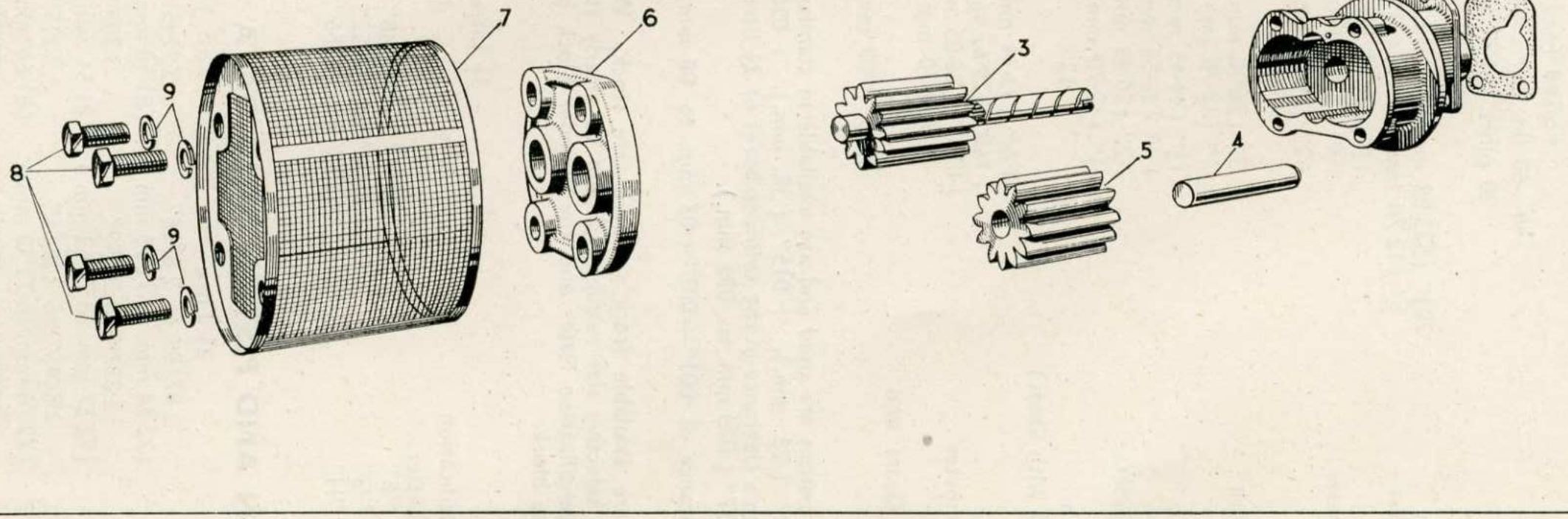


PLATE B.33. OIL PUMP

Body, Oil Pump	1	Cover, Oil Pump	6
Washer, Jointing, for Pump	2	Filter, Oil	7
Spindle, Driving	3	Screw, Set, securing Filter and Cover to Body	8
Spindle for Loose Gear	4	Washer, Spring, on Setscrews	9
Gear, Loose	5		

LUBRICATING SYSTEM DATA

	2½ Litre	3½ Litre
Type	Forced Feed	
Pressure. Hot	40—60 lbs. per square inch	
Sump capacity	20 pints (11·37 litres)	
Oil Pump Type	Gear	
Driving Shaft Overall Length	20⅝″ (523·88 mm.)	12 1/16″ (306·38 mm.)
Overall Diameter	½″ (12·70 mm.)	½″ (12·70 mm.)
Driving Wheel Length	1¾″ (44·45 mm.)	
Overall Diameter	1·4″ (35·56 mm.)	
Pitch Centre Diameter	1·2″ (30·48 mm.)	
Number of Teeth	12	
Idler Wheel Pin Overall Length	3″ (76·20 mm.)	
Diameter	½″ (12·70 mm.)	
Idler Wheel Length	1¾″ (44·45 mm.)	
Overall Diameter	1·4″ (35·56 mm.)	
Pitch Centre Diameter	1·2″ (30·48 mm.)	
Bore Diameter	½″ (12·70 mm.)	
Number of Teeth	12	
Spiral Driven Gear. (Integral with Shaft)		
Overall Length	1 5/16″ (33·34 mm.)	
Overall Diameter	1·168″ (29·67 mm.)	
Pitch Centre Diameter	1·0257″ (26·05 mm.)	
Overall Diameter	½″ (12·70 mm.)	
Clearance between end of Gears and Cover not to exceed	·0035″ (·09 mm.)	

PISTONS. Aerolite oval skirt pistons are used and are available in standard sizes and oversize +·005″ (·13 mm.), +·010″ (·25 mm.), +·015″ (·38 mm.), +·020″ (·51 mm.) and +·030″ (·76 mm.). Pistons should be fitted with a clearance in the cylinder bores of 2½ litre ·0028″ to ·0034″ (·071 mm. to ·086 mm.) and 3½ litre ·0031″ to 0037″ (·078 mm. to ·093 mm.).

Piston rings should have a groove clearance of ·001″—·003″ (·03 mm. to ·08 mm.). Ring gap fitted ·003″ to ·007″ (·08 mm. to ·18 mm.).

The following selective piston sizes are available from standard size stock. When ordering standard size pistons the identification letter of the selective size required should be clearly stated. Standard size pistons are stamped on the crown with the identification letter and the cylinder block is also stamped close to the bores on the right-hand top face of the block.

2½ Litre Size	Identification Letter	3½ Litre Size	Identification Letter
2·8715″ to 2·8718″	"F"	3·2245″ to 3·2248″	"F"
2·8718″ to 2·8722″	"G"	3·2248″ to 3·2252″	"G"
2·8722″ to 2·8726″	"H"	3·2252″ to 3·2256″	"H"

PISTON AND PISTON RING DATA

	2½ Litre	3½ Litre
Piston Skirt Diameter	2·8715″ to 2·8726″ (72·94 mm. to 72·96 mm.)	3·2245″ to 3·2256″ (81·90 mm. to 81·93 mm.)
Ring Land Top	2·857″ to 2·859″ (72·57 mm. to 72·62 mm.)	3·209″ to 3·211″ (81·51 mm. to 81·56 mm.)
Ring Land Intermediate	2·8645″ to 2·8655″ (72·76 mm. to 72·78 mm.)	3·215″ to 3·216″ (81·66 mm. to 81·69 mm.)
Gudgeon Pin Hole	·75005″ to ·7503″ (19·05 mm. to 19·06 mm.)	·87505″ to ·8755″ (22·23 mm. to 22·24 mm.)

PISTON AND PISTON RING DATA—*contd.*

Piston Rings quantity	Compression	2	2
	Scraper	1	1
Width.	Compression	·0927″ to ·0937″ (2·36 mm. to 2·38 mm.)	·0615″ to ·0621″ (1·56 mm. to 1·58 mm.)
	Scraper	·186″ to ·187″ (4·72 mm. to 4·75 mm.)	·186″ to ·187″ (4·72 mm. to 4·75 mm.)
Thickness compression		·095″ to ·103″ (2·41 mm. to 2·62 mm.)	·123″ to ·129″ (3·12 mm. to 3·28 mm.)
,,	Scraper	·117″ to ·125″ (2·97 mm. to 3·18 mm.)	·105″ to ·113″ (2·67 mm. to 2·87 mm.)
Width of Scraper Groove		·112″ (2·85 mm.)	·112″ (2·85 mm.)
Depth of Scraper Groove		·024″ (·61 mm.)	·021″ (·53 mm.)

SPARKING PLUGS. It is recommended that new sparking plugs be fitted at overhauls, Champion N.8 on 2½ litre and Champion L.10 on 3½ litre. Gap setting ·025″ (·64 mm.). If existing plugs are used these should be cleaned by sand blasting and tested using Champion plug cleaning and testing equipment.

STARTER MOTOR. Factory reconditioned starters are available on an exchange basis. Should it be desired to overhaul the existing starter, servicing instructions will be found in Section P, "Electrical."

SUMP. Examine the casting for any flaws or cracks and check the machined flange face for truth and freedom from burrs.

TESTING. It is recommended that wherever possible, overhauled engines should be bench tested before installation in the chassis. Recommended periods and loads are as follows :—

4 hours at 1,500 r.p.m. without load.
30 minutes at 1,600 r.p.m. on full load.
30 minutes at 2,000 r.p.m. on full load.
1 hour at 2,500 r.p.m. on full load.
5 minutes at 3,000 r.p.m. on full load when output should approximate to 2½ litre 78 b.h.p. and 3½ litre 104 b.h.p.

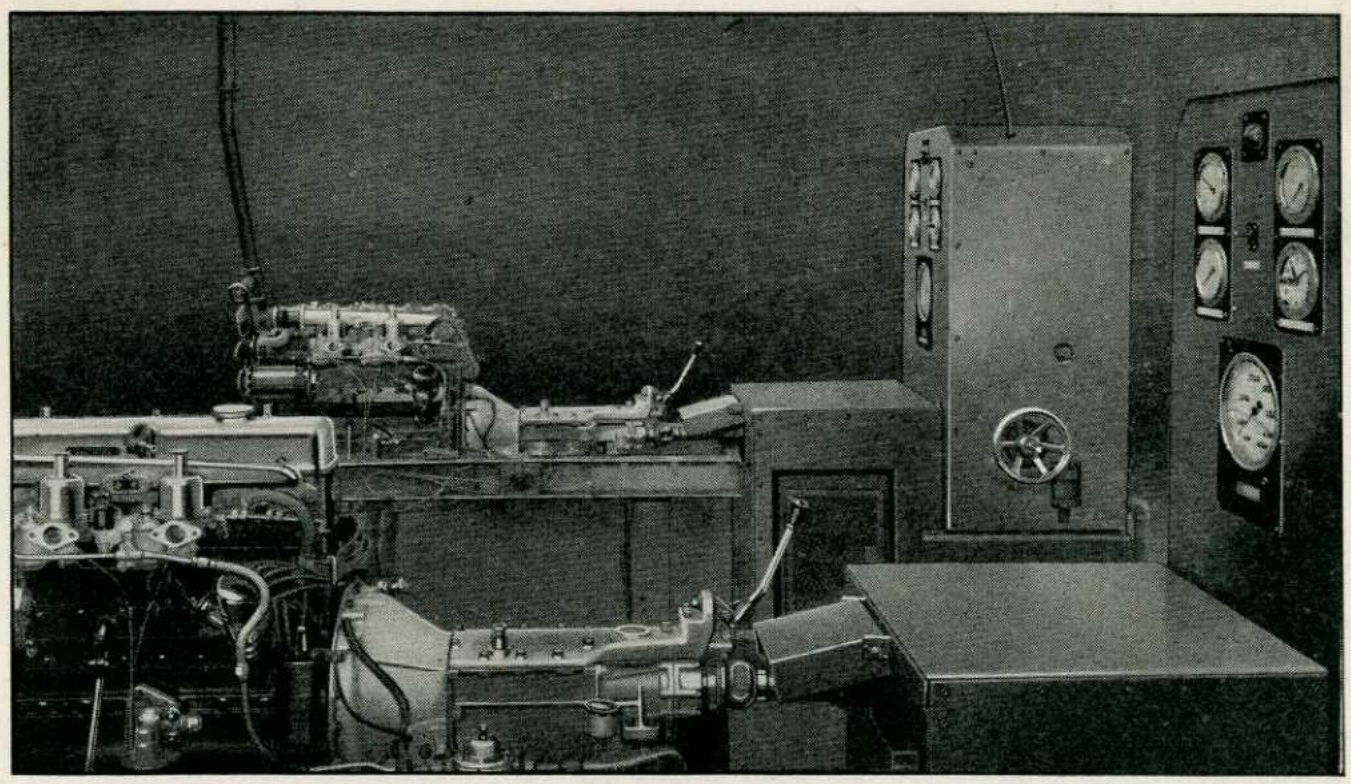


PLATE B.34. BENCH TESTING

THERMOSTAT. Factory reconditioned thermostats are available on an exchange basis and it is recommended that a new unit is fitted when overhauls are undertaken.

THERMOSTAT DATA

Part No. C.527/1. Hot Climates.
Commences to open 65°C. Fully open 75°C.
Part No. C.527/2. Temperate Climates.
Commences to open 75°C. Fully open 85°C.
Valve Lift $\frac{5}{16}$".

TIMING GEAR. If the chain shows signs of stretching or wear a new one should be fitted. If the chain is renewed it is essential to also replace crankshaft and camshaft sprockets and the chain tensioner. If a new chain is fitted to worn sprockets, or vice versa, rapid wear of all components in the assembly will occur. Always renew the tensioner spring blade and contact fingers. (Plate B.24.)

If, when resetting the timing, it is found that with the wheels in position it is not possible to get the timing sufficiently accurate, one tooth movement of the chain giving too great a correction, the camshaft wheel should be removed and replaced with the setscrews in the other two holes which will set the wheel half a tooth out from the original position.

If this is still not correct the wheel may be reversed, which, owing to the manner of drilling, will give two further positions making an adjustment to a quarter of a tooth. (For valve timing, see below.)

The timing cover should be replaced in the following manner to ensure correct oil retention and quiet running. First replace the cover with the securing screws just holding, then place a drop of oil on the inside of the crankshaft pulley (centre for damper in the case of $3\frac{1}{2}$ litre), and fit the pulley on the shaft but with the key removed. The pulley (or centre for damper) will not rotate freely by hand if it rubs the hole in the timing cover, in which case centralise the cover until clearance is effected and then tighten the securing screws. It is advisable to recheck for pulley (or centre for damper) freedom after tightening the cover screws. (Plates B.25 and B.26.)

Ensure that the fibre sealing washer is replaced on the timing cover centre support stud before the timing cover is replaced or oil leakage at this point will be experienced.

TIMING CHAIN AND WHEELS. DATA

	$2\frac{1}{2}$ and $3\frac{1}{2}$ Litre
Chain Type	Duplex Flat Back
Pitch	$\frac{3}{8}$" (9·53 mm.)
Number of pitches	58
Crankshaft Sprocket Teeth	21
Camshaft Sprocket Teeth	42

TIMING. VALVE. Adjust No. 1 cylinder valves to the special valve timing clearance of ·020" (·51 mm.) and set the timing as follows :—

Inlet valve opens 10° before top dead centre.
Inlet valve closes 50° after bottom dead centre.
Exhaust valve opens 50° before bottom dead centre.
Exhaust valve closes 10° after top dead centre.

Observe that the camshaft chain wheel is located by two setscrews. Removing the wheel and replacing with the other two holes in the wheel on the setscrews will set the wheel half a tooth out from its original position. If the wheel is removed and reversed two further positions are available, giving adjustment to a quarter of a tooth. (Plate B.24.)

Reset valves to running clearances of Inlet ·012" (·31 mm.) Exhaust ·015" (·38 mm.), Cold.

A timing arrow is stamped on the rim of the flywheel and when lined up with the centre point of the top dowel of the clutch bell housing indicates top dead centre for No. 1 cylinder, No. 1 cylinder being at the rear of the engine, that is, the flywheel end. (Plate B.35.)

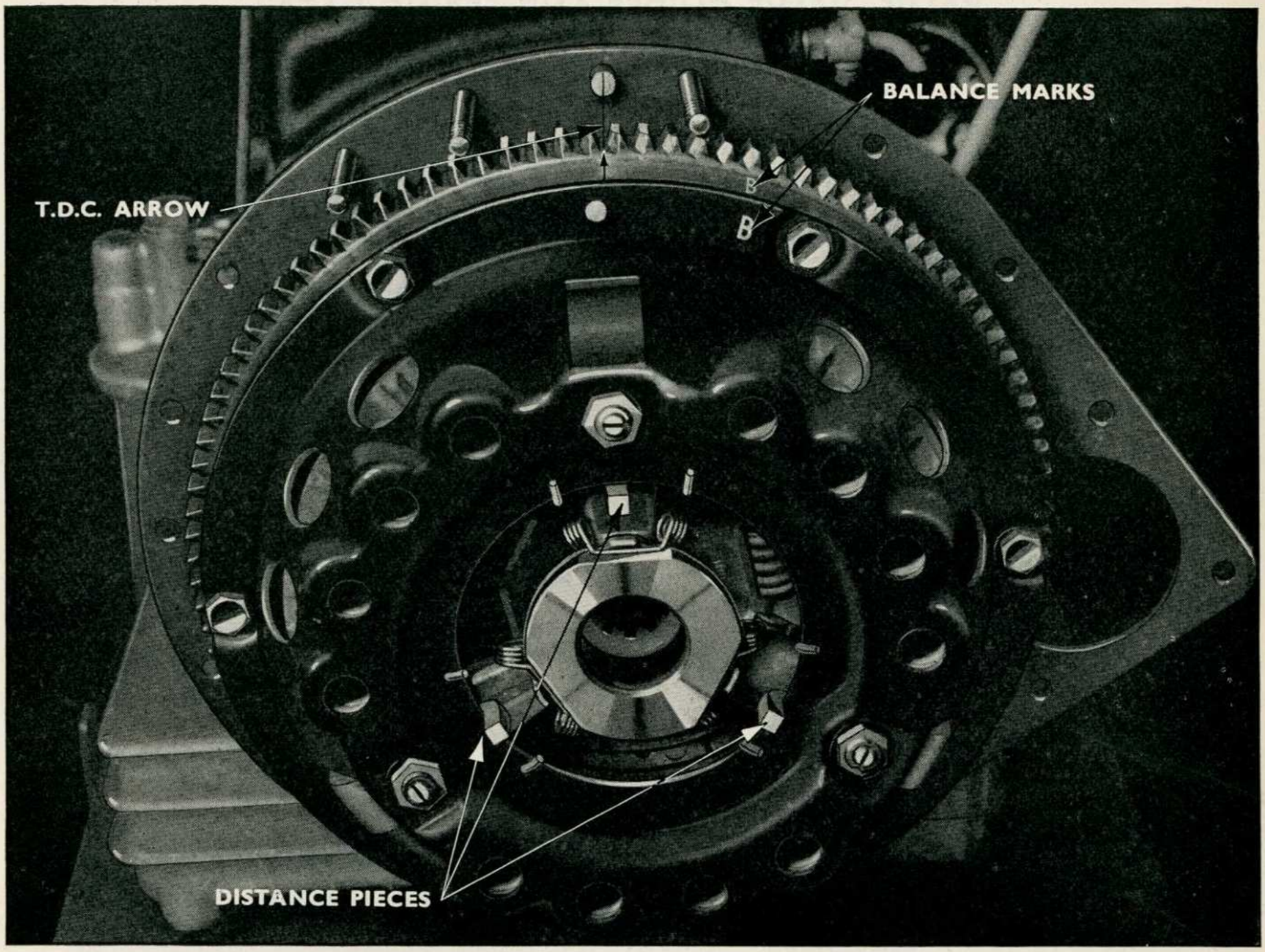


PLATE B.35. FLYWHEEL. TOP DEAD CENTRE ARROW

TIMING. IGNITION. Ensure that the vacuum and centrifugal advance mechanisms are in the fully retard positions and set the ignition timing to fire 5° before T.D.C. (top dead centre) with the micrometer adjustment in the neutral position, that is, with the datum line in the centre of the scale. This may require slight alteration when tested on the road. (See Engine Tuning, page B.61.) Observe that No. 1 cylinder is at the rear, that is, the flywheel end.

VALVES. Valves should be reconditioned using valve grinding equipment. Valve seat angle 30°. Renew valves on which stem wear exceeds ·003" (·08 mm.) Replace worn guides. Valve guides should be driven out upwards, using a suitable drift. Stem clearance in inlet guide ·002" to ·004" (·05 mm. to ·10 mm.), exhaust guide ·003" to ·005" (·08 mm. to ·13 mm.). When refitting, guides should be driven in from the top of the head until the guide protrudes $\frac{7}{8}$" (22·2 mm.) above the face of the valve spring recess on the top of the cylinder head.

Renew valve springs showing signs of fatigue. Observe that close coils of outer springs are fitted next to cylinder head, open coils to rocker arms.

Valve clearances Inlet ·012" (·31 mm.) Exhaust ·015" (·38 mm.) set when the engine is cold.

VALVE, VALVE GUIDES AND SPRING DATA

		2½ Litre	3½ Litre
Valve Head Diameter	Inlet	1 15/32" (37·31 mm.)	1 21/32" (42·07 mm.)
	Exhaust	1 11/32" (34·13 mm.)	1 15/32" (37·31 mm.)
Valve Stem Diameter		5/16" (7·94 mm.)	
Stem Clearance Guide	Inlet	·002" to ·004" (·05 mm. to ·10 mm.)	
	Exhaust	·003" to ·005" (·08 mm. to ·13 mm.)	
Total Length of Valve		5 43/64" (144·07 mm.)	5 23/32" (145·26 mm.)
Amount of Lift		5/16" (7·94 mm.)	
Valve Springs Free Length	Inner	2·35" (59·69 mm.)	
	Outer	2 7/8" (73·03 mm.)	
Maximum Working Length	Inner	1 13/16" (46·04 mm.)	
	Outer	1 7/8" (47·63 mm.)	
To Exert.	Inner	26 lbs. (11·8 kg.)	
	Outer	68 lbs. (30·8 kg.)	
Solid length not to exceed.	Inner	1·42" (36.07 mm.)	
	Outer	1·52" (38·61 mm.)	
Internal Diameter.	Inner	·684" (17·37 mm.)	
	Outer	1·062" (26·98 mm.)	
Rate Inner	Initial	48·5 lbs. in.	
	Final	78 lbs. in.	
Outer		69·4 lbs. in.	
Number of Free Coils.	Inner	10·5	
	Outer	7·5	
Valve Guides Length	Inlet	3 1/4" (82·55 mm.)	
	Exhaust	3 1/4" (82·55 mm.)	
Outside Diameter		5/8" (15·88 mm.)	
Inside Diameter		5/16" (7·94 mm·)	
Interference Fit		·001" to ·002" (·03 mm. to ·05 mm.)	

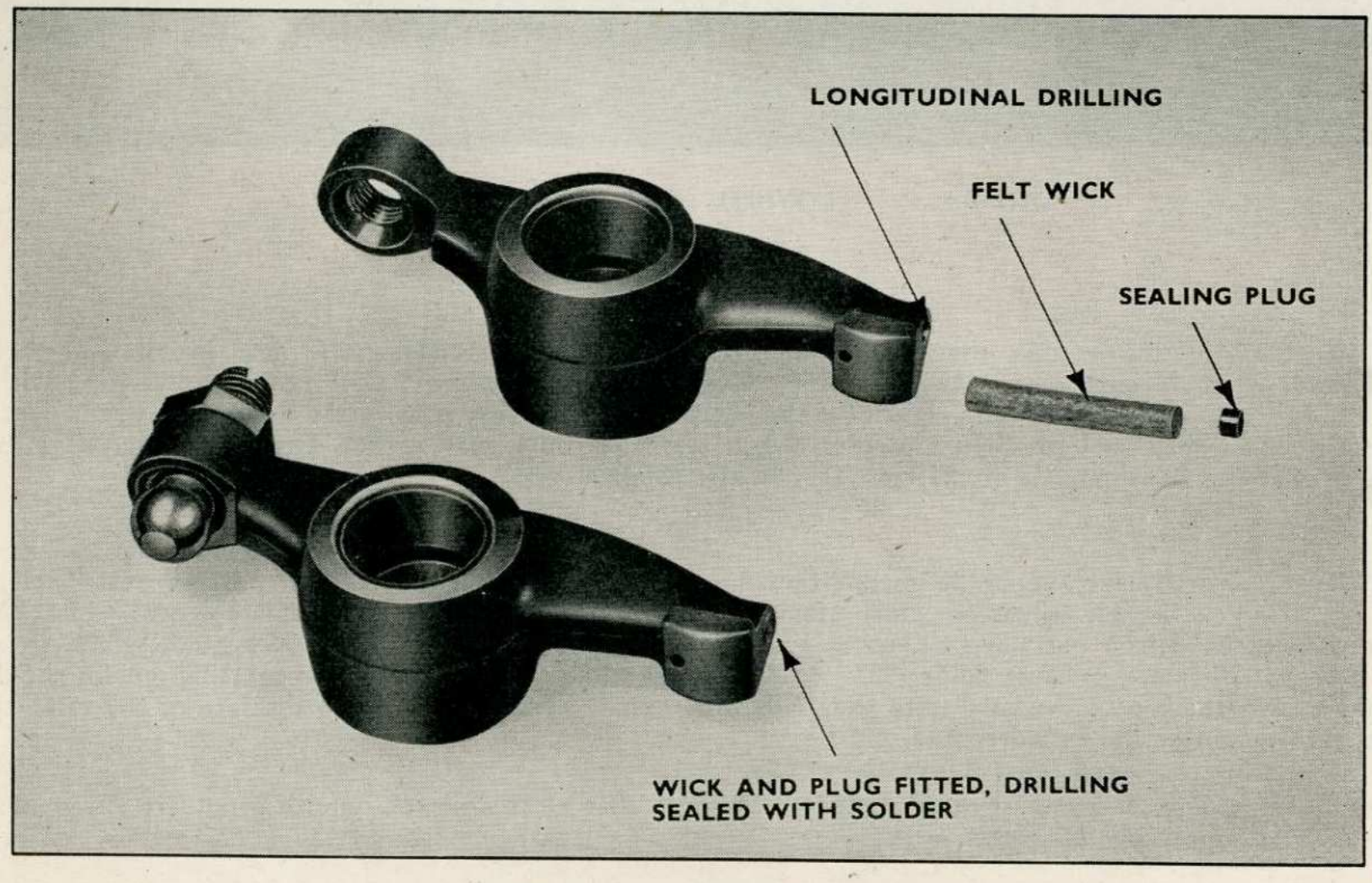


PLATE B.36. ROCKER ARM WICKS

VALVE GEAR. Tappets and tappet blocks should be examined and renewed if worn or if case hardening is flaking. Test push rods for truth and replace those showing misalignment. Examine rocker shaft for wear. Observe that oil feed down centre of rocker shaft feeds rocker arm bushes through small drillings in the shaft offset to the centre line of each rocker arm when the rocker is in its working position. Ground on top of these small drillings is a ·003" (·08 mm.) flat. Oil is fed across the flat into the annular groove provided in the rocker bush. Renew rocker shaft if worn.

Check rocker arms and rebush if necessary, note that each rocker arm is drilled longitudinally from pad to annular groove in bush and has a felt wick inserted in this drilling to control lubrication of rocker pads and valve guides, the hole being sealed by a plug and blob of solder. Renew felt wicks. Renew rocker adjusting screws which show wear on ball ends or damage in screwdriver slots or threads and lock nuts having damaged threads or hexagon faces.

It is essential that the bushed rocker arms are a good fit on the rocker shaft and that the oil control felt wicks are in sound condition or an excessive supply of oil will be delivered at the rocker assembly which may find its way down the valve guides causing excessive oil consumption.

VALVE TAPPET DATA

	$2\frac{1}{2}$ and $3\frac{1}{2}$ Litre
Total Length	$2\frac{1}{4}$" (57·15 mm.)
Total Diameter	$1\frac{5}{32}$" (29·37 mm.)
Tappet Clearance Inlet. (Cold)	·012" (·31 mm.)
Exhaust. (Cold)	·015" (·38 mm.)
Special Valve Timing Tappet Clearances	·020" (·51 mm.)

WATER HOSES. Examine all water hoses for cracking or interior deterioration and renew as necessary.

WATER PUMP. Factory reconditioned water pumps are available on an exchange basis and it is recommended that this service is utilised whenever overhauls are undertaken. If the existing water pump is to be overhauled the impellor spindle bushes, carbon sealing gland and fan spindle bearings should be examined and renewed if necessary. Detailed servicing instructions will be found in Section D, "Cooling System."

RECONDITIONED UNITS. Reference has been made in the preceding paragraphs to factory reconditioned units. The following assemblies are available, reconditioned to manufacturers' standards, on an exchange basis.

Carburettors
Clutch Units
Clutch Plates
Crankshafts
Distributors
Dynamos
Oil Pumps
Petrol Pumps
Starter Motors
Thermostats
Water Pumps

Engine Units. Supplied complete with : Rocker cover and oil filler cap, oil filter assembly, clutch assembly and release bearing, sparking plugs, fan, fan belt, water pump and by-pass hose, thermostat, water manifold, crankcase breather pipe, revolution counter drive and adaptor.

Components not included unless specified are : Induction and exhaust manifolds, mountings, dynamo, distributor and H.T. leads, carburettors and controls, gearbox, clutch bell housing, starter and coil.

It follows, therefore, that worn engines for return to the Factory under this scheme must conform to the above detail. In special cases complete engines comprising all the above components can be supplied.

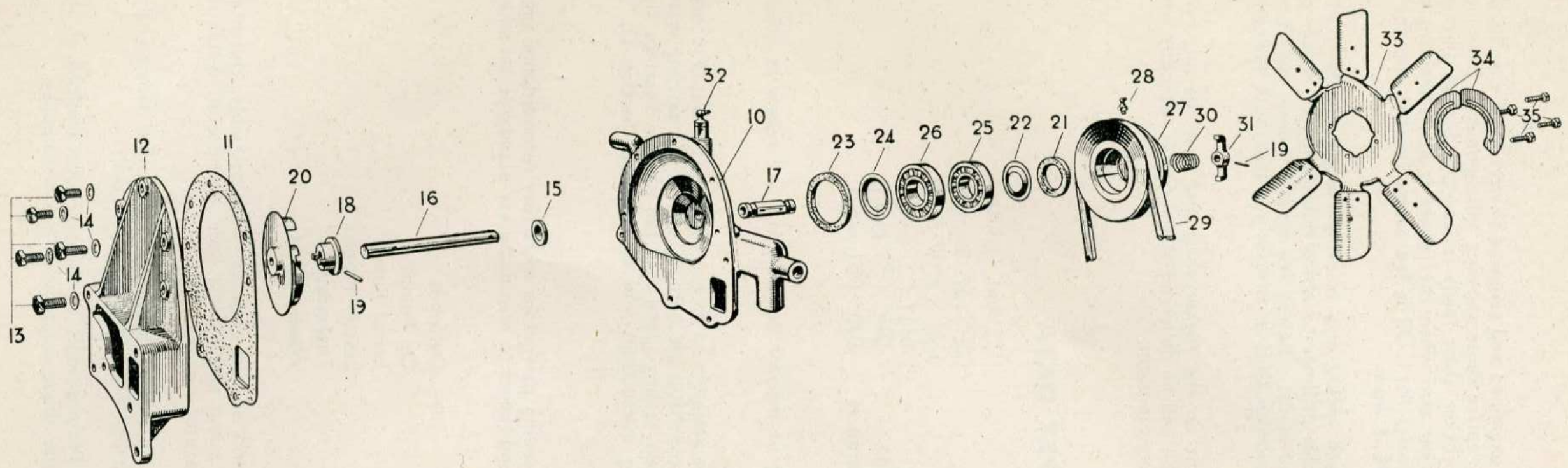


PLATE B.37. WATER PUMP AND FAN ASSEMBLY

Body, Water Pump	10
Washer, Jointing, between Body and Cover	11
Cover for Water Pump	12
Screw, Set, securing Cover to Pump	13
Washer, Shakeproof, on Setscrews	14
Gland	15
Spindle for Water Pump	16
Bush for Spindle	17
Piece, Driving, for Impellor	18
Pin (Mills Type GP.3) securing Driving Pieces	19
Impellor	20
Washer (Felt) Front	21
Disc for Front Felt Washer	22
Washer (Felt) Rear	23
Disc for Rear Felt Washer	24
Bearing, Ball, Rear (Hoffman S.9)	25
Bearing, Ball, Rear (Hoffman S.10)	26
Pulley, Fan	27
Nipple, Grease (Tec. HA.5) on Fan Pulley	28
Belt, Fan Driving	29
Spring for Pump Spindle	30
Piece, Driving, on Fan Pulley	31
Nipple, Grease, on Water Pump Body	32
Fan Assembly	33
Piece, Balance, for Fan	34
Screw, Set, securing Fan to Pulley	35

Remove Watermark Wondershare PDFelement

COMPONENTS. TO REMOVE AND REFIT

The preceding paragraphs have referred to operations carried out when the engine is removed from the chassis frame and the following instructions deal with the servicing of individual engine components when the engine is fitted to the car.

BREATHER. TO REMOVE, DISMANTLE AND REFIT

GENERAL. The 3½ litre engine is fitted with two breathers, one an aperture in the rocker cover which is connected to the air silencer and the other a vent pipe with adaptor bracket fitted to the tappet gallery plate. The former requires no maintenance and the following remarks refer to the tappet gallery plate breather. The tappet gallery plate breather only is not fitted to 2½ litre engines.

REMOVE BREATHER. Raise car on lift. Remove three nuts securing breather adaptor to tappet gallery plate. Remove adaptor complete with vent pipe.

DISMANTLING. The vent pipe is retained in the adaptor by a split fixing with clamp bolt and nut. Situated on the inside face of the tappet gallery plate is a baffle retained on the three adaptor mounting studs, which pass through the gallery plate, by nuts and spring washers.

Should it be necessary to remove the baffle plate the tappet gallery plate must first be withdrawn. (Page B.55.)

REFITTING. Refitting is the reverse of the above procedure. Observe that the breather pipe must be fitted correctly in the adaptor. Examination of the pipe will disclose that the cut-away at one end is cut at an angle of 30°, this is the top end, and the other end is cut at an angle of 45°, this being the bottom end. Fit the pipe to the adaptor with the high edge of the 30° cut-away next to the tappet gallery plate so that the high edge acts as a baffle to the outside of the aperture into the crankcase interior. With the pipe fitted in this manner the 45° cut-away at the bottom of the pipe will face the rear of the car. The pipe should be fitted as far as it will go into the adaptor before the clamp bolt is tightened. Care must be taken not to over-tighten the clamp bolt or fracture may occur.

CAMSHAFT. TO REMOVE AND REFIT

REMOVE BONNET. Release bonnet catches by pushing forward the controls situated at either side under the facia board, and with both bonnet top panels open remove two screws from centre hinge front "T" piece. Raise front of bonnet and remove forward.

REMOVE BONNET SIDE PANELS. Remove three countersunk screws from top face of both bonnet side panels and lift out panels. (Slide rubber sleeves off adaptors on radiator block and air conditioner motor and lift out heater air duct. Fitted only to early cars.) (Plates B.13 and B.14.)

DRAIN COOLING SYSTEM. Drain radiator block and engine by opening tap at offside (right hand) base of radiator block and tap at offside (right hand) rear of cylinder block. (Plates B.11 and B.12.) If anti-freeze mixture is in use conserve water. (On early cars radiator tap fitted at nearside (left hand) base of radiator and operated by remove control.)

REMOVE RADIATOR SHELL AND BLOCK ASSEMBLY. Disconnect tie rods from radiator header tank. Disconnect top and bottom water hoses. Remove two nuts securing base of radiator shell to front wing apron, observing distance rubbers fitted between shell and valance. Remove two bolts per side securing shell upper casing to bonnet side stays. Remove three bolts per side securing block lower casing to transverse wing stay. Remove two bolts per side securing shell lower casing to wings. Remove bolt from central main radiator mounting on chassis observing disposition of rubber washers. (Remove radiator drain tap. Later cars only.) Place pieces of thin fibre sheet, one on either side of the bottom of radiator shell, and lift assembly forward to rest on fibre whilst withdrawing drain tap (early cars only) and bottom outlet pipe from transverse wing stay, thus avoiding scratching front cellulose. Draw radiator upwards clear of car.

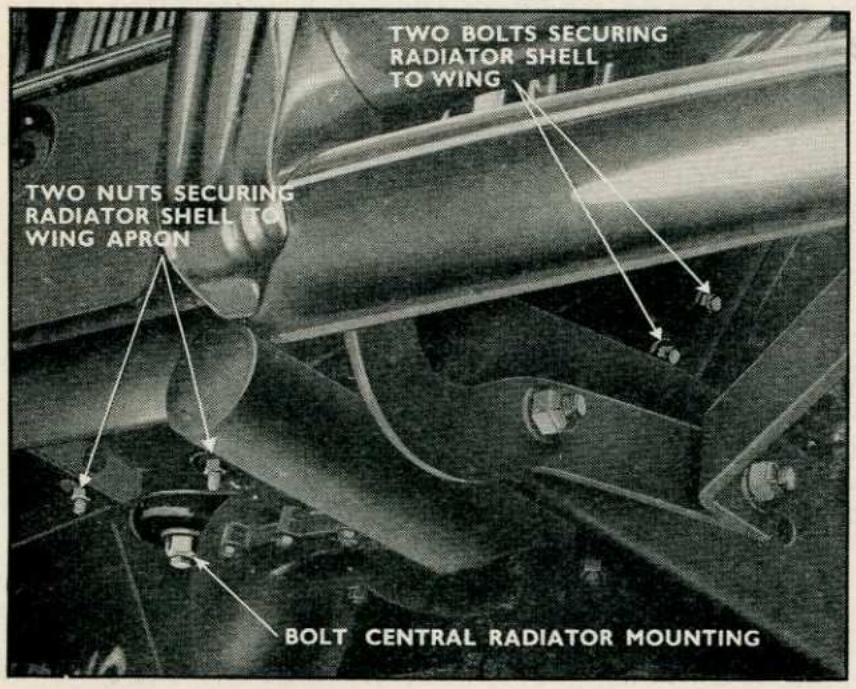


PLATE B.38

REMOVAL OF RADIATOR SHELL AND BLOCK ASSEMBLY

(Viewed from under)

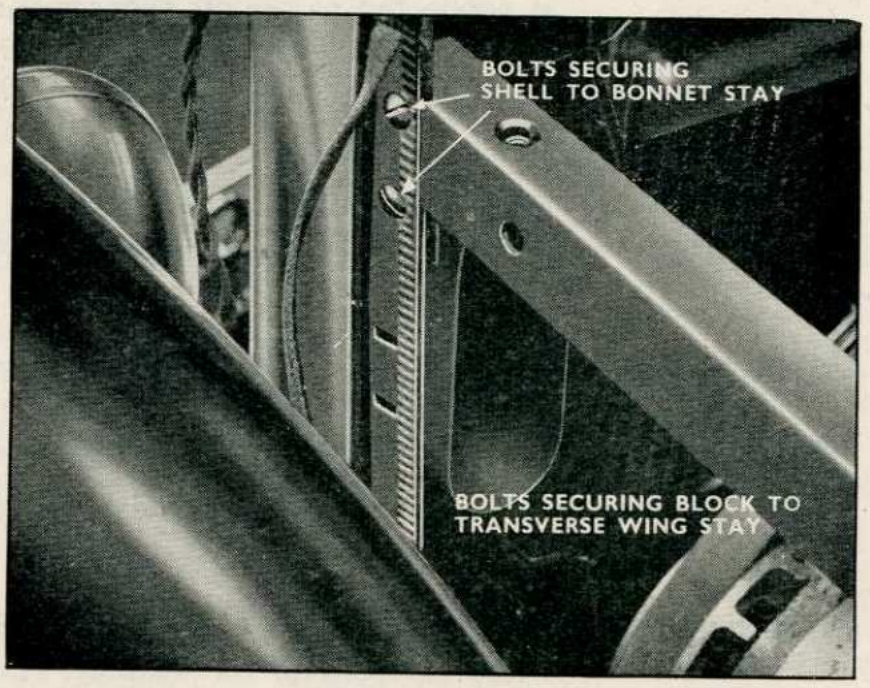


PLATE B.39

REMOVAL OF RADIATOR SHELL AND BLOCK ASSEMBLY

REMOVE AIR SILENCER AND MANIFOLD. Remove rocker cover centre dome nut and setscrew passing through steady bracket into front of air silencer. Remove silencer. Withdraw four nuts securing air silencer manifold to carburettor flanges. Remove manifold.

REMOVE DYNAMO. Disconnect battery positive lead. Remove dynamo connections noting that "Yellow" wire is connected to terminal "D" (large terminal) and "Yellow with Green" wire to terminal "F" (small terminal). Remove adjusting bolt situated at top of dynamo and swing dynamo towards engine to free fan belt. Disengage fan belt from dynamo pulley, remove two securing bolts situated under dynamo and lift out dynamo. (Plate B.8.)

REMOVE CARBURETTORS. Disconnect distributor vacuum feed pipe from front carburettor by unscrewing union. Disconnect petrol flexible feed pipe. Disconnect auxiliary starting carburettor solenoid wire at thermostat switch in water manifold. Disconnect solenoid feed wire. Unscrew auxiliary starting carburettor feed pipe union from cylinder head. Disconnect throttle linkage at rear flexible joint. Release overflow pipes. Remove four carburettor flange nuts and withdraw carburettors.

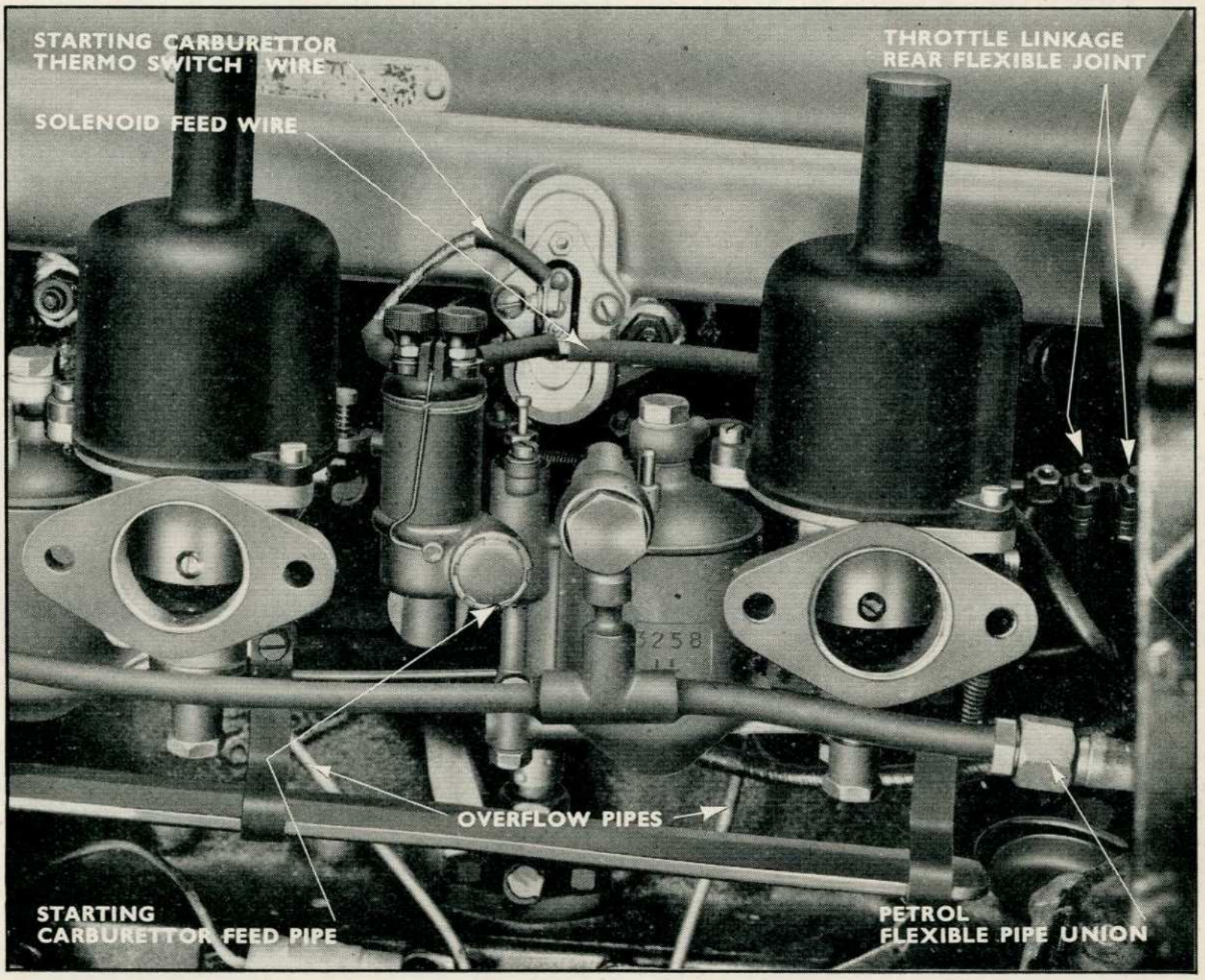


PLATE B.40. CARBURETTORS

REMOVE DISTRIBUTOR AND DRIVE GEAR. Disengage sparking plug high tension lead carriers from engine rear plate. Disconnect high tension leads from sparking plugs. Remove dowel bolt located under distributor in tappet cover plate boss. Release base plate setscrew and withdraw distributor. Remove tappet cover plate. Observe that this is located by dowels. Remove two setscrews passing through drive gear adaptor (thrust plate) now disclosed. Withdraw adaptor followed by gear, observing shims fitted under adaptor. When assembling the drive gear, it is essential to allow ·003" (·08 mm.) end float between drive gear and adaptor by correct shimming. The clearance can be checked with a pair of long-nosed pliers engaging the dog on the drive gear through the adaptor plate. If this clearance is not allowed, damage to the drive gear and camshaft will result. (Plate B.19.)

REMOVE OIL PUMP AND REVOLUTION COUNTER DRIVE GEAR. Remove revolution counter adaptor bracket situated on cylinder head of $2\frac{1}{2}$ litre and on cylinder block of $3\frac{1}{2}$ litre engines. Adaptor bracket is secured by three nuts on $2\frac{1}{2}$ litre and two nuts on $3\frac{1}{2}$ litre. Withdraw two setscrews from centre tappet block passing through drive gear thrust plate and slide thrust plate up and clear. Slide drive gear up shaft. Remove circlip from under drive gear and two Woodruff keys securing gear to shaft. Withdraw shaft upwards. (Plate B.20.)

REMOVE ROCKER GEAR. Remove two remaining rocker cover dome nuts and withdraw rocker cover. Remove nuts from rocker shaft posts and lift off rocker assembly. (Plate B.18.)

REMOVE TAPPET BLOCKS AND PUSH RODS. Lift out push rods. Remove two setscrews securing each tappet block and remove blocks. (Plate B.20.) On 2½ litre, observe that the tappet block bolts are not interchangeable, the two centre bolts being longer. If incorrectly fitted severe damage will be caused to cylinders and pistons.

REMOVE CRANKSHAFT PULLEY, 2½ LITRE. Release starter dog lock plate. Unscrew starter dog nut anti-clockwise, remove dog, shims and distance piece. Draw off crankshaft pulley. (Plate B.25.)

REMOVE VIBRATION DAMPER, 3½ LITRE. Remove two setscrews with distance pieces and draw off lock plate. Unscrew starter dog nut anti-clockwise, remove dog and shims. Remove six setscrews and withdraw flange portion of damper. Remove rubber loaded portion, which is secured by a split cone, by fitting a suitable tube over the end of the crankshaft and tap sharply. This will release the split cone and allow the damper to be withdrawn. Withdraw damper centre which is keyed to crankshaft. (Plate B.26.)

REMOVE TIMING COVER AND CAMSHAFT SPROCKET. Remove timing cover flange setscrews and nut from central support pillar. Withdraw timing cover. Remove two setscrews and withdraw camshaft sprocket.

REMOVE CAMSHAFT. Remove two setscrews securing camshaft front bearing. Withdraw camshaft complete with bearing.

ASSEMBLY. Refitting is the reverse of the above procedure. Camshaft permissible end float ·003" — ·006" (·08 mm. to ·15 mm.). End float is controlled by front bearing which must be machined to increase end float and renewed to reduce float. On 2½ litre the tappet block bolts are not interchangeable, the two centre bolts being longer. If incorrectly fitted severe damage will be caused to cylinders and pistons. Refer to page B.44 for instructions regarding centralising timing cover to ensure quiet running and correct oil retention.

CONNECTING ROD BEARINGS. TO REMOVE AND REFIT

REMOVE SUMP. Raise car on lift to a height convenient for working under the engine. Drain sump, remove twenty-two retaining setscrews and remove sump.

REMOVE BEARINGS. Remove connecting rod bearing cap nuts and withdraw bearing caps observing that caps and rods are numbered to ensure correct mating on assembly. Lift connecting rods off crankshaft journals and withdraw top bearing shells. Note that on connecting rods which have the oil feed pipe to the little end offset from the centre line of the rod the feed pipe should face the front of the engine when the rods are fitted.

ASSEMBLY. Assembly is the reverse of the above procedure. Note that bearings are precision shell type and under no circumstances must these be hand scraped or the bearing caps filed. Clearance of bearing on vertical distance ·001" to ·0025" (·03 mm. to ·07 mm.). Connecting rod bearing maximum tightening torque 350 lbs. in.

CRANKSHAFT VIBRATION DAMPER. (3½ LITRE ONLY) TO REMOVE AND REFIT

REMOVE BONNET. Release bonnet catches by pushing forward the controls situated at either side under the facia board, and with both bonnet top panels open remove two screws from centre hinge front "T" piece. Raise front of bonnet and remove forward.

REMOVE BONNET SIDE PANELS. Remove three countersunk screws from top face of each bonnet side panel and lift out side panels. (Slide rubber sleeves off adaptors on radiator block and air conditioner motor and lift out heater air duct. Fitted only to early cars.)

REMOVE RADIATOR SHELL AND BLOCK ASSEMBLY. Disconnect tie rods from radiator header tank. Disconnect top and bottom water hoses. Remove two nuts securing base of radiator shell to front wing valance, observing distance rubbers fitted between shell and valance. Remove two bolts per side securing shell upper casing to bonnet side stays. Remove three bolts per side securing block lower casing to transverse wing stay. Remove two bolts per side securing shell lower casing to wings. Remove bolt from central main radiator mounting on chassis observing disposition of rubber washers. (Remove drain tap, later cars only.) Place pieces of thin fibre sheet, one on either side of the bottom of radiator shell, and lift assembly forward to rest on fibre whilst withdrawing drain tap (early cars only) and bottom outlet pipe from transverse wing stay thus avoiding scratching front apron cellulose. Draw radiator upwards clear of car. (Plates B.38 and B.39.)

REMOVE DAMPER. Remove two setscrews with distance pieces and draw off lock plate. Unscrew starter dog nut anti-clockwise, remove dog and shims. Remove six setscrews and withdraw flange portion of damper. Remove rubber loaded portion, which is secured by a split cone, by fitting a suitable tube over the end of the crankshaft and tap sharply. This will release the split cone and allow the damper to be withdrawn. Withdraw damper centre which is keyed to crankshaft. (Plate B.26.)

ASSEMBLY. Assembly is the reverse of the above procedure. Observe that the damper centre must not rub the hole in the timing cover or oil retention and quiet running will be affected. To centralise, loosen the timing cover setscrews until they are just holding. The damper centre will not rotate freely by hand, with the key removed, if it rubs the hole in the cover in which case centralise the cover until clearance is effected and then tighten the securing screws. Recheck after tightening.

CYLINDER HEAD. TO REMOVE AND REFIT

REMOVE BONNET. Release bonnet catches by pushing forward the controls situated at either side under the facia board, and with both bonnet top panels open remove two screws from centre hinge front "T" piece. Raise front of bonnet and remove forward.

REMOVE BONNET SIDE PANELS. Remove three countersunk screws from top face of each bonnet side panel and lift out side panels. (Slide rubber sleeves off adaptors at radiator block and air conditioner motor and lift out heater air duct. Fitted only to early cars.) (Plates B.13 and B.14.)

DRAIN COOLING SYSTEM. Drain radiator block and engine by opening tap at base of radiator and tap at right-hand rear of engine block. (Plates B.11 and B.12.) If anti-freeze mixture is in use, conserve water. Disconnect top water hose from thermostat housing.

REMOVE AIR SILENCER AND MANIFOLD. Remove rocker cover centre dome nut and setscrew passing through steady bracket into front of air silencer. Remove silencer. Withdraw four nuts securing air silencer manifold to carburettor flanges. Remove manifold.

DISCONNECT CONTROLS. Disconnect battery positive lead. Remove thermometer element from thermostat and tie clear. Disconnect throttle linkage at rear flexible joint and remove coupling rod from bush on dash, together with lever and spring. Disconnect petrol feed pipe from carburettors. Remove heater hoses and pipes from rear of engine. Disconnect feed wire to self starting carburettor solenoid. Disconnect revolution counter cable at elbow drive, $2\frac{1}{2}$ litre models only. Disconnect exhaust down pipes by removing nuts from flange couplings. Disconnect distributor high tension leads from sparking plugs and remove sparking plugs. Disconnect by-pass hose from thermostat housing to water pump. Disconnect rocker gear feed pipe. Release radiator centre tie rod at front and place clear. (Plates B.15 and B.16.)

REMOVE ROCKER GEAR. Remove two remaining rocker cover dome nuts and withdraw rocker cover. Remove nuts from rocker shaft posts and remove rocker assembly. (Plate B.18.) Lift out push rods.

REMOVE CYLINDER HEAD. Remove cylinder head nuts starting at the centre and working outwards. (See Plates B.21 and B.22.) Slacken the nuts only a quarter of a turn each initially, until they become free, to prevent strain on studs and distortion of cylinder head. Remove cylinder head.

ASSEMBLY. Assembly is the reverse of the foregoing procedure. Compression plates are used on all $3\frac{1}{2}$ litre engines, but not on $2\frac{1}{2}$ litre. Where the plate is used two cylinder head corrujoint gaskets are necessary, one fitted above and one below the plate. Always use a new cylinder head joint, or joints, and observe that this is marked to indicate correct fitting, however, it is advantageous to offer up the gasket before fitting to ensure that the markings are correct. Jointing compound should be used sparingly round the water apertures only.
See page B.27 for sequence of tightening cylinder head nuts and page B.37 for tightening torque data.

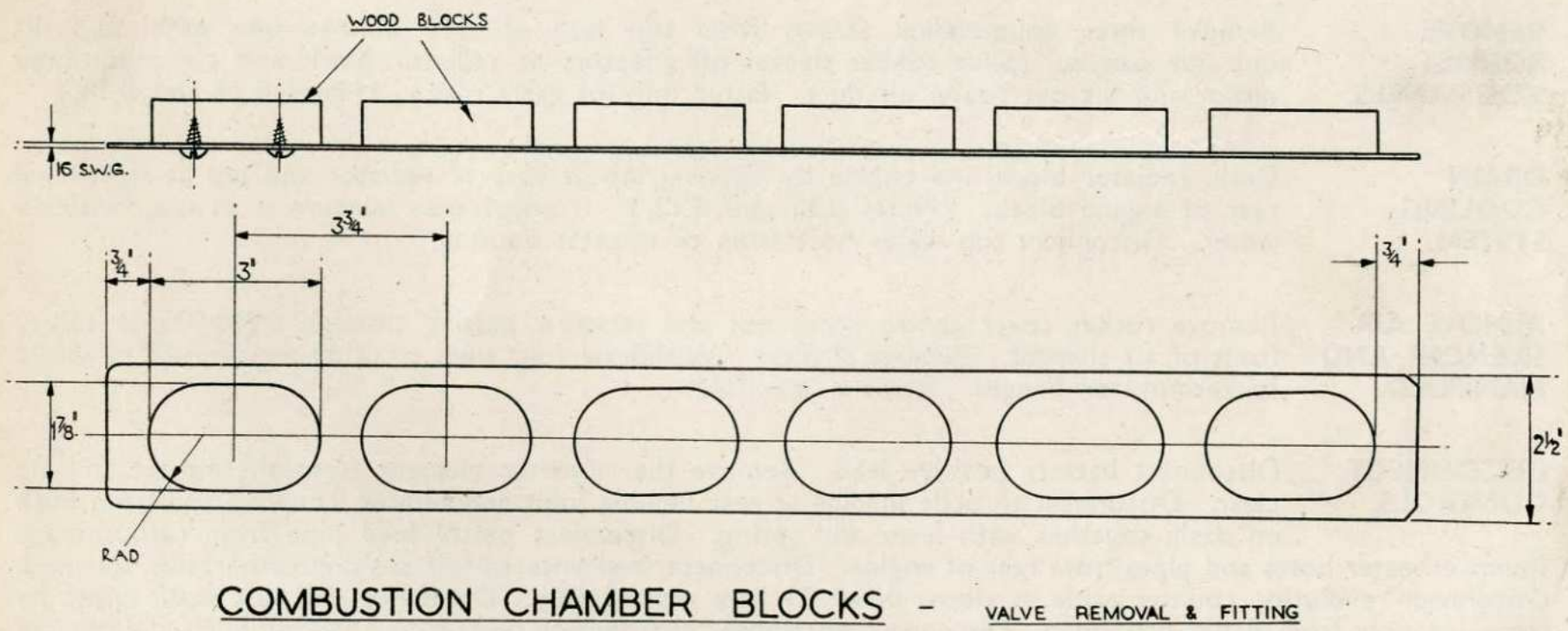
DECARBONISE AND GRIND VALVES

REMOVE CYLINDER HEAD. Remove bonnet, drain engine, disconnect controls and remove cylinder head as described in paragraph "Remove Cylinder Head," page B.53.

DECARBONISE AND GRIND VALVES. With the head on the bench remove exhaust manifolds and carburettors. Remove the core plugs from either end of the induction passage passing through the head. Remove valves by inserting combustion chamber blocks (Plate B.41) in the combustion chambers when the valve springs can be compressed and the split cones extracted followed by collars, springs and valves. Observe that valves are numbered and must be replaced in original locations, No. 1 cylinder being at the rear, that is, the flywheel end.

Remove all traces of carbon from the combustion chambers and deposits from the carburettor ports, exhaust ports and induction passage. Thoroughly clean the water passages in the cylinder head. Clean the carbon deposit from the piston crowns and ensure that the top face of the cylinder block is quite clean, particularly round the cylinder head studs.

Remove any pitting in valve seats using valve seat grinding equipment. Reface the valves, if necessary, using valve grinding equipment; grind the valves to the valve seats using a suction valve grinding tool. Clean the sparking plugs by sand-blasting and set gaps to ·025" (·64 mm.). Use Champion plug cleaning and testing equipment, if possible. Clean and adjust distributor contact breaker points to ·012" (·31 mm.).



COMBUSTION CHAMBER BLOCKS - VALVE REMOVAL & FITTING

PLATE B.41

ASSEMBLY. Assembly is the reverse of the above procedure. Observe that close coils of outer valve springs are fitted next to cylinder head, open coils to rocker arms. Pay particular attention to the remarks on previous page, "Cylinder Head. To Remove and Refit." Ensure that new core plugs are fitted to the ends of the induction passage. Pull down the cylinder head starting at the centre and working out, finally tightening the nuts a little at a time to prevent damage and distortion. (Cylinder head nut tightening torque, page B.37.) Valve clearances Inlet ·012" (·31 mm.), Exhaust ·015" (·38 mm.), Cold. Refer to page B.61, "Engine Tuning," for recommendations in regard to adjusting valves when tappets are on the back of the cam.

N.B. : Core plugs may be removed by striking the centre of the plug using a hammer and punch. This will cause the core plugs to assume a concave shape when they will free and can be removed. When fitting replacement core plugs ensure that the lip of the core plug aperture in the cylinder head is quite clean and free from burrs and tap in the replacement core plug gently. Continue to tap the convex face of the core plug until plug is secure.

DISTRIBUTOR AND DRIVE GEAR. TO REMOVE AND REFIT

REMOVE AIR SILENCER AND MANIFOLD. Remove rocker cover centre dome nut and setscrew passing through steady bracket into front of air silencer. Remove silencer. Withdraw four nuts securing air silencer manifold to carburettor flanges. Remove manifold.

REMOVE DYNAMO. Disconnect battery positive lead. Remove dynamo connections noting that "Yellow" wire is connected to terminal "D" (large terminal) and "Yellow with Green" wire to terminal "F" (small terminal). Remove adjusting bolt situated at top of dynamo and swing dynamo towards engine to free fan belt. Disengage fan belt from dynamo pulley, remove two securing bolts situated under dynamo and lift out dynamo.

REMOVE CARBURETTORS. Disconnect distributor vacuum feed pipe from front carburettor by unscrewing union. Disconnect petrol flexible feed pipe. Disconnect auxiliary starting carburettor solenoid wire at thermostat switch in water manifold. Disconnect solenoid feed wire. Unscrew auxiliary starting carburettor feed pipe union from cylinder head. Disconnect throttle linkage at rear flexible joint. Release overflow pipes. Remove four carburettor flange nuts and withdraw carburettors. (Plate B.40.)

REMOVE DISTRIBUTOR. Disengage sparking plug high tension lead carriers from engine rear plate. Disconnect high tension leads from sparking plugs. Remove dowel bolt located under distributor in tappet cover plate boss. Release base plate setscrew and withdraw distributor.

REMOVE DISTRIBUTOR DRIVE GEAR. Remove tappet cover plate. Observe that this is located by dowels. Remove two setscrews passing through drive gear adaptor (thrust plate) now disclosed. Withdraw adaptor followed by gear observing shims fitted under adaptor. (Plate B.19.)

When assembling the drive gear it is essential to allow ·003" (·08 mm.) end float between drive gear and adaptor by correct shimming. The clearance can be checked with a pair of long-nosed pliers engaging the dog on the drive gear through the adaptor plate. If this clearance is not allowed, damage to the drive gear and camshaft will result.

ASSEMBLE. Assembly is the reverse of the above procedure.

DYNAMO. TO REMOVE AND REFIT

REMOVE. Disconnect battery positive lead. Remove dynamo connections noting that "Yellow" wire is connected to terminal "D" (large terminal) and "Yellow with Green" wire to terminal "F" (small terminal). Remove adjusting bolt situated at top of dynamo and swing dynamo towards engine to free fan belt. Disengage fan belt from dynamo pulley, remove two securing bolts situated under dynamo and lift out dynamo.

REFIT. Assembly is the reverse of the above procedure. Lever the dynamo until tension on the fan belt is just obtained before finally tightening mounting bolts. Undue tension will create heavy wear of belt, pulleys and dynamo bearings.

EXHAUST MANIFOLDS. TO REMOVE AND REFIT

REMOVE. Disconnect down pipes by removing four nuts at each flange fitting on the respective exhaust manifolds. Remove nuts from exhaust port flanges and remove manifolds. (Plate B.16.)

REFIT. Refitting is the reverse of the above procedure.

FAN. TO REMOVE AND REFIT

REMOVE. Observe balance pieces fitted under setscrews. Mark location of balance pieces, remove four setscrews and withdraw fan.

REFIT. Offer up the fan with balance pieces correctly located and bolt into position. (Plate B.37.)

FAN BELT. TO REMOVE AND REFIT

REMOVE. Release adjusting bolt situated on top of dynamo, and two securing bolts under dynamo. Swing dynamo towards engine and disengage fan belt from dynamo pulley. (Plate B.8.) Remove belt from crankshaft pulley and withdraw over fan.

REFIT. Assembly is the reverse of the above procedure but it is important to ensure that, due to the construction of the belt, this is not stretched over the pulleys other than by hand. If a tool is used to lever the belt on or off rupture will occur.

FAN BELT. TO ADJUST

ADJUST. Lever the dynamo until tension is just obtained with the adjusting bolt situated on top and the two securing bolts situated under the dynamo released. Tighten all bolts. (Plate B.8.) Undue tension will create heavy wear of belt, pulleys and dynamo bearings.

MOUNTINGS. TO REMOVE AND REFIT

LOCATION. The engine is supported on rubber mountings situated as follows. One on either side of the front bearer plate and located on platforms attached to the chassis behind the front cross member. One rear mounting under the gearbox extension and located on the chassis forward cruciform members.

REMOVAL FRONT. Take the weight of the engine under the sump with a suitable packing interposed to prevent sump damage. Release exhaust down pipes. Remove two bolts securing mountings on either side to the chassis platforms and three bolts on either side securing the mounting to the front engine plate. Raise engine slightly and remove mountings.

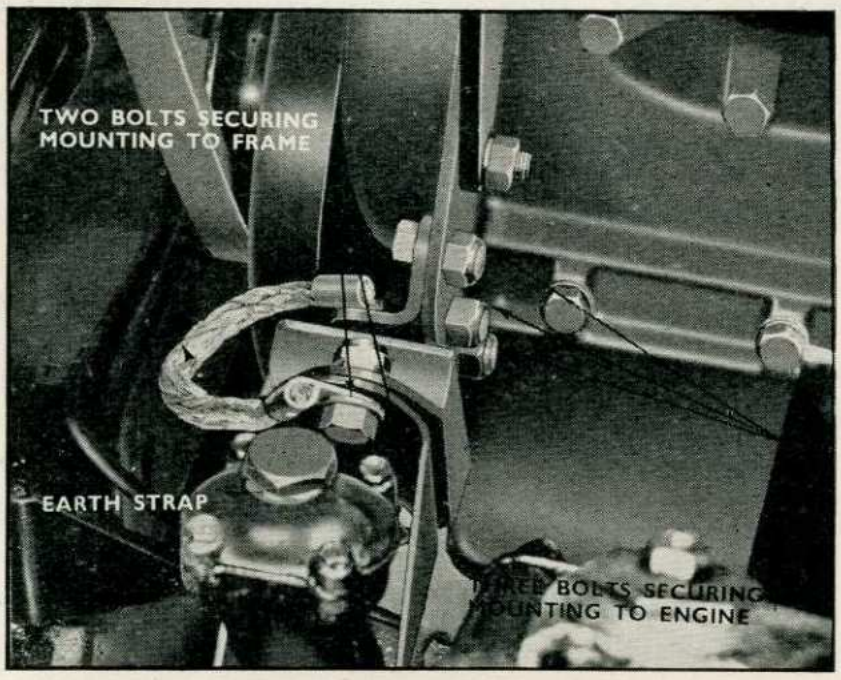


PLATE B.42. ENGINE. FRONT MOUNTING

REPLACEMENT FRONT. Replacement is the reverse of the foregoing procedure. Ensure that the earth bonding strip is replaced on the one mounting and the two earth wires on the other.

REMOVAL REAR. Take the weight of the engine under sump with suitable packing interposed to prevent sump damage. Release exhaust down pipes. Remove four bolts securing mounting bracket to chassis frame and four bolts securing mounting to gearbox extension. Remove mounting and bracket.

REPLACEMENT REAR. Replacement is the reverse of the above procedure.

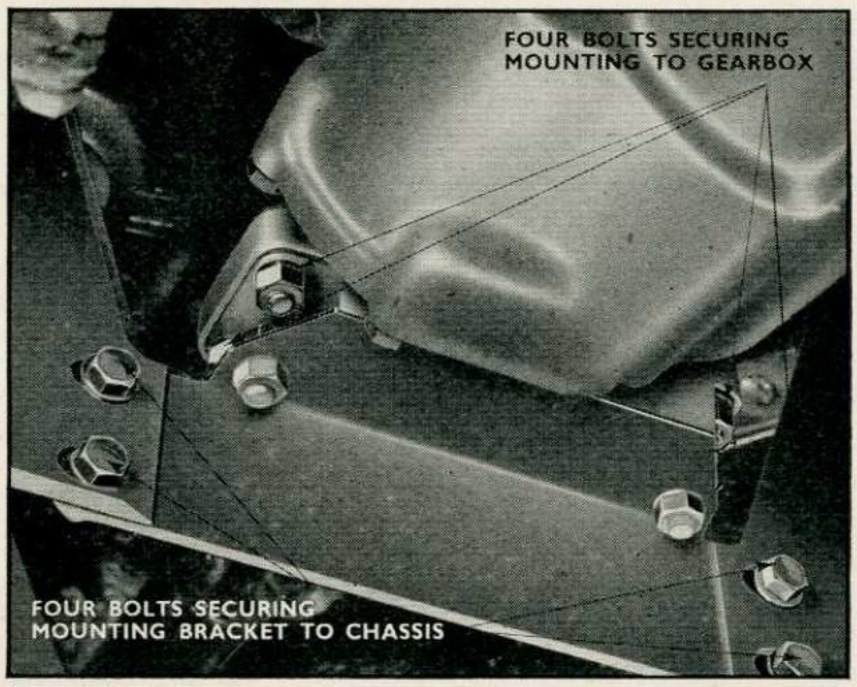


PLATE B.43. ENGINE. REAR MOUNTING

OIL FILTER ASSEMBLY. TO REMOVE AND REFIT

REMOVAL. Remove four nuts securing assembly to cylinder block and withdraw assembly complete. (Plate B.9.)

REFITTING. Refitting is the reverse of the above procedure. Note that a new gasket must always be used on assembly.

OIL FILTER ELEMENT. TO REMOVE AND REFIT

REMOVAL. Slacken bolt situated on top of body securing canister to body. Withdraw canister, complete with element, downwards. (Plate B.9.)

REFITTING. Refitting is the reverse of the above procedure. Renew the rubber sealing ring on top of the canister if this is distorted or damaged. It has been found that with low quality fuels certain fractions remain unburned and contaminate the oil, inducing a tendency to sludge formation, which has the effect of blocking the oil filter element. It is important, therefore, to clean the element by thoroughly rinsing in petrol every 2,500 miles (4,000 kilometres), and renew the element every 5,000 miles (8,000 kilometres).

OIL PRESSURE. TO ADJUST

LOCATION. The oil pressure release valve assembly is incorporated in the oil filter assembly body. (Plate B.32.)

ADJUSTMENT. Remove dome nut and washer. Adjustment is carried out at the screw now disclosed which can be rotated when the locknut is released. Rotating clockwise increases and anti-clockwise decreases the pressure. (Plate B.32.) A satisfactory oil pressure is between 40 and 60 lbs. per square inch at 2,500 r.p.m. when the engine is at normal operating temperature and not less than 20 lbs. per square inch at maintained high r.p.m. It is important to note that due to the setting of the by-pass valve incorporated in the body of the filter assembly, blockage of the oil filter element will cause a fall in oil pressure and the possibility of a fluctuating reading on the oil pressure gauge. Service the element at the recommended intervals. Page B.18.

OIL PRESSURE RELEASE VALVE. TO REMOVE, DISMANTLE AND REFIT

REMOVAL. Unscrew the hexagon head of the release valve assembly, which is situated next to the filter body, until the assembly can be withdrawn.

DISMANTLE. Grip the assembly by the hexagon head, unscrew the dome nut and release the lock nut. Unscrew the adjuster and withdraw adjuster, spring and plunger. (Plate B.32.)

ASSEMBLY. Assembly is the reverse of the above procedure. Ensure that the fibre washer is fitted under the assembly and next to the filter body. Two further washers should be fitted, one on either side of the locknut.

OIL PUMP. TO REMOVE, DISMANTLE AND REASSEMBLE

REMOVAL. Drain sump. Withdraw setscrews and remove sump. Remove three bolts securing pump to cylinder block. Withdraw pump complete.

DISMANTLE. Remove four setscrews passing through gauze filter into body of pump. Remove filter, end plate, pump driving and driven gears. (Plate B.33.)

ASSEMBLY. Assembly is the reverse of the above procedure. Clearance between end of gears and cover should be ·0015" (·04 mm.) to ·0035" (·09 mm).

PISTONS AND CONNECTING RODS. TO REMOVE AND REFIT

REMOVAL. Drain sump. Withdraw setscrews and remove sump. Remove big end bearing caps, observing that caps and connecting rods are numbered to ensure correct reassembly, No. 1 cylinder being located at the rear of the engine, that is, the flywheel end.

Note that on connecting rods which have the oil feed pipe to the little ends offset from the centre line of the rod the feed pipe should face the front of the engine when the rods are fitted.

On $2\frac{1}{2}$ litre the pistons must be withdrawn downwards since the connecting rod big ends will not pass up the bores. On $3\frac{1}{2}$ litre the pistons will not pass the crankshaft and must be withdrawn upwards.

Proceed as follows :—

$2\frac{1}{2}$ Litre. Do not remove the cylinder head. Pull connecting rod and piston downwards until clear of the bore and tilt the piston until it lies along the crankshaft webb. Rotate the crankshaft withdrawing the piston at the same time.

$3\frac{1}{2}$ Litre. Remove the cylinder head as described in paragraph "Cylinder Head. To Remove and Refit," page B.53. Remove big end bolts from connecting rods and withdraw pistons and connecting rods upwards through the bores.

PUSH RODS AND TAPPET BLOCKS. TO REMOVE AND REFIT

REMOVE BONNET. Release bonnet catches by pushing forward the controls situated at either side under the facia board, and with both bonnet top panels open remove two screws from centre hinge front "T" piece. Raise front of bonnet and remove forward.

REMOVE BONNET LEFT-HAND SIDE PANEL. Remove three countersunk screws from top face of nearside (left-hand) bonnet side panel and lift out side panel. (Plates B.13 and B.14.) (Slide rubber sleeves off adaptors on radiator block and air conditioner motor and lift out heater air duct. Fitted only to early cars.)

REMOVE AIR SILENCER AND MANIFOLD. Remove rocker cover centre dome nut and setscrew passing through steady bracket into front of air silencer. Remove silencer. Withdraw four nuts securing air silencer manifold to carburettor flanges. Remove manifold.

REMOVE DYNAMO. Disconnect battery positive lead. Remove dynamo connections noting that "Yellow" wire is connected to terminal "D" (large terminal) and "Yellow with Green" wire to terminal "F" (small terminal). Remove adjusting bolt situated at top of dynamo and swing dynamo towards engine to free fan belt. Disengage fan belt from dynamo pulley, remove two securing bolts situated under dynamo and lift out dynamo.

REMOVE CARBURETTORS. Disconnect distributor vacuum feed pipe from front carburettor by unscrewing union. Disconnect petrol flexible feed pipe. Disconnect auxiliary starting carburettor solenoid wire at thermostat switch in water manifold. Disconnect solenoid feed wire. Unscrew auxiliary starting carburettor feed pipe union from cylinder head. Disconnect throttle linkage at rear flexible joint. Release overflow pipes. Remove four carburettor flange nuts and withdraw carburettors. (Plate B.40.)

REMOVE DISTRIBUTOR. Disengage sparking plug high tension lead carriers from engine rear plate. Disconnect high tension leads from sparking plugs. Remove dowel bolt located under distributor in tappet cover plate boss. Remove base plate setscrew and withdraw distributor.

REMOVE ROCKER GEAR. Remove two remaining rocker cover dome nuts and withdraw rocker cover. Remove nuts from rocker shaft posts and lift off rocker assembly. (Plate B.18.)

REMOVE OIL PUMP AND REVOLUTION COUNTER DRIVE GEARS, PUSH RODS AND TAPPET BLOCKS. Disconnect revolution counter cable from adaptor situated on cylinder head of $2\frac{1}{2}$ litre and on cylinder block of $3\frac{1}{2}$ litre. Remove revolution counter adaptor by withdrawing three nuts for $2\frac{1}{2}$ litre and two nuts for $3\frac{1}{2}$ litre. Remove tappet cover plate. Withdraw push rods upwards. Remove two screws securing centre tappet block and slide revolution counter drive gear bracket up the shaft and clear. Withdraw shaft upwards, removing circlip located under gear to allow gear to pass down shaft. Remove the two Woodruff keys and lift out shaft. (Remove remaining tappet block bolts and tappet blocks. (Plate B.20.)

ASSEMBLY. Assembly is the reverse of the above procedure. On $2\frac{1}{2}$ litre the tappet block bolts are not interchangeable, the two centre bolts being longer. If incorrectly fitted severe damage will be caused to cylinders and pistons.

ROCKER GEAR. TO REMOVE AND REFIT

REMOVE AIR SILENCER. Remove rocker cover centre dome nut and setscrew passing through steady bracket into front of air silencer body. Remove silencer.

REMOVE ROCKER GEAR. Remove two remaining rocker cover dome nuts and withdraw rocker cover. Remove nuts from rocker shaft posts and lift off rocker assembly. (Plate B.20.)

ASSEMBLY. Assembly is the reverse of the above operation. Observe that to control lubrication of the rocker pads and valve guides each rocker arm is drilled longitudinally from pad to rocker shaft bush and has a small felt wick inserted, this hole being sealed by a plug and blob of solder. Should an excess of oil pass the rockers and valve guides causing oiling up of the sparking plugs or excessive oil consumption, the wicks should be renewed. (Refer to page B.47.)

STARTER MOTOR. TO REMOVE AND REFIT

REMOVAL. Remove exhaust down pipes. Disconnect starter lead. Remove starter fixing bolts and withdraw starter.

ASSEMBLY. Assembly is the reverse of the above procedure. Observe clutch pedal throw out stop fitted to fixing bolt on right-hand drive cars.

WATER PUMP. TO REMOVE, DISMANTLE AND REASSEMBLE

REMOVE BONNET. Release bonnet catches, by pushing forward the controls situated at either side under the facia board, and with both bonnet top panels open remove two screws from centre hinge front "T" piece. Raise front of bonnet and remove forward.

REMOVE BONNET SIDE PANELS. Remove three countersunk screws from top face of each bonnet side panel and lift out side panels. (Slide rubber sleeves off adaptors at radiator block and air conditioner motor and lift out heater air duct. Fitted only to early cars.) (Plate B.13 and B.14.)

DRAIN COOLING SYSTEM. Drain radiator block and engine by opening tap at base of radiator and tap at right-hand rear of engine block. (Plates B.11 and B.12.) If anti-freeze mixture is in use, conserve water. Disconnect by-pass hose from water pump and remove bottom water hose completely. Disconnect water connection to air conditioner at water pump.

REMOVE FAN BELT. Release adjusting bolt situated on top of dynamo and two securing bolts under dynamo. Swing dynamo towards engine and disengage fan belt from dynamo pulley. (Plate B.8.) Remove belt from crankshaft pulley and withdraw over fan.

REMOVAL. Remove four setscrews and withdraw fan, observing balance pieces fitted under setscrews. Remove five setscrews securing water pump to cylinder block and remove pump complete. (Plate B.23.)

DISMANTLING. Remove five setscrews and withdraw pump back-plate. Drive out pin securing driving dog on front of shaft and remove dog and spring. Withdraw shaft to rear with impellor, conical faced collar and carbon seal. Collar is pinned to the shaft and dogged to impellor, the spindle running in a bush pressed into the pump housing. Withdraw fan pulley which runs on ball bearings, this assembly being pressed on to the pump housing. Observe felt oil retaining washers fitted to front and rear of fan bearings. The carbon sealing gland requires no lubrication. (Plate B.37.)

REFITTING. Reassembly and refitting is the reverse of the above procedure.

ENGINE TUNING

GENERAL. It must be realised that engine tuning cannot be carried out in a haphazard manner and satisfactory results will not be obtained unless each component is dealt with thoroughly and in sequence. The following operations carried out systematically in the order shown will produce satisfactory results.

Before commencing any engine adjustment run the engine until the normal operating temperature is recorded on the water temperature gauge. Quick warm-up of the engine should be checked, indicating that the water cooling system thermostat is operating correctly. If the engine runs too cool ignition setting and performance will be affected. Normal running temperature approximately 70°C. Using the starter handle check that all compressions are even and good. (A compression gauge may be used for this check.) If one or more compressions are weak it will most probably be due to poor valve seatings, when the cylinder head must be removed and the valves and valve seats refaced and reground.

BATTERY. Check the battery electrolyte level and top up as necessary to bring the level $\frac{1}{8}$" (3·0 mm.) above the separators. Test that the battery is in a saisfactory state of charge. Check that the battery connections, and earth connection on dash, are clean and tight.

DISTRIBUTOR. Remove distributor cover and check carbon brush, rotor arm and segments. Wipe out the interior of the cover with a dry rag. Check free operation of centrifugal advance mechanism and lubricate movement with thin oil. Place a spot of thin oil on the top of the distributor spindle.

Clean and adjust contact breaker points to ·012" (·31 mm.). Place a smear of light grease on cam and a spot of oil on contact breaker rocker pivot. (Plate B.7.)

Refit head and check tightness of all H.T. and L.T. connections on distributor and coil. Check over insulation of wires and cables for faults. Check that distributor dowel bolt and base plate setscrew are tight since looseness will allow the distributor to rise and fall, thus affecting ignition timing. Check correct operation of vacuum advance mechanism with engine running.

SPARKING PLUGS. Champion N.8 sparking plugs are used with $2\frac{1}{2}$ litre and L.10 with $3\frac{1}{2}$ litre engines. Plugs should be cleaned by sand blasting, points set to ·025" (·64 mm.) and tested using Champion plug cleaning and testing equipment. Clean porcelain insulators. Do not replace the sparking plugs until the valve clearances have been adjusted to facilitate turning over the engine. New copper asbestos washers should be fitted when replacing plugs.

VALVE CLEARANCES. Remove the rocker cover and check that all valve springs are intact and accurately adjust the tappet clearances to Inlet ·012" (·31 mm.) and Exhaust ·015" (·38 mm.), Cold. To obtain accurate settings each valve should be adjusted with the tappet on the back of the cam. This may be achieved as follows, observing that No. 1 cylinder is at the rear of the engine, that is, the flywheel end.

Turn the engine by the starting handle, and

Set No. 1 inlet valve when No. 6 inlet valve is fully open.
" " 5 " " " " 2 " " " " "
" " 3 " " " " 4 " " " " "
" " 6 " " " " 1 " " " " "
" " 2 " " " " 5 " " " " "
" " 4 " " " " 3 " " " " "

Set No. 1 exhaust valve when No. 6 exhaust valve is fully open.
" " 5 " " " " 2 " " " " "
" " 3 " " " " 4 " " " " "
" " 6 " " " " 1 " " " " "
" " 2 " " " " 5 " " " " "
" " 4 " " " " 3 " " " " "

Firing Order : 1 5 3 6 2 4

PETROL PUMP. Test operation of S.U. electric pump. Remove filter at base of pump body, clean and replace.

CARBURETTORS. Remove air silencer and air silencer manifold. Test free operation of pistons by lifting with finger and noting clean drop. Remove dash pots and pistons, check that correct jet needles are fitted : 2½ litre R.3, and 3½ litre F.W. Observe that the needle should be fitted with the shoulder of the needle boss flush with the base of the piston ; reposition if necessary. Check the fit of the piston in the dash pot. This is not measured mechanically, but by air leak between the large diameter of the piston and the dash pot interior.

Hold the piston upside down in the right hand with a finger covering the small air hole. With the left hand push the dashpot on to the piston as far as it will go. When the left hand is removed the dashpot will fall until clear of the piston, this time should be between four and five seconds. Check that the jet is correctly centred to the jet needle. It must be understood that the needle has a very fine working clearance in the jet and yet must not touch the jet. If centralising is required release the jet securing screw. Remove cap nut and rotate the jet adjusting screw to its top position. Replace the piston with needle correctly fitted and feel if the piston is perfectly free by lifting it up with the finger. Tighten jet securing screw. It may be necessary to slacken the securing screw several times before the piston falls perfectly freely. When this has been done bring the jet adjusting screw back to its original position.

Wipe out dashpot, piston and spindle and refit. Do not use metal polish. On 2½ litre insert thin oil through the caps on top of the dashpots. The 3½ litre models have hydraulic piston dampers, in which case fill to the top of the hollow piston spindle chamber with the recommended grade of engine oil. Absence of oil will cause weakness of mixture on acceleration and poor performance, the oil level must therefore be checked at 1,000 mile (1,500 kilos) intervals.

Remove carburettor petrol pipe unions at float chambers. Remove and clean petrol filters. Check that the level of fuel in the jets is correct. The level of fuel in the float chamber, and therefore the level in the jet, is controlled by the angle to which the forked float lever is set. Hold the float chamber cover inverted and press the forked lever downwards with the finger above the hinged end, thus ensuring that the needle is in the closed position. If the petrol level is correct a $\frac{7}{16}$" (11·1 mm.) round bar will just slide between the lever and the spigot on the lid. If the lever does not touch this bar at the same time as it holds the needle on the seating adjustment must be made by bending the lever. Reassemble and refit. Lubricate throttle controls and linkage, check free operation and full travel. Check for air leaks at carburettor flanges and mounting bolts for tightness.

IGNITION TIMING. It is necessary to set correctly the ignition timing at the distributor before tuning the carburettors since if retarded or advanced too far the setting of the carburettors will be affected. Test the car on the road and when the engine has reached normal operating temperature set the fixed setting of ignition timing on distributor so that, with the micrometer adjustment in the neutral position, that is, with the datum line on the zero mark, the engine just shows a tendency to pink on full throttle under load at 1,500 to 2,000 r.p.m. in top gear.

CARBURETTOR TUNING. When the ignition has been correctly set check that both carburettors are sucking equally by listening with the ear or placing the fingers partially over the intake so that the suction can be heard. Slacken one clamp bolt on the universally jointed connection between the throttle spindles. Rotate the throttle adjusting screws until the carburettors are synchronised, that is, are sucking equally, and the engine is idling at approximately 450 r.p.m. Tighten the clamp bolt. Before carrying out the instructions which follow, it is desirable to ensure that the mixture strength of both carburettors is approximately correct.

It may therefore be desirable to screw the jet adjusting screws upwards (clockwise) as far as they will go and then rotate them downwards (anti-clockwise) two and one half turns, ensuring that the jets are not sticking and are following the movement of the adjusting screws.

Next check the mixture strength by starting the engine and inserting the blade of a small screwdriver in the **front** carburettor intake below the piston and lift the piston approximately ¼" (6·0 mm.) when, if :

(a) The engine speed increases and the engine continues to run at increased speed this indicates that the mixture strength of the **rear** carburettor is too rich.

(b) The engine speed increases and the engine then stops, this indicates that the mixture strength of the **rear** carburettor is too weak.

(c) The engine speed increases momentarily and then decreases but the engine continues to run somewhat bumpily, then the mixture strength of the **rear** carburettor is correct.

Repeat the operation, lifting the **rear** carburettor piston and testing the mixture setting of the **front** carburettor.

To adjust the mixture strength, remove the dome nut covering the jet and to enrich the mixture rotate the jet adjusting screw in an anti-clockwise direction, that is, downwards. To weaken the mixture, rotate the jet adjusting screw clockwise, that is, upwards. Ensure that the jet is not sticking and is following the movement of the adjusting screw. Always replace the dome nuts after adjustment.

Some slight adjustment of the slow running, to maintain this at 450 r.p.m., may now be necessary following alteration of the mixture strength, in which case ensure that the two throttle adjusting screws are rotated by an exactly equal amount or the adjustments previously made will be upset. Note that it is essential to make final adjustments (on the road) with the air silencer and manifold fitted.

STARTING CARBURETTOR. Test operation of thermostatically operated starter carburettor by shorting carburettor thermostat connection in water uptake manifold to earth and flicking throttle open when engine should run at approximately 1,000 r.p.m. without excessive hunting. The mixture setting of the starter carburettor is adjusted by rotating the hexagon nut surrounding the primer valve. Turning the hexagon nut clockwise weakens, anti-clockwise enriches the starting mixture.

If difficult starting from cold is experienced in the form of the engine starting but failing to keep running, indicating a weak starting mixture, test with the engine cold and adjust the mixture setting by turning the hexagon nut in an anti-clockwise direction until the engine runs steadily without hunting. The self-starting carburettor should cut out at 35°C. Starting carburettor needle sizes : $2\frac{1}{2}$ litre 455/8, $3\frac{1}{2}$ litre 435/8. A full description of the carburettors and starting carburettor will be found in Section C, " Carburettors and Fuel System."

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CARBURETTORS AND FUEL SYSTEM

MARK V

2½ and 3½ LITRE

ENGINE NUMBERS

(Stamped on a boss at right-hand rear of cylinder block)

2½ Litre	3½ Litre
H.2001 ONWARDS	T.5001 ONWARDS

The instructions in this section are presented under the following main headings which appear as sub-titles on the pages concerned and in the order shown :—

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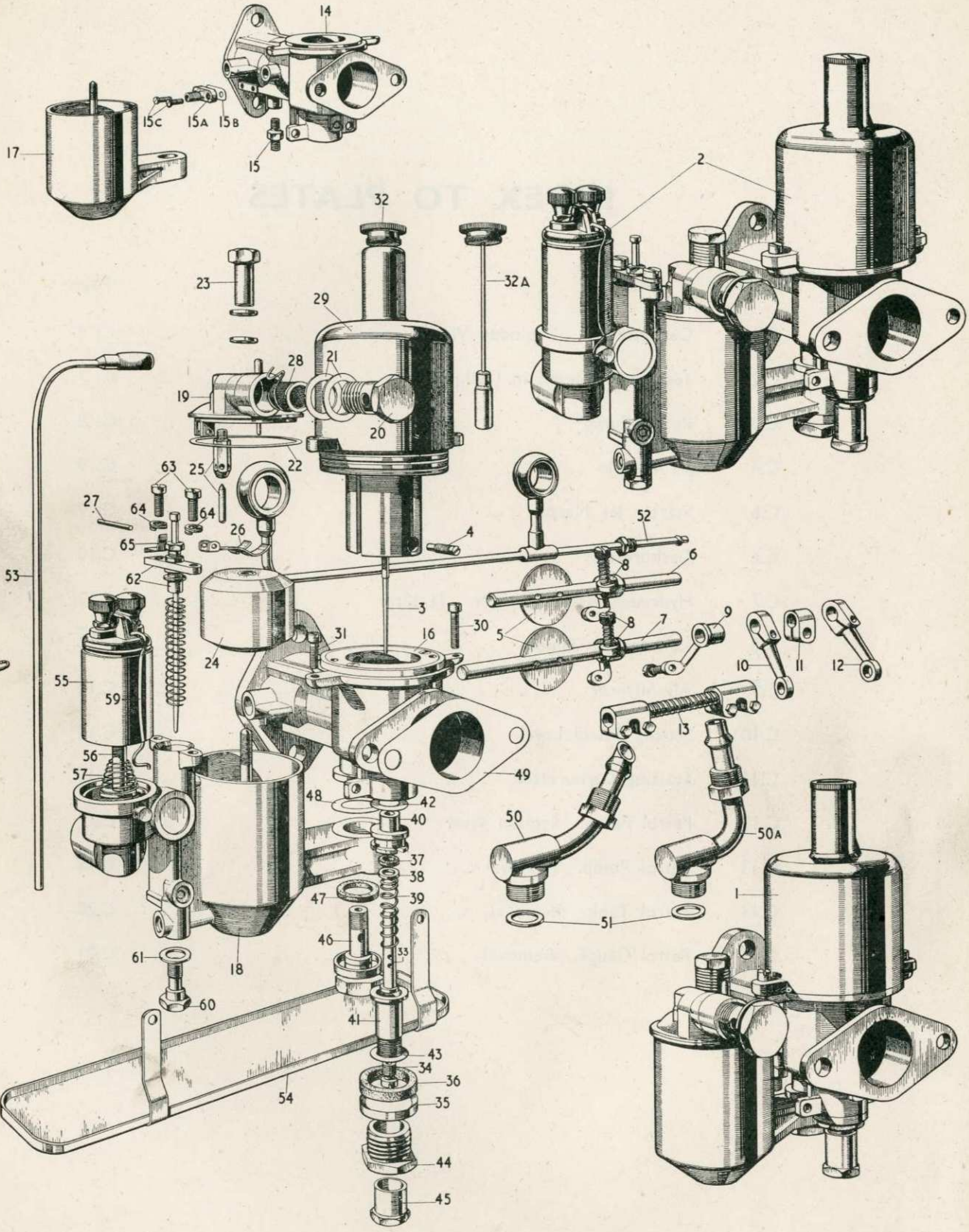


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GENERAL. Twin S.U. carburettors, incorporating an automatic auxiliary self starting carburettor, are used on both models. Type H.3. is used on 2½ litre and type H.4 on 3½ litre, both types being similar in principle, operation and servicing.

The action of the carburettor is as follows : The area of the air intake and the orifice of the fuel jet are automatically varied by means of a sliding piston to which is attached a tapered jet needle. The piston is raised and lowered by variations in depression governed by engine speed and throttle butterfly opening. This depression operates on the piston through a drilling passing from the atmosphere side of the throttle butterfly through the body of the carburettor and dash pot to the top of the piston. When the piston is raised, a larger area is available for the entry of air, and also, since the tapered needle rises with the piston, more fuel is allowed to pass through the jet. The piston and tapered needle, in conjunction with the jet, are proportioned to provide the correct mixture at all speeds and loads.

The carburettors are fed by a single large capacity S.U. electric pump, type P.P.31/L.C.S., situated on the chassis left hand rear cruciform member drawing from a fifteen gallon tank located at the rear of the chassis frame. The quantity of petrol in the tank is indicated by an electric gauge situated in the facia board. The gauge is operated by the petrol tank unit consisting of a float supported by the petrol level in the tank which rises and falls with variations of fuel level. The float arm operates on an electrical resistance which in turn registers on the petrol gauge.

A petrol level warning light fitted to the petrol gauge is also operated by the petrol tank unit. When the petrol level falls to approximately one quarter full the float arm commences to contact the feed to the warning light situated in the petrol gauge which consequently lights up intermittently. As the level of petrol falls below this point the contact becomes permanent and the warning light operates continuously.

MAINTENANCE. Routine carburettor maintenance is confined to cleaning the petrol filters situated in the float chamber caps, checking that the auxiliary starting carburettor electrical connections are clean and tight and the addition of oil through the caps on top of the dashpots. On 2½ litre add thin oil to lubricate the piston spindles but on 3½ litre, which have hydraulic piston dampers, add the recommended grade of engine oil until the hollow piston spindle is filled. Observe that lack of oil will cause weakness of mixture on snap throttle openings and consequent falling off in performance. Occasionally the carburettors should be removed and dismantled for thorough cleaning. In view of the very fine tolerances to which the working parts are machined, metal polish or other abrasives must under no circumstances be used to clean these working parts. The fit of the piston in the dashpot chamber is not measured mechanically but by air leak between the large diameter of the piston and the dashpot interior. To check the fit hold the piston upside down in the right hand with a finger covering the small air hole. With the left hand push the dashpot on to the piston as far as it will go. When the left hand is removed the dashpot will fall until clear of the piston, the time taken for this fall should be between four and five seconds.

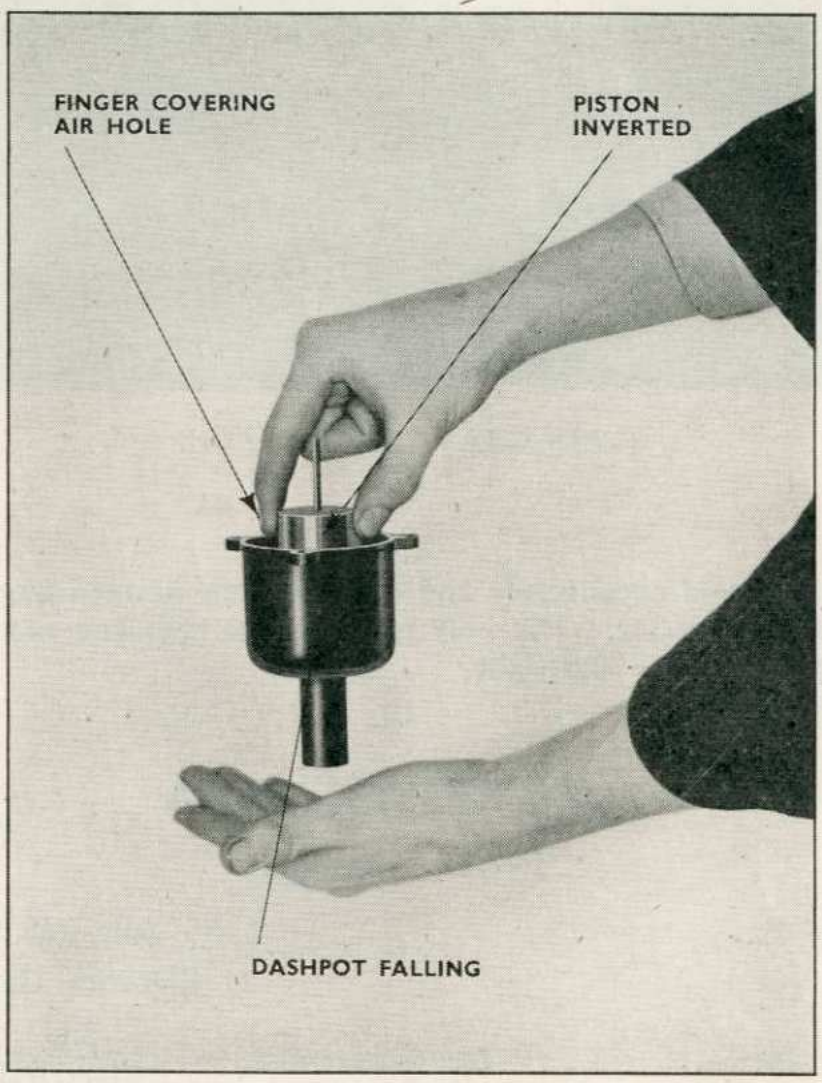


PLATE C.2. TESTING PISTON FIT IN DASHPOT

Test operation of S.U. electric pump which is situated on the chassis nearside (left hand) rear cruciform member. Since the petrol pump is below petrol tank level the following procedure is recommended to prevent draining the tank when servicing the pump. Attach a suitable length of rubber tubing to the door pillar at a height above the petrol tank. Pass the tube over the end of the suction nipple (elbow pipe) as soon as it is detached to avoid loss of petrol. Remvoe filter by withdrawing six cheese headed screws securing base plate. Clean filter and replace. Check that petrol pump electrical connections are clean and tight. Situated at the nearside (left hand) base of the petrol tank is a well sealed by a hexagon bung which may be used to drain the contents of the tank. Contained in this well is a gauze strainer through which all petrol is drawn.

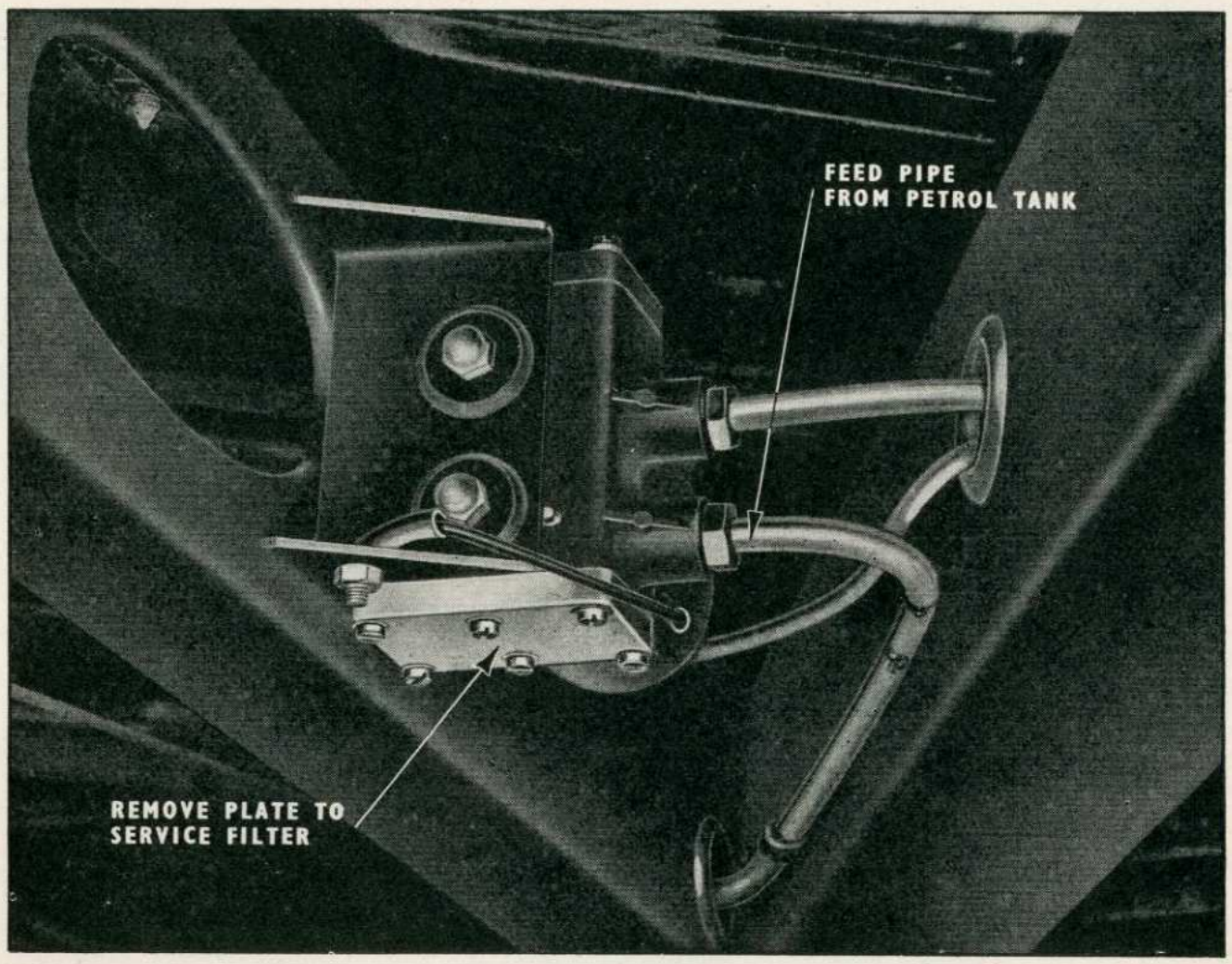


PLATE C.3. PETROL PUMP

The hexagon bung should be removed occasionally and the sediment drained from the petrol tank. The gauze strainer should be cleaned before refitting. The only maintenance required to the petrol gauge and tank unit is to ensure that all connections are clean and tight.

FUEL SYSTEM DATA

	$2\frac{1}{2}$ litre.	$3\frac{1}{2}$ litre.
Petrol Tank. Total Capacity.	15 galls. (68 litres).	
Petrol Measured by	Electrical Gauge.	
Petrol Pump. Make	S.U.	
Operation	Electrical	
Type	P.P. 31/L.C.S.	

CARBURETTORS

Make	S.U. Twin	
Type	H.3.	H.4.
Needle Size	R.3.	F.W.
Jet Size	.090″ ±.002″ (2.3 mm ±0.05 mm)	
Float Weight	350 to 370 Grains. (22.66 to 23.98 Grammes)	
Starting Carburettor Needle Size	455/8	435/8



PLATE C.4
JET NEEDLE

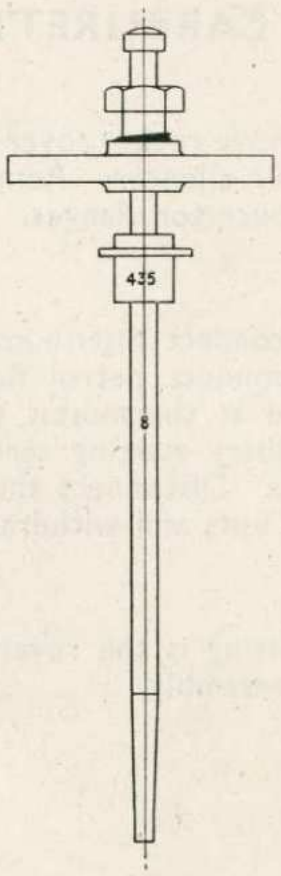


PLATE C.5
STARTER JET NEEDLE

The jet needle size and starter jet needle size is marked on the respective needles as indicated in the above plates.

CARBURETTORS. TO REMOVE AND REFIT

REMOVE AIR SILENCER AND MANIFOLD. Remove rocker cover centre dome nut and set screw passing through steady bracket into front of air silencer. Remove silencer. Withdraw four nuts securing air silencer manifold to carburettor flanges. Remove manifold.

REMOVE CARBURETTORS. Disconnect distributor vacuum feed pipe from front carburettor by unscrewing union. Disconnect petrol flexible feed pipe. Disconnect auxiliary starting carburettor solenoid wire at thermostat switch in water manifold. Disconnect solenoid feed wire. Unscrew auxiliary starting carburettor feed pipe union from cylinder head on 2½ litre and self starting carburettor on 3½ litre. Disconnect throttle linkage at rear flexible joint. Release overflow pipes. Remove four carburettor flange nuts and withdraw carburettors.

REFITTING. Refitting is the reverse of the above procedure. Always fit new carburettor flange joints on assembly.

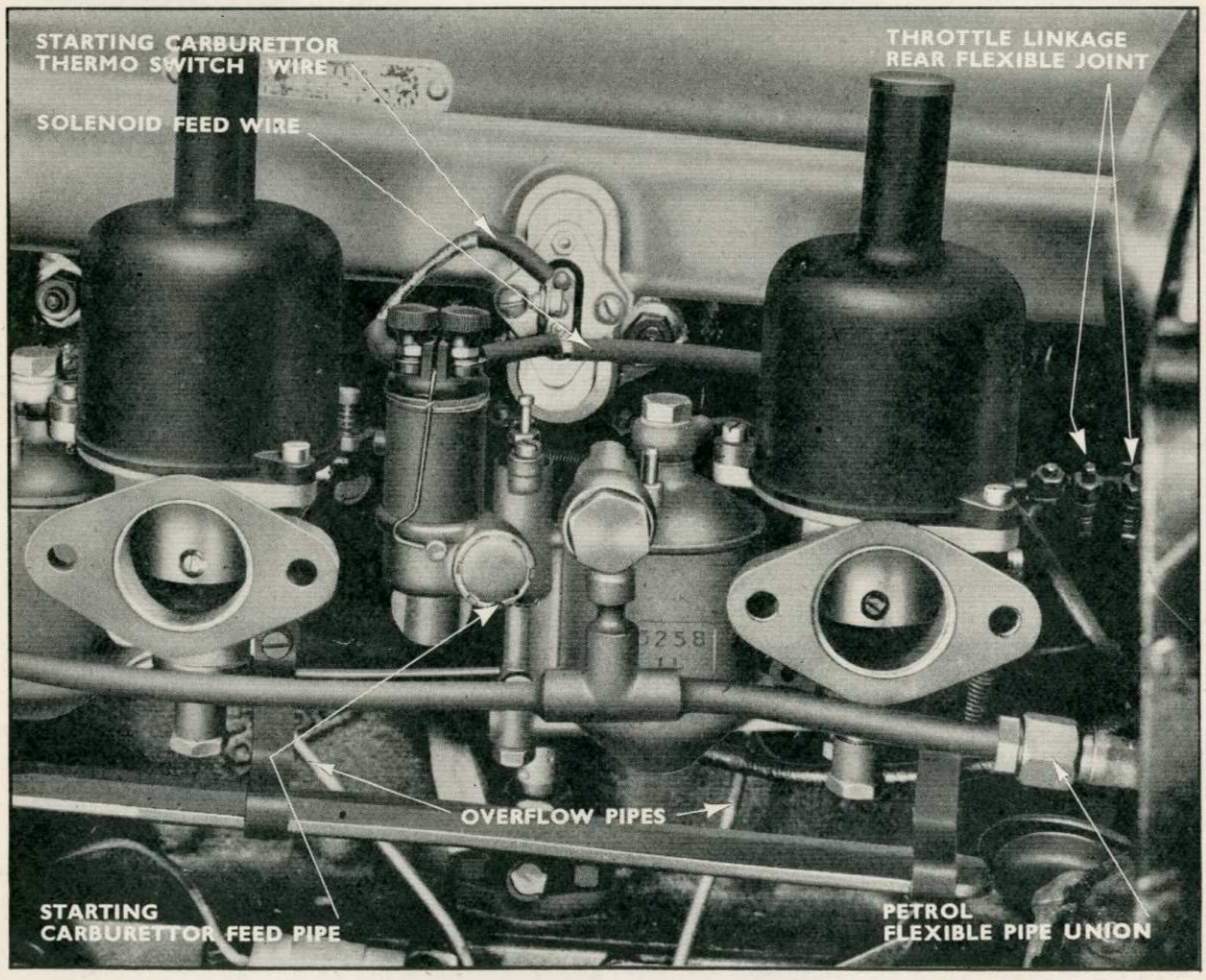


PLATE C.6. CARBURETTORS

CARBURETTORS. TO DISMANTLE AND REASSEMBLE

REMOVE AIR SILENCER AND MANIFOLD. Remove rocker cover centre dome nut and set screw passing through steady bracket into front of air silencer. Remove silencer. Withdraw four nuts securing air silencer manifold to carburettor flanges. Remove manifold.

DISMANTLE. (Refer to Plate C.1.) Unscrew caps on top of dash pots. Observe hydraulic piston dampers attached to caps on 3½ litre. Withdraw three screws (two screws on 2½ litre) securing each dash pot to carburettor body and remove dash pots and pistons. (Care must be exercised not to bend the needle, which is attached to the piston). Remove screw at base of piston and withdraw needle. Note that needle should be fitted with lip of shoulder flush with base of piston. Remove petrol feed pipe from float chamber covers. Observe gauze filter thimble located in float chamber cap and two fibre washers fitted in front and behind petrol feed pipe union. Remove hexagon nut under carburettor body retaining float chamber and remove float chamber. Withdraw set screw passing through float chamber cap, remove overflow pipes and withdraw cap and float now disclosed. Dismantle needle valve assembly fitted to float chamber cap by withdrawing pin from fork and unscrewing valve assembly.

Withdraw drip tray which is attached to lugs at the base of each carburettor body by removing nuts. To dismantle jet assembly remove the dome nut at base of jet followed by the jet screw and jet securing screw when the jet can be removed, together with top and bottom bearings. Observe disposition of fibre, cork, copper and brass washers. The auxiliary starting carburettor solenoid can be removed by releasing spring retaining clip. Remove two set screws to withdraw the auxiliary starting carburettor jet needle.

ASSEMBLY. Assembly is the reverse of the above procedure. If the jet has been disturbed recentring should be carried out as follows :—

Remove cap nut at base of jet and rotate the jet adjusting screw upwards (clockwise) as far as it will go to position jet at its highest point. Ensure that the jet parts are assembled in the correct position and release the jet securing screw. (Plate C.1.). Fit the dash pot and piston with needle correctly fitted. In the case of 3½ litre unscrew cap and remove hydraulic piston damper. Raise and lower the piston to centralise the jet with the jet needle and finally tighten the securing screw. It may be necessary to slacken the jet securing screw several times before the piston falls perfectly freely. When the jet has been centred correctly bring the jet adjusting screw back to its original position and fit the cap nut.

CARBURETTOR HYDRAULIC PISTON DAMPER. (3½ LITRE ONLY)

DESCRIPTION AND MAINTENANCE

DESCRIPTION. Attached to the cap, situated on top of the dashpots, is a short rod on the bottom end of which is mounted a small ball valve. The piston spindle is hollow and the rod and ball valve are contained in the spindle. When the level of oil is correct, that is, to the top of the hollow piston spindle, the ball valve is immersed in oil. It will thus be seen that on acceleration and snap throttle openings a slightly enriched mixture is obtained due to the control exerted on the piston by the hydraulic damper preventing the piston from rising with undue quickness.

MAINTENANCE. The only attention necessary is at 1,000 mile (1,500 kilometres) intervals to remove the caps on top of the dash pots and add the recommended grade of engine oil until the hollow piston spindles are filled. Replace the caps and dampers. Absence of oil will be indicated by poor acceleration, loss of power and spitting back through the carburettors on rapid opening of the throttle.

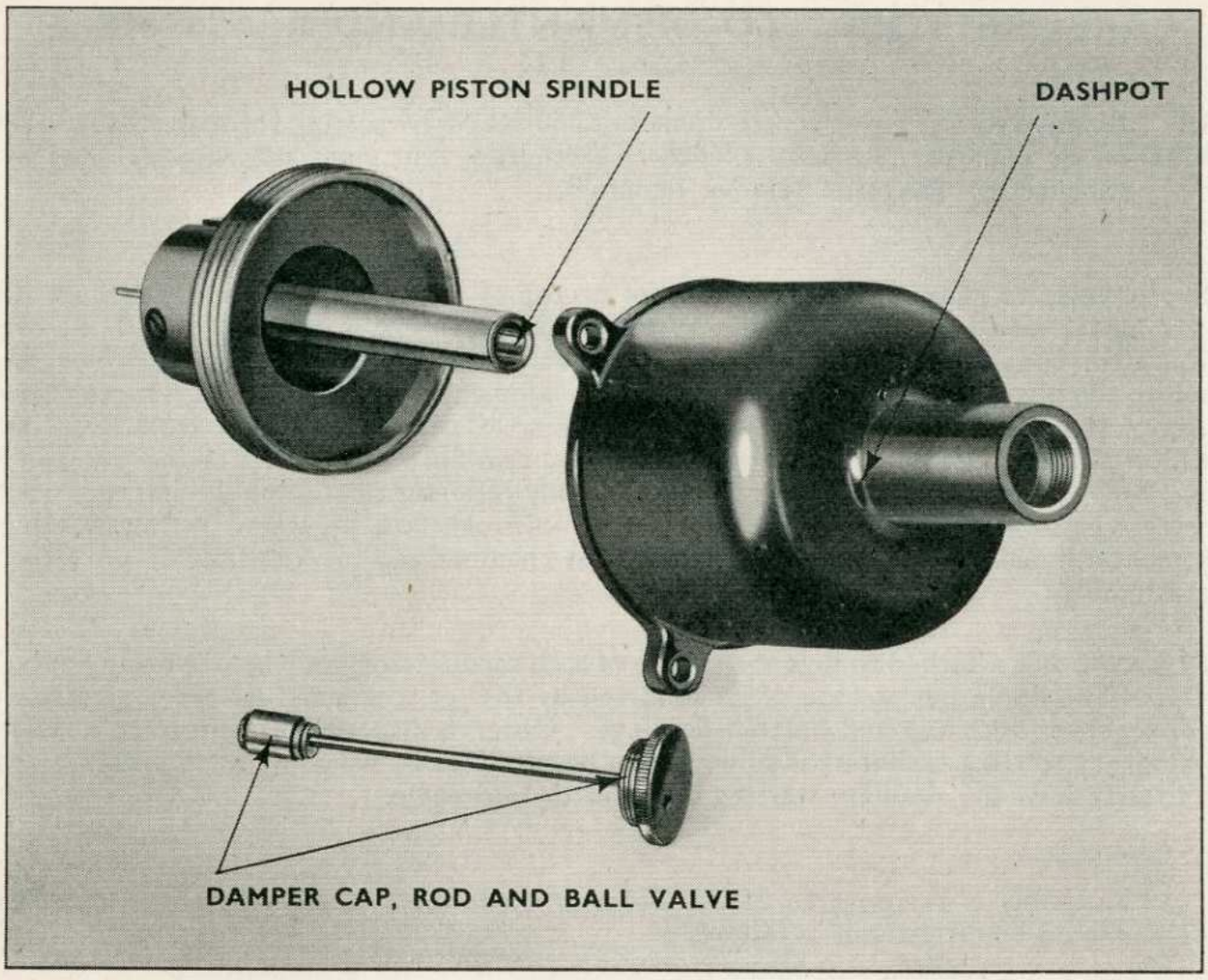


PLATE C.7. HYDRAULIC PISTON DAMPER. 3½ LITRE

CARBURETTOR JET. TO CENTRE

REMOVE AIR SILENCER AND MANIFOLD. Remove rocker cover centre dome nut and setscrew passing through steady bracket into front of air silencer. Remove silencer. Withdraw four nuts securing air silencer manifold to carburettor flanges. Remove manifold.

GENERAL. Should it be necessary to remove the jet, this can be done by unscrewing the jet securing screw. It must be understood that the needle has a very fine working clearance in the jet and yet must not touch the jet. When assembling it is therefore necessary to carefully centre the jet to the needle, which is done as follows :—

TO CENTRE. Withdraw drip tray which is attached to lugs at the base of each carburettor body by removing nuts. Remove cap nuts at base of jet and rotate the jet adjusting screw upwards (clockwise) as far as it will go to position jet at its highest point. Ensure that the jet parts are assembled in the correct position and release the jet securing screw (Plate C.1.). Fit the dash pot and piston with needle correctly fitted. In the case of 3½ litre unscrew cap and remove hydraulic piston damper. Raise and lower the piston to centralise the jet with the jet needle and finally tighten the securing screw. It may be necessary to slacken the jet securing screw several times before the piston falls perfectly freely. When the jet has been centred correctly bring the jet adjusting screw back to its original position and fit the cap nut. Experience shows that a very large percentage of carburettors that are returned for correction have had the jet removed and not centred correctly to the needle. Care is necessary when removing the piston not to bend the needle, since a bent needle will bind on the jet and thus cause the piston to stick.

CARBURETTORS. TO TUNE AND SYNCHRONISE

GENERAL. It is useless to attempt carburettor tuning until the cylinder compressions, valve clearances, sparking plug gaps and contact breaker point gaps have been checked and a general tune up has been carried out. See "Engine Tuning" Section B.

Ensure that both jet needles are correctly located in the pistons, that is, with the shoulder of the needle flush with the base of the pistons. Correct needles are 2½ litre R.3 and 3½ litre F.W. Check over the carburettors and ensure that pistons are free, petrol filters clean and hydraulic piston dampers (3½ litre only) filled with oil.

Run the engine until normal operating temperature is reached and check that both carburettors are sucking equally by listening with the ear or placing the fingers partially over the intake so that the suction can be heard.

If carburettors do not suck equally slacken one clamp bolt on the universally jointed connection between the throttle spindles. Rotate the throttle adjusting screws until the carburettors are synchronised, that is, are sucking equally, and the engine is idling at approximately 450 r.p.m. Tighten the clamp bolt. Before carrying out the instructions which follow, it is desirable to ensure that the mixture strength of both carburettors is approximately correct.

It may therefore be desirable to screw the jet adjusting screws upwards (clockwise) as far as they will go and then rotate them downwards (anti-clockwise) two and one half turns, ensuring that the jets are not sticking and are following the movement of the adjusting screws.

Next check the mixture strength by starting the engine and inserting the blade of a small screwdriver in the **front** carburettor intake below the piston and lifting the piston approximately ¼″ (6.0 mm) when, if :

(*a*) The engine speed increases and the engine continues to run at increased speed this indicates that the mixture strength of the **rear** carburettor is too rich.

(*b*) The engine speed increases and the engine then stops this indicates that the mixture strength of the **rear** carburettor is too weak.

(*c*) The engine speed increases momentarily and then decreases but the engine continues to run somewhat bumpily, then the mixture strength of the **rear** carburettor is correct.

Repeat the operation lifting the **rear** carburettor piston and testing the mixture setting of the **front** carburettor.

To adjust the mixture strength remove the dome nut covering the jet and to enrich the mixture rotate the jet adjusting screw in an anti-clockwise direction, that is, downwards. To weaken the mixture rotate the jet adjusting screw clockwise, that is, upwards. Ensure that the jet is not sticking and is following the movement of the adjusting screw. Always replace the dome nuts after adjustment.

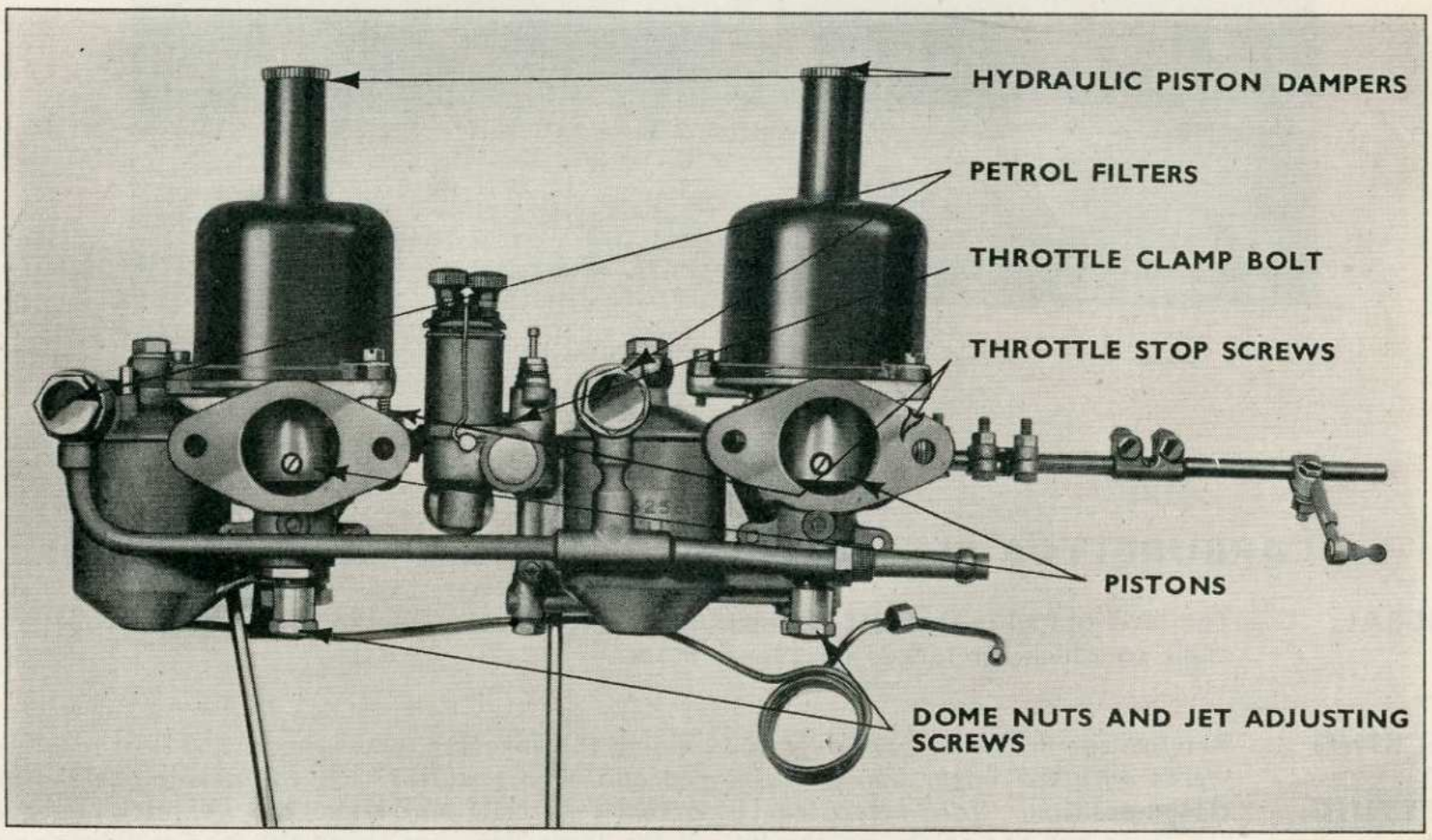


PLATE C.8. CARBURETTOR TUNING

Some slight adjustment of the slow running, to maintain this at 450 r.p.m. may now be necessary following alteration of the mixture strength, in which case ensure that the two throttle adjusting screws are rotated by an exactly equal amount or the adjustments previously made will be upset. Note that it is essential to road test and make final adjustments with the air silencer and manifold fitted.

CARBURETTOR AIR SILENCER. TO REMOVE, SERVICE AND REFIT

REMOVE. Remove rocker cover centre dome nut and setscrew passing through steady bracket into front of silencer body. Remove silencer.

SERVICE. At intervals of approximately 2,500 miles (4,000 kilos) or more frequently, under dusty conditions, the gauze element of the air silencer should be washed thoroughly in petrol and the element lightly moistened with clean engine oil.

ASSEMBLY. Assembly is the reverse of the above procedure.

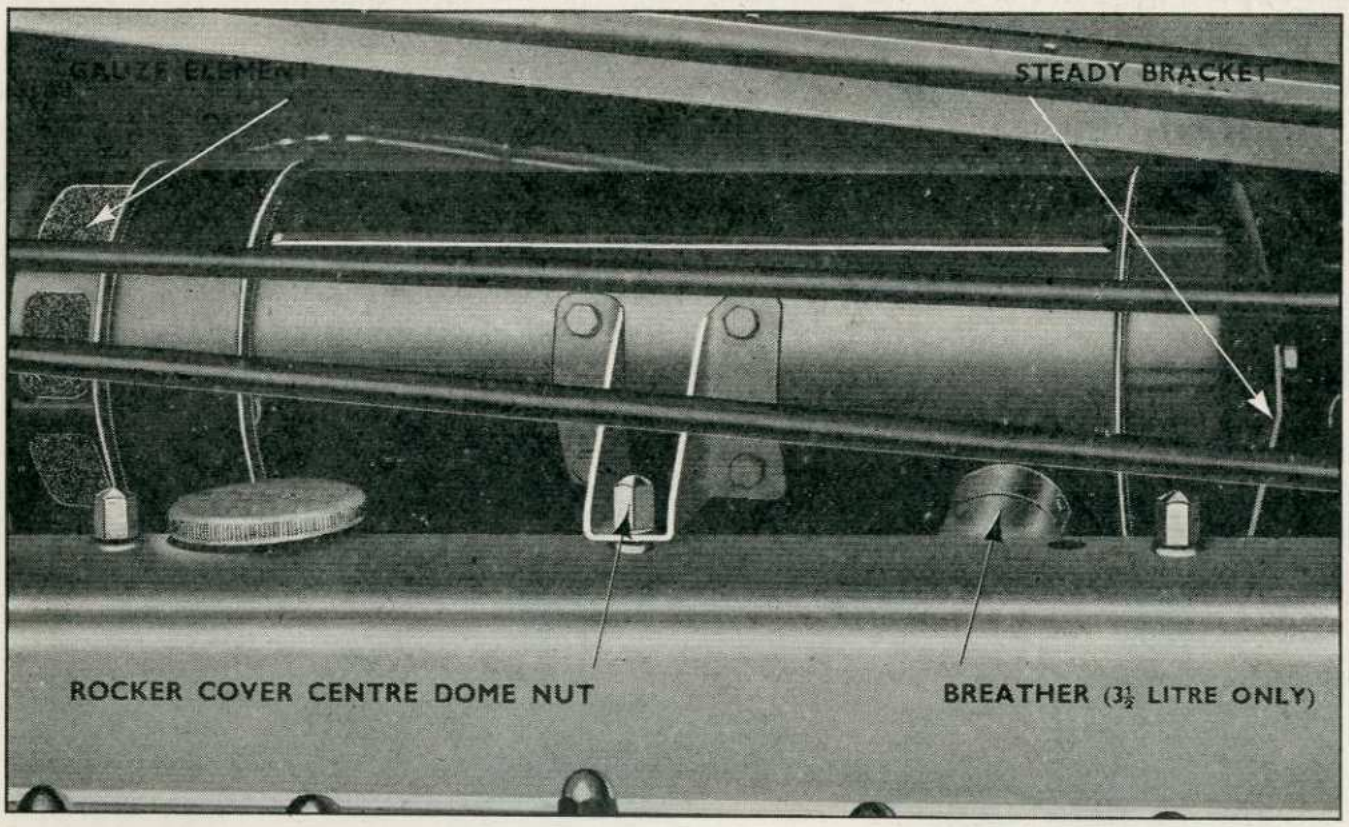


PLATE C.9. AIR SILENCER

CARBURETTOR PETROL LEVEL. TO CHECK AND RESET

GENERAL. The level of fuel in the float chamber and, therefore, the level in the jet, is controlled by the angle to which the forked float lever is set.

CHECKING AND RESETTING. Remove the float chamber cover and holding this inverted, press the forked float lever downwards with the finger above the hinged end, thus ensuring that the needle valve is in the closed position. If the petrol level is correct a $\frac{7}{16}$" (11.1 mm) round bar will just slide between the lever and the spigot on the lid. If the lever does not touch this bar at the same time as it holds the needle on the seating adjustment must be made by bending the lever. (Plate C.10).

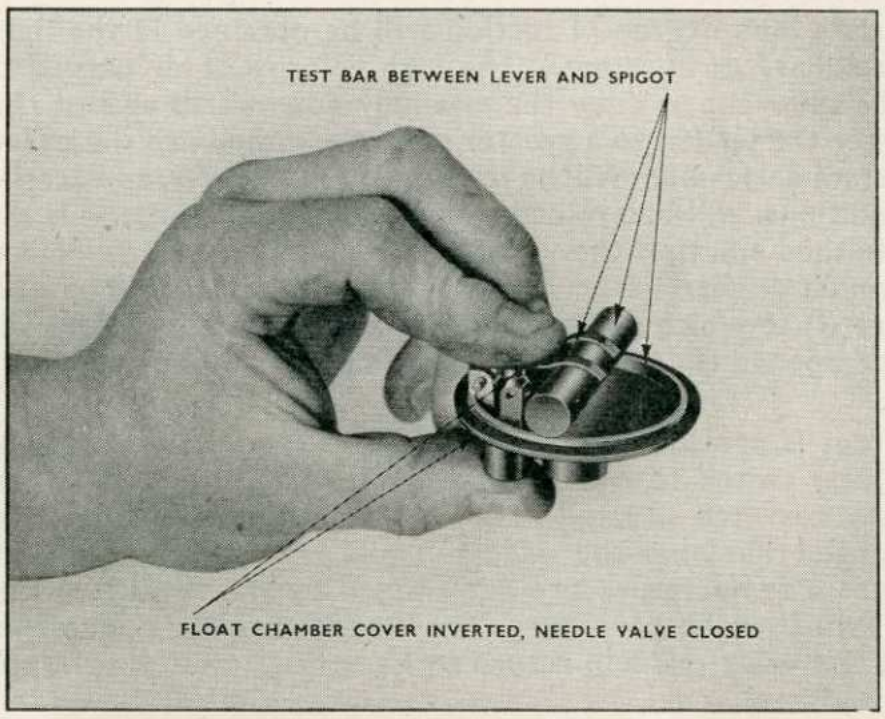
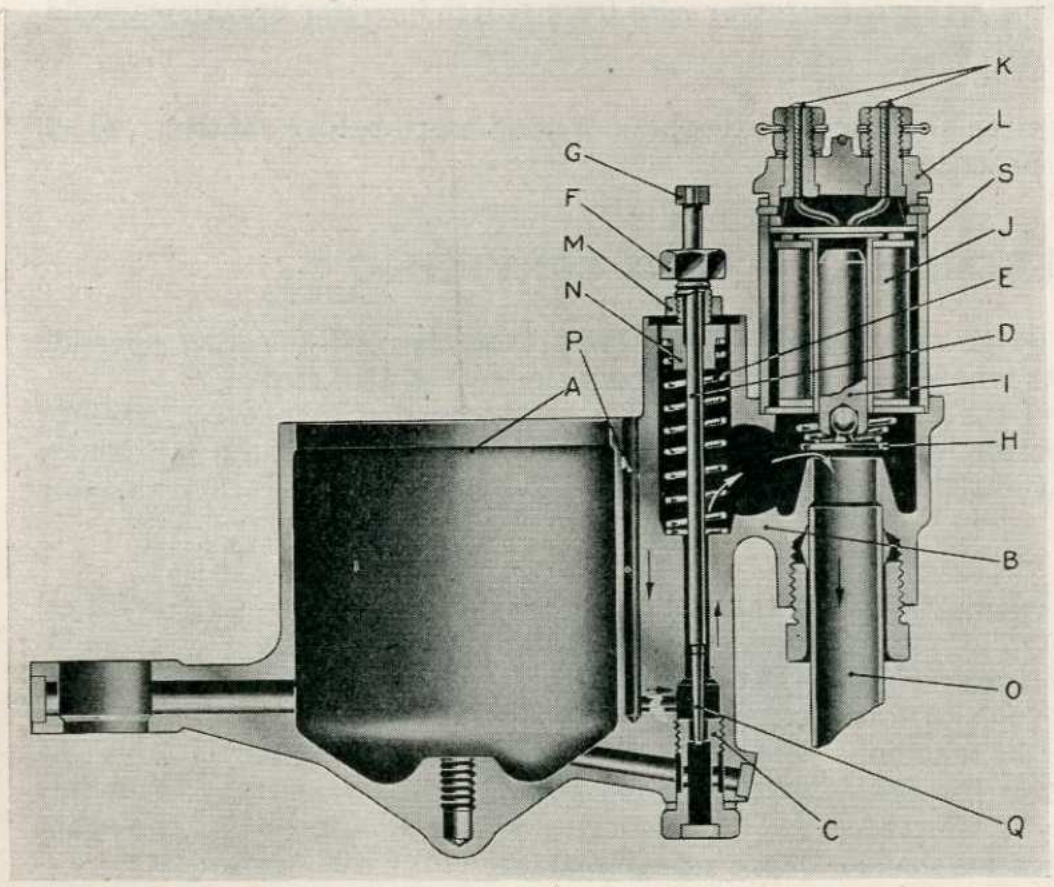


PLATE C.10. SETTING PETROL LEVEL

STARTING CARBURETTOR. DESCRIPTION AND ADJUSTMENT

OPERATION. This consists of an auxiliary jet (C) controlled by a tapered needle (Q), and fed from the main float chamber. (A).

Fuel emerging from this jet passes upwards between the shank (D) of the needle and the bore formed in the body through which this passes. Air at the same time enters through the passage (P) and mixes with the jet discharge. The emulsion thus formed is mixed with a further supply of air which passes downwards between a clearance provided between the disc (N) fixed to the needle shank (D) and the core surrounding this disc. The assembly comprising the disc and needle can move vertically and is normally spring-loaded upwards by means of the spring (E). The mixture thus formed passes between valve (H) and its seating, and is drawn through the tube (O) into the induction passage of the engine. It will thus be seen that an additional amount of mixture is drawn directly into the induction passage irrespective of the main throttle position, and serves to provide the starting mixture, and also to enrich the mixture generally, so long as the device is in action. The movable parts (N) and (D) are normally held in the position shown in the diagram, thus when the engine is first started and the suction created in the induction passage by means of the starter is low, a rich mixture will be provided since the tapered needle (Q) will be withdrawn from the jet.



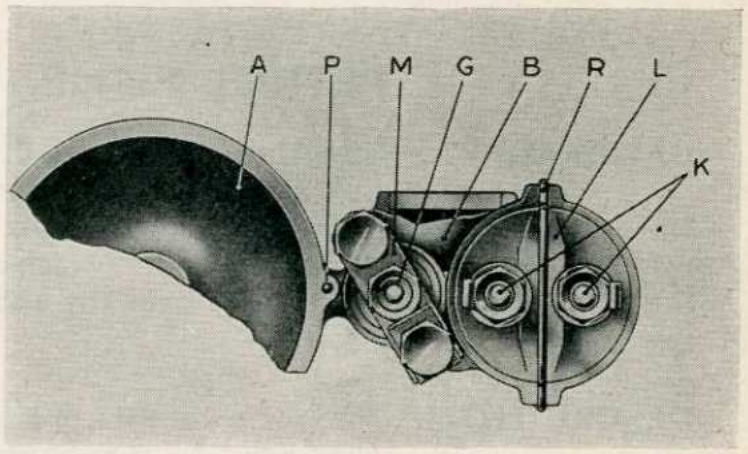


PLATE C.11 STARTING CARBURETTOR

Immediately the engine starts a high degree of suction will be obtained in the induction pipe and consequently a strong flow through the auxiliary carburettor. The high velocity of air passing between the disc (N) and the bore surrounding this will be sufficient to draw the assembly downwards against the action of the spring and the needle (Q) will therefore enter the jet (C) to a greater extent and diminish the effective orifice of this, thus under these conditions only a moderate enrichment will be provided. In this way, an excess of petrol which will otherwise be obtained under these conditions, will be avoided. Immediately the throttle is opened however, the induction pipe depression will be diminished and thus the velocity of air past the disc will fall and so permit the assembly to rise again and provide a greater discharge from the jet. The valve (H) is held off its seating by means of a solenoid (J) which raises the iron core (I) to which the valve disc is attached, thus so long as a current is flowing through the solenoid this valve will be opened and the auxiliary carburettor will be in action.

ELECTRICAL CONNECTIONS. The current is provided for the solenoid in the following manner :—One lead is taken from the ignition switch to one of the terminals (K) and the other terminal is connected to a thermostatic switch situated in the water outlet pipe from the cylinder head. This switch is so arranged that when the engine is cold a circuit is provided from the terminal (K) to earth. Immediately the water attains a temperature pre-determined by the setting of the thermostat, the points will open and no return circuit will then be provided. The circuit through the solenoid thus having been broken, the core (I) will be released and valve (H) will return to its seating, thus putting the whole device out of action.

ADJUSTMENT. The only adjustment provided consists in setting the stop screw (F) which limits the movement of the needle (D). Screwing this down (clock-wise) weakens, screwing it up (anti-clockwise) strengthens the idling mixture. The engine having been allowed to attain its normal working temperature, the auxiliary carburettor should be brought into action by short circuiting the thermostatic switch. A convenient means of doing this is to make contact between the terminal in the centre of the switch and the body of the switch by means of a screwdriver. Having done this the throttle should be momentarily flicked open, thus releasing the valve (H) and bringing the auxiliary carburettor into action. The stop screw should now be adjusted upwards to an extent just short of that which will make the engine run evenly ; in other words, the engine should be given the strongest mixture possible, upon which it will fire on all its cylinders.

If on the next occasion upon which the engine is started from cold difficulty is experienced, the engine firing but failing to keep running, the stop screw should be unscrewed by a further amount of about half a turn.

STARTING CARBURETTOR THERMOSTATIC SWITCH.
TO REMOVE AND REFIT

REMOVAL. Remove rocker cover centre dome nut and setscrew passing through steady bracket into front of silencer. Remove air silencer manifold by withdrawing four nuts securing manifold to carburettor flanges. Remove manifold. Detach starting carburettor wire from switch in water uptake manifold. Remove two screws and withdraw switch.

REFITTING. Clean the joint faces of the switch and manifold to obtain a good earth before refitting, which is the reverse of the above procedure.

PETROL PUMP. DESCRIPTION AND SERVICING

GENERAL. An S.U. pump, type L.C.S. (large capacity single) is fitted to the chassis frame rear nearside (left hand) cruciform member where it is gravity fed from the rear petrol tank.
Since the petrol pump is below petrol tank level the following procedure is recommended to prevent draining the tank when servicing the pump. Attach a suitable length of rubber tubing to the door pillar at a height above the petrol tank. Pass the tube over the end of the suction nipple (lower pipe) as soon as it is detached to avoid loss of petrol (Plate C.3.)

DESCRIPTION. The pump consists of three main assemblies, the body, the magnet and the contact breaker. The body "A" is an aluminium die casting, to which is attached by 2 B.A. screws two rectangular lids ("B" the upper and "C" the lower), the lower of which retains the filter. The upper lid gives access to the cage "D" for the outlet valve "E" and, when this cage is unscrewed, also to the inlet valve "F". These inlet and outlet valves are thin brass discs and should be assembled smooth side downwards—the outlet valve can be extracted (rarely necessary) after the spring circlip has been detached, and care should be taken not to unduly distort this circlip or the correct valve lift may be affected. A $\frac{3}{8}$" (9.5 mm) diameter hole connects the space between the valves to the pumping chamber, which is a shallow depression in one face of the body casting.

This space contains the diaphragm unit "J", which is clamped on its rim between the magnet housing "K" and the main body "A".

A bronze rod "L" is screwed to the centre of the armature "M", to which the diaphragm is also fastened, and passes through the magnet core "N" to the trunnion "O" in the contact breaker, which is positioned at the far end. An armature spring "P" is interposed between the armature and the end of the magnet coil.

The magnet consists of a cast-iron housing "K", having an iron magnet core "N" on which is wound a coil of copper wire "Q" which energises the magnet. Between the magnet housing "K" and the armature "M" are fitted eleven spherical-edged brass rollers "R". These locate the armature centrally within the magnet and allow absolute freedom of movement in a longitudinal direction.

The contact breaker consists of a small bakelite moulding, "S", carrying two rockers, an inner rocker "T" and an outer rocker "U", which are both hinged to the moulding at one end and are connected together at the top end by two small springs arranged to give a " throw-over " action. A trunnion bearing "O" is fitted into the centre of the inner rocker and the bronze rod "L" connected to the armature is screwed into this.

The outer rocker is fitted with a tungsten point on a spring blade "V". This blade is connected to one end of the coil and the other coil end is connected to the terminal screw "W".

A short length of flexible wire connects the outer rocker to one of the screws which hold the bakelite moulding on to the magnet housing, in order to ensure a good earth.

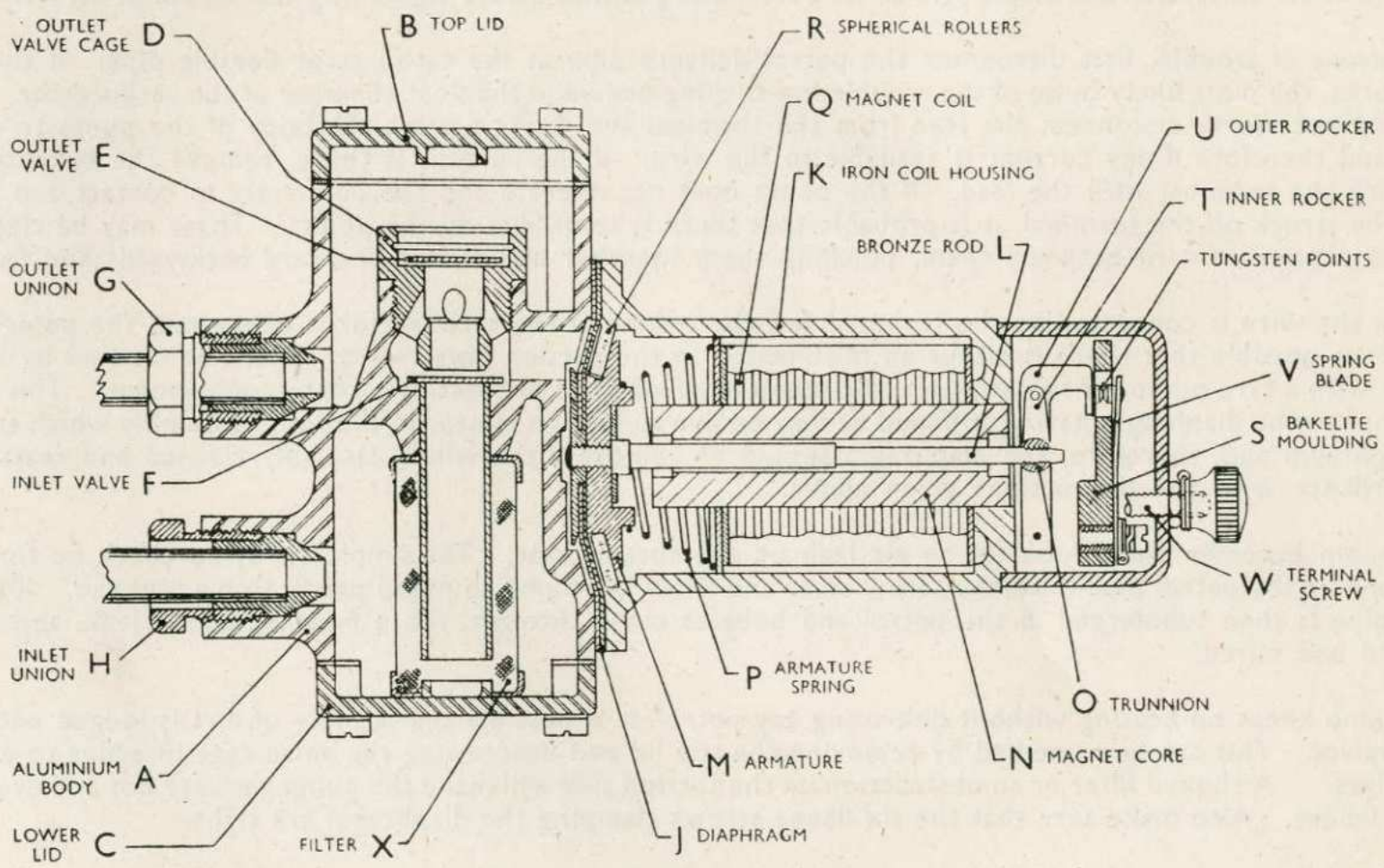


PLATE C.12. PETROL PUMP (Section view)

The action of the pump is as follows :—

When the pump is at rest the outer rocker lies in the outer position and the tungsten points are in contact. The current passes from the terminal, through the coil, back to the blade, through the points and to earth, thus energising the magnet and attracting the armature. This comes forward, bringing the diaphragm with it, and sucking petrol through the suction valve into the pumping chamber. When the armature has advanced nearly to the end of its stroke, the " throw-over " mechanism operates, and the outer rocker flies back, separating the points and breaking the circuit. The spring "P" then pushes the armature and the diaphragm back, forcing petrol through the delivery valve at a rate determined by the requirements of the engine. As soon as the armature gets near the end of this stroke, the " throw-over " mechanism again operates, the points again make contact, and the cycle of operations is repeated.

The spring blade rests against a small projection on to the bakelite moulding, and it should be set so that when the points are in contact it is deflected back from the moulding. The width of the gap at the points is approximately .030". (.76 mm).

SERVICING. Since specialised knowledge is required to service the pump it is recommended that advantage be taken of the factory reconditioned unit exchange scheme available for the S.U. pump, in preference to servicing the original unit.

If the magnet is removed from the body for any reason, care should be taken that the rollers "R" do not drop out. If the armature and centre rod have been unscrewed it will be necessary to reset these. In order to do this the spring blade which carries the contact must be swung to one side. The armature should be screwed in as far as possible and should then be screwed back gradually and pressed in and out until it is found that when it is pushed in slowly but firmly (not jerkily) the " throw-over " mechanism operates. It should then be unscrewed two-thirds of a turn. The six screws which hold the magnet to the body may now be screwed into place, but before tightening these down it is essential that the diaphragm should be stretched to the outermost position. This is most easily done by inserting a matchstick behind one of the white fibre rollers on the outer rocker and thus holding the points in contact. If a current is then passed through the pump the magnet will be energised and will pull the armature forward, and while it is in this position the screws should be tightened. (Whilst this diaphragm-stretching operation can be done quite effectively by the matchstick method, there is available a special but simple "Agent's Repair" tool. This is a flat steel wedge, which is inserted under the trunnion "O" in the centre of the inner rocker in order to stretch the diaphragm to its outermost position before tightening the six flange screws).

In the event of trouble, first disconnect the petrol delivery pipe at the carburettor flexible pipe. If the pump then works, the most likely cause of the trouble is a sticking needle in the float-chamber of the carburettor. Should the pump not work, disconnect the lead from the terminal and strike against the body of the pump to see if it sparks and therefore if any current is available in the wire. If the current is there, remove the bakelite cover and touch the terminal with the lead. If the pump does not operate and the points are in contact and a spark cannot be struck off the terminal, it is probable that there is some dirt on the points. These may be cleaned by inserting a piece of card between them, pinching them together and sliding the card backwards and forwards.

If, when the wire is connected to the terminal and the tickler of the carburettor is depressed, the points fail to break, it is possible that there is either an obstruction in the suction pipe, which should be cleaned by blowing down it with a tyre pump, or something in the pump itself which is preventing a correct movement. This may be due either to the diaphragm having stiffened or may be due to foreign matter in the roller assembly which supports the diaphragm and, therefore, the diaphragm should be removed, the whole assembly cleaned and reassembled in accordance with the instructions given above.

If the pump becomes noisy, look for an air leak on the suction side. The simplest way to check up for this is to disconnect the petrol pipe from the carburettor and allow the pump to pump petrol into a pint can. If the end of the pipe is then submerged in the petrol and bubbles come through, there must be an air leak, and it must be found and cured.

If the pump keeps on beating without delivering any petrol, it is possible that a piece of dirt is lodged under one of the valves. This can be remedied by removing the top lid and unscrewing the valve cage in order to examine both valves. A choked filter or an obstruction on the suction side will make the pump get very hot and eventually cause a failure. Also make sure that the six flange screws clamping the diaphragm are tight.

PETROL PUMP. TO REMOVE AND REFIT

GENERAL. Since the petrol pump is below petrol tank level the following procedure is recommended to prevent draining the tank when servicing the pump. Attach a suitable length of rubber tubing to the door pillar at a height above the petrol tank.

REMOVAL. Disconnect suction pipe union, this is the lower pipe, and attach the rubber tubing to the nipple as soon as it is detached to avoid loss of petrol. Disconnect delivery pipe union, this is the upper pipe. Disconnect electric feed wire from terminal on bakelite cover. Disconnect earth wire from pump body. Remove two securing nuts and withdraw pump. (Plate C.13).

REFIT. Refitting is the reverse of the foregoing procedure. Observe rubber grommets fitted to mounting bolts. It is essential that these are fitted and that they are in sound condition or pump operation noise will be transferred to the chassis frame.

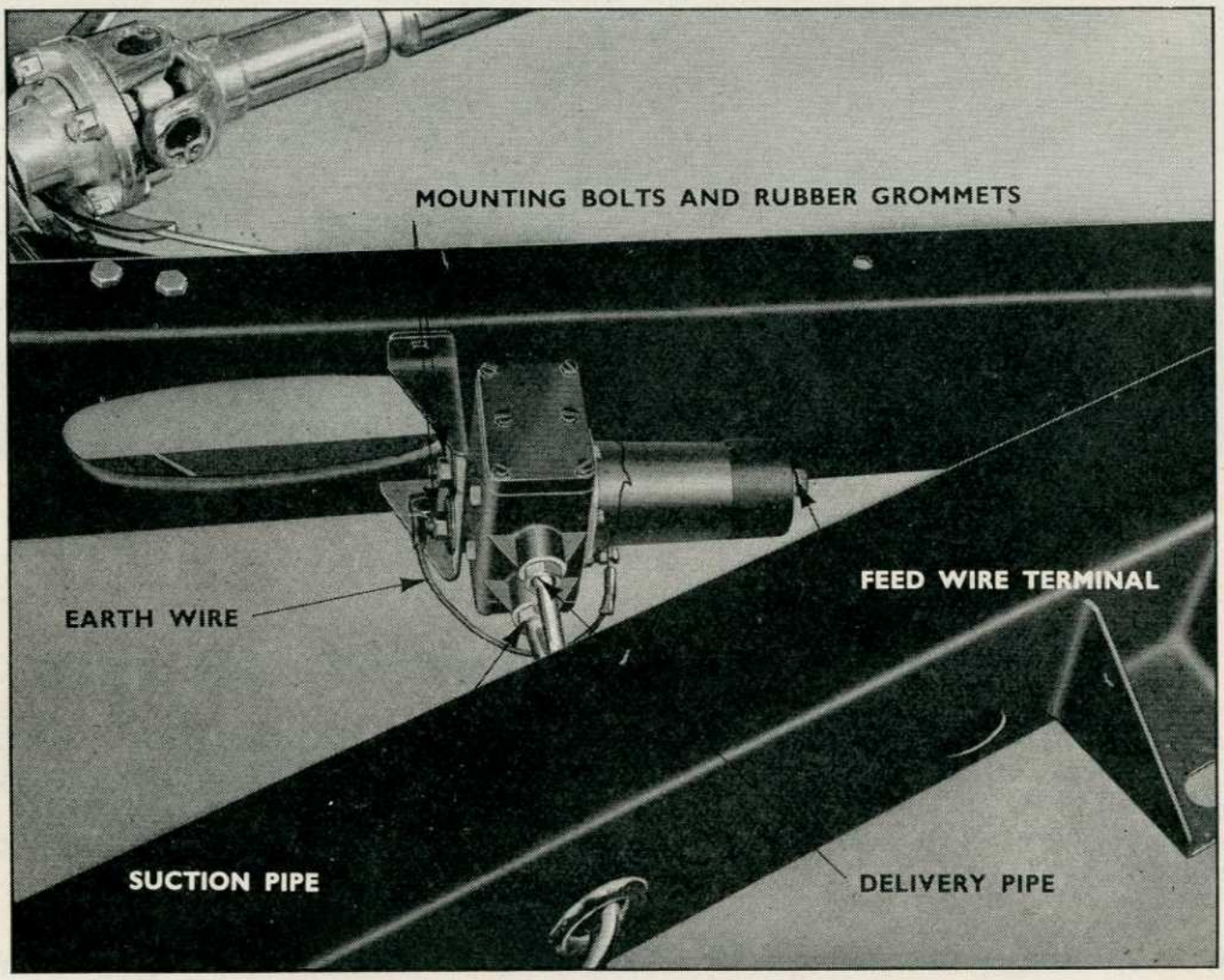


PLATE C.13. PETROL PUMP—REMOVAL

PETROL TANK. TO REMOVE AND REFIT

DISCONNECT TANK CONNECTIONS. Raise car on lift, remove drain bung and drain tank into a clean receptacle. Disconnect petrol feed pipe union from tank. Lower car. Withdraw twelve countersunk screws retaining rear locker floor board. Unscrew left hand dome nut securing stop arm to pivot and remove pivot stud, unscrew left hand knurled locking nut and remove stud. Lift out locker floor board through clearance now obtained (Plate C14.). Disconnect hose clip retaining petrol filler hose and ease hose off petrol tank. (If difficulty is encountered in withdrawing the hose from the tank, open hinged petrol filler cover and remove four screws securing petrol filler to body shell. With the filler pipe free the hose can now readily be disengaged from the tank). Disconnect petrol vent pipe union from offside (right hand) of tank. Disconnect two wires from petrol tank gauge unit.

REMOVAL. Withdraw fourteen set screws securing flange of petrol tank. Lift out tank through boot lid aperture.

REFITTING. Refitting is the reverse of the above procedure.

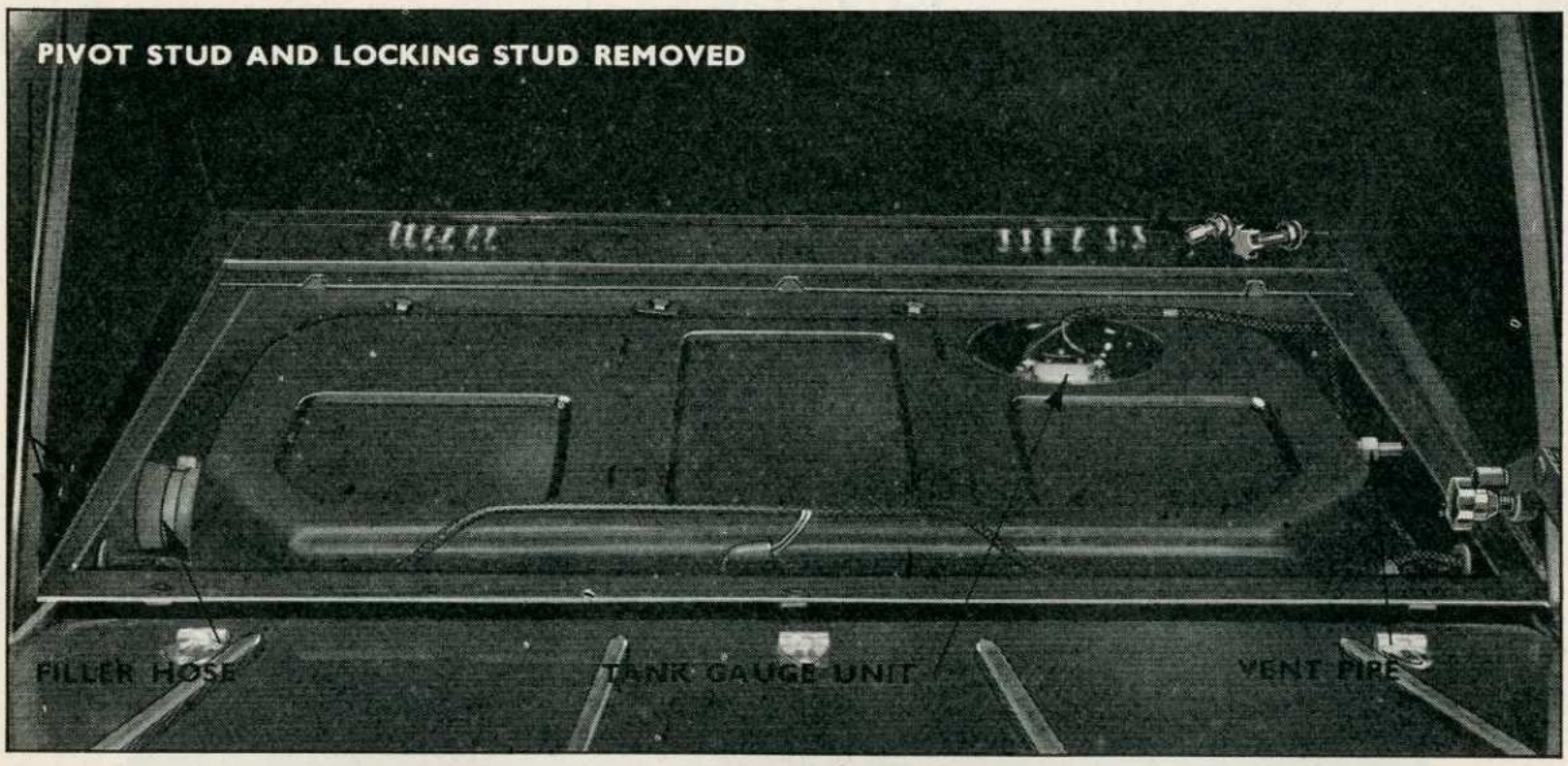


PLATE C.14. PETROL TANK—REMOVAL

PETROL TANK VENT PIPE. TO REMOVE AND REFIT

REMOVAL. Withdraw twelve countersunk screws retaining rear locker floor board. Unscrew left hand dome nut securing stop arm to pivot and remove pivot stud, unscrew left hand knurled locking nut and remove stud. Lift out locker floor board through clearance now obtained (Plate C14). Disconnect petrol vent pipe union from offside (right hand) of tank. Release clips securing pipe to wheel arch panel. Withdraw pipe into boot interior.

REFITTING. Refitting is the reverse of the above procedure. Ensure that the rubber grommet is fitted to the vent pipe aperture in the wheel arch panel and that the pipe is secured by the clips to the wheel arch panel.

PETROL TANK FILLER HOSE. TO REMOVE AND REFIT

REMOVAL. Withdraw twelve countersunk screws retaining rear locker floor board. Unscrew left hand dome nut securing stop arm to pivot and remove pivot stud, unscrew left hand knurled locking nut and remove stud. Lift out locker floor board through clearance now obtained (Plate C14). Remove boot left hand side casing. Remove clips securing hose to petrol tank. Open hinged petrol filler cover and withdraw four screws securing petrol filler to body shell. Remove filler and hose through hinged cover aperture.

REFITTING. Refitting is the reverse of the above procedure.

PETROL TANK GAUGE UNIT. TO REMOVE AND REFIT

REMOVAL. Withdraw twelve countersunk screws retaining rear locker floor board. Unscrew left hand dome nut securing stop arm to pivot and remove pivot stud, unscrew left hand knurled locking nut and remove stud. Lift out locker floor board through clearance now obtained (Plate C14). Disconnect petrol gauge and petrol level warning light wires from gauge tank unit. Remove six screws and withdraw tank unit. Care must be taken not to bend the float lever or the calibration will be upset giving a false reading on the gauge.

REFITTING. Refitting is the reverse of the foregoing procedure. Ensure that jointing washer between unit and tank is in sound condition. If there is any apparent damage fit a new washer using jointing compound applied sparingly.

PETROL GAUGE. TO REMOVE AND REFIT

REMOVE CENTRE FACIA. Remove drive screws securing dash casing and withdraw casing. Remove six control knobs all being retained by a spring loaded pin registering in a hole in the knob. Press in the pins and withdraw knobs. Remove centre fixing screw from lamp switch control and remove control. Remove cigar lighter and ignition key. Remove two screws, one from either side securing lower edge of facia to support brackets. Remove two chrome plated thumb screws, each passing through a top corner of the facia panel. Remove centre facia. (Plate C15.)

REMOVE GAUGE. Remove two screws securing gauge to instrument carrier, draw gauge away from carrier, release wiring and remove gauge.

REFITTING. Refitting is the reverse of the above procedure.

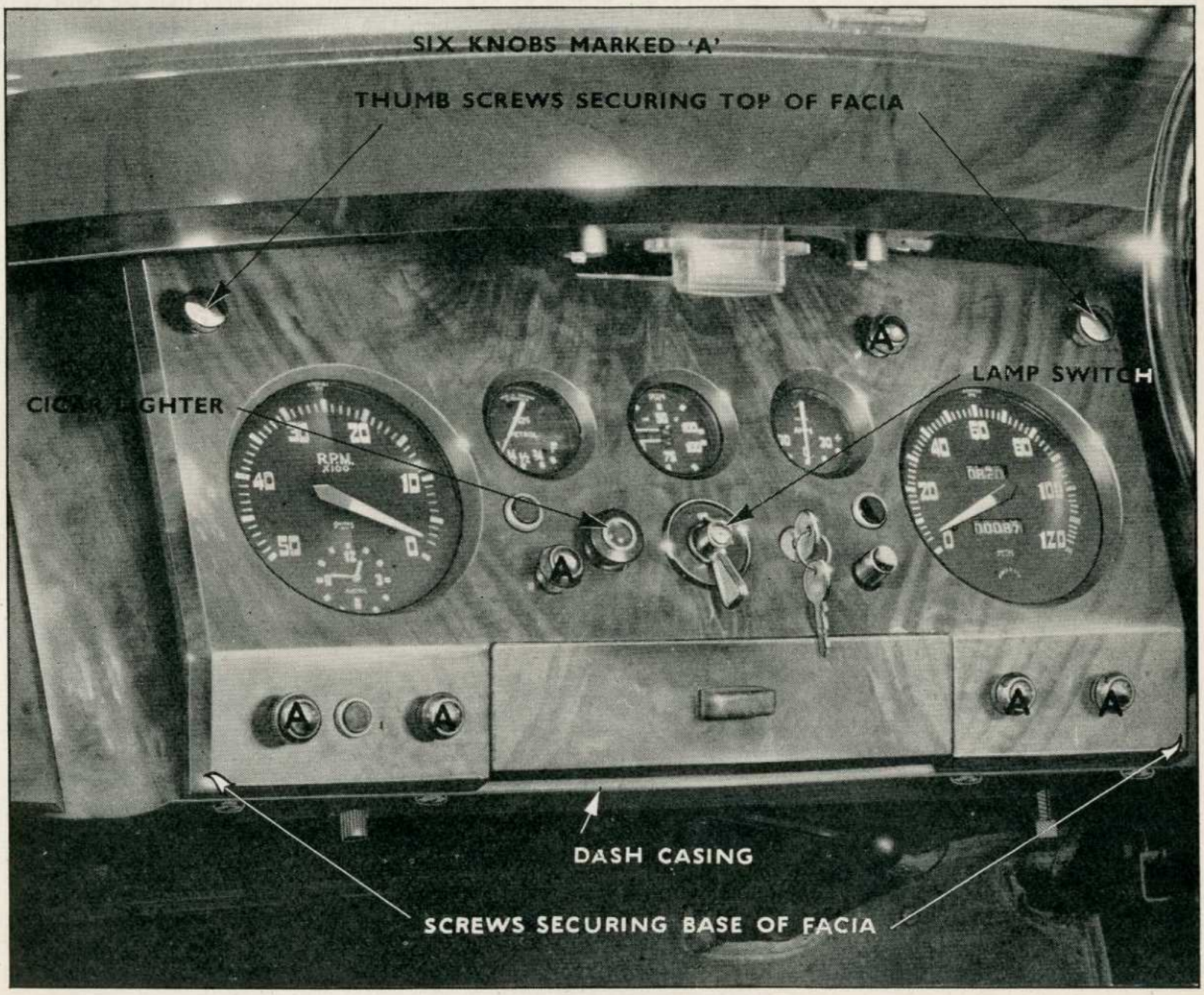


PLATE C.15. PETROL GAUGE—REMOVAL

PETROL GAUGE AND TANK UNIT. TO SERVICE

GENERAL. The petrol gauge is connected to the tank unit by a single wire. The following methods may be used to check the system and trace any faults that have developed. In all cases first check that all wiring connections are clean and tight.

SERVICING. To check the wire connecting gauge to tank unit for an earth, disconnect the wire from tank unit, switch on ignition, when the gauge should register " Full."

If the gauge does not register " Full " when the wire is disconnected from the tank unit, disconnect the wire from the gauge also, when, if the gauge now registers " Full," the wire is faulty and must be repaired or replaced. If, with the wire from the tank unit disconnected from the gauge, a reading other than " Full " is recorded, the gauge is faulty and must be replaced.

To check the wire connecting gauge to tank unit for an open circuit disconnect the wire from the tank unit, switch on the ignition and earth the wire, when the gauge should read " Empty." If the gauge does not register " Empty " earth the gauge terminal normally connected to the tank unit, when, if the gauge now registers " Empty," the wiring is faulty and must be repaired or replaced. If, with the terminal normally connected to the tank element earthed, the gauge gives a reading other than " Empty " the gauge is faulty and must be replaced.

When the petrol tank unit has been removed care should be taken to ensure that when refitting the float is free to rise and fall without obstruction from the tank. This may be tested with the tank unit replaced and the cover plate removed by gently moving the fingers contacting the resistance through their full travel. If there is interference, bend the float arm until clearance is effected. It will be realised that the float arm may be bent vertically and thus calibrate the gauge to the contents of the petrol tank. When the tank is empty (or full) if the gauge does not show a reading of " Empty " (or " Full ") the float arm should be bent until the correct conditions are obtained.

Remove Watermark Wondershare PDFelement

SECTION D

COOLING SYSTEM

MARK V

2½ and 3½ LITRE

ENGINE NUMBERS

(Stamped on a boss at right-hand rear of cylinder block)

2½ Litre	3½ Litre
H.2001 ONWARDS	T.5001 ONWARDS

The instructions in this section are presented under the following main headings which appear as sub-titles on the pages concerned and in the order shown :—

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DESCRIPTION

GENERAL. Water is circulated from the base of the radiator block via the water pump through the cylinder block and head water passages, and returned to the radiator header tank via the cylinder head water manifold. To ensure a quick warm up from cold, a thermostat valve is incorporated at the radiator end of the water manifold and by-passes water back to the engine until a sufficient operating temperature is reached when the thermostat valve opens and normal circulation through the radiator block is obtained. An overflow pipe is fitted in the neck of the radiator block filler which discharges at the nearside (left hand) base of the block. To ensure an adequate flow of air through the cooling element of the radiator block a six bladed fan is mounted on the water pump spindle boss, the drive being by an adjustable " V " belt from the crankshaft pulley. The water take off for the air conditioning equipment is from the rear of the water manifold with a remote control ON-OFF valve situated between take off point and air conditioning unit. Return circuit from the air conditioning unit is to an adaptor on the water pump uptake elbow.

MAINTENANCE

DRAINING THE SYSTEM. Drain the radiator whilst the car is standing on level ground by opening the drain tap situated at the base of the radiator block and the engine by opening the tap at the right hand rear of the cylinder block. Observe that it is essential to open both drain taps to drain the cooling system completely.

On a number of early cars the radiator drain tap is fitted to the nearside (left hand) base of the radiator block. (Plate D.1.) On later models the tap is fitted to the offside (right hand) base of the block. Plate D.2.

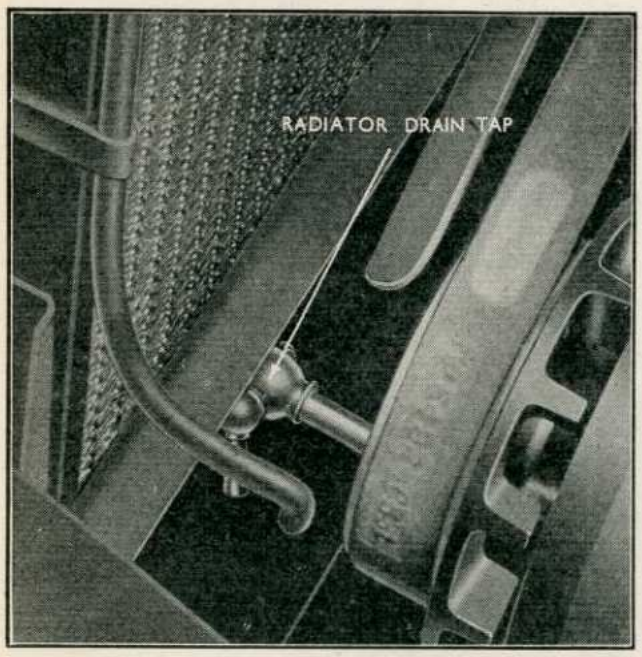


PLATE D.1
DRAIN TAP. RADIATOR. (Early Cars)

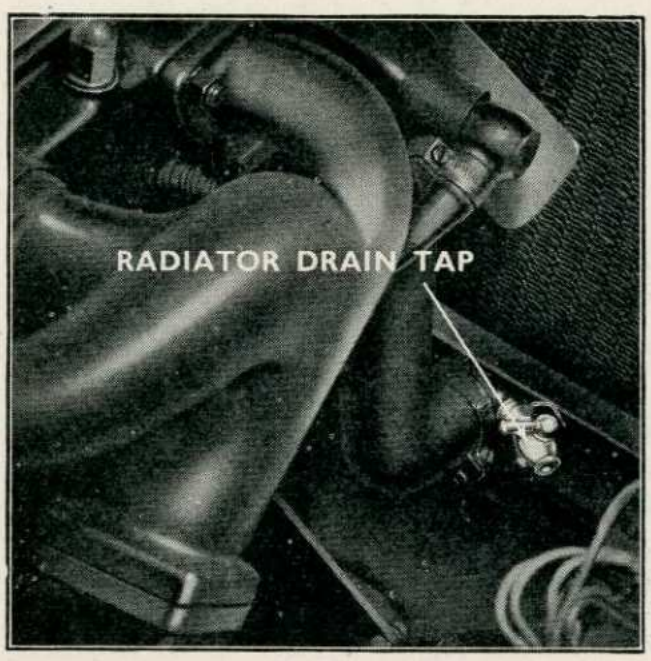


PLATE D.2
DRAIN TAP. RADIATOR.

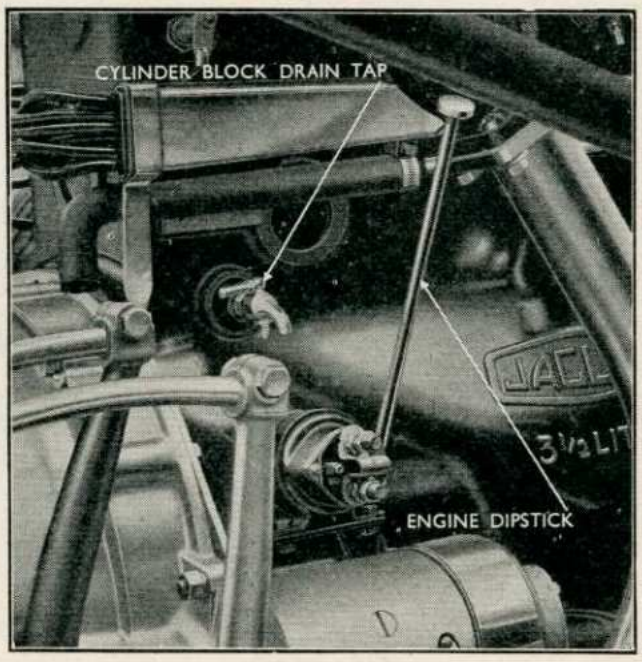


PLATE D.3
DRAIN TAP. ENGINE

FILLING THE SYSTEM. Ensure that the radiator block and cylinder block drain taps are closed. Fill the system with water which is as nearly neutral (soft) as possible. Open the air conditioner hot/cold tap by rotating to the hot position, that is, anticlockwise, and run the engine for a few seconds to allow the water to circulate through the air conditioner and expel any air present. Top up at the radiator, if necessary, the correct level being when the coolant just reaches the bottom of the filler neck baffle plate.

CLEANING. The entire cooling system should occasionally be flushed out to remove sediment. To do this, open the radiator block and cylinder block drain taps and insert a water hose into the radiator filler neck. Allow the water to flow through the system, with the engine running at 1,000 r.p.m., to cause circulation, until the water runs clear.

CARE OF THE SYSTEM. Since deposits in the water will in time cause fouling of the surfaces of the cooling system with consequent impaired efficiency, it is desirable to retard this tendency as much as possible by using water as nearly neutral (soft) as is available. One of the approved brands of water inhibitor may be used with advantage to obviate the creation of deposits in the system. Every 1,000 miles (1,500 kilometres) apply grease sparingly through the nipples provided to lubricate the water pump spindle bearing and the fan bearings. Every 5,000 miles (8,000 kilometres) check the tension of the fan belt and adjust, if necessary. Occasionally check all water hose connections, joints of the water pump, water manifold and drain taps to ensure that these are tight and free from leaks.

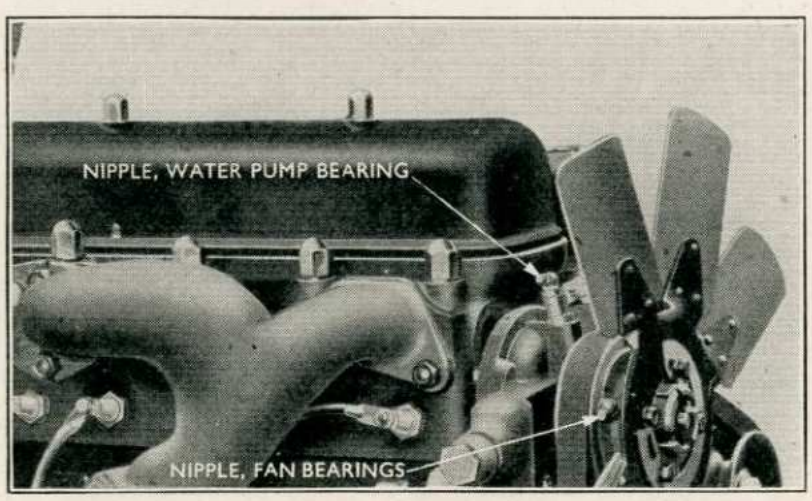


PLATE D.4
NIPPLES. WATER PUMP AND FAN.

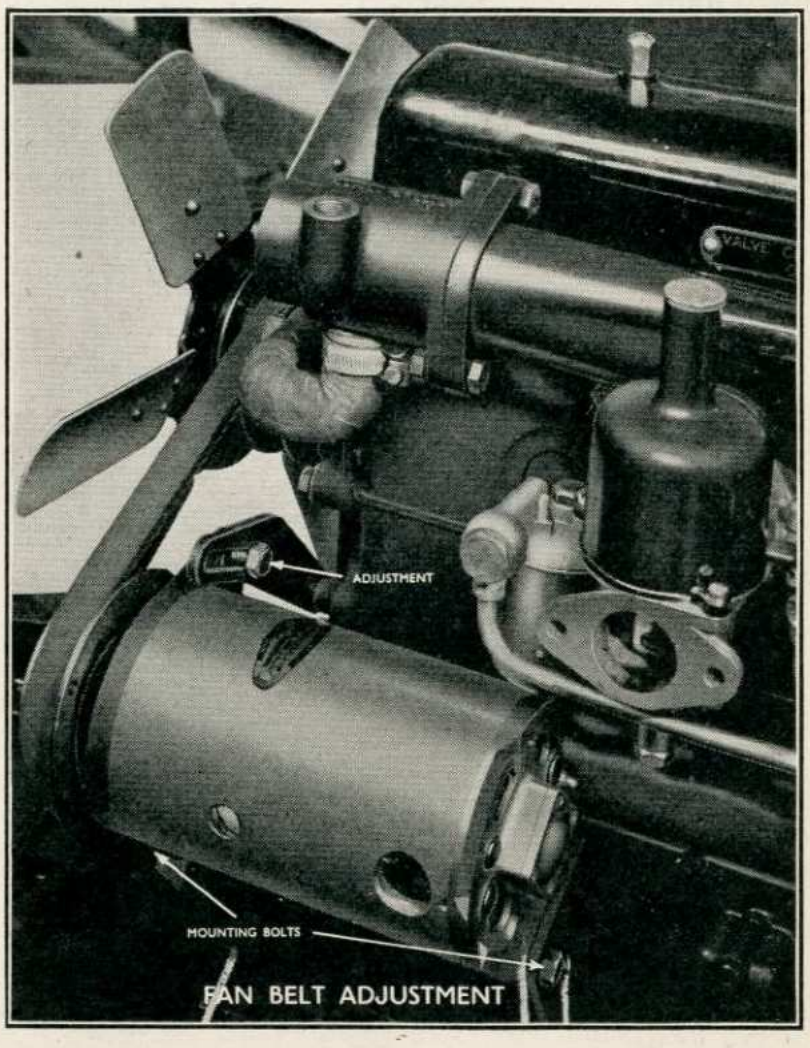


PLATE D.5
FAN BELT ADJUSTMENT.

FROST PRECAUTIONS

GENERAL. During winter months it is strongly recommended that an approved anti-freeze solution should be added to the cooling water in the proportions laid down by the manufacturers. If an anti-freeze solution is not used it is essential to adhere closely to the following instructions, otherwise it is likely that severe and expensive damage will be caused to the engine.

DRAINING. Drain the radiator whilst the car is standing on level ground by opening the drain taps situated at the base of the radiator block and the engine by opening the tap at the right hand rear of the cylinder block. It is recommended that a wire be inserted in the two drain taps to ensure that these are clear and the engine then run at 1,000 r.p.m. for thirty seconds to dry out remaining water pockets. Observe that it is essential to open both drain taps to completely drain the cooling system.

ANTI-FREEZE. Before adding anti-freeze solution the cooling system should be cleaned by flushing as described above. The cylinder head gaskets must be in good condition and cylinder heads pulled down correctly since if the solution leaks into the crankcase a mixture will be formed with the engine oil likely to cause blocking of oil ways with consequent damage to working parts. Check tightness of all water hose connections, water pump and manifold joints. Measure the recommended proportion of water and anti-freeze solution in a separate container and fill the system from this container, rather than add the solution direct to the cooling system, to ensure satisfactory mixing. If topping up is necessary during the period in which anti-freeze solution is in use this topping up must be carried out using anti-freeze solution or the degree of protection provided may be lost. Topping up with water will dilute the mixture, possibly to an extent where damage by frost will occur.

COOLING SYSTEM DATA

		2½ Litre.	3½ Litre.
Total Capacity		28 pints. 25.9 litres.	26 pints. 24.8 litres.
Radiator Core.	Type.	Film.	
	Thickness.	84 mm.	
Water Pump.	Type.	Centrifugal.	
	Drive.	Fan Belt.	
Fan.	Number of Blades.	6	
	Overall Diameter.	14″ (35.6 cm.).	
Fan Belt.	Angle of 'V'	32°.	
Fan Pulley.	Diameter of Fan Boss.	4¼″ (10.8 cm.).	

FAN. TO REMOVE AND REFIT

REMOVAL. Observe that the fan is secured by four setscrews with balance pieces under the setscrews. Mark position of balance pieces to facilitate correct assembly. Remove setscrews and withdraw fan. (Plate D.9.)

REFITTING. Offer up fan with balance pieces correctly located and bolt into position.

FAN BELT. TO ADJUST

ADJUST. Release adjusting bolt situated on top and two securing bolts situated under the dynamo. Lever the dynamo until tension is just obtained. Tighten all bolts. (Plate D.5.) Undue tension will create heavy wear of belt, pulleys and dynamo bearings.

FAN BELT. TO REMOVE AND REFIT

REMOVAL. Release adjusting bolt situated on top of dynamo and two securing bolts under dynamo. Swing dynamo towards engine and disconnect fan belt from dynamo pulley. Remove belt from crankshaft pulley. Withdraw over fan.

REFITTING. Refitting is the reverse of the above procedure, but it is important to ensure that due to the construction of the belt this is not stretched over the pulleys other than by hand. If a tool is used to lever the belt on or off rupture will occur.

RADIATOR BLOCK. TO REMOVE AND REFIT

REMOVE BONNET. Release bonnet catches by pushing forward the controls situated on either side under the facia board and with bonnet top panels open remove two screws from centre hinge front "T" piece. Raise front of bonnet and remove forward.

REMOVE BONNET SIDE PANELS. Remove three countersunk screws from top face of each bonnet side panel and lift out side panels. (Slide rubber sleeves off adaptor at radiator block and air conditioner motor and lift out heater air duct. Fitted only to early cars.)

REMOVE RADIATOR SHELL AND BLOCK ASSEMBLY. Drain radiator by opening drain tap at base of block. Disconnect tie rods from radiator header tank. Disconnect top and bottom water hoses. Remove two nuts securing base of radiator shell to front wing valance, observing distance rubbers fitted between shell and valance. Remove two bolts per side securing shell upper casing to bonnet side stays. Remove three bolts per side securing block lower casing to transverse wing stay. Remove two bolts per side securing shell lower casing to wings. Remove bolt from central main radiator mounting on chassis observing disposition of rubber washers. Remove drain tap (later cars only). Disconnect remote control rod from tap (early cars only). Place pieces of thin fibre sheet, one on either side of the bottom of radiator shell, and lift assembly forward to rest on fibre whilst withdrawing drain tap (early cars only), and bottom outlet pipe from transverse wing stay thus avoiding scratching front apron cellulose. Draw radiator upwards clear of car. (Plates D.6 and D.7.)

REMOVE RADIATOR SHELL FROM BLOCK. Exercising care not to damage the chromium plate of the radiator shell remove two bolts per side securing the flange of the shell to the block. Release bonnet tapes. Remove filler cap and withdraw radiator shell.

REFITTING. Refitting is the reverse of the foregoing procedure.

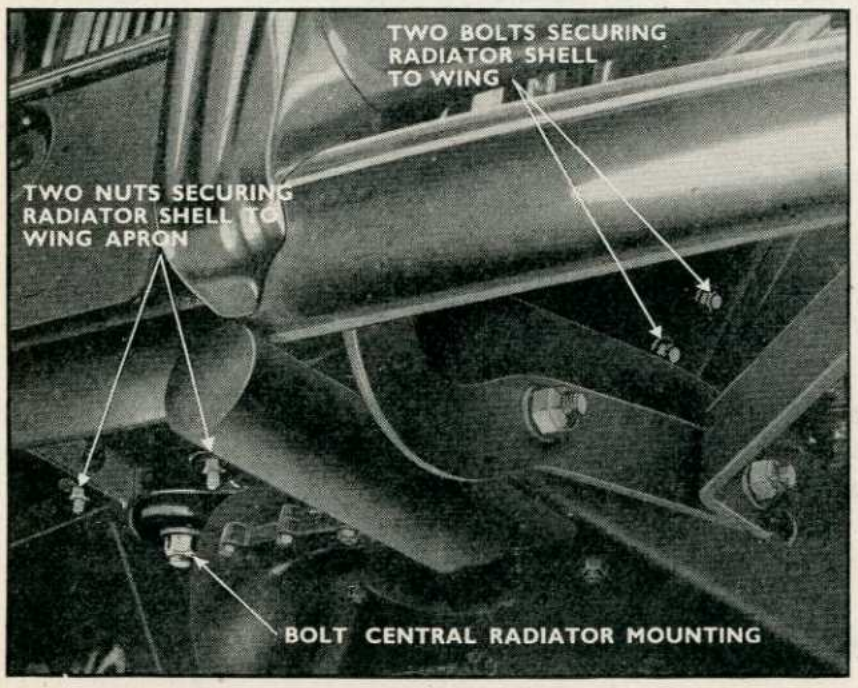


PLATE D.6.
REMOVAL OF RADIATOR SHELL AND BLOCK ASSEMBLY
(Viewed from under)

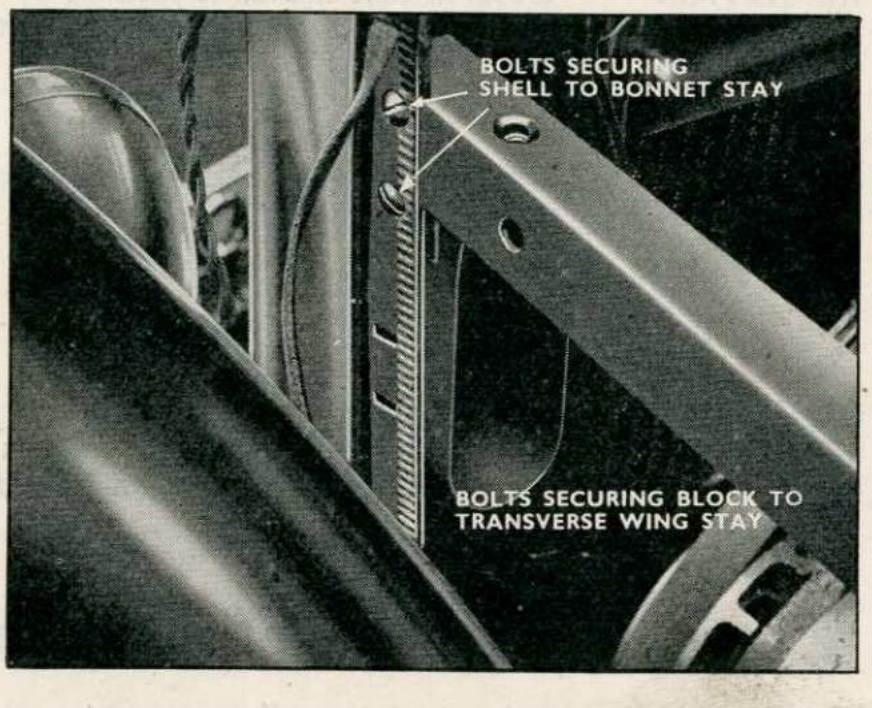


PLATE D.7.
REMOVAL OF RADIATOR SHELL AND BLOCK ASSEMBLY

THERMOSTAT. REMOVE, CHECK AND REFIT

REMOVAL. Drain radiator by opening drain tap at base of block. Remove water temperature gauge bulb from thermostat housing by holding flats of bulb portion and unscrewing union. It is necessary to exercise care not to twist the capillary tube during removal or fracture of the tube may occur. Disconnect hose clips and remove top water hose and by-pass hose from thermostat housing. Remove two bolts securing thermostat housing to water manifold and lift out thermostat. Observe gasket fitted between thermostat housing and water manifold flange.

CHECKING. Thoroughly clean the thermostat and housing and check that the small ball release valve is free. This release valve allows the passage of a limited quantity of water, and air, from one side of the thermostat valve to the other when the thermostat is in the closed position. If the release valve is blocked this may cause trouble due to the building up of pressure and possible loss of water at the overflow pipe. Check the thermostat for correct operation by immersing in a container of cold water, together with a centigrade thermometer Heat the water and observe if the characteristics of the thermostat are in agreement with the following data..

Part No. C.527. Extreme Cold.
Commences to open 85°C. Fully open 98°C.
Valve Lift $\frac{5}{16}$" (7.9 mm).
Part No. C527/1. Hot Climates.
Commences to open 65°C. Fully open 75°C.
Valve lift $\frac{5}{16}$" (7.9 mm).
Part No. C527/2. Temperate Climates.
Commences to open 75°C. Fully open 85°C.
Valve Lift $\frac{5}{16}$" (7.9 mm).

If the thermostat is faulty reconditioned assemblies are available on an exchange basis. Thermostat valves and thermostat housings are not serviced separately, replacements being issued with the valve mounted in the housing.

REFITTING. Refitting is the reverse of the foregoing procedure. Observe that the air silencer support bracket is attached to the top thermostat fixing bolt. Always use a new gasket between thermostat housing and water manifold flange.

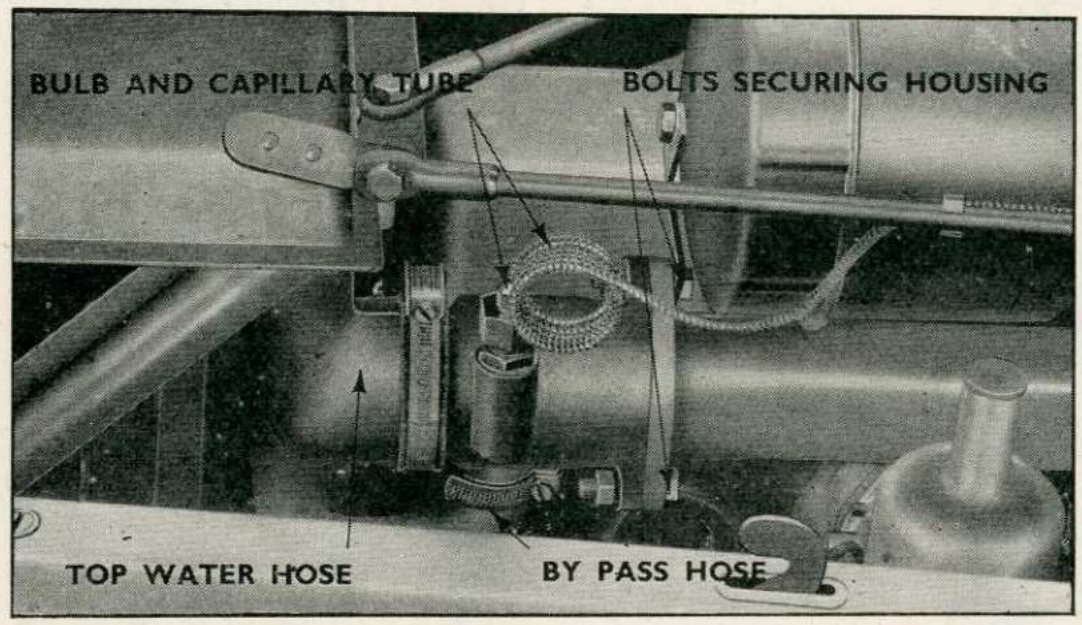


PLATE D 8 THERMOSTAT

WATER PUMP. TO REMOVE, DISMANTLE AND REASSEMBLE

REMOVE BONNET. Release bonnet catches by pushing forward the controls situated at either side under the facia board and with both bonnet top panels open remove two screws from centre hinge front "T" piece. Raise front of bonnet and remove forward.

REMOVE BONNET SIDE PANELS. Remove three countersunk screws from top face of each bonnet side panel and lift out side panels. (Slide rubber sleeves off adaptor at radiator block and air conditioner motor and lift out heater air duct. Fitted only to early cars.)

DRAIN COOLING SYSTEM. Drain radiator block and engine by opening tap at base of radiator. (Plates D.1. to D.3.) If anti-freeze mixture is in use conserve water. Disconnect bypass hose from water pump and remove bottom water hose completely. Disconnect water connection from air conditioner at water pump inlet elbow.

REMOVE FAN BELT. Release adjusting bolt situated on top of dynamo and two securing bolts under dynamo. Swing dynamo towards engine and disengage fan belt from dynamo pulley. (Plate D.5.) Remove belt from crankshaft pulley and withdraw over fan.

REMOVAL. Remove four set screws and withdraw fan observing balance pieces fitted under setscrews (marking balance pieces to facilitate correct assembly). Remove five setscrews securing water pump to cylinder block and remove pump complete.

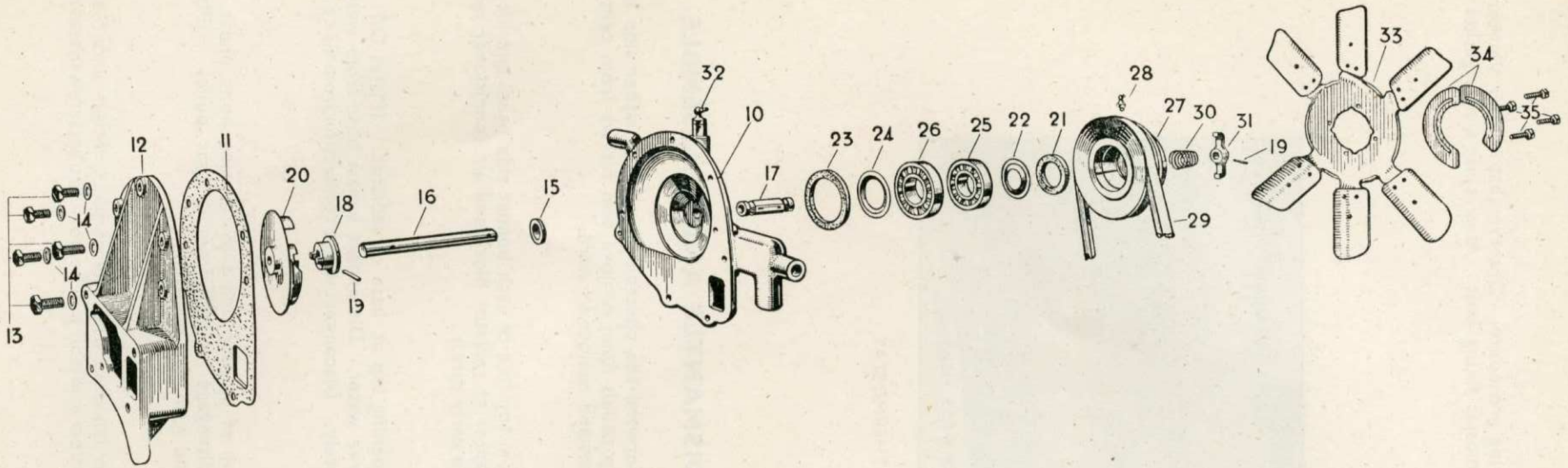


PLATE D.9. WATER PUMP AND FAN ASSEMBLY

Body, Water Pump	10	Washer (Felt) Rear	23
Washer, Jointing, between Body and Cover	11	Disc for Rear Felt Washer	24
Cover for Water Pump	12	Bearing, Ball, Rear (Hoffman S.9)	25
Screw, Set, securing Cover to Pump	13	Bearing, Ball, Rear (Hoffman S.10)	26
Washer, Shakeproof, on Setscrews	14	Pulley, Fan	27
Gland	15	Nipple, Grease (Tec. HA.5) on Fan Pulley	28
Spindle for Water Pump	16	Belt, Fan Driving	29
Bush for Spindle	17	Spring for Pump Spindle	30
Piece, Driving, for Impellor	18	Piece, Driving, on Fan Pulley	31
Pin (Mills Type GP.3) securing Driving Pieces	19	Nipple, Grease, on Water Pump Body	32
Impellor	20	Fan Assembly	33
Washer (Felt) Front	21	Piece, Balance, for Fan	34
Disc for Front Felt Washer	22	Screw, Set, securing Fan to Pulley	35

Remove Watermark
Wondershare PDFelement

DISMANTLING. Remove five setscrews and withdraw pump backplate. Drive out pin securing driving dog on front of shaft and remove dog and spring. Withdraw shaft to rear with impellor, conical faced collar and carbon seal. Collar is pinned to the shaft and dogged to impellor, the spindle running in a bush pressed into the pump housing. Withdraw fan pulley which runs on ball bearings, this assembly being pressed on to the pump housing. Observe felt oil retaining washers fitted to front and rear of fan bearings. The carbon sealing gland requires no lubrication. (Plate D.9.)

REASSEMBLY AND REFITTING. Reassembly and refitting is the reverse of the above procedure.

WATER MANIFOLD. TO REMOVE AND REFIT

REMOVAL. Drain engine by opening tap at right hand rear of engine block. Conserve water if anti-freeze is in use.

REMOVE AIR SILENCER MANIFOLD. Remove four nuts securing air silencer manifold to carburettor flanges and lift out manifold. Disconnect self starting carburettor solenoid wire from thermostat switch in water manifold. Release air conditioner hose from adaptor at rear of manifold. Remove two bolts securing thermostat housing to water manifold. Remove nuts securing manifold flanges to cylinder head. Remove manifold.

REFITTING. Refitting is the reverse of the above procedure, renewing gaskets fitted between manifold and cylinder head and between thermostat housing and manifold.

WATER TEMPERATURE GAUGE ASSEMBLY.

TO REMOVE AND REFIT

GENERAL. The water temperature gauge fitted to the facia panel is connected to the bulb screwed into the water thermostat housing by a capillary tube which is an integral part of the gauge and bulb. The gauge, capillary tube and bulb are serviced only as an assembly.

REMOVE CENTRE FACIA. Remove drive screws securing dash casing and withdraw casing. Remove six control knobs all being retained by a spring loaded pin registering in a hole in the knob. Press in the pins and withdraw knobs. Remove centre fixing screw from lamp switch control and remove control. Remove cigar lighter and ignition key. Remove two screws, one from either side, securing lower edge of facia to support brackets. Remove two chrome plated thumb-screws each passing through a top corner of the facia panel. Remove centre facia. (Plate D.10.)

REMOVE GAUGE ASSEMBLY. Drain radiator by opening tap at base of block. Conserve water if anti-freeze is in use. Remove water temperature gauge bulb from thermostat housing by holding flats of bulb portion and unscrewing union. It is necessary to exercise care not to twist the capillary tube during removal or fracture may occur. Disconnect and remove battery.

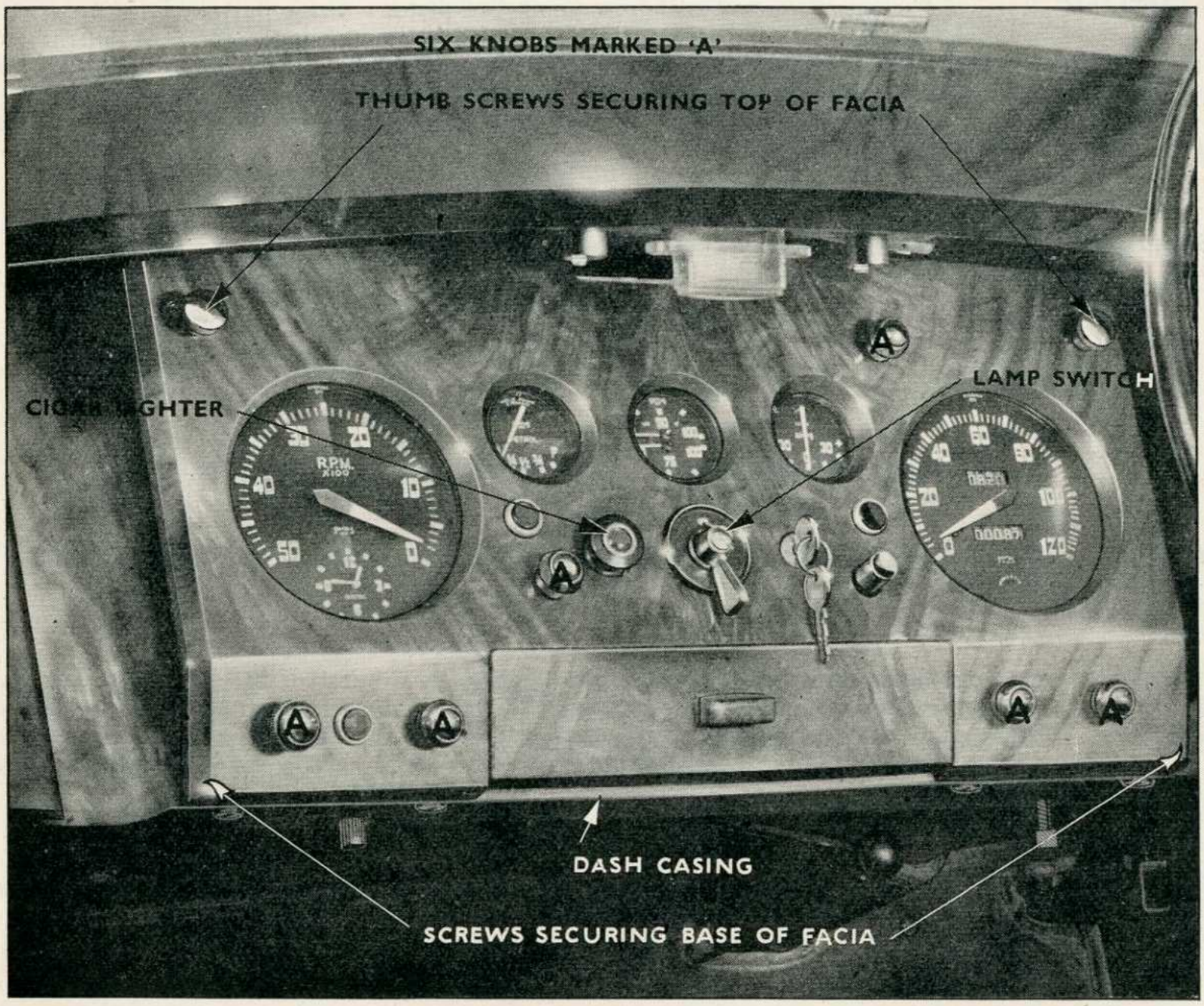


PLATE D.10. WATER TEMPERATURE GAUGE—REMOVAL

Release capillary tube from clips on stay rod and floating dash. Withdraw grommet supporting capillary tube in floating dash. Disconnect oil pressure gauge pipe from rear of water temperature gauge. Remove two screws securing gauge to instrument carrier. Draw gauge complete with capillary tube and bulb into car.

REFITTING. Refitting is the reverse of the above procedure.

WATER JACKET CORE PLUGS. TO SERVICE

REMOVAL. Core plugs are fitted to the water jackets of the cylinder head and cylinder block and may be removed by striking the centre of the plug using a hammer and punch. This will cause the core plugs to assume a concave shape when they will free and can be removed.

FITTING. When fitting replacement core plugs ensure that the lip of the core plug aperture in the head or block is quite clean and free from burrs and tap in the replacement core plug gently. Continue to tap the convex face of the core plug until the plug is secure.

Remove Watermark Wondershare PDFelement

SECTION E

CLUTCH AND FLYWHEEL

MARK V

2½ and 3½ LITRE

ENGINE NUMBERS

(Stamped on a boss at right-hand rear of cylinder block)

2½ Litre	3½ Litre
H.2001 ONWARDS	T.5001 ONWARDS

The instructions in this section are presented under the following main headings which appear as sub-titles on the pages concerned and in the order shown :—

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Clutch	Adjust. Right-Hand Drive Cars	E.12
Clutch	Adjust. Left-Hand Drive Cars	E.13
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E.4	Clutch	E. 9
E.5	Clutch and Flywheel	E.10
E.6	Clutch Adjustment. Right-Hand Drive Cars	E.12
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E.8	Clutch and Flywheel Balance	E.14
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(Refer to Plate E.5)

DESCRIPTION. The clutch is of the single dry plate type, consisting of a driven plate assembly, a cover assembly and a graphite release bearing assembly. A 9″ model, type 9A6-G is used on 2½ litre and a 10″ model, type 10A6-G on 3½ litre. The driven plate assembly is of the flexible centre type in which a splined hub (15) is indirectly attached to a disc (14) and transmits the power and overrun through a number of coil springs held in position by shrouds. Two facings are riveted to the disc.

The cover assembly consists of a pressed steel cover (1) and a cast iron pressure plate (2) loaded by thrust springs (3) Mounted on the pressure plate are three release levers (8) which pivot on floating pins (9) retained by eyebolts (10). Adjustment nuts (12) are screwed on the eyebolts and secured by staking. Struts (13) are interposed between lugs on the pressure plate and the outer ends of the release levers. Anti-rattle springs (11) load the release levers and retainer springs (7) connect the release levers to a release lever plate (4). The release bearing consists of a graphite bearing (5) shrunk into a metal cup (6), the cup being located by the operating forks and release bearing retainer springs. Observe that under no circumstances should the release bearing be lubricated.

ADJUSTMENT. The adjustment nuts (12) are correctly set and locked when the clutch is assembled and should not be altered unless the clutch has been dismantled and new parts fitted. The only adjustment necessary throughout the life of the driven plate facings, is to restore periodically the free movement of the pedal before the release bearing comes into contact with the release lever plate and commences to release the clutch. To ensure this free movement, a clearance of not less than $\frac{1}{16}$″ (1.6 mm.) must be provided, this being measured in practice as 1″ (25.0 mm.) free or unloaded movement at the pedal pad. To obtain a clean release, the inner ends of the release levers should be pushed towards the flywheel .47″ to .42″ (11.9 mm. to 10.7mm.) for the 2½ litre clutch and .55″ to .50″ (14.0 mm. to 12.7 mm.) for the 3½ litre clutch. The effective pedal movement corresponding to these dimensions is 2½ litre 4.45″ (113.0 mm.) 3½ litre 5.25″ (133.4 mm.).

As the driven plate facings wear, the pressure plate moves closer to the flywheel and the outer ends of the release levers travel further towards the gearbox and decrease the release bearing clearance or free pedal movement referred to previously.

CLUTCH DATA

	2½ litre	3½ litre.
Make	Borg and Beck	
Model	9A6-G	10A6-G
Outside Diameter	8⅞″ (225.43 mm.)	9⅞″ (250.83 mm.)
Type	Dry Single Plate	
Clutch Pedal Adjustment	Adjusting Screw	
Clutch Release Bearing	Graphite	

CLUTCH ASSEMBLY. TO REMOVE AND REFIT

GENERAL. The engine and gearbox unit is removed as an assembly, either by lowering it away from the car into a pit, moving the car, and subsequently picking the assembly up again, or alternatively, raising the car on a hoist and lowering the engine and gearbox unit to the floor, whichever procedure is most convenient.

REMOVE BONNET. Release bonnet catches, by pushing forward the controls situated at either side under the facia board, and with both bonnet top panels open remove two screws from centre hinge front 'T' piece. Raise front of bonnet and remove forward.

REMOVE BONNET SIDE PANELS. Remove three countersunk screws from top face of each bonnet side panel and lift out side panels. (Slide rubber sleeves off adaptors at radiator block and air conditioner motor and lift out heater air duct. Fitted only to early cars).

DRAIN COOLING SYSTEM. Drain radiator block and engine by opening tap at base of radiator and tap at right hand rear of engine block. If anti-freeze mixture is in use conserve water. Disconnect top water hose from thermostat housing and remove bottom water hose completely.

REMOVE DYNAMO. Disconnect battery positive lead. Remove dynamo connections noting that "Yellow" wire is connected to terminal 'D' (large terminal) and "Yellow with Green" wire to terminal 'F' (small terminal). Remove adjusting bolt situated at top of dynamo and swing dynamo towards engine to free fan belt. Disengage fan belt from dynamo pulley, remove two securing bolts situated under dynamo and lift out dynamo.

REMOVE AIR SILENCER. Remove rocker cover centre dome nut and set screw passing through steady bracket into front of silencer body and remove silencer. (Remove four nuts securing manifold to carburettor flanges and withdraw manifold. Left hand drive cars only.)

DISCONNECT ENGINE CONNECTIONS. Remove thermometer element from thermostat and tie clear. Care must be exercised not to twist the capillary pipe from element to gauge or fracture may occur. Remove fan belt.

Disconnect throttle linkage at rear flexible joint and remove coupling rod from bush on dash together with lever and spring. Disconnect L.T. (Low Tension) feed from distributor and H.T. (High Tension) feed from coil. Disconnect petrol feed pipe from carburettors. Disconnect oil pressure gauge flexible pipe. Remove heater hoses and pipes from rear of engine. Disconnect wire to self starting carburettor solenoid. Disconnect revolution counter cable at elbow drive. (Disconnect wiring to right hand horn and remove horn and bracket. Early cars only.) Disconnect wiring from starter motor. Remove engine oil level dipstick. Remove exhaust down pipes by disconnecting at twin manifolds and at flange coupling to intermediate pipe. Disconnect earth strap from right hand side of clutch bell housing.

REMOVE GEARBOX CONNECTIONS. Remove both front seats and floor carpets and place clear of car. Remove change speed lever knob and locknut. Remove gearbox and bell housing cover and carpets. Disconnect reverse light wires from switch on remote control. Remove dipstick. Remove gearbox cover (remote control) and fit blank to exclude entry of dirt. Disconnect speedometer cable and place clear. Remove four bolts from propellor shaft companion flange at gearbox and spring shaft upwards from the spigot. Remove clutch pedal and stem from clutch operating lever. (On left hand drive cars dismantle clutch operating linkage by removing split pin from clevis pin and withdraw clevis pin. Remove three bolts from support plate bolted to gearbox, tilt plate thus disengaging the spherical joint and lift plate clear of lever and shaft.)

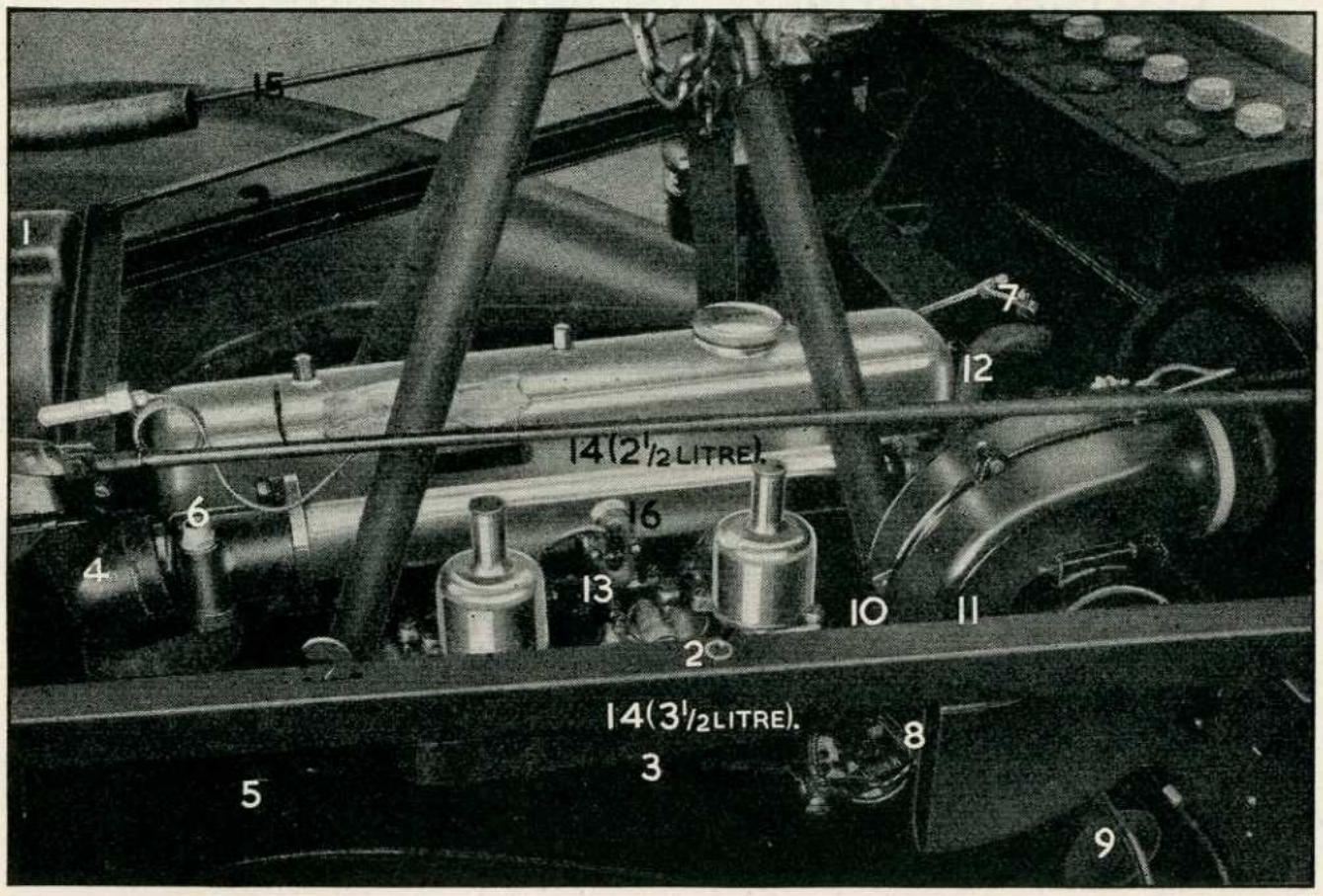


PLATE E.1. ENGINE REMOVAL (View left hand side)

1. Bonnet.
2. Side Panel.
3. Air Conditioner Duct.
4. Top Water Hose.
5. Dynamo.
6. Thermometer Element.
7. Throttle Linkage.
8. Distributor L.T. Feed.
9. Coil H.T. Feed.
10. Petrol Feed Pipe.
11. Oil Gauge Pipe.
12. Heater Hose.
13. Starting Carburettor Wire.
14. Revolution Counter Cable.
15. Radiator Stay Rod.
16. Air Silencer Manifold.

REMOVE ENGINE. Release radiator centre stay rod at front and place clear to allow clearance for engine slings. Arrange slings to come immediately behind the front engine bearer plate and in front of clutch bell housing mounting flanges. Take weight of engine. Disconnect one earth strap and two earth wires from front mountings, remove bolts securing mounting block angle brackets to engine bearer plate (three bolts per side). Remove bolts securing mountings to chassis brackets and remove front mountings. Observe that the engine and gearbox unit is positioned on the rear (gearbox) mounting to align the front and rear

propellor shafts in as straight a line as possible. It is therefore desirable to mark the position of the gearbox mounting support bracket to chassis frame members before disturbing the securing bolts. Withdraw four bolts (two per side) securing rear engine mounting support bracket to chassis frame. Lower engine complete with gearbox through chassis frame.

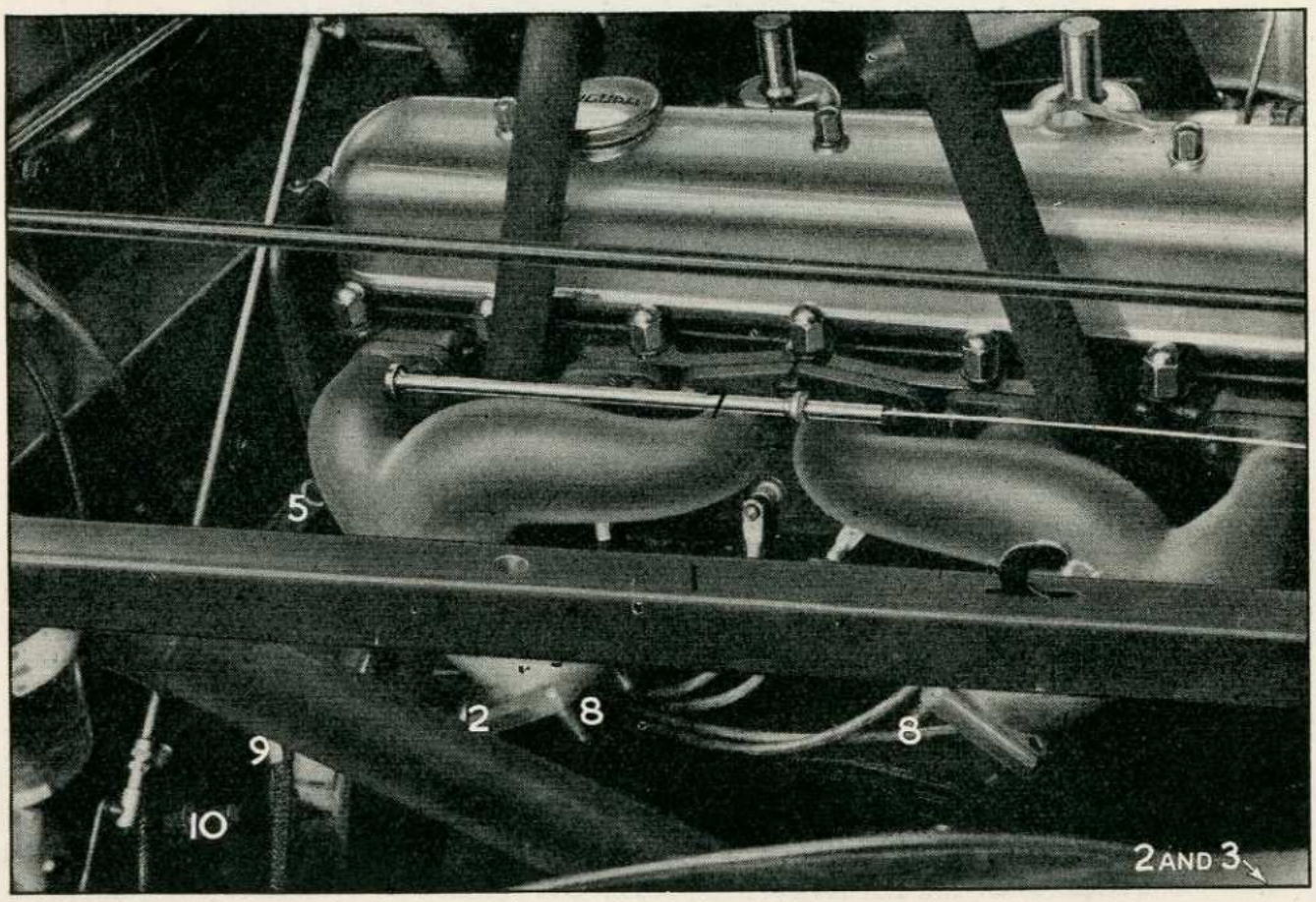


PLATE E.2. ENGINE REMOVAL (View right hand side)

1. Side Panel.
2. Cooling System.
3. Bottom Water Hose.
4. Air Silencer.
5. Heater Hose.
6. Starter Motor.
7. Oil Dipstick.
8. Exhaust Down Pipes.
9. Earth Strap.
10. Clutch Pedal.

REMOVE GEARBOX. Remove clutch bell housing mounting bolts and withdraw gearbox to rear. The gearbox must be supported during this operation in order to avoid strain on the shaft and distortion of the driven plate assembly

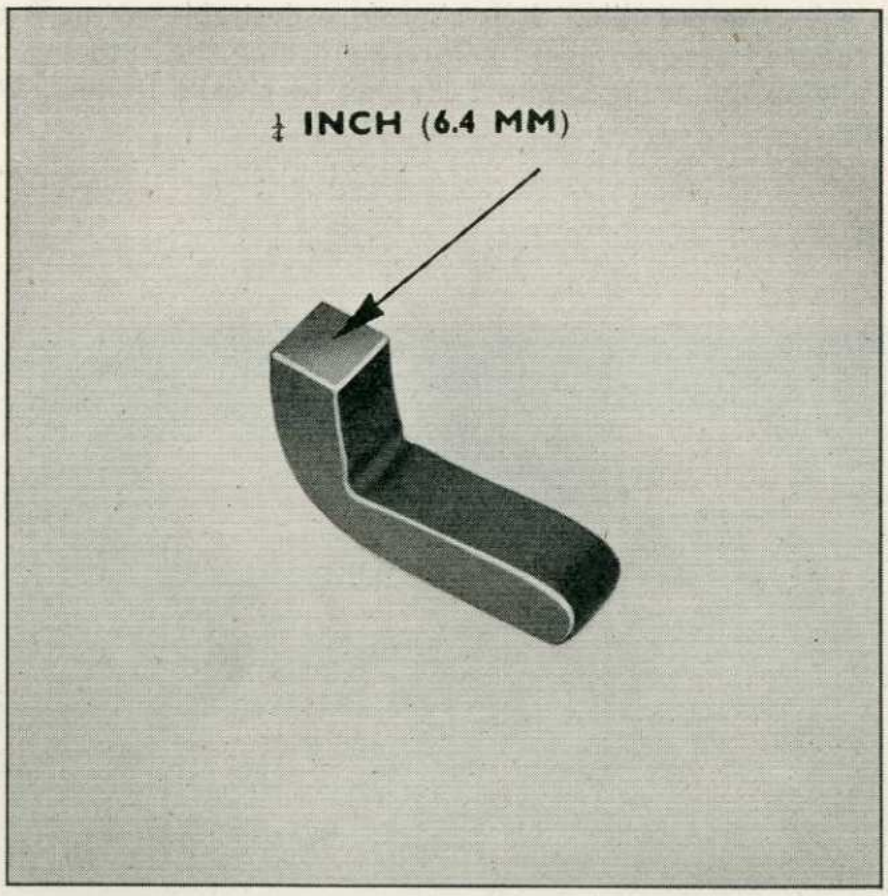


PLATE E.3. RELEASE LEVER DISTANCE PIECE

REMOVE CLUTCH ASSEMBLY. Fit three ¼" (6.4 mm.) distance pieces, one between each of the three release levers and the release lever plate, to reduce thrust spring pressure and thus assist removal of the clutch assembly from the flywheel. Slacken the clutch mounting screws a turn at a time by diagonal selection until the thrust spring pressure is released. Remove the setscrews and withdraw the complete clutch assembly from the flywheel. Remove the driven plate assembly. Observe that the clutch and flywheel are balanced as an assembly and located by dowels in this position. This location is indicated by a balance mark "B" inscribed on the clutch and flywheel. Remove withdrawal bearing.

REFIT CLUTCH ASSEMBLY. If a new clutch unit and/or flywheel is to be fitted it will first be necessary to balance the clutch and flywheel as an assembly and clearly mark their relationship in the balanced position, as described on page E.14 (Plate E.8). Assemble the driven plate in the flywheel, taking care to place larger chamfered spline end of the hub towards the gearbox, that is, the rear of the vehicle. Centralise the driven plate by means of a dummy shaft which fits the splined bore of the driven plate hub and the spigot bearing in the flywheel. (A constant pinion shaft may be used for this purpose.) Fit the three ¼" (6.4 mm.) distance pieces between release levers and release lever plate. Fit the cover assembly to the flywheel by means of the holding screws, tightening them a turn at a time by diagonal selection. Ensure that the clutch is assembled in the balanced position relative to the flywheel by observing that the balance marks "B" coincide and that the flywheel dowels locate in the clutch housing holes. Do not remove the dummy shaft until all the setscrews are securely tightened. Remove the dummy shaft. Remove lock wire and check tightness of taper lock bolt retaining release bearing operating fork to shaft. Tighten if necessary and lock with new wire. Refit withdrawal bearing. Finally remove ¼" (6.4 mm.) distance pieces.

REFIT GEARBOX. Fit the gearbox and clutch bell housing unit to the engine unit but observe that these units must be in alignment or jumping out of top gear may subsequently be experienced.

With the clutch bell housing bolts just finger tight operate the clutch approximately twelve times to effect alignment and finally tighten the bolts. The weight of the gearbox must be supported during refitting in order to avoid strain on the shaft and distortion of the driven plate assembly.

REFIT ENGINE AND GEARBOX UNIT. Refitting is the reversal of the operations for removal, paying particular attention to the positioning of the rear (gearbox) mounting so that the front and rear propellor shafts occupy as straight a line as possible.

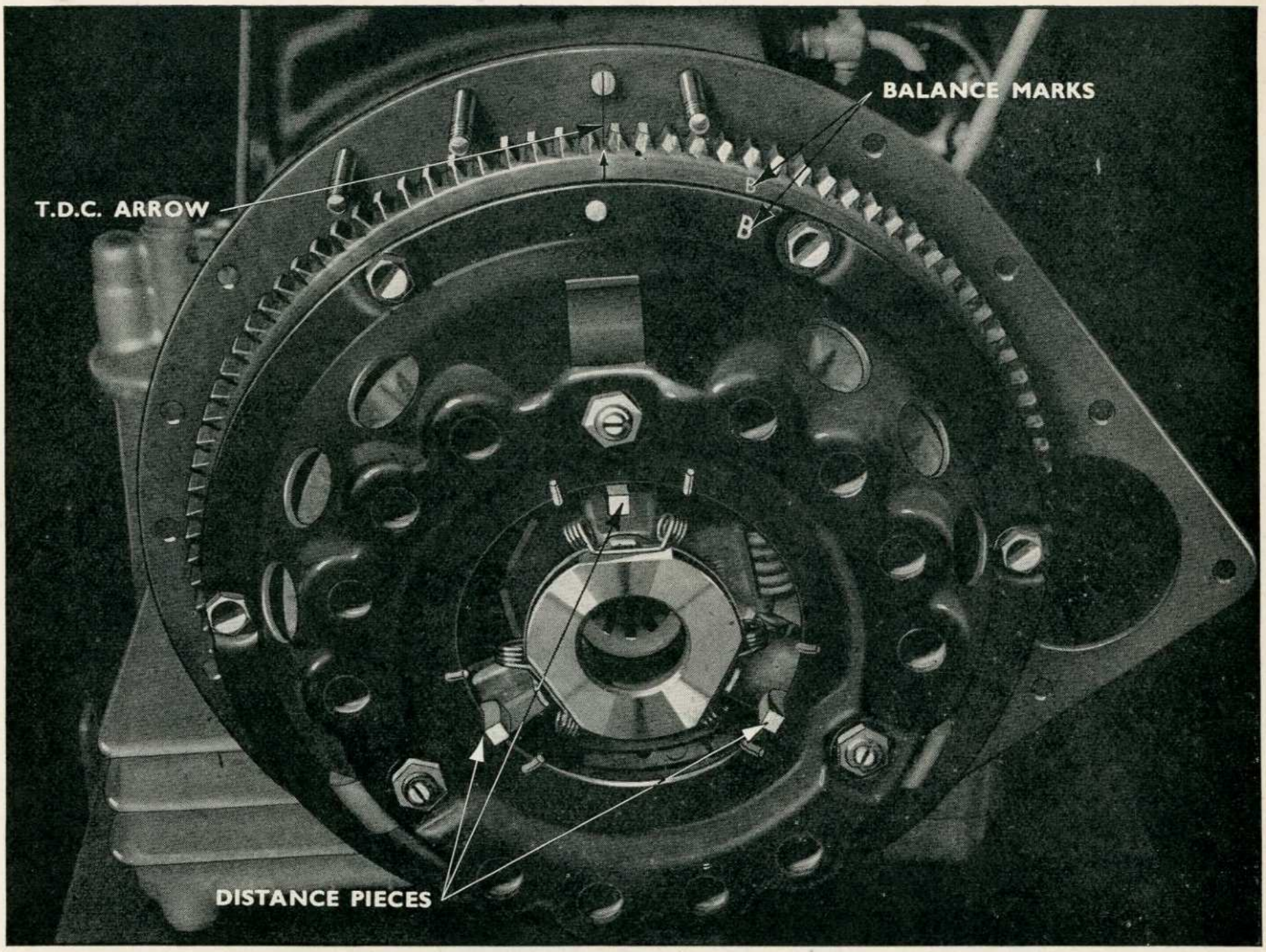


PLATE E.4. CLUTCH

CLUTCH ASSEMBLY. TO DISMANTLE AND REASSEMBLE

GENERAL. Factory reconditioned clutch assemblies are available on an exchange basis and it is recommended that this service is utilised in preference to overhauling the existing unit.

DISMANTLE. (PLATE E.5.) Suitably mark the following parts in such a manner that they can be reassembled in the same relative positions to each other in order to preserve the balance and adjustment :—

Cover (1), lugs on the pressure plate (2), and the release levers (8). Detach the release lever plate (4) from the retainer springs (7) and place the cover assembly on the bed of a press with the pressure plate (2) resting on blocks, so arranged that the cover is free to move downwards when pressure is applied. Place a block across the top of the cover resting on the spring bosses and compress the cover, by means of the ram ; while holding it under compression, remove the adjustment nuts (12) and slowly release the pressure until the load of the thrust springs is relieved. Scrap the adjustment nuts. Remove the cover from the pressure plate and collect the thrust spring. Remove each release lever (8) by holding the lever and eyebolt (10) between fingers and thumb so that the plain end of the lever and the threaded end of the eyebolt are as close together as possible, keeping the eyebolt pin (9) in position in the lever. Lift the strut (13) over the ridge on the lever and remove the eyebolt from the pressure plate.

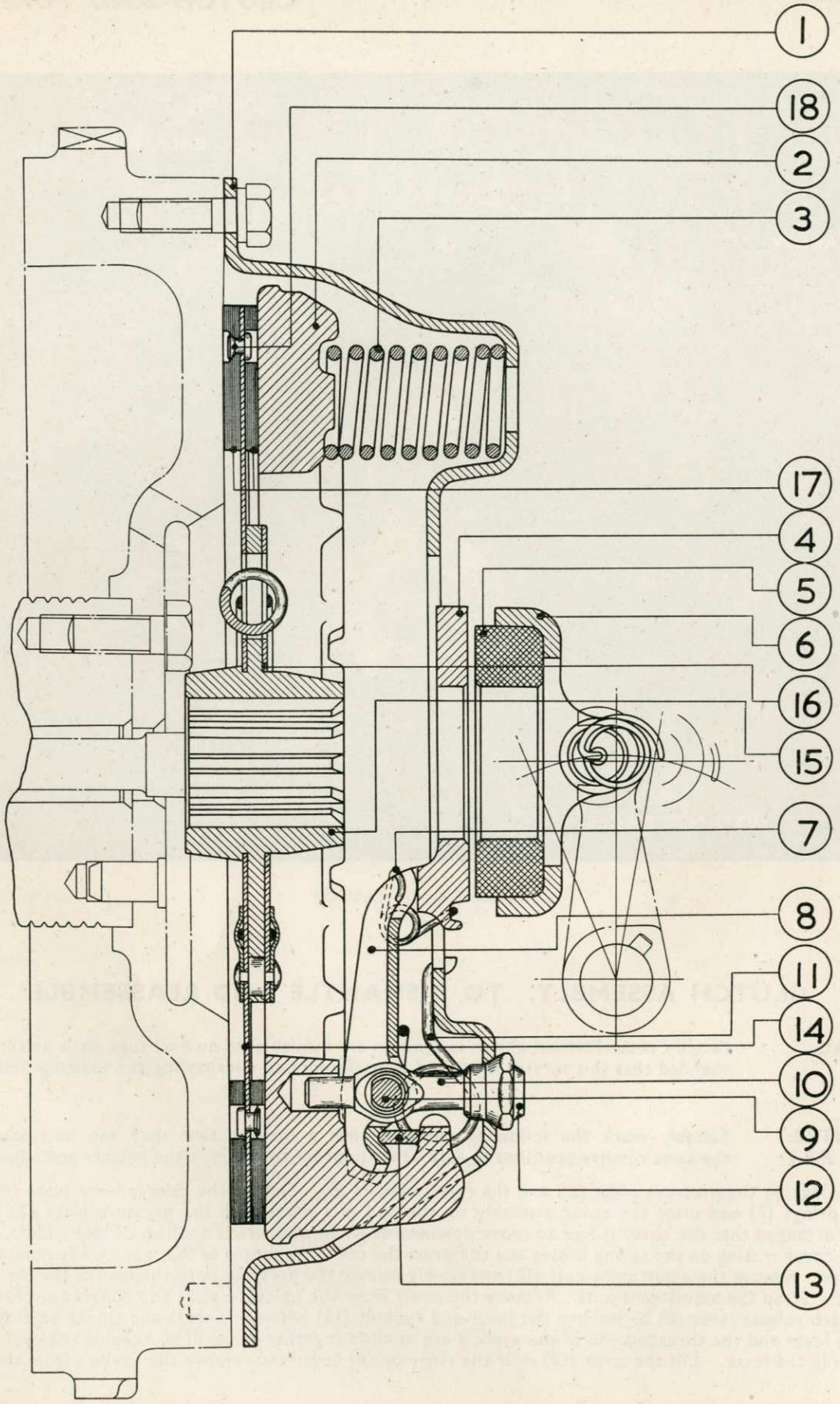


PLATE E.5. CLUTCH AND FLYWHEEL

INDEX TO PLATE E.5. CLUTCH AND FLYWHEEL

1. Cover
2. Pressure Plate
3. Thrust Springs
4. Release Lever Plate
5. Release bearing. (Graphite)
6. Release Bearing Cup
7. Release Lever Plate Retaining Spring
8. Release Levers
9. Release Lever Floating Pins
10. Eyebolts
11. Anti-rattle Springs
12. Adjustment Nuts
13. Struts
14. Clutch Plate Disc.
15. Clutch Plate Splined Hub
16. Clutch Plate Damper Assembly
17. Clutch Plate Facing
18. Clutch Plate Facing Rivet

ASSEMBLE. Before assembly, thoroughly clean all parts and renew those which show appreciable wear. A very slight smear of grease should be applied to the release lever pins (9), contact faces of the struts (13), eyebolt seats in the clutch cover (1), drive lug sides on the pressure plate (2), and the plain end of the eyebolts (10).

Assemble one release lever (8), eyebolt (10), and eyebolt pin (9), holding the threaded end of the eyebolt and the inner end of the release lever as close together as possible. With the other hand insert the strut (13) in the slots in the pressure plate sufficiently to allow the plain end of the eyebolt to be inserted in the hole in the pressure plate.

Move the strut upwards into the slots in the pressure plate lug, over the ridge on the short end of the lever and drop it into the groove formed in the latter. Fit the remaining levers in a similar manner. Place the pressure plate (2) on blocks on the end of the press and arrange the thrust springs (3) in a vertical position on the plate, seating them on the bosses provided. Lay the cover over the assembled parts, ensuring that the anti-rattle springs (11) are in position, that the tops of the thrust springs are directly under the seats in the cover and that the machined portions of the pressure plate lugs are under the slots through which they have to pass. Place the block across the cover resting on the spring bosses, and compress the cover by means of the ram, guiding the eyebolts and pressure plate lugs through their respective holes. Always use new adjusting nuts on assembly. Screw the adjusting nuts (12) temporarily on to the eyebolts (10) and observe that they will subsequently be secured by staking when the release levers have been correctly set (see " Adjusting Release Levers " below). Operate the clutch a few times, by means of the ram, to ensure that the working parts have settled in their correct positions. Remove the clutch from the press and connect the release lever plate (4) to the retainer springs (7). Remove lock wire and check tightness of taper lock bolt retaining release bearing operating fork to shaft. Tighten if necessary and lock with new wire. When carrying out adjustment, the release levers should be set by using the gauge plate CG.192 for the $2\frac{1}{2}$ litre clutch or CG.14322 for the $3\frac{1}{2}$ litre clutch.

ADJUSTING RELEASE LEVERS. Assemble the gauge plate in the flywheel, in the position normally occupied by the driven plate, and mount the cover assembly on the flywheel, tightening the holding screws a turn at a time by diagonal selection and ensuring that the gauge plate is correctly centred with the three machined lugs directly under the release levers (8). After the cover assembly has been fitted to the flywheel, place a short straight edge across the centre boss and the bearing surface of one release lever, then turn the adjusting nut (12) until the lever is exactly the same height as the gauge plate boss. Repeat for the other levers. Secure adjusting nuts by staking. Slacken the holding screws a turn at a time by diagonal selection, then remove the screws and the clutch from the flywheel. Remove the gauge plate.

If the special gauge plates mentioned above are not available the levers can be adjusted satisfactorily by clamping the cover assembly, with driven plate in position, to a flat surface and the adjustment checked by means of a clock gauge recording on the release lever plate. The clutch should be released and the driven plate turned through 90°, during this operation to counteract for any lack of parallelism in the plate and to ensure that the release levers are in plane with each other.

CLUTCH. TO ADJUST—RIGHT HAND DRIVE CARS

ADJUSTMENT. Adjustment is carried out at the set bolt and lock nut fitted to the clutch operating lever (Plate E.6.) Clockwise rotation of the set bolt reduces pedal free travel, anti-clockwise rotation increases pedal free travel. Release lock nut and rotate the adjusting set bolt until there is 1″ (25.0 mm) free or unloaded movement at the pedal pad. Tighten lock nut.

The rake of the clutch pedal lever in the free position is adjustable by means of the set bolt and lock nut fitted to the clutch pedal lever. (Plate E.6.) Clockwise rotation of the set bolt, moves the pedal away from the driver's seat, anti-clockwise rotation towards the driver's seat. Release the lock nut and rotate the adjusting set bolt until the clutch pedal lines up with the brake pedal when both are in the off position. Tighten lock nut.

Observe that if the rake adjustment has been altered it is necessary to check, and reset, if necessary, the clutch pedal free travel.

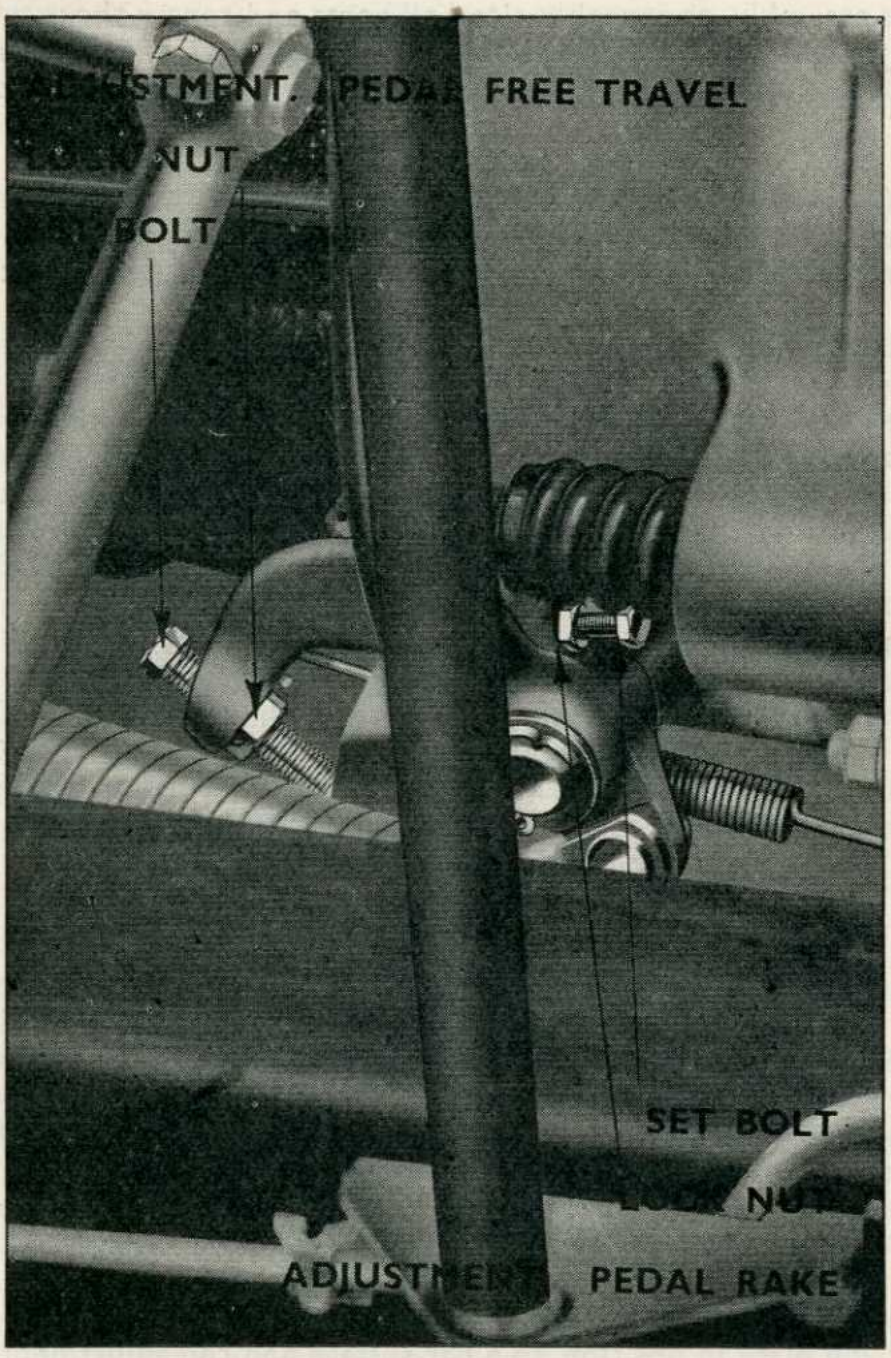


PLATE E.6.

CLUTCH ADJUSTMENT. RIGHT HAND DRIVE CARS

CLUTCH. TO ADJUST—LEFT HAND DRIVE CARS

ADJUSTMENT. Adjustment is carried out at the brass nut fitted to the clutch operating rod (Plate E7). Clockwise rotation of the nut will reduce pedal free travel, anti-clockwise rotation increases pedal free travel. Rotate the adjustment nut until there is 1″ (25.0 mm.) free or unloaded movement at the pedal pad. The adjusting nut is retained in this position by the tension of the spring fitted to the operating rod.

The rake of the clutch pedal lever in the free position is adjustable by means of a set bolt and lock nut fitted to the outside face of the chassis left hand side member immediately to the rear of the clutch pedal lever. Clockwise rotation of the set bolt, moves the pedal towards the driver's seat, anti-clockwise rotation away from the driver's seat. Release the lock nut and rotate the adjusting set bolt until the clutch pedal lines up with the brake pedal when both are in the off position. Tighten lock nut. Observe that if the rake adjustment has been altered it is necessary to check, and reset, if necessary, the clutch pedal free travel.

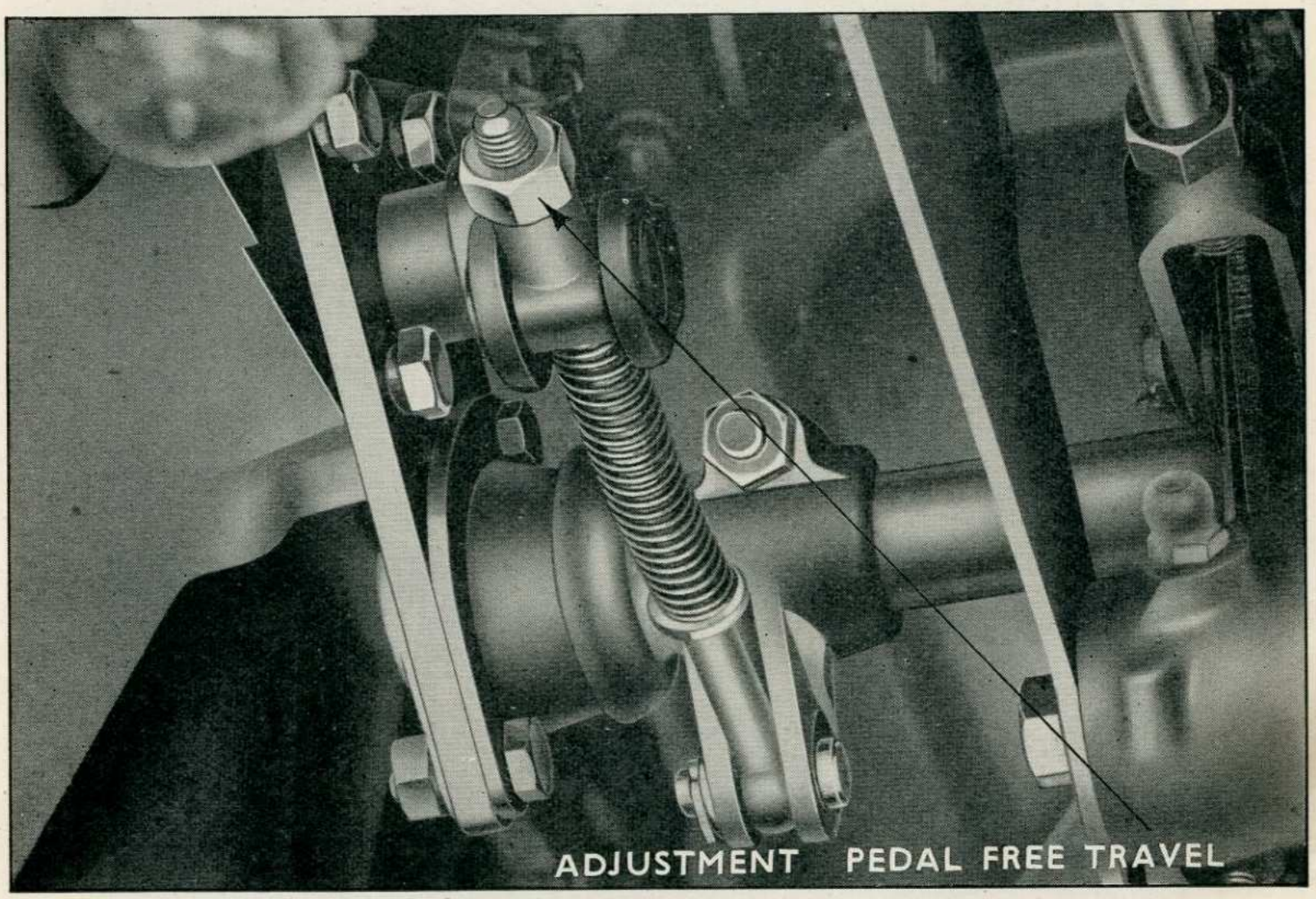


PLATE E.7
CLUTCH ADJUSTMENT, LEFT HAND DRIVE CARS (Viewed from under)

FLYWHEEL. TO REMOVE, SERVICE AND REFIT

REMOVE GEARBOX AND CLUTCH. Remove the gearbox and clutch as described in page E.5.

REMOVE FLYWHEEL. Release the tab washers and remove the four flywheel mounting bolts. Removal of the mounting bolts and tab washers will disclose two mushroom headed dowels passing through the flywheel into the crankshaft boss. Using two levers on opposite sides of the flywheel remove the flywheel, care being taken not to damage the crankshaft boss or drop the flywheel during final release.

Exercising care not to damage the bush a $\frac{7}{16}$″ (11.0 mm.) round bar may be fitted through the flywheel into the crankshaft spigot and used with advantage to support the flywheel during removal.

SERVICE. If the starter gear is badly worn a new flywheel should be used since the starter gear teeth are integral with the flywheel. Should the original flywheel be used again the starter gear teeth should be dressed up by filing and the flywheel clutch face faced up by grinding, provided that not more than $\frac{1}{32}$" (.79 mm.) of metal is removed. In these circumstances the flywheel should be assembled to the crankshaft rotated a quarter of a turn to present fresh starter gear teeth to the starter motor pinion wheel on initial engagement. Check the flywheel balance by mounting on a mandril and set up this assembly on parallel knife edges. If necessary drill balance holes in the flywheel rim. Flywheel and clutch should then be mounted in the same manner on a mandril and balanced as an assembly, this location being clearly marked. Examine the oilite bush fitted to the spigot of the crankshaft boss and if this shows signs of wear withdraw the bush which is a press fit in the spigot.

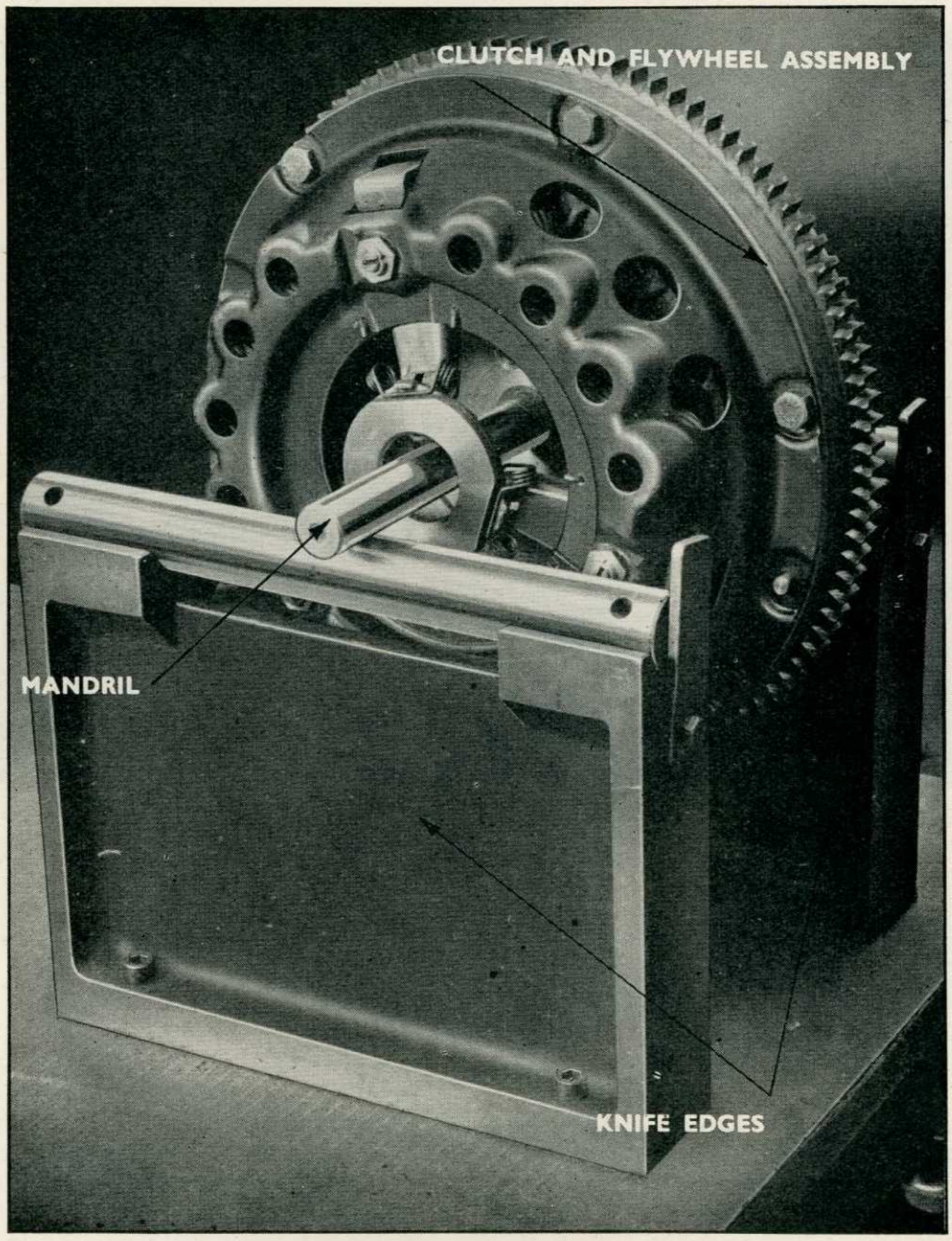


PLATE E.8. CLUTCH AND FLYWHEEL BALANCE

REFIT FLYWHEEL. If the oilite bush has been removed from the crankshaft spigot press in a new bush. The flywheel should now be fitted to the crankshaft ensuring that the flywheel is a sound fit on the crankshaft boss. The dowel holes in the flywheel are $\frac{3}{8}$″ diameter —.002″ to —.003″ (9.5 mm. diameter —.05 mm. to —.08 mm.) and should be reamed $\frac{3}{8}$″ ±.0002″ (9.5 mm. ±.005 mm.) in conjunction with crankshaft on assembly. Use new tab washers and mounting bolts observing that tab washers are fitted covering dowels to ensure positive retention. When mounting the clutch to the flywheel ensure that balance marks, mentioned previously, coincide.

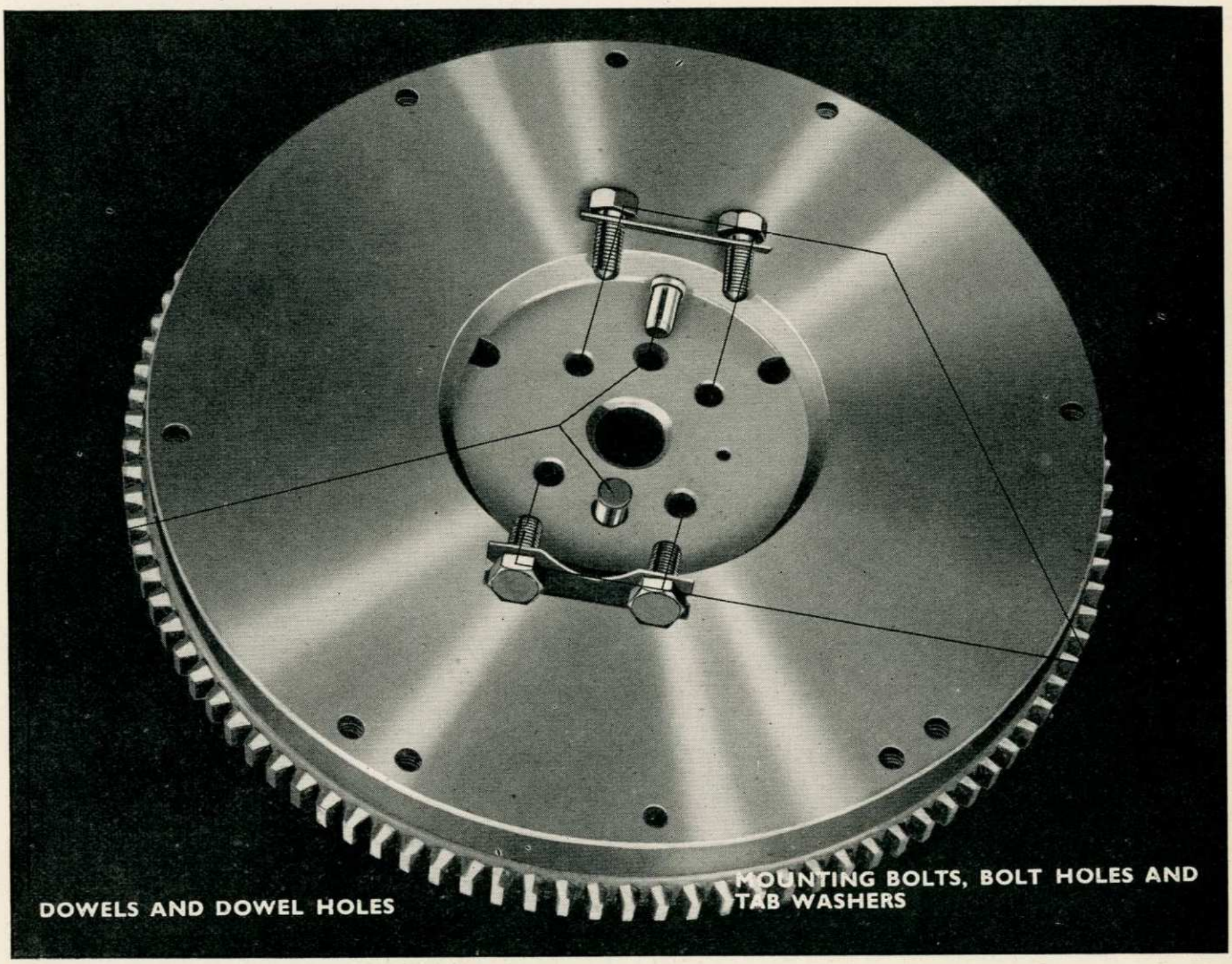


PLATE E.9. FLYWHEEL

Remove Watermark
Wondershare PDFelement

GEARBOX

MARK V

2½ and 3½ LITRE

CHASSIS NUMBERS

(Stamped at the front of the chassis left-hand side member)

2½ Litre		3½ Litre	
	Saloon		
520001	Right-Hand Drive	620001	Right-Hand Drive
527001	Left-Hand Drive	627001	Left-Hand Drive
	Coupé		
540001	Right-Hand Drive	640001	Right-Hand Drive
547001	Left-Hand Drive	647001	Left-Hand Drive

GEARBOX NUMBERS

(Stamped on a small shoulder at the top of the rear left-hand side of the gearbox casing and on the rim of the core plug aperture in the top cover. The gearbox number is also given on a plate fixed to the right hand of the scuttle under the bonnet.)

S.H. Series. (Gearbox number prefixed by S.H.)
J.H. Series. (Gearbox number prefixed by J.H.)

The instructions in this section are presented under the following main headings which appear as sub-titles on the pages concerned and in the order shown :—

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Index to Plates - - - - - - - Page F.3
Description and Maintenance - - - - Page F.4
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Gearbox	Reassemble	F.24
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Gearbox Top Cover	Dismantle	F.28
Gearbox Top Cover	Reassemble	F.29
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Gearbox Extension	Remove and Refit. (Gearbox fitted) ...	F.31
Gearbox Mounting	Remove and Refit. (Gearbox fitted) ...	F.33

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F.7	Rear End Cover	F.17
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DESCRIPTION. The gearboxes fitted to both 2½ and 3½ litre models are to the same specification and are consequently interchangeable. The constant mesh gears, that is, second, third and top have single helical teeth. All constant mesh gears are brought into engagement by synchronising dog clutches of the toothed type. The internally toothed members slide on synchronising sleeves which are splined to the mainshaft, these members are combined with internal cones for the syncromesh mechanism, the corresponding external cones and external dogs being formed on the gear wheels. First and reverse gears are of straight tooth form, the reverse wheel being bushed and mounted on a short shaft situated to the offside (right hand) and slightly above the countershaft. Selection of the gears is by rods and forks operated by a lever mounted on an extension of the gearbox cover.

SERIES S.H. AND SERIES J.H. Two types of box are used, Series S.H. and Series J.H. which are fully interchangeable as units, but on which many internal parts are not interchangeable. The serial number of the box is prefixed by either S.H. or J.H. thus identifying the type of box to be dealt with. The series and serial number will be found stamped on a boss situated at the nearside (left hand) rear at the top of the gearbox case and on the rim of the core plug aperture in the top cover. The number is also given on a plate fixed to the scuttle under the offside (right hand) bonnet top panel.

The difference between the two types of box is in the construction of the constant pinion shaft and countershaft gears, the constant pinion shaft wheel being dogged to the shaft on Series S.H. and integral with the shaft on J.H. On Series J.H. the countershaft gears consist of 1st speed and integral splined sleeve on which are mounted second, third and top gears. On Series S.H. the countershaft gears, first, second, third and top are a cluster gear.

MAINTENANCE. Every 2,500 miles (4,000 Km) check the level of oil in the gearbox by means of the dipstick when the car is standing on level ground. Access is gained to the dipstick through the inspection plate situated in front of the gear lever. If necessary, top up through the dipstick hole with the recommended grade of oil.

Every 10,000 miles (16,000 Km) drain, flush out with flushing oil and refill the gearbox with the recommended grade of oil. The drain plug is situated at the base of the gearbox. The oil will drain more readily if the operation is carried out at the end of a journey when the oil is hot and consequently more fluid.

RECOMMENDED LUBRICANTS

					S.A.E. Viscosity
Vacuum.	Wakefield	Shell	Essolube	Price's	
Mobiloil A	Castrol XL	Double Shell	Essolube 30	Energol 30	30

Gearbox Capacity 2½ pints (1.4 litres).

DESCRIPTION. The gearboxes fitted to both 2½ and 3½ litre models are to the same specification and are consequently interchangeable. The constant mesh gears, that is, second, third and top have single helical teeth. All constant mesh gears are brought into engagement by synchronising dog clutches of the toothed type. The internally toothed members slide on synchronising sleeves which are splined to the main-shaft, these members are combined with internal cones for the syncromesh mechanism, the corresponding external cones and external dogs being formed on the gear wheels. First and reverse gears are of straight tooth form, the reverse wheel being bushed and mounted on a short shaft situated to the offside (right hand) and slightly above the countershaft. Selection of the gears is by rods and forks operated by a lever mounted on an extension of the gearbox cover.

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MAINTENANCE. Every 2,500 miles (4,000 Km) check the level of oil in the gearbox by means of the dipstick when the car is standing on level ground. Access is gained to the dipstick through the inspection plate situated in front of the gear lever. If necessary, top up through the dipstick hole with the recommended grade of oil.

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RECOMMENDED LUBRICANTS

					S.A.E. Viscosity
Vacuum.	Wakefield	Shell	Essolube	Price's	
Mobiloil A	Castrol XL	Double Shell	Essolube 30	Energol 30	30

Gearbox Capacity 2½ pints (1.4 litres).

DATA

(SERIES S.H. AND J.H.)

			$2\frac{1}{2}$ and $3\frac{1}{2}$ Litre.
Type			Synchromesh 2nd, 3rd and Top
Gearbox Ratios.	Top Speed		1 : 1
	Third Speed		1·367 : 1
	Second Speed		1·982 : 1
	First Speed		3·375 : 1
	Reverse		3·375 : 1
Bearings	Clutch Shaft. In Crank Flange		Oilite Bush
	In Gearbox Casing. (Ball) ...		Hoffman 340K
Main Shaft.	Front		Roller
	Intermediate. (Roller) ...		Hoffman RMS.12$\frac{1}{2}$L
	(Ball)		Hoffman MS.12K
	Rear. (Ball)		Hoffman MS.12
	2nd Speed Gear on Mainshaft ...		Needle Rollers
	3rd Speed Gear on Mainshaft ...		Needle Rollers
	Countershaft Front		Needle Rollers
	Rear		Needle Rollers
Reverse Shaft			Stationary
Reverse Gear			Phosphor Bronze Bush
Fit of Bushed Reverse Gear on Shaft			·0014"—·0024" (·04 mm.—·06 mm.)
Countershaft End Float			·002" to ·004" (·05 mm. to ·10 mm.)
Mainshaft End Float			·002"—·006" (·05 mm.—·15 mm.)
Second Gear End Float on Mainshaft			·002"—·004" (·05 mm.—·10 mm.)
Third Gear End Float on Mainshaft			·002"—·004" (·05 mm.—·10 mm.)
Gearbox Mounting			Unit Construction
Oil Capacity			$2\frac{1}{2}$ Pints (1·4 litres)

GEARBOX. TO REMOVE AND REFIT

GENERAL. The engine and gearbox unit is removed as an assembly, either by lowering it away from the car into a pit, moving the car, and subsequently picking the assembly up again, or alternatively, raising the car on a hoist and lowering the engine and gearbox unit to the floor, whichever procedure is most convenient.

REMOVE BONNET. Release bonnet catches, by pushing forward the controls situated at either side under the facia board, and with both bonnet top panels open remove two screws from centre hinge front 'T' piece. Raise front of bonnet and remove forward.

REMOVE BONNET SIDE PANELS. Remove three countersunk screws from top face of each bonnet side panel and lift out side panels. (Slide rubber sleeves off adaptors at radiator block and air conditioner motor and lift out heater air duct. Fitted only to early cars.)

DRAIN COOLING SYSTEM. Drain radiator block and engine by opening tap at base of radiator and tap at right hand rear of engine block. If anti-freeze mixture is in use, conserve water. Disconnect top water hose from thermostat housing and remove bottom water hose completely.

REMOVE DYNAMO. Disconnect battery positive lead. Remove dynamo connections noting that "Yellow" wire is connected to terminal 'D' (large terminal) and " Yellow with Green " wire to terminal 'F' (small terminal.) Remove adjusting bolt situated at top of dynamo and swing dynamo towards engine to free fan belt. Disengage fan belt from dynamo pulley, remove two securing bolts situated under dynamo and lift out dynamo.

REMOVE AIR SILENCER. Remove rocker cover centre dome nut and setscrew passing through steady bracket into front of silencer body and remove silencer. (Remove four nuts securing manifold to carburettor flanges and withdraw manifold. Left hand drive cars only.)

DISCONNECT ENGINE CONNECTIONS. Remove thermometer element from thermostat and tie clear. Care must be exercised not to twist the capillary pipe from element to gauge or fracture may occur. Remove fan belt. Disconnect throttle linkage at rear flexible joint and remove coupling rod from bush on dash, together with lever and spring. Disconnect L.T. (Low Tension) feed from distributor and H.T. (High Tension) feed from coil. Disconnect petrol feed pipe from carburettors. Disconnect oil pressure gauge flexible pipe. Remove heater hoses and pipes from rear of engine. Disconnect wire to self starting carburettor solenoid. Disconnect revolution counter cable at elbow drive. (Disconnect wiring to right hand horn and remove horn and bracket. Early cars only.) Disconnect wiring from starter motor. Remove engine oil level dipstick. Remove exhaust down pipes by disconnecting at twin manifolds and at flange coupling to intermediate pipe. Disconnect earth strap from right hand side of clutch bell housing.

REMOVE GEARBOX CONNECTIONS. Remove both front seats and floor carpets and place clear of car. Remove change speed lever knob and locknut. Remove gearbox and bell housing cover and carpets. Disconnect reverse light wires from switch on remote control. Remove dipstick. Remove gearbox cover (remote control) and fit blank to exclude entry of dirt. Disconnect speedometer cable and place clear. Remove four bolts from propellor shaft companion flange at gearbox and spring shaft upwards from the spigot. Remove clutch pedal and stem from clutch operating lever. (On left hand drive cars dismantle

clutch operating linkage by removing split pin from clevis pin and withdraw clevis pin. Remove three bolts from support plate bolted to gearbox, tilt plate thus disengaging the spherical joint and lift plate clear of lever and shaft.)

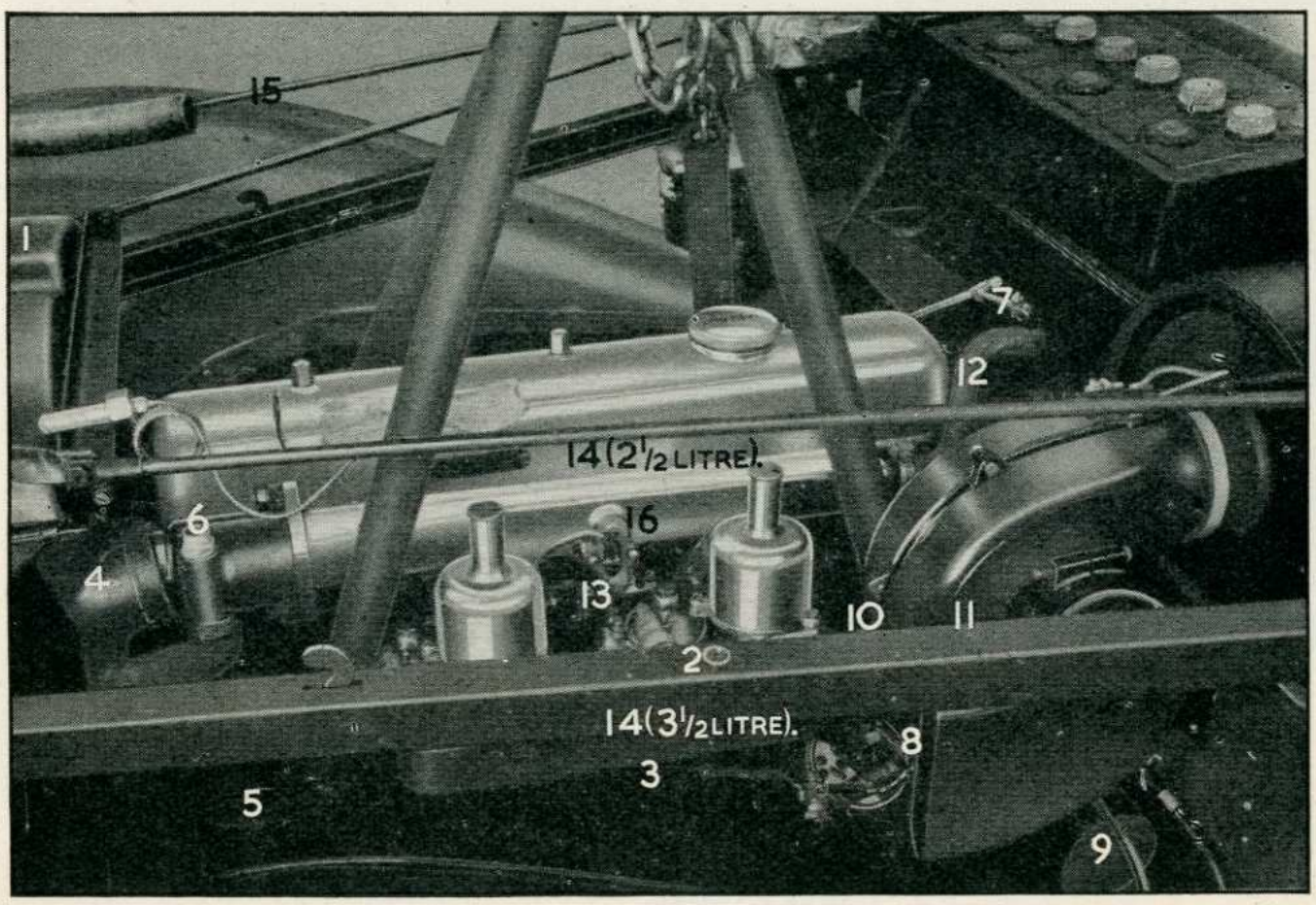


PLATE F.1. ENGINE REMOVAL (View left hand side)

1. Bonnet.
2. Side Panel.
3. Air Conditioner Duct.
4. Top Water Hose.
5. Dynamo.
6. Thermometer Element.
7. Throttle Linkage.
8. Distributor L.T. Feed.
9. Coil H.T. Feed.
10. Petrol Feed Pipe.
11. Oil Gauge Pipe.
12. Heater Hose.
13. Starting Carburettor Wire.
14. Revolution Counter Cable.
15. Radiator Stay Rod.
16. Air Silencer Manifold.

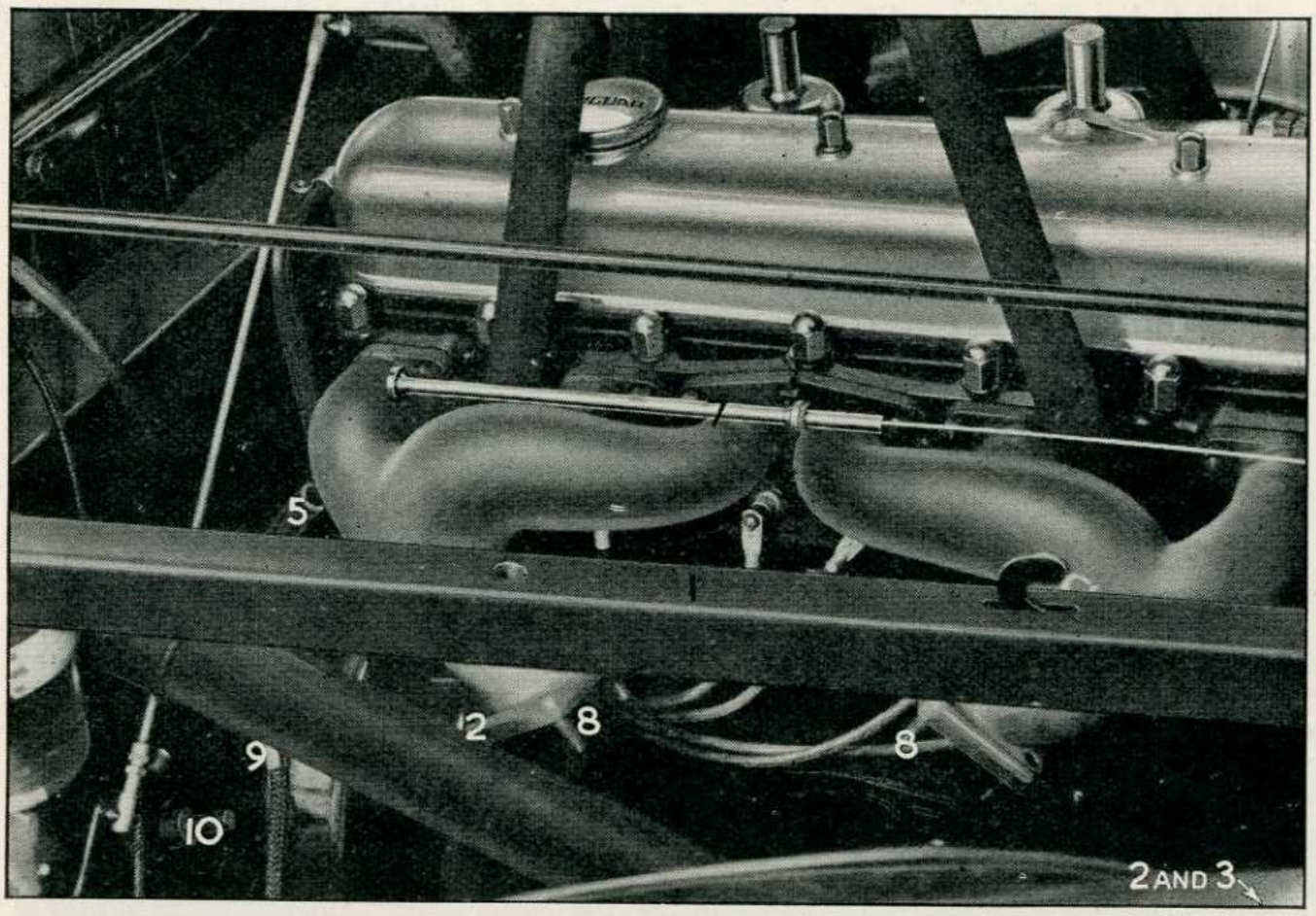


PLATE F.2. ENGINE REMOVAL (View right hand side)

1. Side Panel.
2. Cooling System.
3. Bottom Water Hose.
4. Air Silencer.
5. Heater Hose.
6. Starter Motor.
7. Oil Dipstick.
8. Exhaust Down Pipes.
9. Earth Strap.
10. Clutch Pedal.

REMOVE ENGINE. Release radiator centre stay rod at front and place clear to allow clearance for engine slings. Arrange slings to come immediately behind the front engine bearer plate and in front of clutch bell housing mounting flange. Take weight of engine. Disconnect one earth strap and two earth wires from front mountings, remove bolts securing mounting block angle brackets to engine bearer plate (three bolts per side). Remove bolts securing mountings to chassis brackets and remove front mountings.

Observe that the engine and gearbox unit is positioned on the rear (gearbox) mounting to align the front and rear propellor shafts in as straight a line as possible. It is therefore desirable to mark the position of the gearbox mounting support bracket to chassis frame members before disturbing the securing bolts. Withdraw four bolts (two per side) securing rear mounting support bracket to chassis frame. Lower engine complete with gearbox through chassis frame.

REMOVE GEARBOX. Remove clutch bell housing mounting bolts and withdraw gearbox to rear. The gearbox must be supported during this operation in order to avoid strain on the shaft and distortion of the driven plate assembly. Release locking plates and remove eight set screws securing bell housing to gearbox. Remove bell housing.

REFIT GEARBOX. Fit the gearbox and clutch bell housing unit to the engine unit but observe that these units must be in alignment or jumping out of top gear may subsequently be experienced. With the clutch bell housing bolts just finger tight operate the clutch approximately twelve times to effect alignment and finally tighten the bolts. The weight of the gearbox must be supported during refitting in order to avoid strain on the shaft and distortion of the driven plate assembly.

REFIT ENGINE AND GEAR-BOX UNITS. Refitting is the reversal of the operations for removal, paying particular attention to the positioning of the rear (gearbox) mounting so that the front and rear propellor shafts occupy as straight a line as possible.

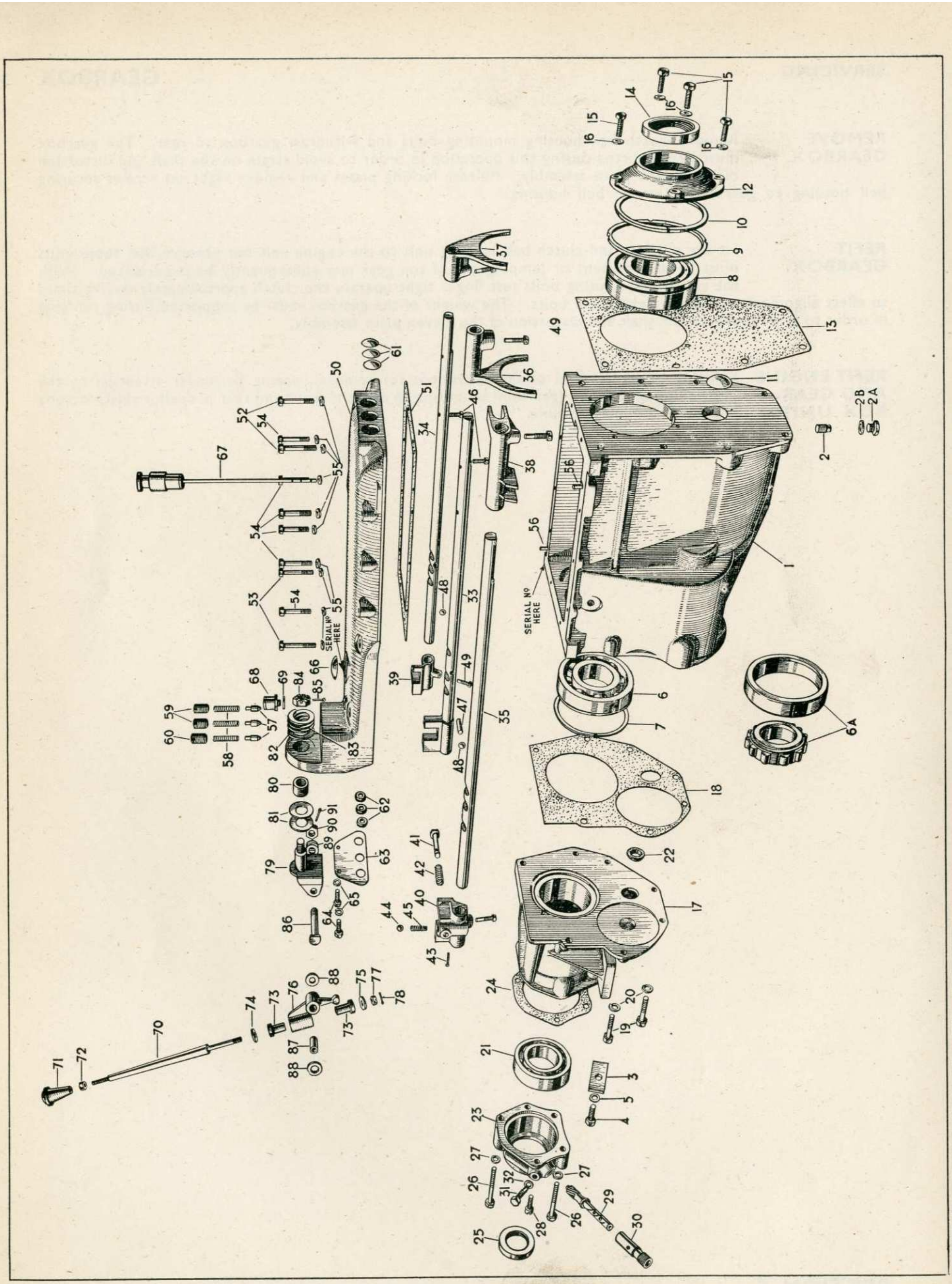
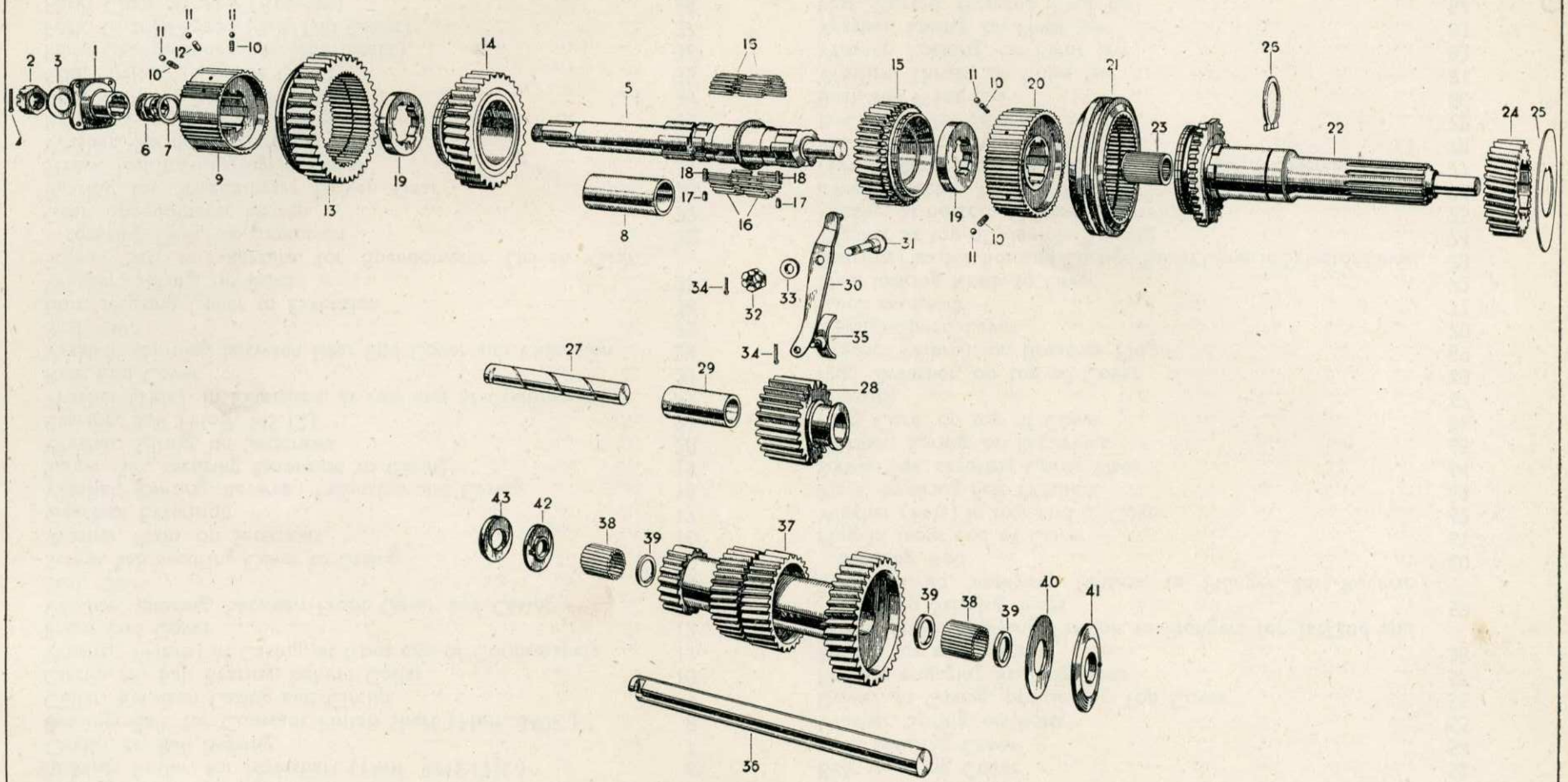


PLATE F.3. TOP COVER AND CASE

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Plug, Drain, at bottom of Casing 2A
Washer (Fibre) on Drain Plug 2B
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Screw, Set, securing Locking Plate 4
Washer, Spring, on Setscrew 5
Bearing, Ball, for Mainshaft 6
Bearing, Roller, for Mainshaft (Hoff. RMS.12½L) 6A
Circlip, on Ball Bearing 7
Bearing, Ball, for Constant Pinion Shaft (Hoff. 340K) ... 8
Collar, between Casing and Circlip 9
Circlip, on Ball Bearing, behind Collar 10
Washer, (Fibre) in Casing, at front end of Countershaft ... 11
Front End Cover 12
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Remove Watermark Wondershare PDFelement



THE SHOULDER ON 3rd/TOP OPERATING SLEEVE (21) SHOULD FACE THE FRONT OF THE GEARBOX AND NOT THE REAR AS ILLUSTRATED ABOVE. (SEE PLATE F.13)

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Remove Watermark
Wondershare PDFelement

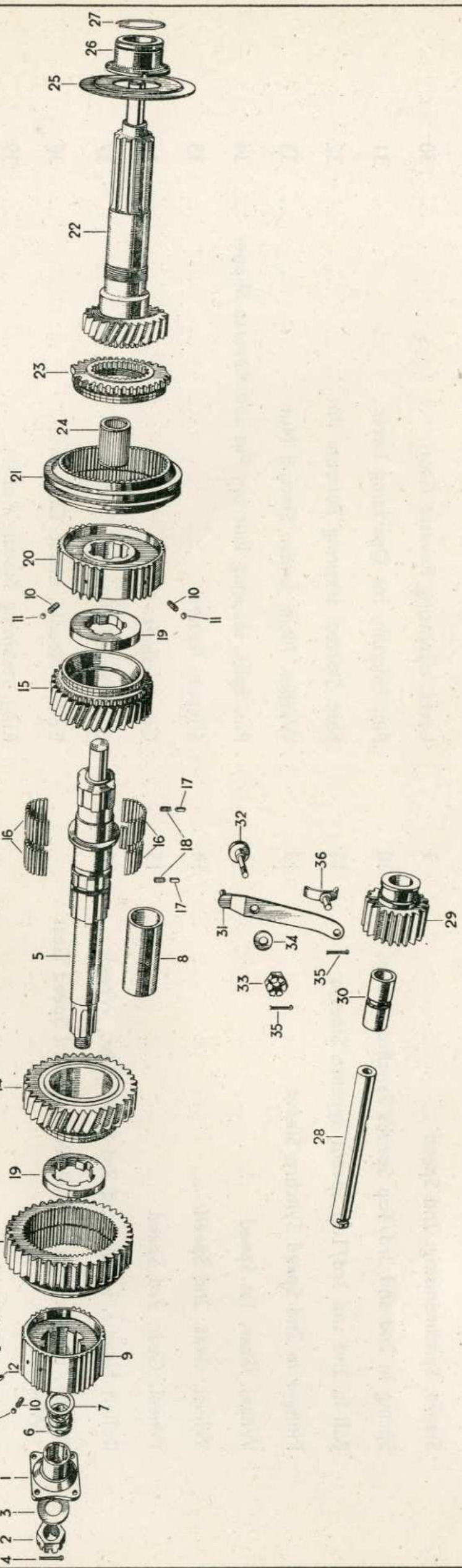


PLATE F.5. GEARS (J.H. SERIES)

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GEARBOX. TO DISMANTLE

REMOVE TOP COVER. Drain gearbox by removing plug situated at base of the case. Withdraw dipstick. Remove ten setscrews with spring washers and lift off top cover observing that this is located by two dowels fitted in the gearbox case. Remove and scrap joint washer. (Dismantling instructions for the top cover will be found on page F28.)

REMOVE FRONT END COVER. Break locking wire and remove four setscrews with plain washers securing cover to case. Remove front end cover. Remove and scrap oil seal from cover. Observe oil drain at bottom of cover mating with return hole in case and jointing washer interposed.

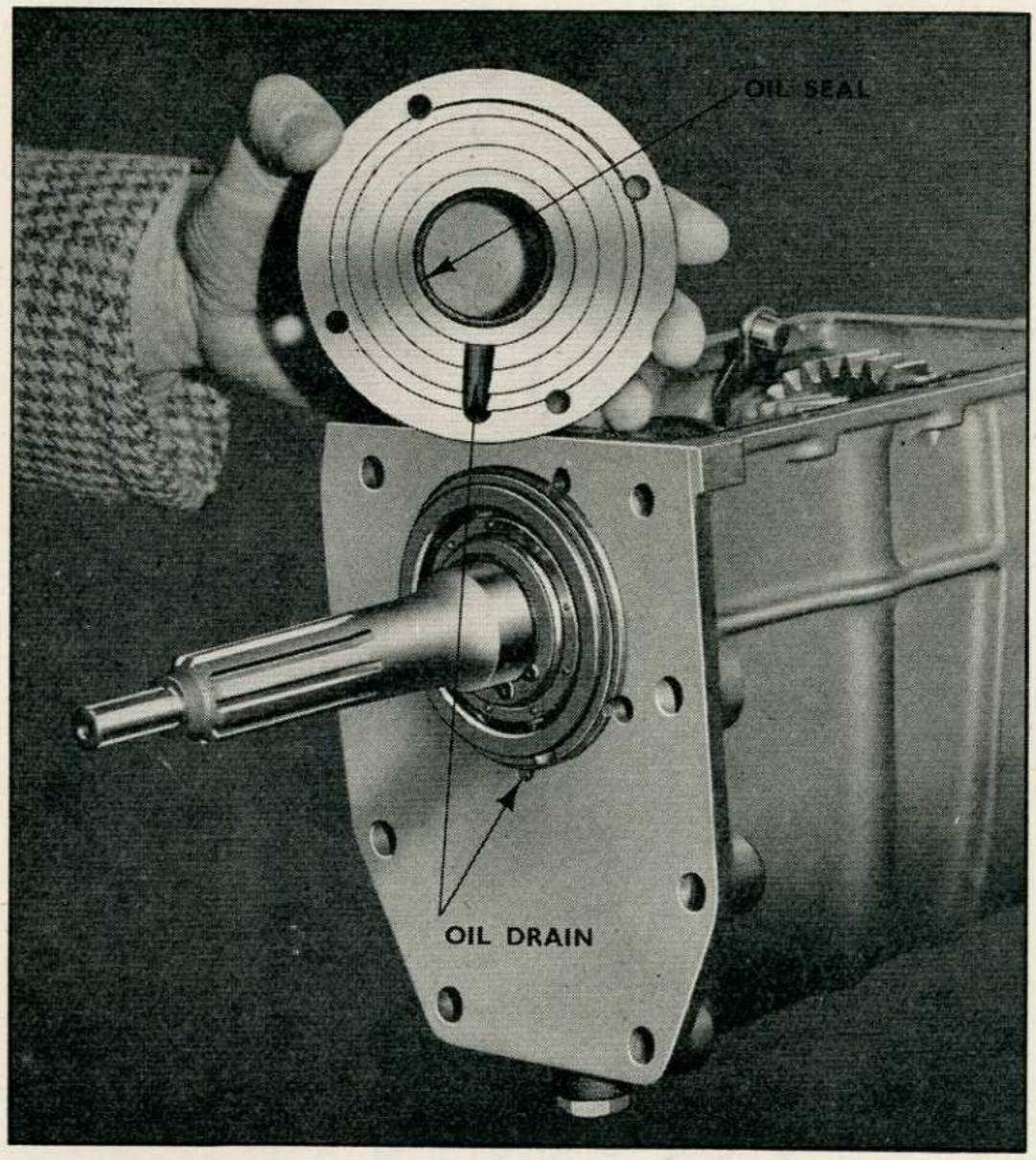


PLATE F.6. FRONT END COVER

REMOVE REAR END COVER. Engage top and reverse gears to lock box, remove split pin, slotted nut and plain washer securing propellor shaft drive flange to mainshaft. Tap drive flange off shaft. Remove four bolts with spring washers securing cover to extension. Remove locking screw with spring washer securing speedometer driven gear in cover. Withdraw driven gear and bearing. Remove cheese-headed setscrew now disclosed securing cover to extension. Remove rear end cover. Remove and scrap oil seal from cover, scrap jointing washer. Withdraw speedometer driving gear and distance piece behind gear from mainshaft.

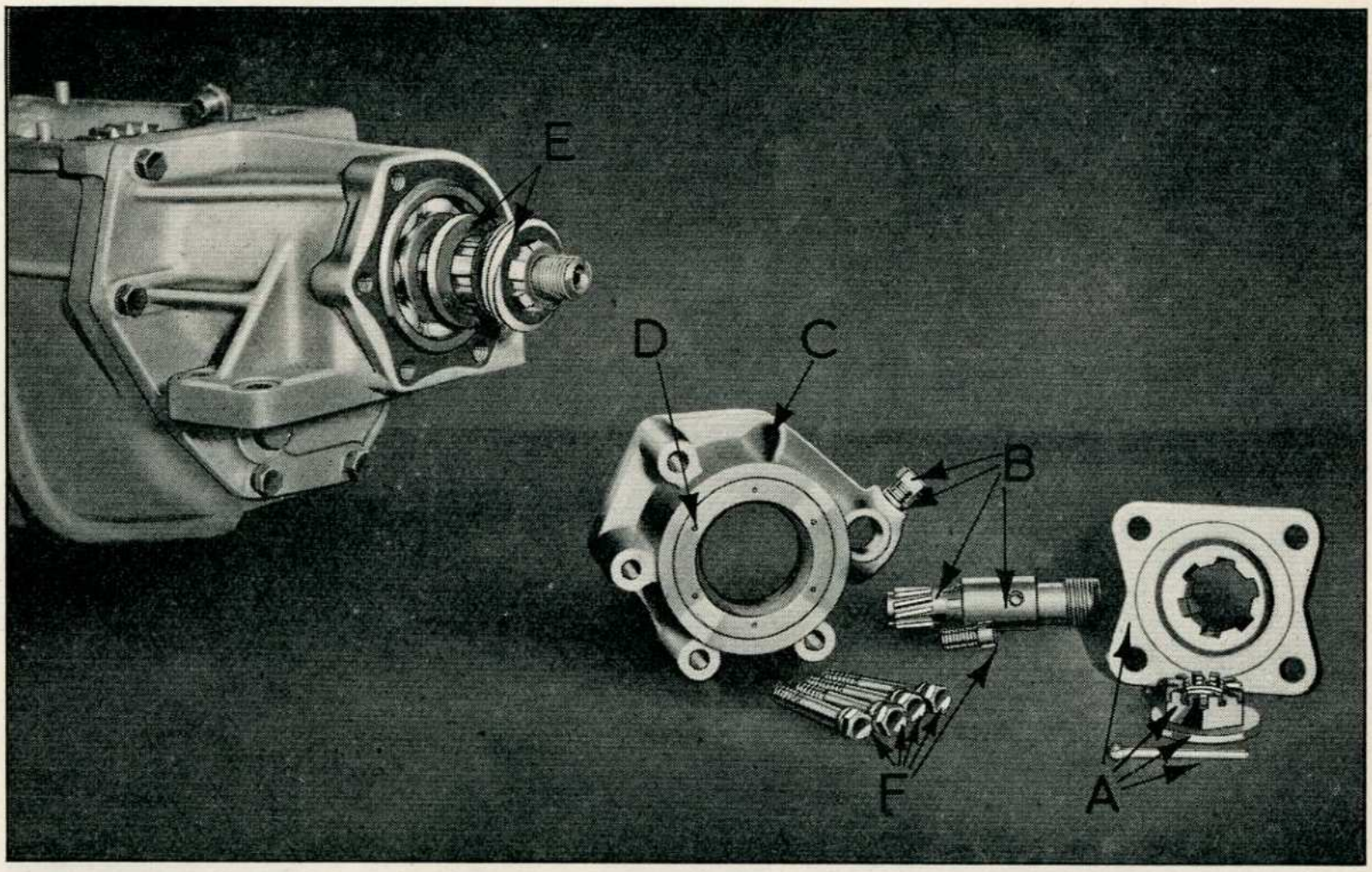


PLATE F.7. REAR END COVER

A. Propellor shaft drive flange, slotted nut, washer and split pin.

B. Speedometer driven gear, bush, lock screw and spring washer.

C. Rear end cover.

D. Oil seal.

E. Speedometer driving gear and distance piece.

F. Cover securing bolts and cheese-headed setscrew.

REMOVE EXTENSION. Disengage top and reverse gears to place box in neutral. Remove seven setscrews with spring washers securing extension to case. Do not disturb plate locking counter and reverse shafts since these will be withdrawn with the extension. Using a suitable drawer engaging on the mainshaft and on the extension draw off the extension complete with mainshaft rear ball bearing, counter and reverse shafts. Remove distance piece between mainshaft front and rear bearings. The countershaft gears will now rest at the bottom of the case out of engagement with mainshaft gears. Remove and scrap

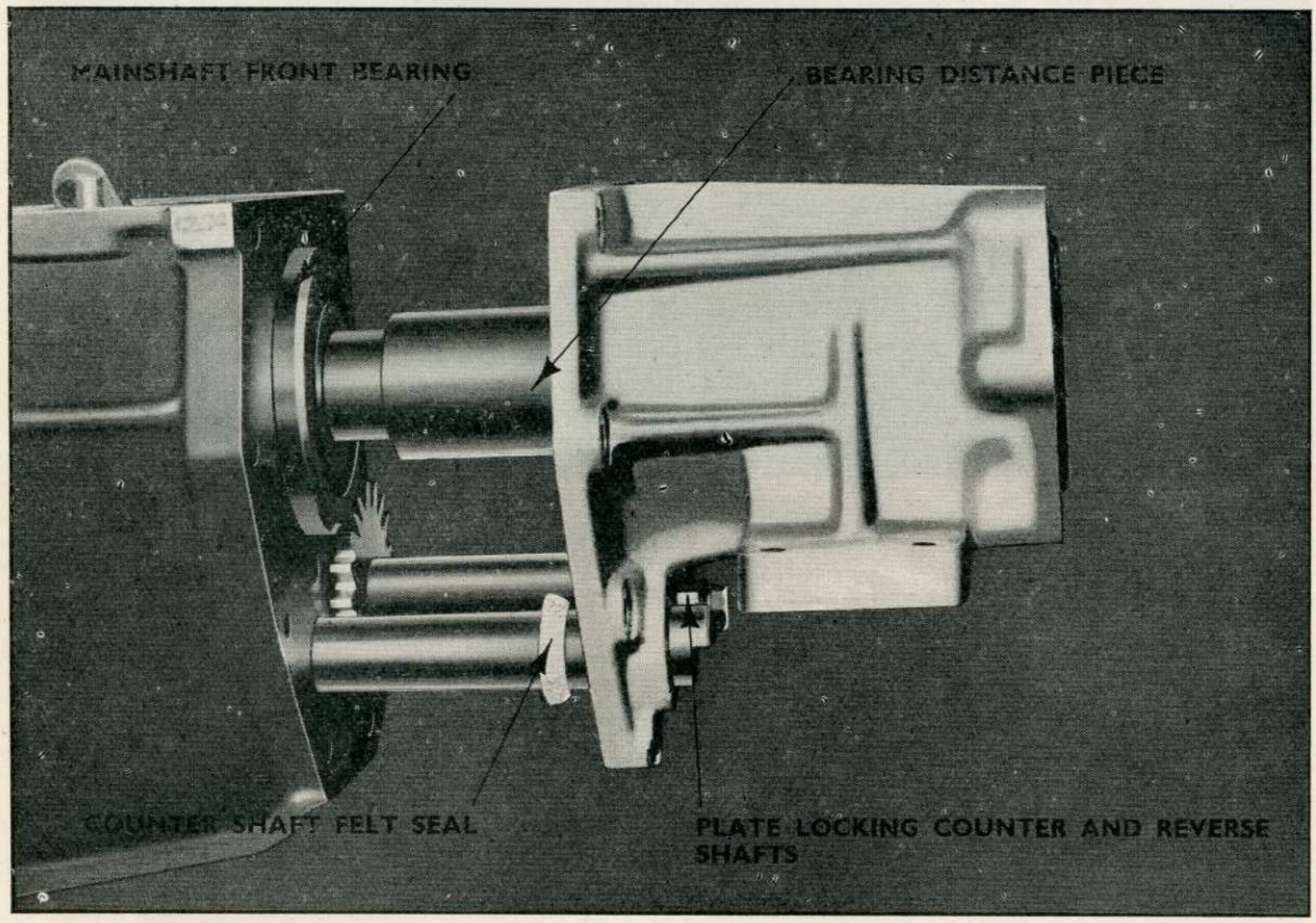


PLATE F.8. EXTENSION

felt oil sealing washer fitted on countershaft between extension and countershaft gears. Remove setscrew with spring washer securing plate locking counter and reverse shafts, remove locking plate and carefully remove any burrs on the locked ends of the shafts which might damage the shaft mounting holes in the extension when the shafts are withdrawn. Withdraw shafts forward. Tap ball bearing out of extension. Observe oil return hole at bottom and breather hole at top of extension mating with oil return and breather holes in case and jointing washer interposed. Scrap joint washer.

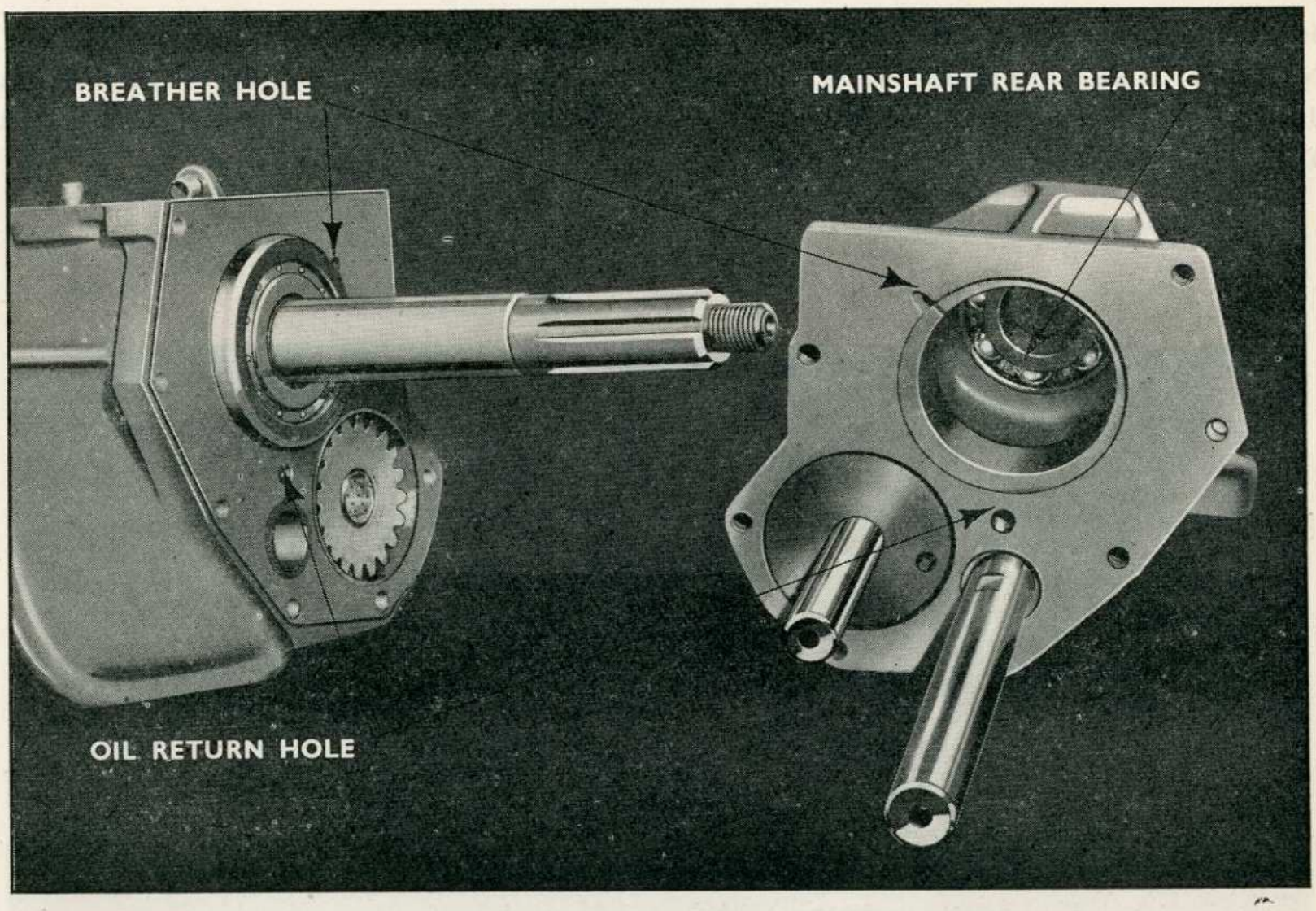


PLATE F.9. EXTENSION REMOVED

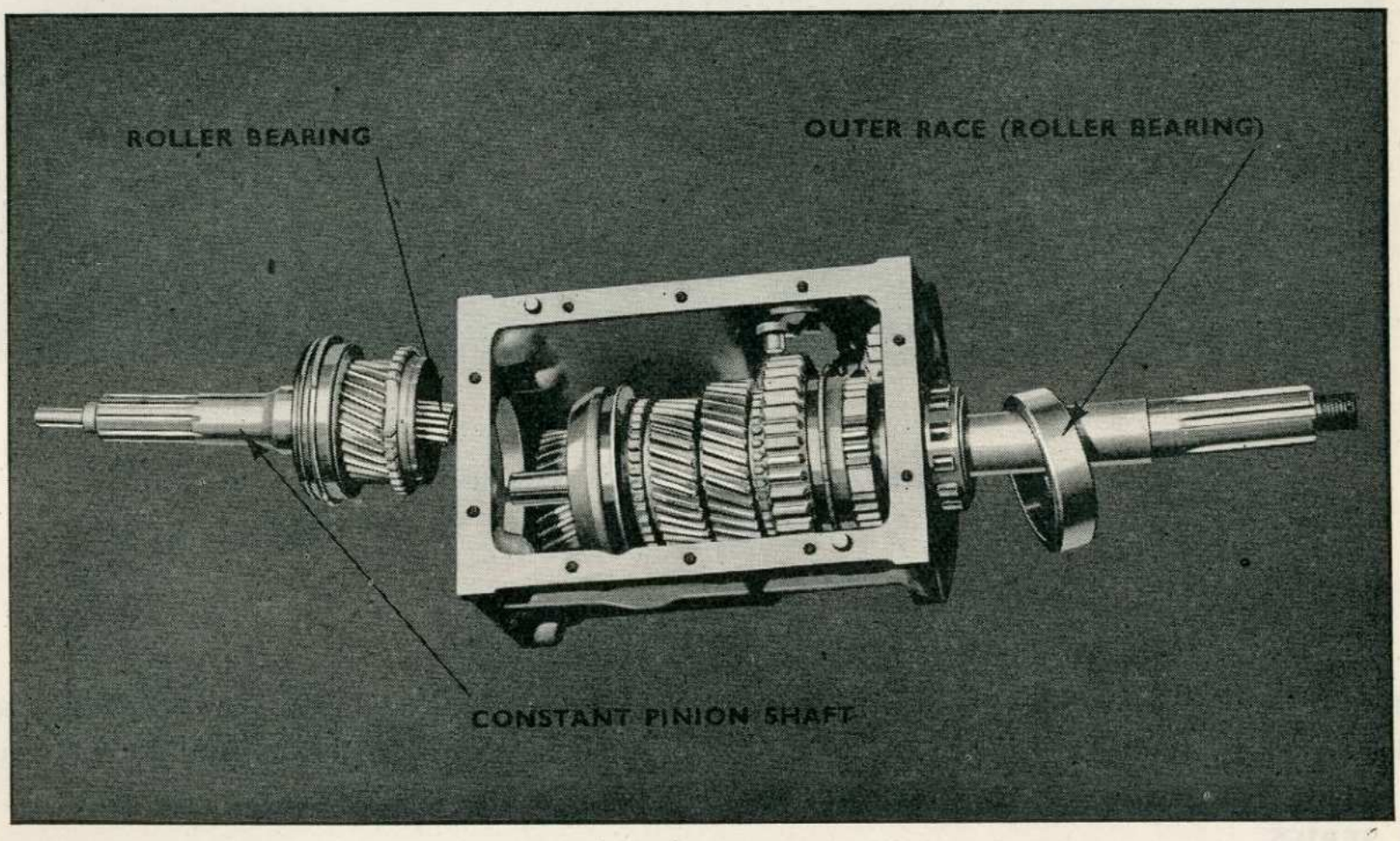


PLATE F.10. REMOVAL OF CONSTANT PINION SHAFT. (S.H. Series illustrated)

REMOVE CONSTANT PINION SHAFT.

Rotate the constant pinion shaft until the two cut away portions of the toothed driving gear are facing the top and bottom of the case. Tap the mainshaft to the front to knock the constant pinion shaft with ball bearing forward out of the case. Remove constant pinion shaft and withdraw roller bearing from shaft spigot.

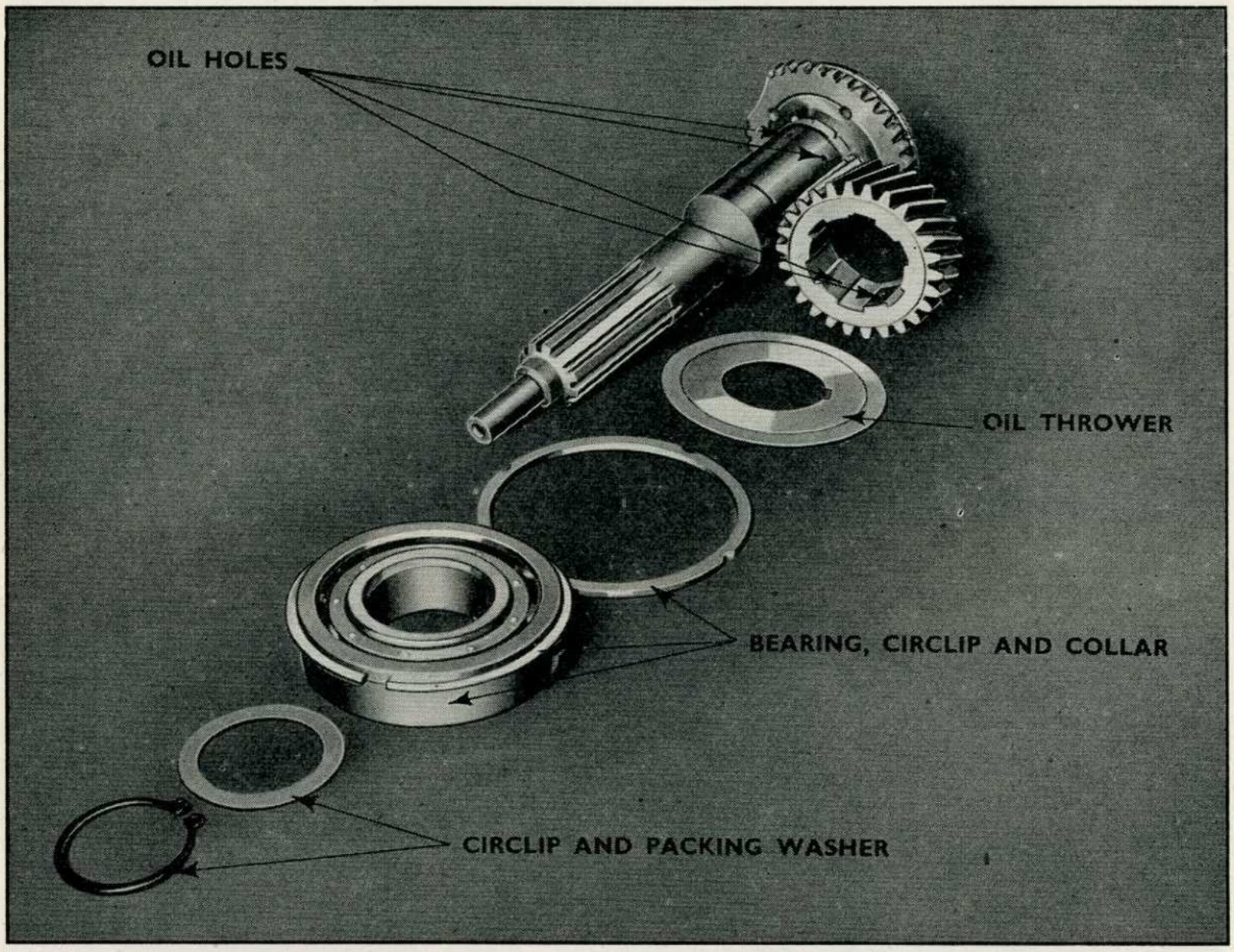


PLATE F.11
CONSTANT PINION SHAFT ASSEMBLY
(S.H. Series)

DISMANTLE CONSTANT PINION SHAFT S.H. SERIES.

Remove circlip, packing washer and shims if fitted. Remove collar and circlip from bearing. With a suitable bearing puller draw bearing off shaft. Remove oil thrower and constant pinion.

DISMANTLE CONSTANT PINION SHAFT J.H. SERIES. Remove toothed driving gear. Withdraw circlip securing lock nut and rotate lock nut off shaft (left hand thread). Remove collar and circlip from bearing. With a suitable bearing puller draw bearing off shaft. Remove oil thrower.

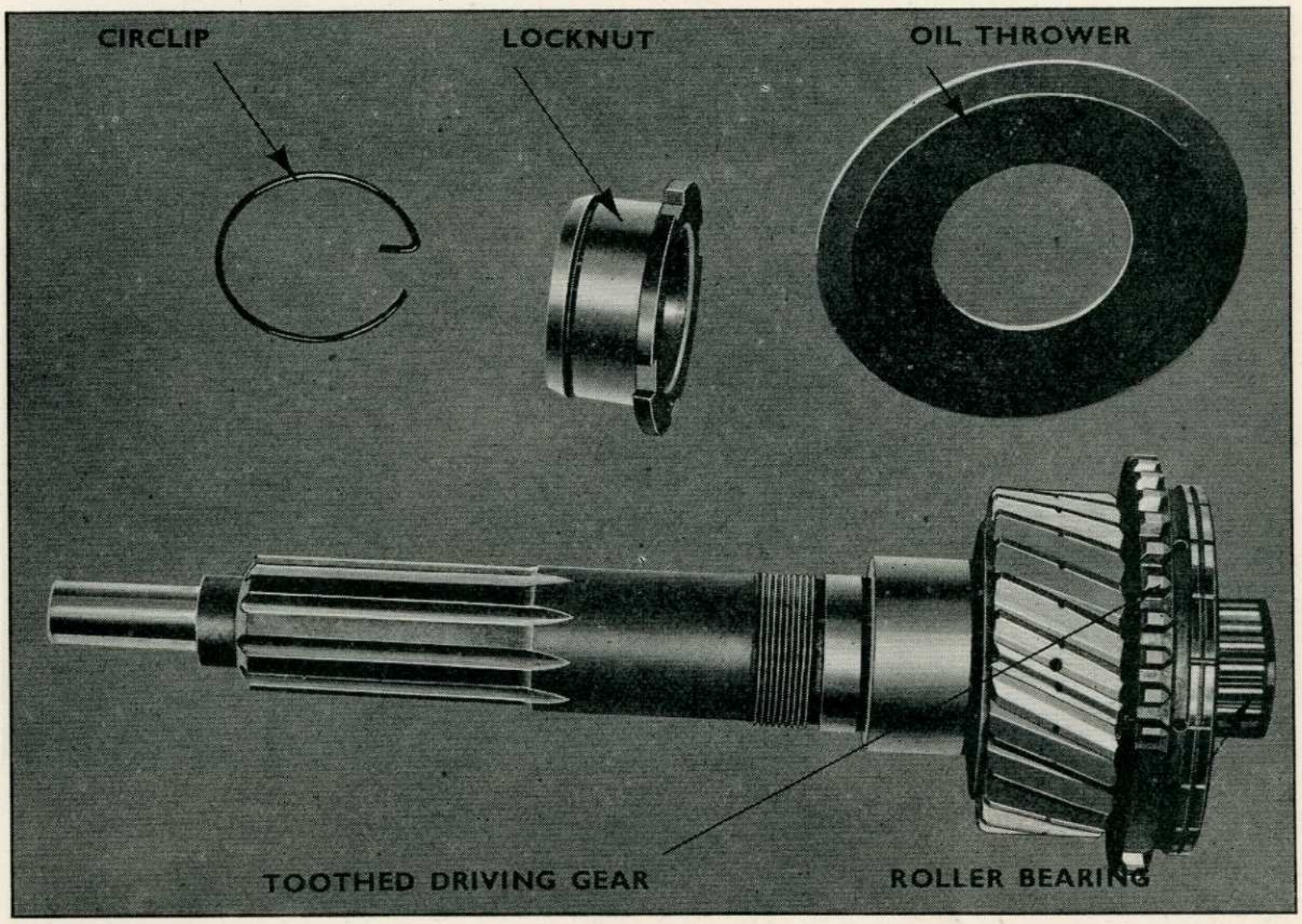


PLATE F.12
CONSTANT PINION SHAFT ASSEMBLY
(J.H. Series)

REMOVE MAINSHAFT. It may be found that either "A" a roller bearing, or "B" a ball bearing is fitted to the mainshaft. Proceed as follows :—

"A." Roller Bearing. Tap the mainshaft to the rear until the outer race of the bearing can be withdrawn off the shaft leaving the rollers and inner bearing on the shaft which is now free to be withdrawn. (Plate F.10.)

" B." Ball Bearing. Using a suitable drift tap the inner race of the bearing rearwards down the shaft until the complete bearing can be removed and the shaft is free to be withdrawn.

Push reverse gear forward out of engagement to clear mainshaft first speed gear wheel. Lift the front end of the shaft upwards and remove complete with all mainshaft gears forward out of the case leaving countershaft gears at the bottom of the case.

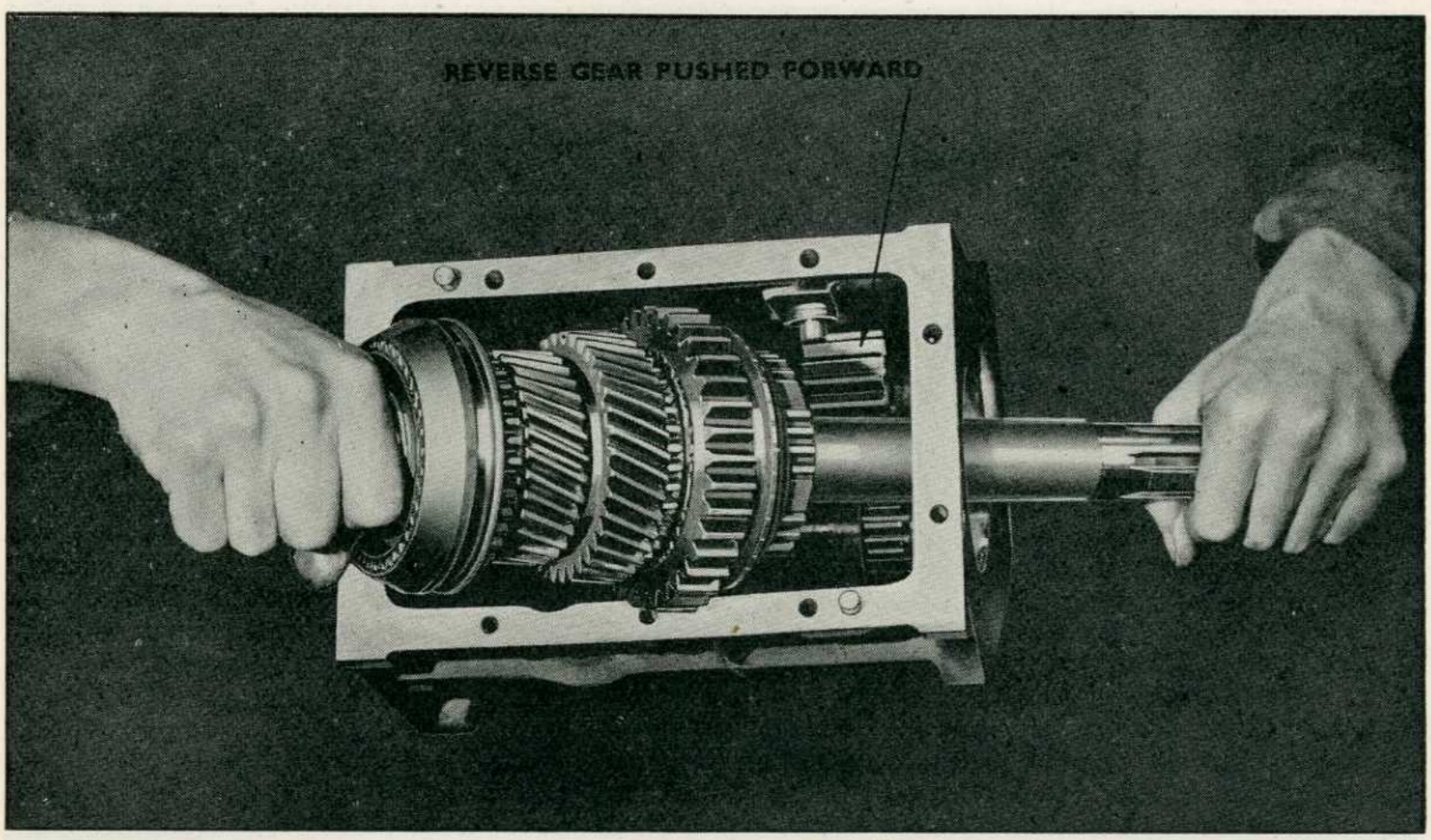


PLATE F.13. REMOVAL OF MAINSHAFT

DISMANTLE MAINSHAFT. Withdraw top and third gear operating and synchronising sleeves forward off the shaft. Press the operating sleeve off the synchronising sleeve and remove the six synchronising balls and springs.

Withdraw second gear synchronising sleeve complete with first speed wheel rearwards off the shaft. Press first speed wheel off the synchronising sleeve and remove six synchronising balls and springs. Remove ball and plunger locking second speed synchronising sleeve to mainshaft.

Press in plunger locking third speed gear wheel thrust washer and rotate washer until splines line up and washer, plunger and spring can be removed. Remove washer forward off shaft followed by third speed gear wheel taking care not to lose any needles which will emerge as the wheel is removed.

Press in plunger locating second speed gear wheel thrust washer and rotate washer until splines line up and washer, plunger and spring can be removed. Remove washer to rear off shaft followed by second speed gear wheel taking care not to lose any needles which will emerge as the wheel is removed.

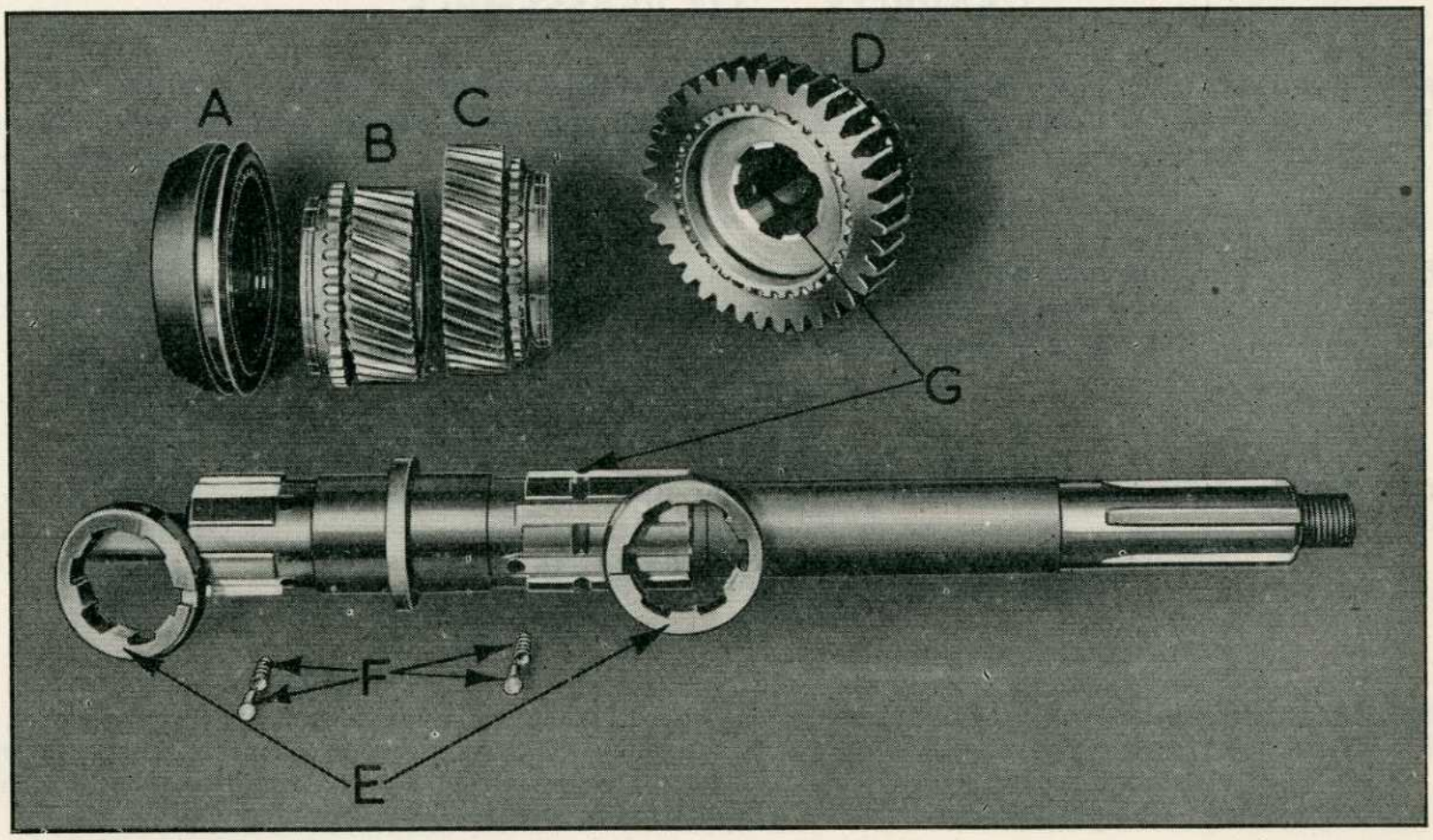


PLATE F.14. MAINSHAFT ASSEMBLY

A. Third and top operating and synchronising sleeves.
B. Third speed gear wheel.
C. Second speed gear wheel.
D. Second speed synchronising sleeve with first speed wheel.
E. Second and third speed gear wheel thrust washers.
F. Thrust washer locking plungers and springs.
G. Second speed synchronising sleeve locking plunger and groove on mainshaft.

REMOVE COUNTER-SHAFT GEARS. Draw reverse wheel rearwards as far as it will go to clear countershaft first speed gear wheel. Lift out countershaft gears observing inner and outer thrust washers fitted at either end of the gears. Take care not to lose any needles which are located at either end of the gear unit. Remove fibre washer from hole in case supporting front end of countershaft.

DISMANTLE COUNTER-SHAFT GEARS. J.H. SERIES. On S.H. Series gearboxes the countershaft gear unit is a cluster. On J.H. Series gearboxes second, third and top gears are mounted on a splined extension of first gear.
To dismantle, remove circlip located behind top gear wheel and push the wheel as far as it will go up the shaft. Remove split ring and draw off top gear wheel. Remove circlip at the front of second and third gear wheels and draw off wheels.

REMOVE REVERSE WHEEL. Push reverse wheel back into case and remove through top. Note bush which is a press fit in reverse wheel. Remove split pin from slotted nut with plain washer securing the fulcrum lever pivot pin. Withdraw pin, lever and reverse slipper. Remove split pin securing reverse slipper to fulcrum lever.

GEARBOX. TO REASSEMBLE

FIT REVERSE WHEEL. Offer up fulcrum lever with reverse slipper split pinned in position and secure to case with pivot pin, plain washer, slotted nut and split pin. Place bushed reverse wheel in slipper and draw wheel rearwards as far as it will go to give clearance for fitting countershaft gears.

ASSEMBLE COUNTER-SHAFT GEARS. J.H. SERIES. Press second and third gear wheels on to splined extension of first gear. Locate with circlip. Press on top gear wheel as far as it will go. Fit split ring and draw gear wheel forward on to ring. Finally fit circlip behind top gear wheel.

FIT COUNTER-SHAFT GEARS. Fit needle roller retaining rings into either end of gear unit followed by needle rollers (29 per end). Apply grease to the needle rollers to facilitate assembly. Fit outer roller retaining ring at front end. Offer up inner and outer thrust washers at either end of gear unit and lower gears into case through the top and insert a thin rod to locate cluster in place.

ASSEMBLE MAINSHAFT. Fit needle rollers (41 off) behind shoulder on shaft and slide second speed gear wheel, synchronising cone to rear, on to rollers. Apply grease to the needle rollers to facilitate assembly. Fit second speed thrust washer spring and plunger into plunger hole. Slide thrust washer up shaft and over splines. Compress plunger and rotate thrust washer into locked position.

Fit needle rollers (41 off) in front of shoulder on shaft and slide third speed gear wheel, synchronising cone to front, on to rollers. Apply grease to the needle rollers to facilitate assembly. Fit third speed thrust washer spring and plunger into plunger hole. Slide thrust washer down shaft and over splines. Compress plunger and rotate thrust washer into locked position.

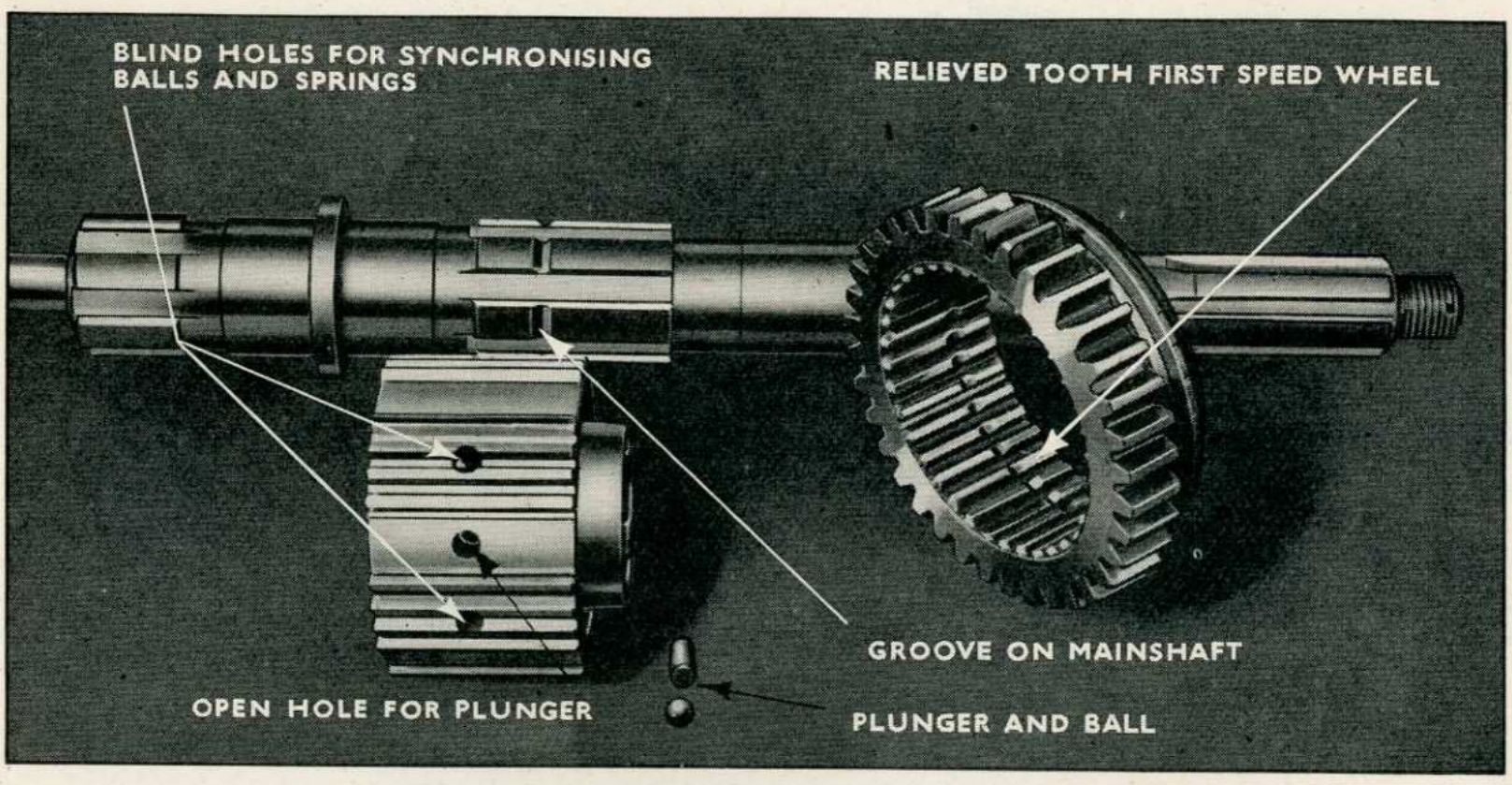


PLATE F.15

SECOND GEAR SYNCHRONISING SLEEVE AND FIRST SPEED WHEEL

Assemble six synchronising balls and plunger into blind holes in second speed synchronising sleeve. Fit locking plunger and ball into hole passing through sleeve, plunger first with round end to shaft, followed by ball. Slide first speed wheel on to sleeve, plain face of gear to synchronising cone end of sleeve ensuring that relieved tooth at rear of first speed internal spline lines up with locking plunger ball in synchronising sleeve. Slide sleeve on to splines of main shaft, synchronising cone facing forward. (Plate F.15.)

Assemble six synchronising balls and plungers into blind holes in third and top synchronising sleeves. Press on operating sleeve, large boss to front. Slide synchronising sleeve on to splines of mainshaft.

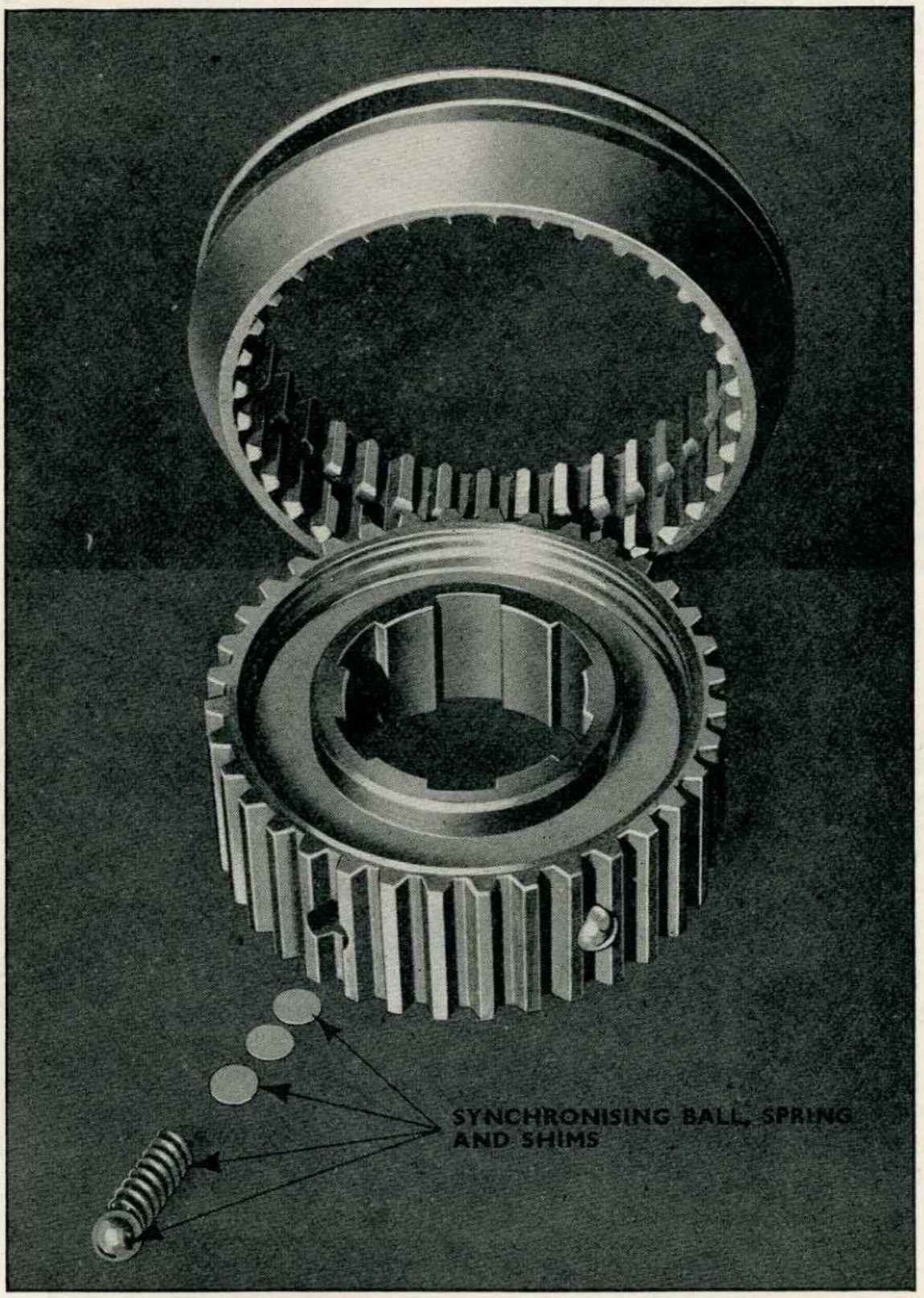


PLATE F.16

TOP AND THIRD SYNCHRONISING AND OPERATING SLEEVES

ASSEMBLE CONSTANT PINION SHAFT S.H. SERIES. Press the constant pinion wheel on to the shaft ensuring that the two oil holes in the wheel line up with the companion holes in the shaft. Fit oil thrower followed by ball bearing with circlip and collar fitted to outer track of bearing. Fit shims, if necessary, to eliminate all end float and secure by circlip. Fit roller race into shaft spigot.

ASSEMBLE CONSTANT PINION SHAFT J.H. SERIES. Fit oil thrower followed by ball bearing on to shaft with circlip and collar fitted to outer track of bearing. Screw on locking nut (left hand thread) and secure in position with circlip. Fit toothed driving member and roller race into shaft spigot.

FIT MAIN-SHAFT. If the mainshaft front bearing is a roller bearing press the inner race and rollers on to shaft from the rear until the face butts against second speed synchro sleeve. If the front bearing is a ball bearing it will have to be fitted after the mainshaft is in the case.

Enter mainshaft through top of case and pass to the rear through bearing hole in case. Offer up the constant pinion shaft at the front of the case with cut away portions of toothed driving member facing the top and bottom of the case. Tap the constant pinion shaft to the rear until the collar and circlip on the bearing butt against the case. Holding the constant pinion shaft in position tap in the outer race, internal flange outwards, of mainshaft front bearing if it is a roller bearing and the complete bearing if a ball bearing.

ASSEMBLE EXTENSION. Fit the ball race to the rear of the extension. Apply a little jointing compound to the countershaft and reverse shaft holes in the extension. Fit the countershaft and reverse shaft into the extension and secure in position with the locking plate, setscrew and spring washer. Fit a new felt sealing washer to the countershaft pressing the rounded surface of the washer into the recess of the extension. (Plate F.8.)

FIT EXTENSION. Fit a new jointing washer to the rear of the gearbox case ensuring that the oil return hole and breather hole apertures are cut in the washer. Fit distance sleeve to mainshaft. Lift the countershaft gears up into engagement with the mainshaft gears using the thin rod left in position when the countershaft gears were fitted. Pass a spare countershaft through the countershaft gears from the **front** to act as a pilot ensuring that none of the needle rollers are disturbed in the process.

Offer up the extension and tap into position driving the pilot countershaft forward out of the case. Secure extension with seven setscrews and spring washers. Fit a new fibre washer at the front end of the countershaft.

FIT REAR END COVER. Fit a new oil seal into the cover, lip of oil seal facing interior of box. Fit a new joint washer to rear face of extension. Assemble distance piece followed by speedo driving gear, shoulder to front, on to the mainshaft. (Plate F.7.)

Fit cover and secure with four bolts and spring washers. Fit cheese headed setscrew securing cover to extension. Fit speedometer driven gear into bearing, place in end cover and locate with locking screw and spring washer ensuring that screw does not bottom and foul driven gear. Engage top and reverse gears to lock box. Tap propellor shaft drive flange on to splines on mainshaft, fit plain washer and secure with slotted nut and split pin. Place top and reverse gears in neutral. (Plate F.7.)

FIT FRONT END COVER. Fit a new oil seal into the cover, lip of oil seal facing interior of box. Fit a new joint washer to front face of case ensuring that oil return hole is cut in washer. Offer up front cover ensuring that oil drain groove is at the bottom and mating with return hole in case. Secure cover with four setscrews and plain washers. Lock setscrews with new locking wire. (Plate F.6.)

FIT TOP COVER. Fit a new joint washer to top face of case. Offer up top cover observing that this is located by two dowels and secure in position with ten setscrews and spring washers. (Two long screws at front, two short screws at rear.) Refit oil dipstick and gearbox drain plug. (Assembly instructions for top cover will be found on page F.29.)

GEARBOX. TO OVERHAUL

GENERAL. The following remarks in regard to overhauling the gearbox are made in sub paragraphs set out in the correct sequence for assembling the box and may be read in conjunction with paragraphs "Gearbox. To Reassemble" page F.24.

ASSEMBLE CONSTANT PINION SHAFT S.H. SERIES. Press the constant pinion wheel on to the shaft ensuring that the two oil holes in the wheel line up with the companion holes in the shaft. Fit oil thrower followed by ball bearing with circlip and collar fitted to outer track of bearing. Fit shims, if necessary, to eliminate all end float and secure by circlip. Fit roller race into shaft spigot.

ASSEMBLE CONSTANT PINION SHAFT J.H. SERIES. Fit oil thrower followed by ball bearing on to shaft with circlip and collar fitted to outer track of bearing. Screw on locking nut (left hand thread) and secure in position wit circlip. Fit toothed driving member and roller race into shaft spigot.

FIT MAIN-SHAFT. If the mainshaft front bearing is a roller bearing press the inner race and rollers on to shaft from the rear until the face butts against second speed synchro sleeve. If the front bearing is a ball bearing it will have to be fitted after the mainshaft is in the case.

Enter mainshaft through top of case and pass to the rear through bearing hole in case. Offer up the constant pinion shaft at the front of the case with cut away portions of toothed driving member facing the top and bottom of the case. Tap the constant pinion shaft to the rear until the collar and circlip on the bearing butt against the case. Holding the constant pinion shaft in position tap in the outer race, internal flange outwards, of mainshaft front bearing if it is a roller bearing and the complete bearing if a ball bearing.

ASSEMBLE EXTENSION. Fit the ball race to the rear of the extension. Apply a little jointing compound to the counter-shaft and reverse shaft holes in the extension. Fit the countershaft and reverse shaft into the extension and secure in position with the locking plate, setscrew and spring washer. Fit a new felt sealing washer to the countershaft pressing the rounded surface of the washer into the recess of the extension. (Plate F.8.)

FIT EXTENSION. Fit a new jointing washer to the rear of the gearbox case ensuring that the oil return hole and breather hole apertures are cut in the washer. Fit distance sleeve to mainshaft. Lift the countershaft gears up into engagement with the mainshaft gears using the thin rod left in position when the countershaft gears were fitted. Pass a spare countershaft through the countershaft gears from the **front** to act as a pilot ensuring that none of the needle rollers are disturbed in the process.

Offer up the extension and tap into position driving the pilot countershaft forward out of the case. Secure extension with seven setscrews and spring washers. Fit a new fibre washer at the front end of the countershaft.

FIT REAR END COVER. Fit a new oil seal into the cover, lip of oil seal facing interior of box. Fit a new joint washer to rear face of extension. Assemble distance piece followed by speedo driving gear, shoulder to front, on to the mainshaft. (Plate F.7.)

Fit cover and secure with four bolts and spring washers. Fit cheese headed setscrew securing cover to extension. Fit speedometer driven gear into bearing, place in end cover and locate with locking screw and spring washer ensuring that screw does not bottom and foul driven gear. Engage top and reverse gears to lock box. Tap propellor shaft drive flange on to splines on mainshaft, fit plain washer and secure with slotted nut and split pin. Place top and reverse gears in neutral. (Plate F.7.)

FIT FRONT END COVER. Fit a new oil seal into the cover, lip of oil seal facing interior of box. Fit a new joint washer to front face of case ensuring that oil return hole is cut in washer. Offer up front cover ensuring that oil drain groove is at the bottom and mating with return hole in case. Secure cover with four setscrews and plain washers. Lock setscrews with new locking wire. (Plate F.6.)

FIT TOP COVER. Fit a new joint washer to top face of case. Offer up top cover observing that this is located by two dowels and secure in position with ten setscrews and spring washers. (Two long screws at front, two short screws at rear.) Refit oil dipstick and gearbox drain plug. (Assembly instructions for top cover will be found on page F.29.)

GEARBOX. TO OVERHAUL

GENERAL. The following remarks in regard to overhauling the gearbox are made in sub paragraphs set out in the correct sequence for assembling the box and may be read in conjunction with paragraphs " Gearbox. To Reassemble " page F.24.

REMOVE AND DISMANTLE GEARBOX. Remove and dismantle the gearbox as described on pages F.6 and F.16. Thoroughly clean all parts and gearbox case for examination.

GEARBOX CASE. Examine case for flaws or cracks, particularly at the reverse wheel lever fulcrum lug and at all bosses. Ensure that all machined faces are free from burrs. Paint the interior of the case with oil resisting paint.

REVERSE WHEEL. Check the fulcrum lever pivot pin and slipper for wear and renew if worn or if the pivot pin and shank of the slipper have excessive clearance in the respective operating holes in the fulcrum lever. Observe that if the reverse wheel is not moving sufficiently into engagement the fulcrum lever may be set by bending and thus obtain correct travel of the wheel. Check that the teeth of the reverse gear wheel are sound, are not pitted on the working faces and that case hardening is not flaking. Ensure that the reverse slipper engages with the sleeve on the gear without excessive side play. The reverse wheel bush is not serviced separately and a new bushed wheel must be fitted if bush or wheel is worn. The bush should have .0014″—.0024″ (.04 mm to .06mm) clearance on the shaft.

COUNTER-SHAFT GEARS. Check gears for wear ensuring that all teeth are sound, are not pitted on the working faces and that case hardening is not flaking. Note that S.H. Series countershaft gears are a cluster and therefore must be renewed as a unit. J.H. Series countershaft gears are serviced separately. Check countershaft needle rollers, needle roller retaining rings, outer and inner thrust washers for wear and renew as necessary. Assemble countershaft gears with inner and outer thrust washers in position. Place in case and insert countershaft to ensure that bore of gears is in alignment with holes in box and extension. Countershaft gear end float .002″—.004″ (.05 mm—.10 mm). The outer thrust washers fitted at the rear of the countershaft are available in the following thicknesses : .152″, .156″, .159″, .162″, .164″ (3.86 mm., 3.96 mm., 4.04 mm., 4.11 mm., 4.17 mm.).

MAIN SHAFT GEARS. Examine shoulders, splines and threads of the mainshaft for damage or wear. Renew shaft if necessary. Check internal bearing faces of second and third speed wheels and needle rollers for damage or wear. Check gears, toothed driving members and synchromesh cones for wear ensuring that all teeth are sound, are not pitted on the working faces and that case hardening is not flaking. Renew second and third gear wheel thrust washers and ensure that locking springs and plungers are sound. Second and third gear wheel end float on mainshaft .002″—.004″ (.05 mm. to .10 mm.).

Check the fit of first speed wheel on second gear syncromesh sleeve and the fit of the sleeve on the mainshaft splines. If internal teeth of first speed bottom on second gear synchronising sleeve or if sleeve is not a good fit on mainshaft splines renew sleeve. Examine first speed gear teeth for wear ensuring that all teeth are sound, are not pitted on the working faces and that case hardening is not flaking. Grind second gear synchro cones using fine grinding paste until the two mating faces are bedded together and a good bite is obtained when they are in engagement. Examine the synchronising balls and springs and renew the balls if worn and the springs if fatigued. Assemble the six synchronising balls and springs into the blind holes in the synchronising sleeve. Check the tension by endeavouring to slide the operating sleeve off the synchromesh sleeve which should require 62-65 lbs. pressure (28-29 kg.). Fit shims under the springs to obtain correct pressure but ensure that the springs do not become coil bound. As a rough check half of the ball should protrude when the ball is resting on the spring but applying no tension to the spring Examine the ball and plunger locking second speed synchronising sleeve and renew if worn. Fit the locking plunger and ball into the hole which passes through the sleeve, rounded end of plunger next to the shaft followed by ball. Fit first speed gear to second speed synchronising sleeve, plain face of gear to cone end of sleeve ensuring that the relieved internal tooth on the rear of first speed gear lines up with the locking plunger on second speed sleeve. Fit the assembly to the mainshaft and check that the plunger locks second speed synchronising sleeve to the mainshaft when first gear is engaged and on disengagement until the teeth of first gear are clear of the first speed wheel on countershaft.

Check the fit of third and top operating sleeve on the synchronising sleeve and the fit of the sleeve on the mainshaft. Examine the synchronising balls and springs and renew the balls if worn and the springs if fatigued. Assemble the six synchronising balls and springs into the blind holes in the synchronising sleeve. Check the tension by endeavouring to slide the operating sleeve off the synchronising sleeve which should require 42-45 lbs. pressure (19-20 kg.). Check teeth for wear and ensure that they are sound. Grind in the synchromesh cones using fine grinding paste until the two mating faces are bedded together and a good bite is obtained when they are in engagement. Examine mainshaft front and rear bearings and renew if wear is present on balls, rollers or races. Instructions in regard to mainshaft end play will be found on page F.28.

CONSTANT PINION SHAFT. Check the constant pinion wheel, toothed driving member and top gear synchromesh cone for wear. Ensure that all teeth are not pitted on the working faces and that case hardening is not flaking. Note that on S.H. Series boxes constant pinion wheel is serviced separately and that the toothed driving gear is integral with the shaft (Plate F.11). On J.H. Series boxes the toothed driving gear is serviced separately and the wheel is integral with the shaft. (Plate F.12.) Examine spigot in rear end of shaft and needle roller bearings for wear renewing parts as necessary. Check constant pinion shaft ball bearing and renew if wear is present on balls or races. Check the clutch plate splines on the shaft and offer up the clutch plate to the shaft to ensure that it slides easily but that there is no circumferential play on the splines. Fit new oil thrower and circlip. Observe that constant pinion shaft should have no end float when fitted.

EXTENSION. Check extension for flaws or cracks and ensure that machined faces are free from burrs. Always fit a new joint washer and ensure that oil return hole and breather hole are cut in joint and that the holes in the extension and case are clear (Plate F.9). Do not omit the distance piece between mainshaft front and rear bearings when fitting the extension (Plate F.8).

The countershaft and reverse shaft should be a firm fit in the extension holes and it is advantageous to apply jointing compound sparingly to the holes before the shafts are fitted. Always use a new countershaft felt sealing washer with the rounded end of the washer fitted in the recess in the extension. When the two shafts are in position and secured by the locking plate they should be checked for parallelism.

REAR END COVER. Check end cover for flaws or cracks and ensure that machined faces are free from burrs. Always fit a new joint washer. Do not omit the distance piece and speedometer driving gear, shoulder to front, when fitting cover. The speedometer driving and driven gears should be liberally greased on assembly to provide initial lubrication until oil finds its way down the mainshaft. Ensure that the spring washer is in place on the speedometer driven gear setscrew or the setscrew may bottom and jam the gear. Always fit a new oil seal to the cover, lip of seal towards interior of case. When fitting the cover and seal use a suitable taper tube to enter the seal on mainshaft and protect the lip of the seal from damage (Plate F.7).

Where the mainshaft front bearing is a ball bearing the end play of the mainshaft is controlled between the front and rear ball bearings. Where the mainshaft front bearing is a roller bearing the end play of the mainshaft is controlled by the fit of the ball race in its housing between the extension and rear end cover.

Mainshaft end play should be between .002″ to .006″ (.05 mm. to .15 mm.) and should be checked with the drive flange fully tightened and the mainshaft tapped forward. Correction to end play may be made as follows :—

Ball Bearing. To increase end float fit shims at one or other end of the distance sleeve positioned between the mainshaft front and rear bearings. To reduce end float machine sleeve.

Roller Bearing. Since end float is controlled by the ball bearing at the rear of the mainshaft it is only necessary to ensure that the outer track of the bearing is nipped between the extension and end cover. Observe, however, that if the distance sleeve is too short the mainshaft may jam when the drive flange slotted nut is fully tightened, in which case fit shims at one or other end of the sleeve.

FRONT END COVER. Check end cover for flaws or cracks and ensure that machined faces are free from burrs. Fit a new fibre washer at the front end of the countershaft. Always fit a new joint washer and ensure that the oil return hole is cut in the joint and that the grooves in the case and cover are clear. (Plate F.6.) Always fit a new oil seal to the cover, lip of seal towards interior of case. When fitting the cover and seal use a suitable taper tube to enter the seal on to the shaft and protect the lip of the seal from damage. Observe that the end cover setscrews are secured by locking wire.

TOP COVER. TO DISMANTLE

REMOVE CHANGE SPEED LEVER. Remove split pin and slotted nut with spring washer securing the selector lever pivot pin. Withdraw selector lever complete with change speed lever. Observe bush with two thrust washers for selector lever. Remove split pin and slotted nut securing change speed lever to selector lever and dismantle observing flexible rubber bearings in two halves with thrust washers for each half. Release and remove lock nut and lever knob.

Remove split pin and slotted nut securing pivot jaw observing disposition of bush, thrust washers and locking washer.

REMOVE BREATHER AND REVERSE LAMP SWITCH. Unscrew breather and reverse lamp switch observing fibre washer under breather.

REMOVE STRIKING ROD PLUNGERS. Break locking wire on the three striking rod plunger grub screws. Remove grub screws, springs and plungers.

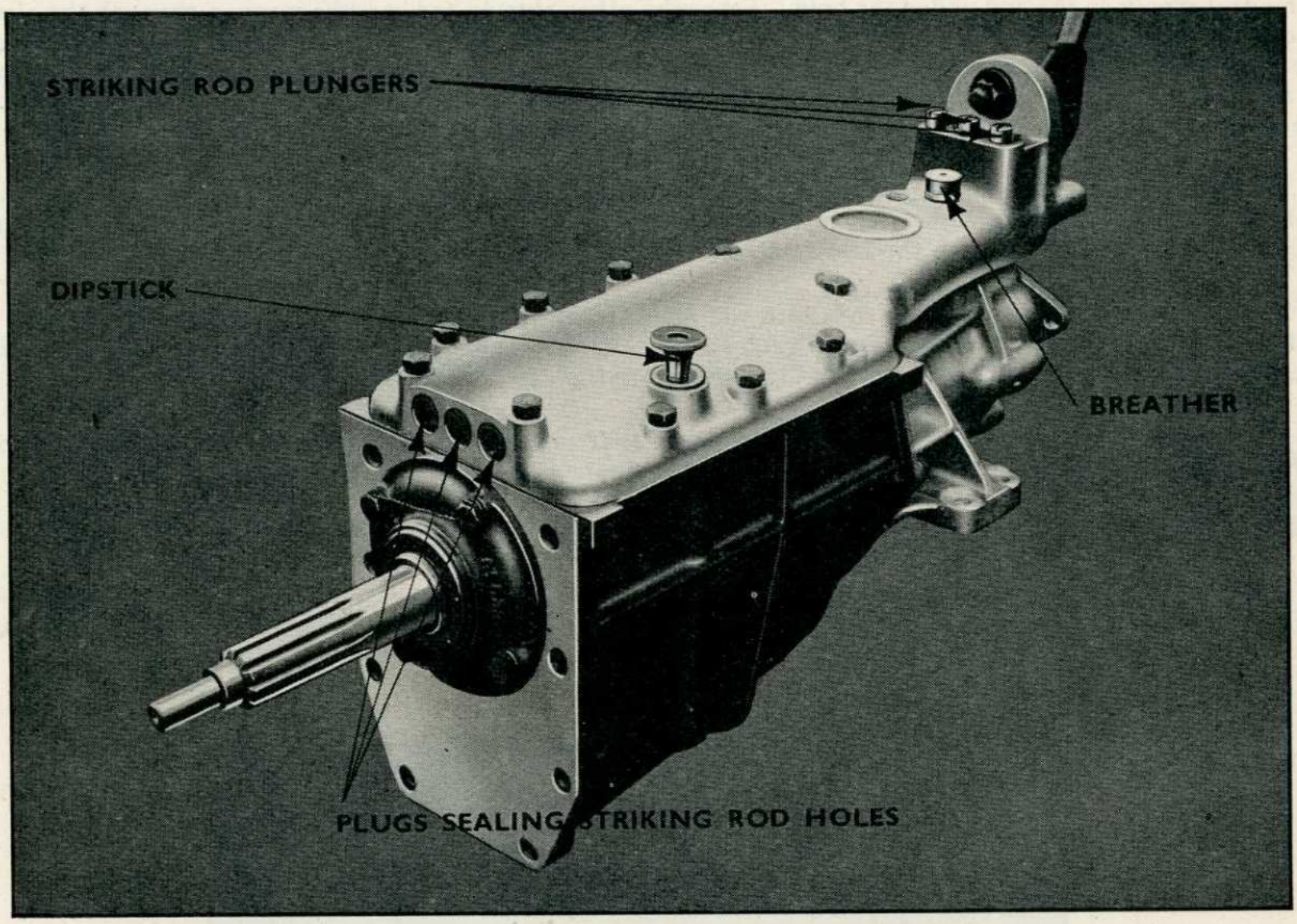


PLATE F.17. TOP COVER (Front view)

REMOVE STRIKING RODS. Break lock wire and remove stop pin from first/second and third/top striking rods. Break lock wire and remove lock bolts securing change speed forks to the three striking rods. Draw the striking rods, one at a time, to the rear out of the cover collecting the interlocking roller and the two interlocking balls as they are released. Remove selectors from third/top and reverse striking rods by breaking lock wire and withdrawing lock bolts. Note that first and second selector is integral with striking rod. Dismantle reverse selector by withdrawing split pin and removing plunger with spring and locking ball with springs.

REMOVE STRIKING ROD SEALS. The front ends of the striking rod holes in the top cover are sealed by plugs. Tap the centre of the plug with a hammer and punch engaging through the holes in the cover until they are free. The rear ends of the striking rods are sealed by a plate retaining felt seals in recesses in each striking rod hole. Remove two setscrews with spring washers retaining plate to cover and withdraw plate and felt washer.

TOP COVER. TO REASSEMBLE

ASSEMBLE STRIKING ROD SEALS. Assemble the reverse selector by fitting the plunger and spring securing the plunger with a new split pin. Fit the plunger locking ball and spring. Fit the reverse selector and the top selector to the respective striking rods and secure in position with lock bolts, locking with new wire.

FIT STRIKING RODS. Fit a new felt washer into each recess in the striking rod holes at the rear of the cover. Thread the plate over one or other of the outside rods and slide the rod into the cover, not forgetting to fit the change speed fork before the rod enters the front hole in the cover, until it occupies the neutral position. This can be checked by looking through the grub screw hole on top of the cover and aligning the neutral groove in the rod under the hole. Enter the other outside rod in a like manner, through the plate and the change speed fork, into the neutral position. Place an interlock ball in the groove in each rod using the centre hole to gain access to the rods which are already in position. Fit the interlock plunger in the hole of the centre rod and pass the rod, through the plate and the change speed fork, into position. Fit lock bolts to the three change speed forks and lock with new wire. Fit stop pins to first/second and third/top striking rods and lock with new wire.

FIT STRIKING ROD SEALS. Fit three new plugs into the striking rod holes in the front of the cover tapping the centre of the plug with a hammer and punch until the plugs are secure. Secure plate in position at the rear with the two setscrews and spring washers.

FIT STRIKING ROD PLUNGERS. Move all striking rods into the neutral position. Place a plunger in each of the three holes followed by springs and grub screws. Observe that the reverse rod grub screw is the longer. Rotate the grub screws until correct tension is obtained and lock with new wire.

FIT REVERSE LAMP SWITCH AND BREATHER. Screw reverse lamp switch and breather into their respective holes on the top cover fitting a new fibre washer under the breather.

FIT CHANGE SPEED LEVER. Fitting is the reverse of the dismantling procedure given on page F.28. Observe that where a cranked gear lever is fitted the cranked portion should face forward to carry the knob towards the front of the gearbox.



PLATE F.18. TOP COVER (Rear view)

TOP COVER. TO OVERHAUL

GENERAL. The following remarks in regard to overhauling the top cover are made in sub-paragraphs set out in the sequence of assembling the cover and may be read in conjunction with paragraph "Top Cover. To Reassemble." (Page F.29.)

DISMANTLE TOP COVER. Remove and dismantle top cover as described in pages F.16 and F.28.

TOP COVER. Examine top cover for flaws or cracks. Ensure that all machined faces are free from burrs. Check the bores of the striking rod holes for size and freedom from damage. Check that the breather passage into the underside of the top cover is clear.

STRIKING ROD SEALS. Before fitting the plugs to the front end of the cover ensure that the plug recesses are perfectly clean and are free from burrs. Always use new plugs on assembly. It is most important that an efficient seal is obtained between the felt washers at the rear of the cover and the striking rods. Ensure therefore that the seals are a good fit in the recesses and nip the rods when compressed by the plate. It is permissible to use two felt washers in place of one on each striking rod to obtain a good seal if it should be considered that the nip obtained by one washer is insufficient.

STRIKING RODS. Check striking rods, selectors and change speed forks for wear, also check fit of selectors and change speed forks on the shaft, renew parts as necessary. Check the alignment of the forked portion of the change speed forks on first/second and third/top striking rods to ensure that they are not bent. Correct any misalignment by bending. Renew interlock balls and interlock plunger.

STRIKING ROD PLUNGERS. Before fitting striking rod plungers ensure that grooves on striking rods line up with plunger holes when each gear is selected, by moving the striking rods, one at a time, into and out of engagement and viewing the groove through the grub screw hole.

Fit plungers, springs and grub screws and adjust until the rod is held firmly in the selected position. Lock screws with new wire.

CHANGE SPEED LEVER. The most likely points at which wear will be found in the change speed lever assembly will be at the tip of the selector lever which may be renewed, or alternatively, built up and then dressed to size. The pivot jaw, the selector lever pivot pin and the change speed lever are all bushed and these bushes may be renewed as necessary.

REFITTING TOP COVER. Always fit a new joint washer between cover and the case observing that the cover is located by two dowels. Ensure that all gears are in neutral and that the change speed lever is in neutral and offer up the cover which must enter into position without any force being used. Check that first/second and third/top change speed forks are in alignment with the selector grooves on the respective gears by blueing the forks, refitting the lid and rotating the mainshaft. On removal of the cover the forks should show an even bearing surface on each side of the fork.

Check that the forks are giving full travel into engagement on all gears as follows. Replace the top cover with one screw only holding and select top gear, remove cover carefully with top gear position still selected and check that the gear is fully home. Repeat for third, second, first and reverse gears. Also check that movement of gear from neutral into top and from neutral into third is of equal travel.

GEARBOX EXTENSION. REMOVE AND REFIT. (GEARBOX FITTED)

GENERAL. Although it is possible to remove the gearbox end cover and extension without removing the gearbox from the car it is normally desirable to effect this service with the gearbox removed. The following instructions refer to the rectification of oil leaks at the rear of the countershaft or reverse shaft and also to withdrawing the reverse wheel without removing the gearbox from the car.

Remove Watermark Wondershare PDFelement

REMOVE TOP COVER. (This operation is not necessary unless the reverse wheel is to be removed.) Remove both front seats and floor carpets and place clear of car. Remove change speed lever knob and lock nut. Remove gearbox and bell housing cover and carpets. Disconnect reverse light wire from switch on top cover. Remove dipstick. Remove gearbox cover and place clear.

DISCONNECT GEARBOX. Raise car on lift to a height convenient for working on the gearbox. Disconnect speedometer cable and place clear. Remove split pins and four slotted nuts from propellor shaft companion flange. Remove bolts and spring front of shaft out of register on gearbox flange. Place jack under engine sump, with suitable packing interposed to prevent damage, and take weight of engine. Mark relative positions of gearbox mounting bracket to chassis members and remove four mounting bolts. Remove four bolts securing mounting to gearbox extension. Remove mounting. (Plate F.19.)

REMOVE END COVER. Engage top and reverse gears to lock box (or top gear only if top cover has not been removed). Remove split pin, slotted nut and plain washer securing propellor shaft drive flange to mainshaft. Tap drive flange off shaft. Remove four bolts with spring washers securing cover to extension. Remove locking screw with spring washer securing speedometer driven gear in cover. Withdraw driven gear and bearing. Remove cheese-headed setscrew now disclosed securing cover to extension. Remove rear end cover. An oil leak at the rear of the mainshaft may now be attended to without further dismantling by renewing the end cover oil seal. Fit seal to cover with lip of oil seal facing interior of box. (Plate F.7.)

RELEASE COUNTER AND REVERSE SHAFTS. Remove setscrew with spring washer securing plate locking counter and reverse shafts, withdraw locking plate and carefully remove any burrs on the locked end of the shafts which might damage the shaft mounting holes in the extension when the extension is withdrawn.

REMOVE EXTENSION. Withdraw speedometer driving gear and distance piece from mainshaft. Remove seven set screws securing extension to case. Using a suitable drawer engaging on the mainshaft and on the extension draw off the extension complete with rear ball bearing, **but keep countershaft in position by tapping it back as extension is withdrawn.** Remove and scrap countershaft felt oil sealing washer. Observe oil return hole at bottom and breather hole at top of extension mating with oil return and breather holes in case and jointing washer interposed. Scrap joint washer.

OIL LEAKS. Oil leaks may now be attended to as follows :—

Countershaft. Fit a new felt oil seal to the shaft with rounded end of the felt in the recess of the extension. Jointing compound should be applied sparingly to the countershaft hole in the extension before the shaft is fitted.

Reverse Shaft. Jointing compound should be applied sparingly to the reverse shaft hole in the extension before the shaft is fitted.

REVERSE WHEEL. Should it be necessary to remove the reverse wheel, first withdraw reverse shaft. Remove split pin from slotted nut with plain washer securing the fulcrum lever pivot pin. Tap the pivot pin into the box and if a flat is cut on the head of the pin withdraw pin, and lift reverse wheel, lever and reverse slipper through top of box. If a flat is not cut on the pin it will be necessary to tap the mainshaft to the rear until clearance is provided for removal of the pivot pin.

REFITTING. Reassembly and refitting is the reverse of the above procedure, but particular attention should be paid to the following points. Always fit a new jointing washer between extension and gearbox case and ensure that the oil return hole and breather hole are cut in the washer and that the respective holes are clear. Always fit a new joint washer between the rear end cover and the extension.

Ensure that the spring washer is fitted to the speedometer driven gear locking screw or the screw may bottom on the gear causing jamming (Plate F.7). When refitting the gearbox mounting bracket ensure that this is positioned in accordance with the marks scribed during removal since it is important that the propellor shafts should be in as straight a line as possible. Some lateral movement of the gearbox mounting bracket is available due to the slotted holes in the bracket. Failure to align the propellor shafts in the manner mentioned above may have a tendency to cause propellor shaft vibration.

GEARBOX MOUNTING. TO REMOVE AND REFIT

REMOVAL. Raise the car on a lift to a height convenient for working on the gearbox. Place suitable packing under engine sump to take weight and remove four bolts securing mounting to gearbox extension. Scribe a line marking the relative positions of gearbox mounting brackets to chassis frame members to facilitate assembly in the same location. Remove four bolts from mounting bracket and remove bracket, complete with gearbox mounting. Observe that mounting bracket holes are elongated thus giving some lateral adjustment of gearbox mounting so that a straight propellor shaft line may be obtained between front and rear propellor shafts. Remove two bolts securing mounting to mounting bracket.

REFITTING. Refitting is the reverse of the above procedure. Ensure that the gearbox mounting bracket is assembled to the chassis brackets with the marks scribed on removal in line or propellor shaft vibration may be experienced due to the two shafts not occupying a straight line.

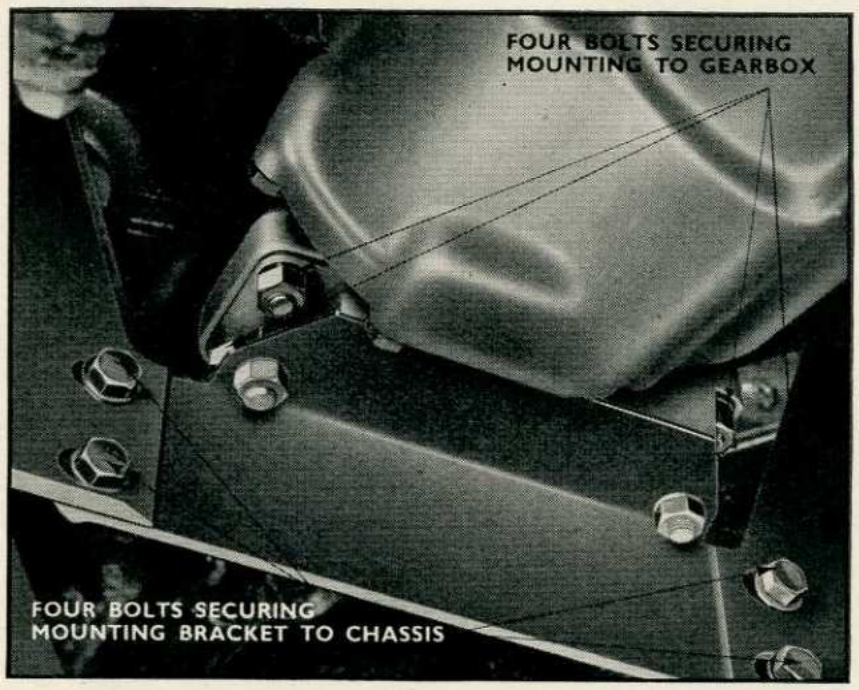


PLATE F.19. GEARBOX MOUNTING

Remove Watermark
Wondershare PDFelement

PROPELLOR SHAFTS

MARK V

2½ and 3½ LITRE

CHASSIS NUMBERS

(Stamped at the front of the chassis left-hand side member)

2½ Litre	3½ Litre
Saloon	
520001 Right-Hand Drive	620001 Right-Hand Drive
527001 Left-Hand Drive	627001 Left-Hand Drive
Coupé	
540001 Right-Hand Drive	640001 Right-Hand Drive
547001 Left-Hand Drive	647001 Left-Hand Drive

ENGINE NUMBERS

(Stamped on a boss at right-hand rear of cylinder block)

2½ Litre	3½ Litre
H.2001 ONWARDS	T.5001 ONWARDS

The instructions in this section are presented under the following main headings which appear as sub-titles on the pages concerned and in the order shown :—

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Propellor Shaft. Front	Dismantle and Reassemble	G.7
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Propellor Shaft Centre Bearing Bracket	Description	G.9

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DESCRIPTION. A Hardy Spicer divided propellor shaft transmits the drive from the gearbox to the rear axle. The propellor shaft is attached at either end by flanged yokes connected to companion flanges on the gearbox mainshaft and rear axle pinion shaft by four bolts passing through the respective flange faces. The shaft is divided to obtain a flat floor and dispense with a tunnel. The front shaft has a needle roller bearing universal joint at the front end and is supported by a deep grooved ball bearing at the rear end, the outer track of which is located in an oval housing attached to the chassis frame by flexible rubber bushes pinched and expanded by through-going bolts. The rear shaft is flange bolted to the front shaft by four bolts passing through the flange faces. Needle roller bearing universal joints are fitted to the front and rear of this shaft and a splined sliding joint is incorporated immediately behind the front universal joint.

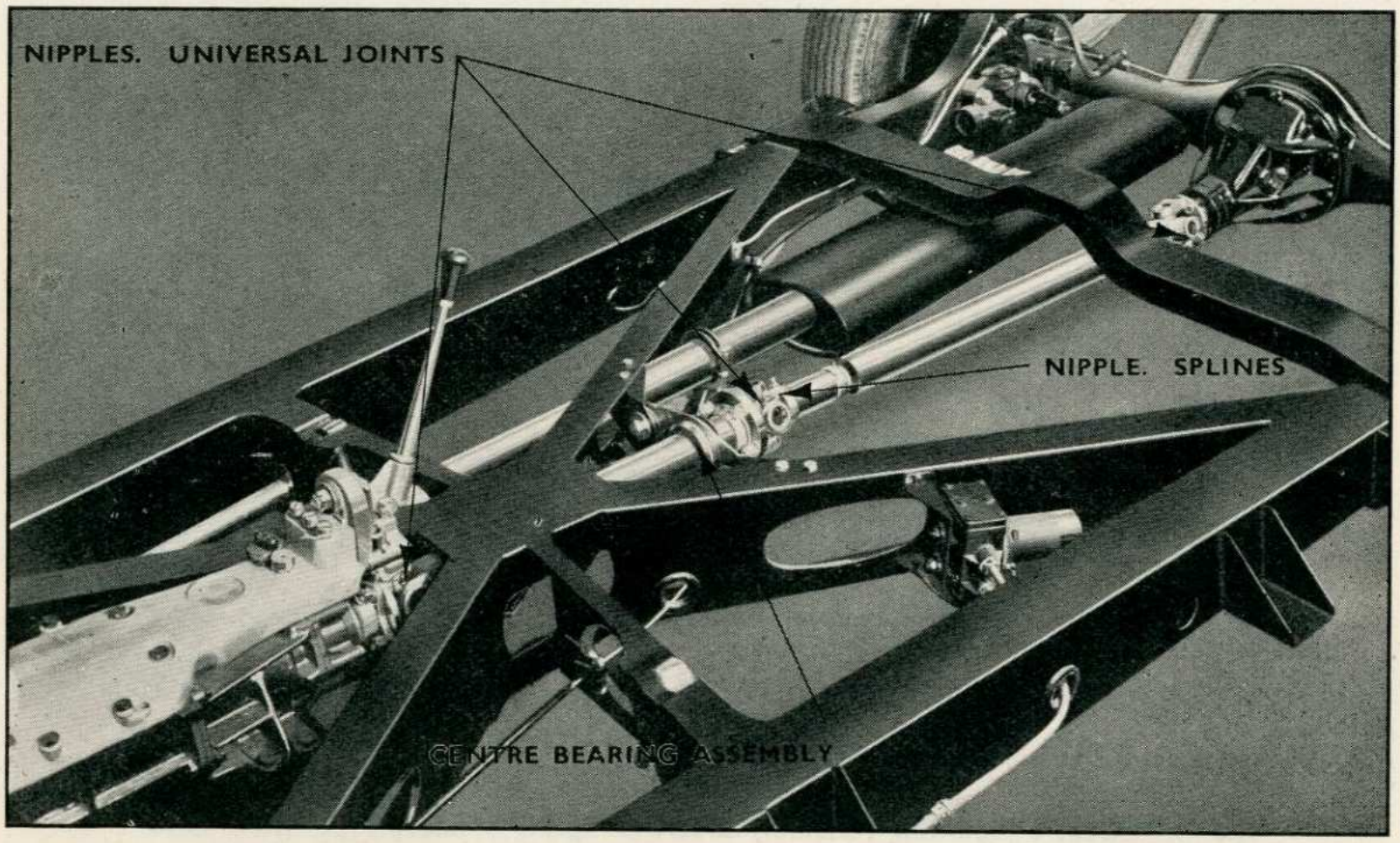


PLATE G.1. PROPELLOR SHAFTS. GENERAL ARRANGEMENT

MAINTENANCE. Routine maintenance consists of lubrication of the universal joints and the sliding spline. Every 1,000 miles (1,500 kilometres) lubricate these nipples with the recommended lubricant. The number of nipples and their location is as follows :—

1 Nipple.	Universal Joint.	Front propellor shaft.
1 Nipple.	Splines.	Rear propellor shaft.
2 Nipples.	Universal Joints.	Rear propellor shaft.

(Refer to Plate G.1.)

The supporting centre bearing on the front propellor shaft is pre-lubricated and requires no attention except at overhauls when it should be packed with grease. Grease is not suitable as a lubricant for universal joint needle bearings, and gear oil, as recommended, should always be used. After high mileages it is desirable to check that the slotted nuts securing the flanged yokes to gearbox mainshaft splines and rear axle pinion shaft splines are tight. Also check that the companion flange bolts are tight and that wear has not taken place in the universal joints. Wear on the thrust faces can be located by testing the lift in the joint either by hand or with a light bar. Any circumferential movement of shaft relative to flange yokes indicates wear in the needle roller bearings or the sliding splines.

RECOMMENDED LUBRICANTS

	Vacuum.	Wakefield	Shell.	Essolube.	Price's	S.A.E. Viscosity
Needle Bearings	Mobilube C	Castrol D	Spirax C	Gear Oil 140 (Heavy)	Energol 140	140
Splines	Mobilgrease No. 4	Castrolease (Heavy)	Retinax R.B.	Essolube Grease	Belmoline C	

PROPELLOR SHAFTS. TO REMOVE AND REFIT ASSEMBLY

REMOVAL. Place the car on a lift with the handbrake off and the gear lever in neutral. Raise the car to a height convenient for working on the propellor shaft ensuring that chocks are in position at either end of the ramp. Remove hexagon adjustment nut from handbrake bisector mechanism and place cable assembly clear of propellor shafts to facilitate subsequent operations. Moving the car backwards or forwards on the ramp to gain access to the bolts, remove cotter pins and slotted nuts from front companion flange (gearbox end). Remove bolts and ease front universal joint from register. Remove cotter pins and slotted nuts from rear companion flange (axle end) and ease rear universal joint from register. Support shaft. Remove two through-going bolts from centre bearing housing oval flange and ease housing clear of chassis plates. Disengage and remove from platforms the coil spring supporting centre bearing. (Not fitted to early cars.) Withdraw shafts to rear of car, taking care not to collapse the shafts, thus imposing undue load on the intermediate universal joint bearings.

REFITTING. Refitting is the reverse of the above procedure. If it has been found necessary to remove the intermediate universal joint and splined sleeve from rear propellor shaft, it is essential, when assembling, to adhere strictly to the lining up arrows stamped on the shaft and on the splined sleeve. Failure to do so will result in damage to the universal joints due to incorrect angular relationship.

Observe that the engine and gearbox unit is positioned on the rear (gearbox) mounting to align the front and rear propellor shafts in as straight a line as possible. The holes in the rear engine mounting support bracket are elongated to enable some lateral adjustment of the mounting and thus obtain a straight propellor shaft line.

Care should be taken when refitting the handbrake adjustment nut that no tension exists in the brake cables when the handbrake is in the off position. (Refer to Section L. "Brakes".)

PROPELLOR SHAFT. FRONT. TO REMOVE AND REFIT

REMOVAL. Place the car on a lift with the handbrake in the off position and the gear lever in neutral. Raise the car to a height convenient for working on the propellor shaft ensuring that chocks are in position at either end of the ramp. Remove hexagon adjustment nut from handbrake bisector mechanism and place cable assembly clear of propellor shafts to facilitate subsequent operations. Moving the car backwards or forwards on the ramp to gain access to the bolts remove cotter pins and slotted nuts from front companion flange (gearbox end). Remove bolts and ease front universal joint from register. Mark relative position of intermediate companion flanges joining front and rear propellor shafts so that they may be reassembled in correct relationship and thus preserve the balance of the assembly. Remove cotter pins and slotted nuts from intermediate companion flange between the front and rear propellor shafts. Ease rear propellor shaft universal joint from register backwards on spline and secure shaft to chassis cruciform member on one side. Remove two through-going bolts from centre bearing housing oval flange and ease housing clear of chassis plates. Disengage and remove from platforms the coil spring supporting centre bearing (not fitted to early cars). Withdraw front propellor shaft to rear of car.

REFITTING. Refitting is the reverse of the above procedure, paying particular attention to the points given in refitting "Propellor Shafts. To Remove and Refit Assembly" (above). Ensure that the marks on the intermediate companion flanges of the front and rear shafts are in line when assembling or the balance of the assembly may be disturbed.

PROPELLOR SHAFT. REAR. TO REMOVE AND REFIT

REMOVAL. Place car on lift and raise to a height convenient for working on propellor shaft. Mark relative position of intermediate companion flanges joining front and rear propellor shafts so that they may be reassembled in correct relationship and thus preserve the balance of the assembly. Remove cotter pins and slotted nuts from front and rear companion flanges. Support shaft and remove bolts. Withdraw shaft to rear.

REFITTING. Refitting is the reverse of the above procedure. If it has been found necessary to remove the intermediate universal joint and splined sleeve from rear propellor shaft, it is essential when assembling to adhere strictly to the lining up arrows stamped on the shaft and on the splined sleeve. Failure to do so will result in damage to the universal joints due to incorrect angular relationship. Ensure that the marks on the intermediate companion flanges of the front and rear shafts are in line when assembling or the balance of the assembly may be disturbed.

PROPELLOR SHAFT. FRONT. TO DISMANTLE AND REASSEMBLE

REMOVE SHAFT. Remove the propellor shaft as described previously.

DISMANTLE UNIVERSAL JOINT. The universal joint consists of a spider with four journals each carrying a needle roller bearing assembly which is retained in the respective yoke ear by a circlip. Dealing with each needle bearing in turn, remove the circlip. If difficulty is experienced tap the bearing housing to release the tension on circlip. Tap the yoke ear in the vicinity of the bearing with a copper or lead hammer until the bearing cage emerges. (If the bearing housing is tight in the yoke ear it may be necessary to drive out one bearing housing by hitting the opposite bearing housing with a hammer and punch. Repeat for the remaining bearings.) Hold the shaft with the bearing facing downwards and withdraw bearing taking care not to lose any of the needles. Repeat for the remaining needle bearings.

DISMANTLE CENTRE BEARING. Two types of centre bearing will be found, Type A fitted to early cars and Type B to later cars. The number of cars fitted with the latter type predominates. The two types of centre bearing are similar in that a deep grooved ball bearing is pressed into a housing which has an oval shaped bearer plate attached and this assembly is mounted on the tail of the propellor shaft with dust shield interposed between housing and shaft tubing. The bearing is retained on the shaft by a flange coupling which is bolted to the companion flange on the rear propellor shaft. In the case of Type A this flange coupling is retained on the front propellor shaft by a tapered spline fitting with centre set bolt.

On Type B retention is by keyways in the flange coupling engaging with Woodruff keys on the shaft and slotted nut and cotter pin.

Type A. Centre punch flange coupling and shaft to mark relationship for reassembly. Remove set bolt observing lock washer and plain washer. Draw flange coupling of splines. Drive shaft through bearing and housing. Scrap dust cover. Press bearing out of housing.

Type B. Remove cotter pin and slotted nut. Draw off flange coupling and remove Woodruff keys. Remove outer dust cover. Drive shaft through bearing and housing. Scrap dust cover. Press bearing out of housing.

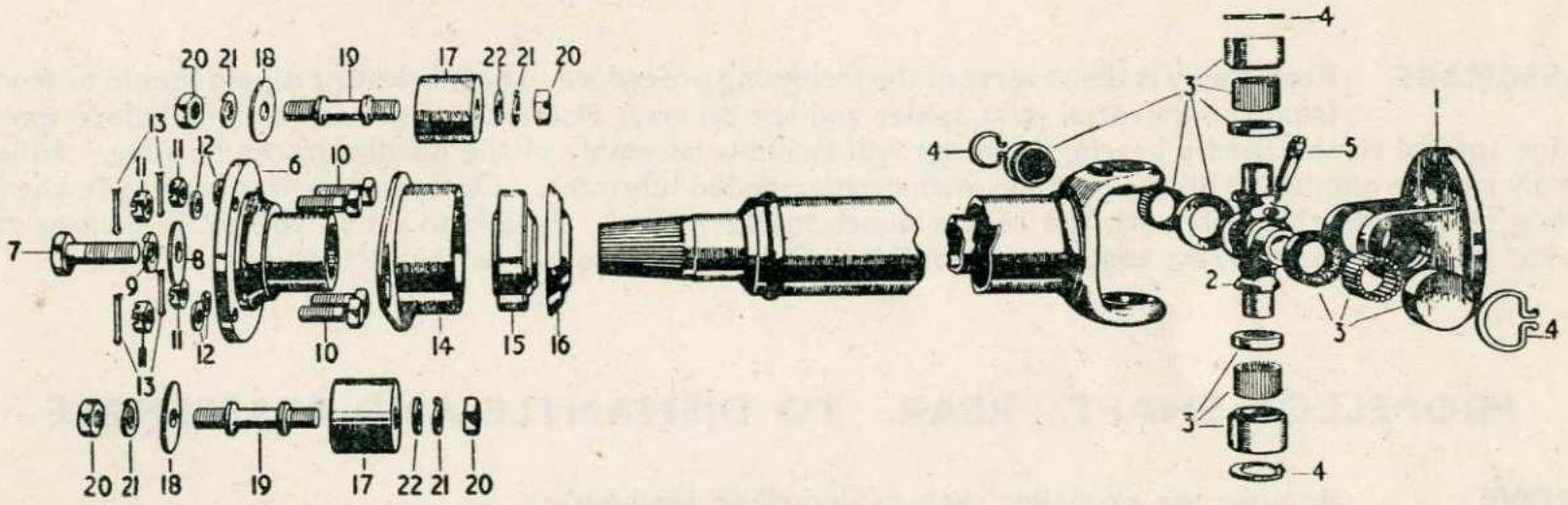


PLATE G.2. FRONT PROPELLOR SHAFT AND CENTRE BEARING. (TYPE A)

Yoke, Flange, at front end of Shaft	1	Washer under Nuts	12
Journal, connecting Flange Yoke to Shaft ...	2	Pin, Split, locking Nuts	13
Bearing, Needle, Assembly, on Journal ...	3	Housing for Ball Bearing	14
Ring, Snap, retaining Needle Bearing Assembly	4	Bearing, Ball	15
Nipple, Grease, on Journal	5	Cover, Dust, over end of Bearing Housing ...	16
Flange, Companion, on rear of Shaft	6	Mounting (Rubber) in Bearing Housing Flanges	17
Bolt, securing Companion Flange to Shaft ...	7	Washer on exposed face of Rubber Mounting	18
Washer on Bolt	8	Stud, through Rubber Mounting	19
Washer, Spring, under head of Bolt	9	Nut on Studs	20
Bolt, at joint of Flanges on Front and Rear Shafts	10	Washer, Spring, under Nuts	21
Nut on Bolts	11	Washer, Plain, under Spring Washer	22

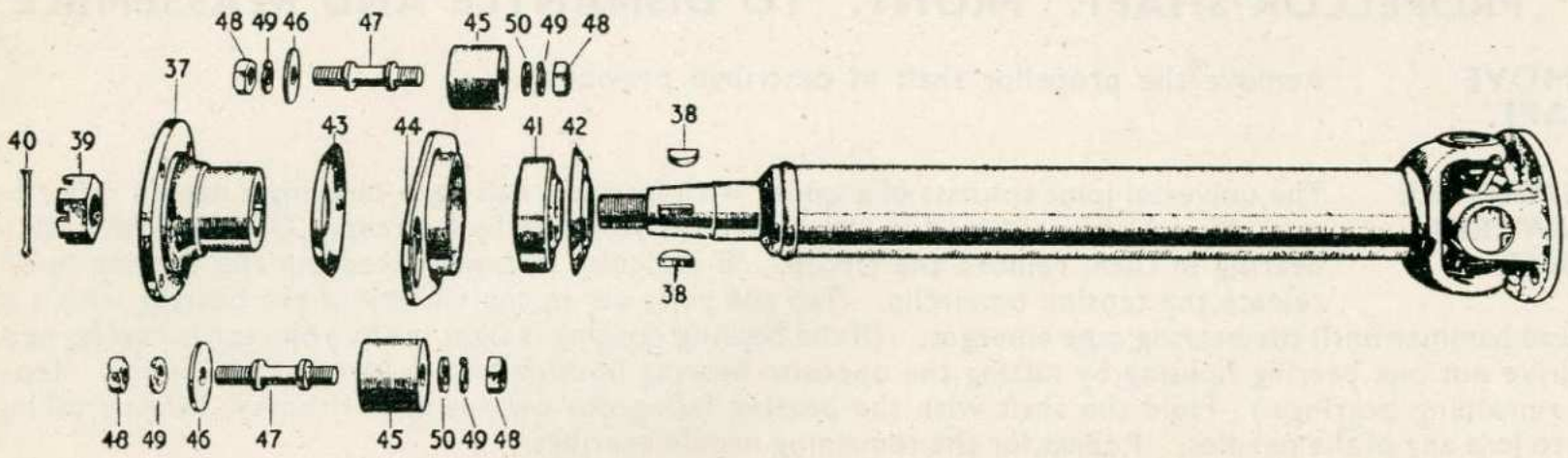


PLATE G.3. FRONT PROPELLOR SHAFT AND CENTRE BEARING. (TYPE B)

Flange, Companion, on rear of Shaft	37	Shield, Dust, at rear of Ball Bearing	43
Key (Woodruff) locating Companion Flange on Shaft	38	Plate, complete with Bearing Housing ...	44
Nut, securing Companion Flange	39	Insulator (Rubber) in Mounting Plate Flanges	45
Pin, Split, locking Nut	40	Washer on exposed face of Insulators	46
Bearing, Ball	41	Stud, through Insulators	47
Shield, Dust, between Front Shaft and Ball Bearing	42	Nut on Studs	48
		Washer, Spring, under Nuts	49
		Washer, Plain, under Spring Washers	50

REASSEMBLE. Reassembly is the reverse of the foregoing procedure. The lubricating nipple should be removed from the universal joint spider and the oil ways blown clean with an air line before assembly. Vaseline applied to the needle bearing housings will facilitate assembly of the needles in the housing. Following assembly replace nipple and fill the bearings with recommended lubricant. On Type A centre bearing fit the flange coupling relative to the shaft with the centre punch marks in line. Failure to do so will cause damage to the universal joint due to incorrect angular relationship. Fit new dust covers to centre bearing.

PROPELLOR SHAFT. REAR. TO DISMANTLE AND REASSEMBLE

REMOVE SHAFT. Remove the propellor shaft as described previously.

DISMANTLE SPLINE JOINT. Unscrew by hand knurled dust cap at the rear of the sliding joint. Observe steel washer and cork washer fitted behind knurled dust cap. Draw the splined sleeve yoke off the splines on the propellor shaft observing that arrows are stamped on splined sleeve yoke and on the propellor shaft tube and when refitting these arrows must be in line.

DISMANTLE UNIVERSAL JOINT. Each individual joint consists of a spider with four journals each carrying a needle roller bearing assembly which is retained in the respective yoke ear by a circlip. Dealing with each needle bearing in turn, remove the circlip. If difficulty is experienced tap the bearing housing to release the tension on circlip. Tap the yoke ear in the vicinity of the bearing with a copper or lead hammer until the bearing cage emerges. (If the bearing housing is tight in the yoke ear it may be necessary to drive out one bearing housing by hitting the opposite bearing housing with a hammer and punch. Repeat for the remaining bearings.) Hold the shaft with the bearing facing downwards and withdraw bearing taking care not to lose any of the needles. Repeat for the remaining needle bearings.

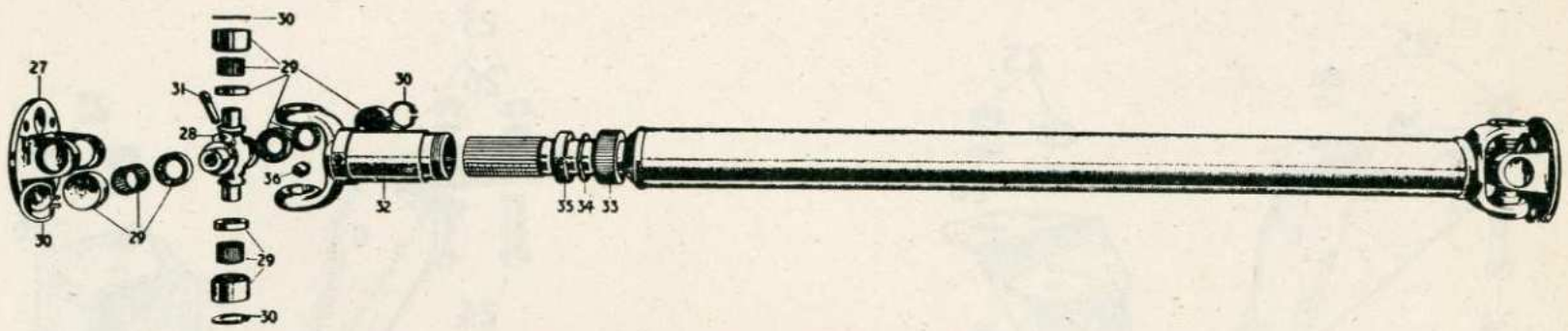


PLATE G.4. REAR PROPELLOR SHAFT

Yoke, Flange, at each end of Shaft	27	Yoke, Sleeve, Assembly, on Sliding End of Shaft	32
Journal, connecting Flange Yokes to Shaft ...	28	Cap, Dust, on Sleeve Yoke Assembly	33
Bearing, Needle, Assembly, on Journals ...	29	Washer (Steel) in Dust Cap	34
Ring, Snap, retaining Needle Bearing Assembly	30	Washer (Cork) in Dust Cap	35
Nipple, Grease, on Journals	31	Nipple, Grease, on Sleeve Yoke Assembly ...	36

REASSEMBLE. Reassembly is the reverse of the foregoing procedure. The lubricating nipple should be removed from the universal joint spider and the oil ways blown clean with an air line before assembly. Vaseline applied to the needle bearing housings will facilitate assembly of the needles in the housing. Following assembly replace nipple and fill the bearings with recommended lubricant. Care is necessary when assembling the spline joint to ensure that the lining up arrows stamped on the shaft and on the splined sleeves are in line or damage will be caused to the universal joints due to incorrect angular relationship.

PROPELLOR SHAFTS. TO OVERHAUL

GENERAL. Factory reconditioned propellor shafts are available on an exchange basis and it is recommended that advantage be taken of this scheme in preference to overhauling the original assembly.

UNIVERSAL JOINTS. If the journals of the spiders or the trunnion bearing holes of the yokes show signs of wear or ovality it will be necessary to renew these parts completely and since one yoke in each case is an integral part of the shaft it is preferable to fit a reconditioned shaft complete. Oversize journals and bearings are not available.

If no wear is present in the universal joints apart from the needle bearing assemblies the latter may be renewed as described in paragraphs " Propellor Shafts. To Dismantle and Reassemble." Note, however, that the needle bearing assemblies must be a light drive fit in the yoke trunnions. N.B.—Replacement journal assemblies are available comprising journal, needle bearing assemblies and snap rings. Part No. K.5/L/4.

SPLINE JOINT. If wear is present on the splines of the shaft or in the splined sleeve yoke a replacement shaft must be fitted.

CENTRE BEARING. Renew the ball bearing if this is worn. Observe that the bearing should be lubricated on assembly with a good quality grease. If the bearing is not a press fit in the housing the latter must be renewed. The flange coupling must be a good fit on the taper of the shaft, if not, renew the flange. Examine the mounting rubbers of the bearing housing and if perished fit replacements. Check all centre bearing bracket bolts for tightness.

PROPELLOR SHAFT CENTRE BEARING BRACKET. DESCRIPTION

DESCRIPTION. Three types of bracket have been used. Early cars, which did not have the coil support spring under the centre bearing, used, one or other of the brackets illustrated in Plate G.5. Later cars have the third type of bracket which is similar to the one illustrated on the right of Plate G.5., but with the addition of a small spring platform which is welded to the bottom lip. The top platform for the supporting coil spring is bolted to the oval bearing housing Plate G.6. The object of the spring is to give support to the bearing and thus allow more flexible jointing rubbers to be used in the bearing mounting flange.

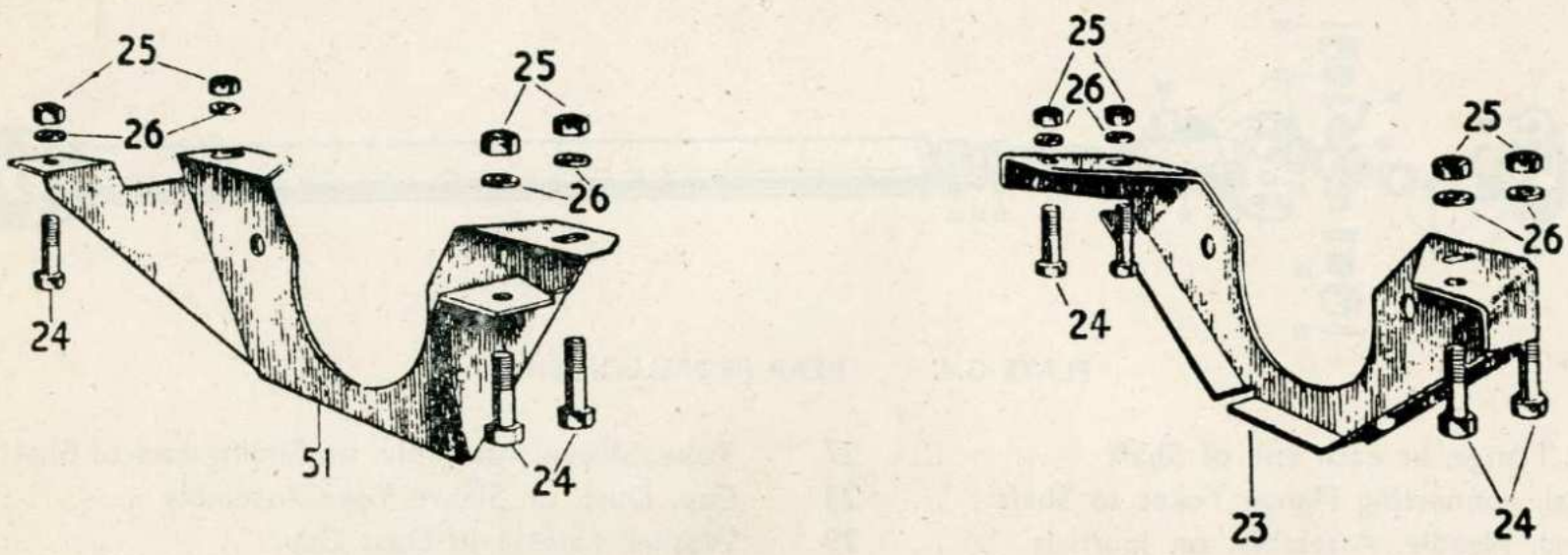


PLATE G.5. CENTRE MOUNTING ASSEMBLY BRACKETS

Bracket, on Chassis Frame, for Centre Mounting Assembly 23
Screw, Set, securing Bracket to Frame 24
Nut on Setscrews 25
Washer, Plain, under Nuts 26
Bracket, on Chassis Frame, for Centre Mounting Assembly 51

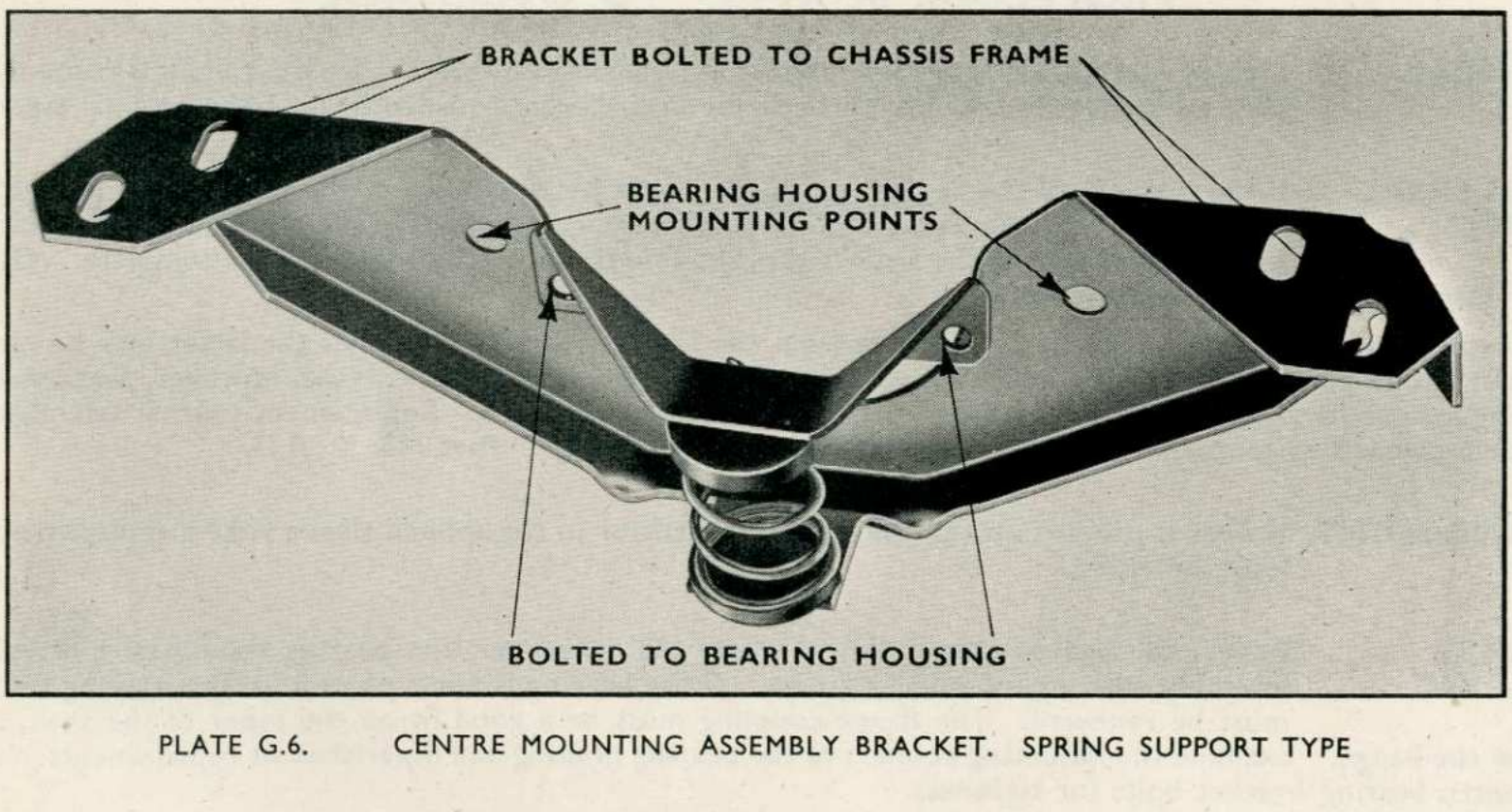


PLATE G.6. CENTRE MOUNTING ASSEMBLY BRACKET. SPRING SUPPORT TYPE

Remove Watermark Wondershare PDFelement

REAR AXLE

MARK V

2½ and 3½ LITRE

CHASSIS NUMBERS

(Stamped at the front of the chassis left-hand side member)

2½ Litre	3½ Litre
Saloon	
520001 Right-Hand Drive	620001 Right-Hand Drive
527001 Left-Hand Drive	627001 Left-Hand Drive
Coupé	
540001 Right-Hand Drive	640001 Right-Hand Drive
547001 Left-Hand Drive	647001 Left-Hand Drive

REAR AXLE NUMBERS

Salisbury Axles	E.N.V. Axles
(Stamped on the top of the gear carrier casting on the width of metal forming the facing for the rear cover).	(Stamped on the flat rectangular face on top of the nose of the differential).
2½ Litre. Numbers prefixed J.9.	2½ Litre. Numbers prefixed J.H.
3½ Litre. Numbers prefixed K.9 and have the suffix E.	3½ Litre. Numbers prefixed J.H.

The instructions in this section are presented under the following main headings which appear as sub-titles on the pages concerned and in the order shown :—

Salisbury Axles		E.N.V. Axles	
Index to Contents	Page H.2	Index to Contents	Page H.2
Index to Plates	Page H.3	Index to Plates	Page H.3
General	Page H.4	General	Page H1.15
Maintenance	Page H.4	Maintenance	Page H1.15
Servicing	Page H.5	Servicing	Page H1.16

See Page H.4 and H1.15 for recognition features of the two types of axle.

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SALISBURY AXLE

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Maintenance		H. 4
Rear Axle	Remove	H. 5
Rear Axle	Refit	H. 5
Axle Shafts	Remove and Refit	H. 8
Differential	Remove and Dismantle	H. 9
Differential	Reassemble and Refit	H.10
Rear Axle	Reconditioning	H.14

E.N.V. AXLE

General		H1.15
Maintenance		H1.15
Rear Axle	Remove	H1.16
Rear Axle	Refit	H1.17
Axle Shafts	Remove, Dismantle, Reassemble and Refit	H1.20
Differential	Remove and Refit	H1.21
Differential	Dismantle and Reassemble	H1.22
Rear Axle	Reconditioning	H1.27

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SALISBURY AXLE

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H.2	Axle Shaft End Float	H. 8
H.3	Removal of Differential	H. 9
H.4	Markings on Differential Bearing Caps	H. 9
H.5	Installation of Differential Bearings	H.10
H.6	Pinion Setting Mark	H.11
H.7	Cone Setting Distance	H.11
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E.N.V. AXLE

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H1.4	Differential. Removal	H1.21
H1.5	Differential Box. Removal	H1.22
H1.6	Differential. Dismantled	H1.23
H1.7	Pinion Shaft. Removal	H1.24
H1.8	Removal of Inner Cone. Pinion Head Bearing	H1.24
H1.9	Pinion Shaft Assembly	H1.25
H1.10	Tooth Contact Indication	H1.26
H1.11	Testing Backlash between Gears	H1.27

GENERAL. Two types of axle are in use both being hypoid semi floating type and to the same specification and therefore fully interchangeable as assemblies ; individual parts are not interchangeable. Recognition features of the two types of axle are as follows :—

Salisbury. Differential unit not dismountable with axle casing in chassis. Cover plate bolted to rear of axle casing. No dipstick fitted, filler and level plug in rear cover plate. Hub lubricating nipples fitted on top face of axle extremities.

E.N.V. Differential unit bolted to axle casing and is withdrawn forward. Cover plate at rear welded to axle casing. Dipstick and filler plug situated at top left hand of pinion shaft housing. Hub lubricating nipples fitted on bottom face of axle extremities.

SALISBURY AXLE. The rear axle assembly, plate H.1, is of the hypoid semi floating type with shim adjustment for all bearings and for the meshing of the driving gear and pinion. The axle shafts are splined at the inner ends to engage splines in the differential side gears. The outer ends of the shafts are provided with tapers and keys for attachment of rear wheel hubs. The wheels are each supported on a taper roller bearing pressed on to the axle shaft and the side thrust from the wheels is transferable from one shaft to the other by a thrust block straddling the differential pinion mate shaft. A cover on the rear of the gear carrier housing permits inspection and flushing of the differential assembly without dismantling the axle. The differential cannot, however, be removed when the axle is fitted to the car and it is necessary to withdraw the axle assembly before adjustments or dismantling can be carried out to the differential. The axle gear ratio is stamped on a plate attached to the assembly by one of the rear cover screws. The axle serial number is stamped on the top of the gear carrier casting on the width of metal forming the facing of the rear cover.

MAINTENANCE. Every 2,500 miles (4,000 kilometres) check the level of oil in the rear axle differential when the car is standing on level ground. A combined level and filler plug is fitted to the cover plate. Top up, if necessary, to the bottom of this plug with the recommended grade of lubricant. Since hypoid oils of different brands may not mix satisfactorily, draining and refilling is preferable to topping up if the brand of oil in the axle is unknown.

Every 5,000 miles (8,000 kilometres) check and tighten, if necessary, the rear axle "U" bolts. It is desirable at this mileage to check and correct, if necessary, the axle shaft end float.

Every 5,000 miles (8,000 kilometres) lubricate the rear wheel bearings sparingly with recommended lubricant through the nipples provided. The nipples are situated on the top of the axle casing immediately behind the brake back plates. A bleed hole is provided adjacent to the nipple to indicate when an excess of lubricant has been applied.

Every 10,000 miles (16,000 kilometres) drain, flush out with flushing oil, and refill with the recommended grade of lubricant. The drain plug is fitted at the base of the differential. The oil will drain more readily if the operation is carried out at the end of a journey when the oil is hot and consequently more fluid.

RECOMMENDED LUBRICANTS

	Vacuum.	Wakefield.	Shell.	Essolube.	Price's.	S.A.E. Viscosity.
Rear Axle.	Mobilube GX. 90.	Castrol Hypoy.	Spirax 90 EP.	Expee Compound 90.	Energol EP.	Hypoid 90
Wheel Bearings.	Mobil Hub Grease.	Castrolease (Heavy).	Retinax R.B.	Essolube Grease.		

Rear axle capacity 3½ pints (2.0 litres).

AXLE RATIOS

2½ Litre. type 2HA (41) 4.55 : 1. (50 x 11).

3½ Litre. type 2HA (41) 4.27 : 1. (47 x 11).

REAR AXLE. TO REMOVE

GENERAL. Jack up the car at the rear and place blocks under chassis frame in front of road spring anchor bolts. Remove wheel spats, nave plates and road wheels. Release handbrake.

REMOVE HUBS. Remove two setscrews locating each brake drum to the hub and remove drums. Withdraw cotter pin and slotted nut with washer securing each hub to axle shaft and draw off hubs with suitable puller.

DISCONNECT BRAKES. Disconnect brake hydraulic pipe at each back plate by unscrewing union on operating cylinder. Disconnect flexible hydraulic pipe between axle and chassis frame. Drain fluid into clean container. On early cars disconnect handbrake cables from operating cylinders by slackening main adjustment barrel nut and disengaging outer cables from clips on chassis rear cruciform frame members. Withdraw outer cables from spring steady clips on frame cross member and release cables from clips on axle casing. Remove setscrew and lock washer securing brass end covers to operating cylinders and withdraw cover to expose inner cable securing nut. Using a screw-driver unscrew nut anti-clockwise against spring loaded locking peg which will enable the inner cables to be disconnected from the outer end of the hydraulic operating plungers. (Remove split pin and withdraw clevis pin securing cable jaw to operating lever on back plate. Later cars.)

REMOVE BRAKE BACK PLATES. Remove brake back plates by withdrawing five nuts and bolts securing each back plate to flange of axle case. Observe plate retaining hub bearing with two joint washers and oil seal assembly on the outside face of each back plate and shims behind each back plate. Do not lose or transpose shims from side to side.

DISCONNECT PROPELLOR SHAFT. Remove cotter pins and four slotted nuts securing rear axle companion flange to propellor shaft. Withdraw bolts, spring propellor shaft out of register and place clear.

REMOVE "U" BOLTS. Remove lock nuts and nuts from rear axle "U" bolts. Remove "U" bolts and "U" bolt plates.

REMOVE CHECK STRAPS. Remove two nuts and bolts per side securing check straps to chassis frame and withdraw check straps.

DISCONNECT SHOCK ABSORBERS. Disconnect rear shock absorbers by removing two cotter pins and slotted nuts from each link arm and tap link arms out of lugs on axle casing.

REMOVE AXLE. Slide axle assembly to the left until right hand end of case is clear of road spring and exhaust tail pipe. Lower to floor and withdraw under car.

REAR AXLE. TO REFIT

GENERAL. Refitting is the reverse of the above procedure but particular attention should be paid to the following points.

REFIT AXLE. When the rear axle assembly has been positioned above the rear springs it will be necessary to jack each spring up into engagement with the rear axle spring pad to facilitate the fitting of the "U" bolts and check straps. Ensure that the centre bolt of the spring seats in the dowel hole in the spring pad and observe that on a number of early cars a wedge is fitted between spring and axle spring pad. In such cases ensure that the wedge is refitted, thick end to the front and that the hole in the wedge engages with the spring centre bolt.

REFIT BRAKE BACK PLATES. Ensure that the same number of shims found on dismantling are positioned behind the back plates when refitting. The same number of shims should be fitted on either side to centralise the half shafts the combined end play on which should be from .001" to .005" (.03 mm. to .13 mm.). Full details on adjusting end play will be found on page H.8. Always use new jointing washers on either side of the bearing retainer plate or an oil leak into the brake drums may be experienced.

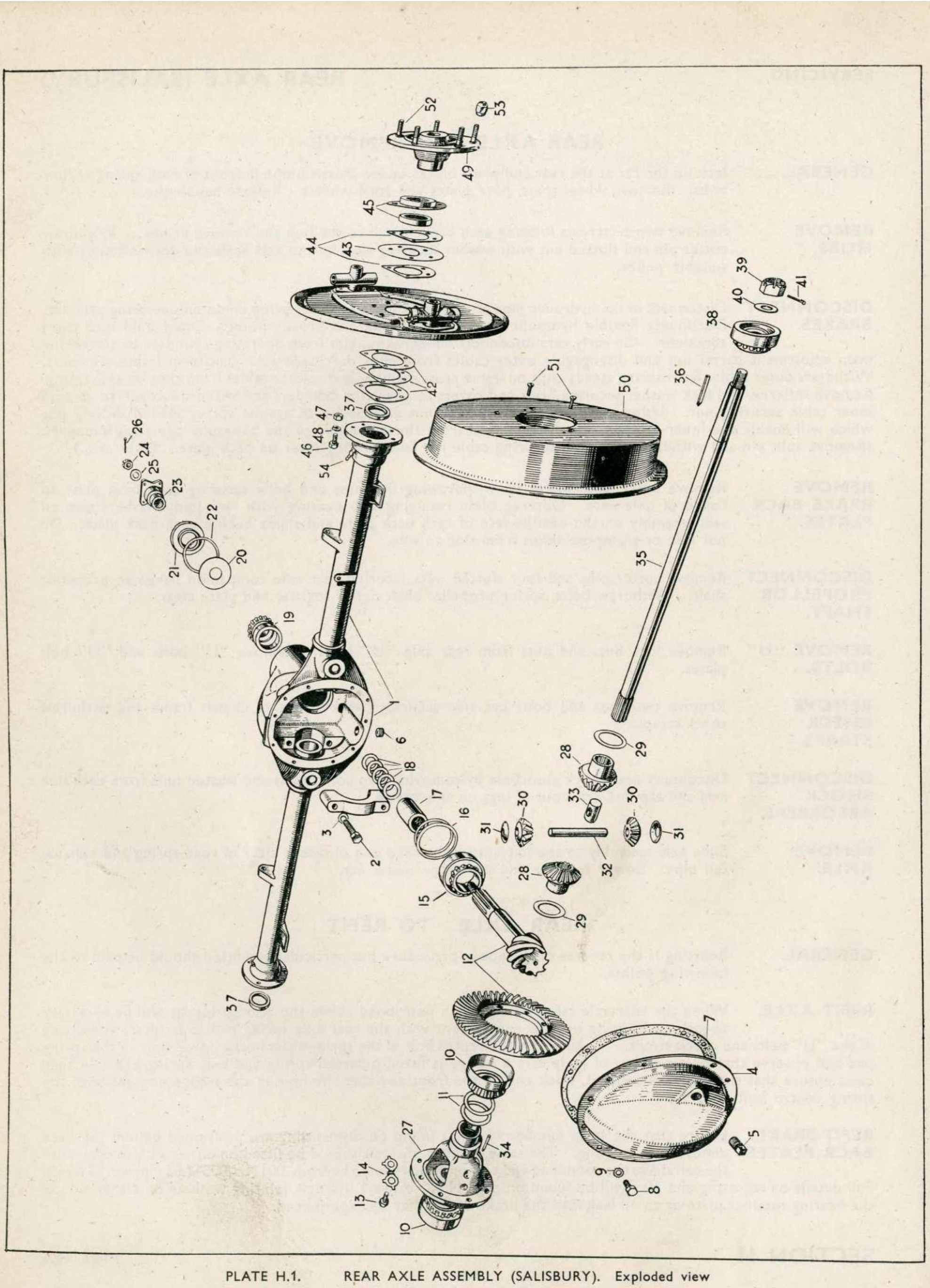


PLATE H.1. REAR AXLE ASSEMBLY (SALISBURY). Exploded view

INDEX TO PLATE H.1. REAR AXLE (SALISBURY). EXPLODED VIEW

Carrier and Tube Assembly 1
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Washer, Thrust, for Pinion Mate Gears 31
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Cotter, securing Nut on Axle Shaft 41
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Plate, retaining Hub Bearings 43
Washer, Jointing, at each side of Retainer Plate ... 44
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Nut on Screws 47
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Drum, Brake 50
Screw, Set, locating Brake Drum on Hubs 51
Stud, securing Brake Drum and Road Wheels to Hubs 52
Nut on Studs 53
Nipple, Grease, on Axle Tubes 54

Remove Watermark Wondershare PDFelement

CONNECT BRAKES. When the hydraulic system has been connected it will be necessary to bleed the brakes as described in Section L "Brakes." To connect handbrake cable assembly to operating cylinder screw securing nut right home with a screw-driver ensuring that spring loaded peg has engaged in an appropriate slot. Replace brass end cover and lock with setscrew and tab washer. (On later cars refit clevis pin securing cable jaw to operating lever and secure with split pin.) Fit outer cables into clips and stops. Adjust cable with barrel nut ensuring that no pre-load is applied to the hydraulic operating piston in the rear brake cylinder. As a safeguard against this on early cars observe that the outer face of the operating plunger is flush with its housing when the handbrake is in the off position. On later cars ensure that the handbrake shoe tappets are exerting no pressure on the shoes when the handbrake is in the off position.

REFIT HUBS. Before refitting hubs they should be lapped on to the axle shaft tapers to ensure a good fit. Finally secure in position with washer, slotted nut and cotter pin.

AXLE SHAFTS. TO REMOVE AND REFIT

REMOVAL. Jack up the car at the rear and place blocks under chassis frame in front of road spring anchor bolts. Remove wheel spats, nave plates and road wheels. Release handbrake. Remove two setscrews locating each brake drum to the hub and remove drums. Withdraw cotter pin and slotted nut with washer securing each hub to axle shaft and draw off hubs with a suitable puller. Before dismantling further check the combined axle shaft end play with a dial indicator (Plate H.2.) Recommended tolerance is from .001″ to .005″ (.03 mm. to .13mm.) and the end play is controlled by shims located between each brake back plate and the axle tube flange. Shims are available in thicknesses of .003″, .005″, .010″ and .030″ (.08 mm., .13 mm., .25 mm. and .76 m.m). Disconnect hydraulic pipe at each back plate by unscrewing union on operating cylinder. Release brake back plates by withdrawing five nuts and bolts securing each back plate to flange of axle case. Observe plate retaining hub bearing with two joint washers and oil seal assembly on outside face of each back plate and the adjusting shims behind. Do not lose or transpose shims from side to side. Supporting the back plate so that the handbrake cable does not become damaged draw the axle shaft with its taper roller bearing with a suitable puller. The wheel bearing may now be withdrawn from the shaft. The oil seal may now be withdrawn from the axle tube, if necessary.

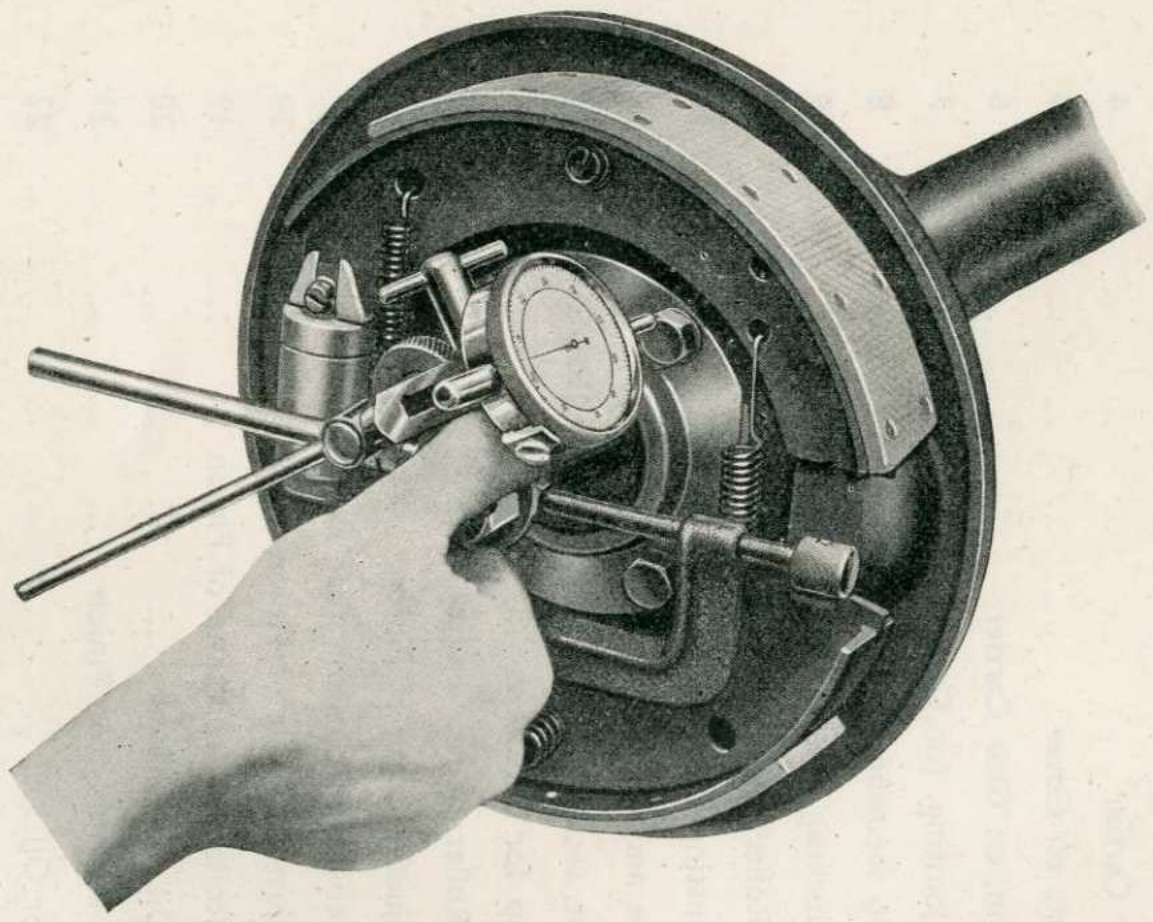


PLATE H.2. AXLE SHAFT END FLOAT

REFITTING. Lubricate the wheel bearings with recommended lubricant and press on to the axle shafts. Fit new inner oil seals to the axle tube, if necessary. Install the axle shafts with the taper roller bearing cones and then the bearing caps. Refit the brake back plates, adjusting shims and bearing retaining plates with new joint washers fitted in front and behind the plates and check the combined axle shaft end float

which should be .001" to .005" (.03 mm. to .13 mm.). This will be just perceptible by hand. Add or subtract adjusting shims to obtain the correct axle shaft end play noting that adding shims increases and subtracting decreases end play. Remove or install approximately an equal number of shims at either end of the axle so that the axle shafts are retained in a central position.
Fit a new outer oil seal assembly, centralising this before finally tightening the brake back plate nuts and bolts. Recheck axle shaft end play. Reconnect the brake hydraulic pipes and bleed the brakes as described in Section L "Brakes." Refit the hubs, brake drums, road wheels, nave plates and wheel spats. It is advisable in all cases where the hubs have been removed to lap these to the tapers of the axle shafts to obtain a good fit. Always lubricate bearings through nipples with recommended lubricant until excess appears at bleed holes denoting that bearings are filled.

DIFFERENTIAL. TO REMOVE AND DISMANTLE

REMOVE AXLE ASSEMBLY. Remove the axle assembly as described on page H.5.

REMOVE AXLE SHAFTS. Remove axle shafts as described on page H.8. Drain lubricant from the gear carrier housing, remove the gear carrier rear cover and flush out the unit thoroughly so that the parts can be carefully inspected.

REMOVE DIFFERENTIAL. Remove the four bolts which hold the differential bearing caps and using two pry bars, one on each side of the differential case opening, pry out the differential assembly. (Plate H.3.) (Care must be taken not to damage the machined gear carrier gasket surface to which the rear cover plate is attached.) The differential bearing caps and the gear carrier cover plate gasket surface are marked during production and when reassembling the bearing caps be sure that the position of the numerals correspond. (Plate H.4.)

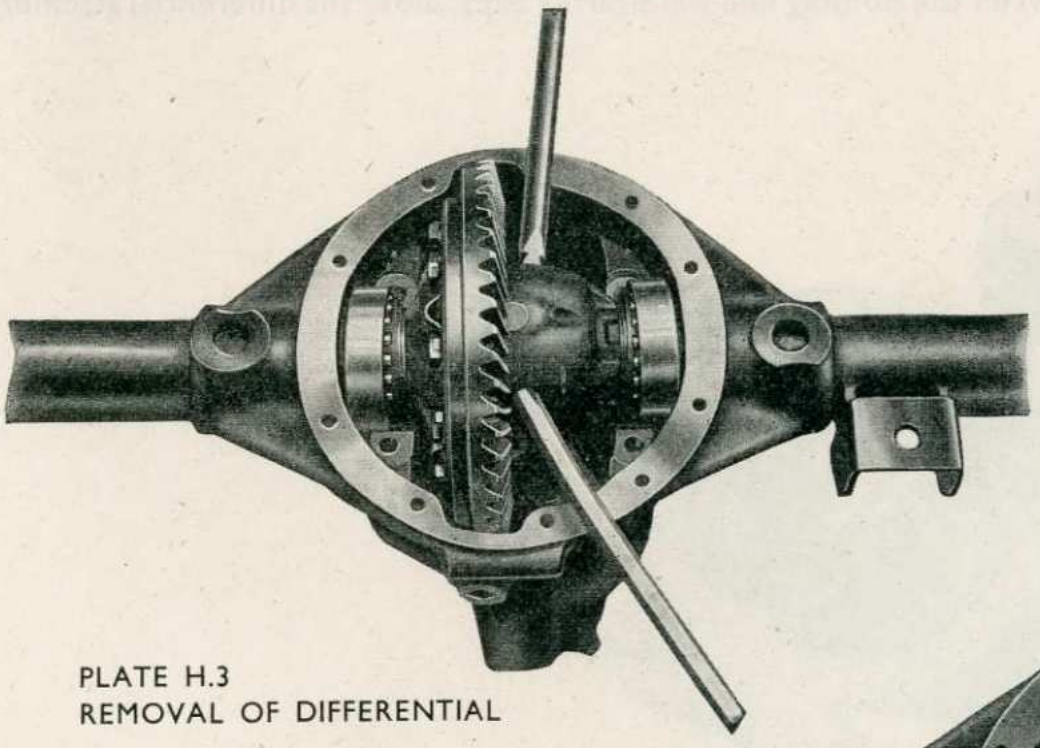


PLATE H.3
REMOVAL OF DIFFERENTIAL

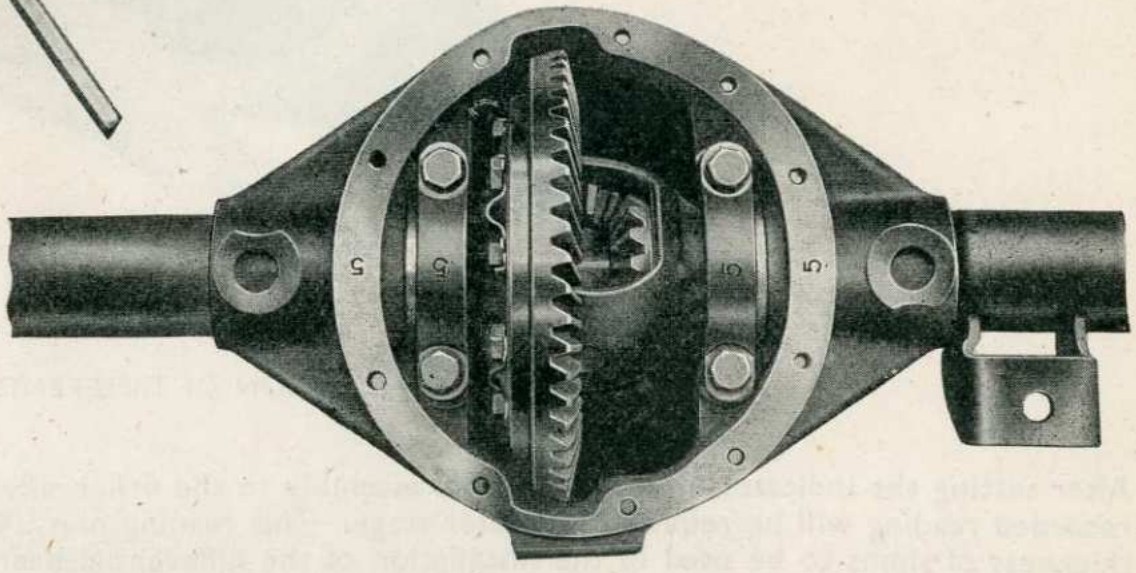


PLATE H.4. MARKINGS ON DIFFERENTIAL BEARING CAPS

REMOVE PINION. Remove cotter pin, slotted nut and washer and withdraw universal joint companion flange with a puller. Press pinion out of the front bearing. The pinion, having been freed from its front bearing, can now be removed from the axle housing. It is important to keep all shims found on the pinion shaft intact. Drive the front bearing cup and oil seal assembly out of the housing and if a damaged rear bearing cup is to be replaced, or if the pinion setting is to be changed, the rear bearing cup must be driven from the housing, care being taken to preserve the shims which are fitted between the bearing cup and the housing abutment face.

DISMANTLE DIFFERENTIAL. Remove the ring gear from the differential case by bending down the locking tabs and removing the mounting setscrews. Drive out the pinion mate shaft locking pin, which is secured in place by peening to case and remove the pinion mate shaft. Take out the axle shaft spacer and rotating the gears by hand until the pinions are opposite the openings in the differential case remove the differential gears and thrust washers which are fitted behind them. If the ring gear setting is to be altered it will be necessary to remove the differential bearings with a drawer to gain access to the shims located between the bearing and the abutment face on the differential case.

DIFFERENTIAL. TO REASSEMBLE AND REFIT

ASSEMBLE DIFFERENTIAL. Reassemble the internal parts of the differential and install the pinion mate shaft lock pin. Using a punch, peen some of the metal of the differential case over the end of the lock pin to prevent it working loose. The ring gear and differential case contacting surfaces should be cleaned and examined for burrs before the ring gear is fitted. When re-installing the ring gear on the differential case align the attaching bolt holes in the ring gear with those in the case and tap the ring gear on the case with a lead hammer. Insert new ring gear setscrews with new locking straps and tighten uniformly. Tightening torque for ring gear set screws 40-50 lbs.ft. (5.5-6.9 mkg.). Bend the locking tabs round the setscrew heads to prevent them working loose. Install the differential bearings with shims on the differential case making sure that the bearing cones and cups in the housings are perfectly clean. Place the differential assembly with the bearing cups in their housings in the gear carrier. Install a dial indicator in the gear carrier with the button against the ring gear back face and, inserting two pry bars between the housing and the bearing cups, move the differential assembly to one side of the case as shown in plate H.5.

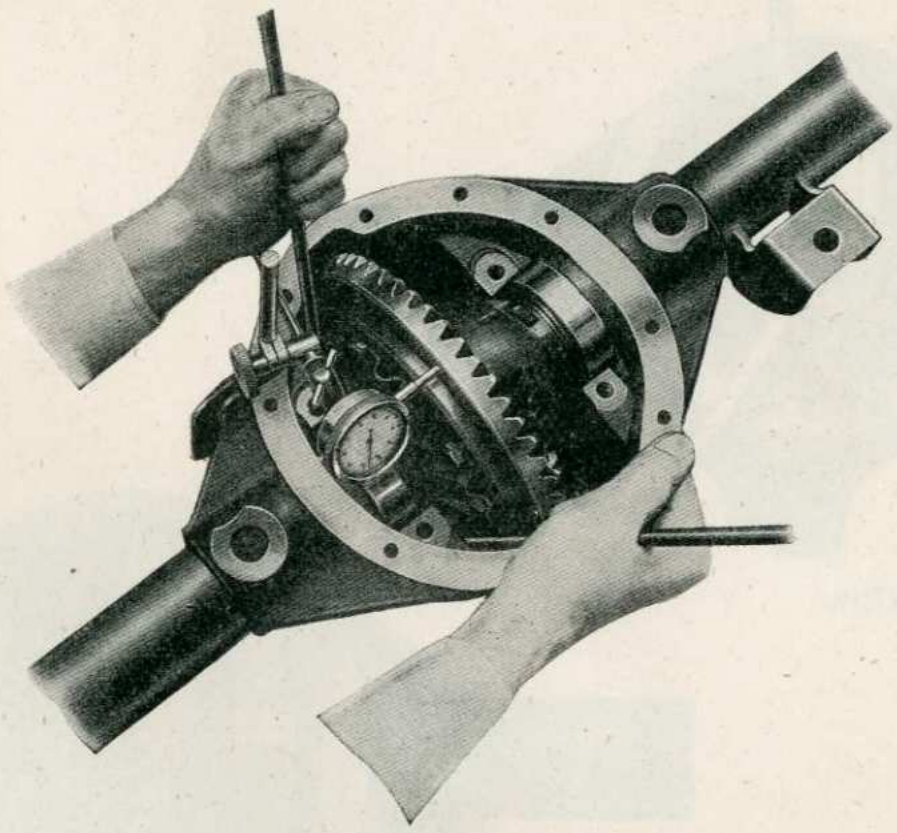


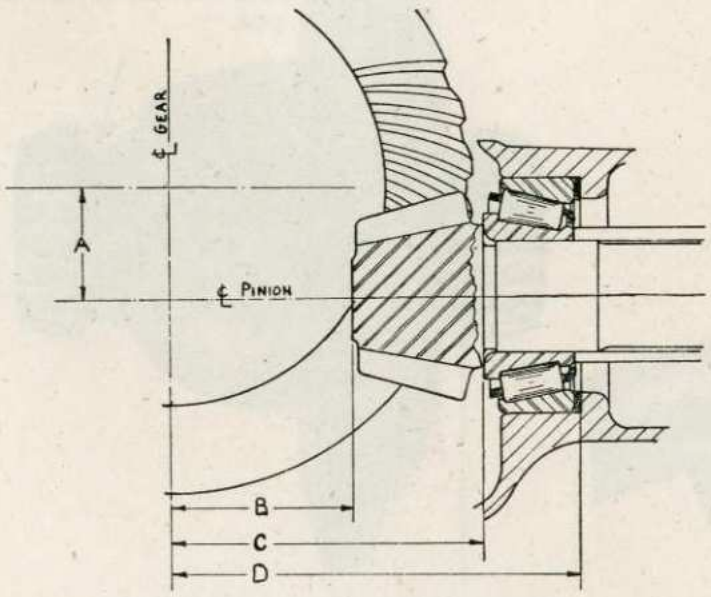
PLATE H.5. INSTALLATION OF DIFFERENTIAL BEARINGS

After setting the indicator at zero move the assembly to the other side and record the indicator reading. This recorded reading will be required at a later stage. This reading plus .008″ (.20 mm.) pre-load denotes the total thickness of shims to be used in the installation of the differential bearings. Remove the differential assembly from the gear carrier.

REFIT AND ADJUST PINION. The rear axle pinion should now be adjusted properly before further rear axle assembly is undertaken. If it has been removed re-install the pinion front bearing cup. Re-install the original pinion adjusting shims and the pinion rear bearing cup. Using an arbor press and a length of tube, press the rear bearing cone on to the pinion, the tube contacting the inner race only and not the roller retainer. The ground end of the pinion is marked with the correct pinion setting. (Plate H.6.) This marking may be zero (0), a minus (—) or a plus (+). When properly adjusted a pinion marked zero (0) will be at the zero cone setting distance from the centre line of the gear ; a pinion marked plus two (+2) should be adjusted to the nominal cone setting distance, plus .002″ (.05 mm.), and a pinion marked minus two (—2) to cone setting distance minus .002″ (.05 mm.) .(Plate H.7.) The zero cone setting distance for the $2\frac{1}{2}$ and $3\frac{1}{2}$ litre axles is 2.750″ (69.85 mm.). Thus for a pinion marked minus two (—2) the distance from the centre of the ring gear to the face of the pinion should be 2.748 (69.80 mm.) and for a pinion marked plus three (+3) the cone setting distance should be 2.753 (69.93 mm.).



PLATE H.6
PINION SETTING MARK



PINION DROP	ZERO CONE SETTING	MOUNTING DISTANCE	C/L TO BRG. HOUSING
A	B	C	D
1.750″	2.750″	4.625″	5.818″ 5.808″
44.45 mm.	69.85 mm.	117.47 mm.	147.78 mm. 147.52 mm.

PLATE H.7. CONE SETTING DISTANCE

Place the pinion with the rear bearing cone in the gear carrier and adjust the pinion to the correct setting distance by means of shims between the rear bearing cup and the housing. Pinion adjusting shims are available in thicknesses of .003″, .005″ and .010″ (.08 mm., .13 mm., and .25 mm.).

Install the pinion bearing spacer and the original bearing adjusting shims on the pinion. Install the pinion front bearing cone, companion flange, washer and nut. The pinion oil slinger and oil seal should not be installed until the pinion bearing adjusting procedure has been completed. Tighten the companion flange nut and test the pinion bearing adjustment. The pinion should have no end play and should afford a slight drag or resistance to turning. Add or remove shims to obtain the proper adjustment.

ADJUST RING GEAR. Ensuring that the bearing cones and cups and the housings are perfectly clean again place the differential assembly with the bearing cups in the housing. Install a dial indicator on the housing with the button against the ring gear back face and insert two pry bars between the housing and the bearing cup. Move the differential case and ring gear away from the pinion until the opposite bearing cup is seated against the housing. After setting the indicator at zero move the differential assembly towards the pinion until the ring gear contacts the pinion deep in mesh. The indicator reading now obtained (clearance between ring gear and pinion) **minus** .005″ (.13 mm.) denotes the thickness of shims to be placed between the differential case and the bearing cone on the ring gear side of the differential. The quantity of shims inserted on the ring gear side of the differential case should then be subtracted from the total indicator reading, taken previously (see final paragraph "Assemble Differential"). (Page H.10.) Insert a thickness of shims equal to this amount plus .008″ (.20 mm.) for pre-load on the opposite side of the differential.

To simplify the differential and ring gear adjustment procedure the following example is given. Assume the total indicator reading to be .080″ (2.03 mm.). This figure plus .008″ (.20 mm.) for the recommended pre-load equals .088″ (2.24 mm) which denotes the total thickness of shims to be used. Assuming the clearance between the ring gear and the pinion to be .042″ (1.07 mm.), subtract .005″ (.13 mm.) (the approximate backlash) from this .042″ (1.07 mm.) clearance. The .037″ (.94 mm.) difference denotes the thickness of shims to be placed between the differential case and the bearing cone on the ring gear side of the differential.

Then subtract the thickness of shims inserted on the ring gear side of the differential case from .088″ (2.24 mm.) and the .051″ (1.30 mm.) difference denotes the thickness of shims to be inserted on the opposite side of the case.

To facilitate installation of the differential assembly, cock the bearing cups and tap them lightly into position with a lead hammer. When re-installing the bearing caps be sure the position of the numerals marked on the gear carrier housing face and the caps correspond. (Plate H.4.) Mount a dial indicator on the gear carrier with the button against one of the ring gear teeth as nearly in line with the tooth travel as possible. Move the ring gear by hand to check the backlash which should be between .003″ and .006″ (.08 mm. and .15 mm.) (Plate H.8.) If the backlash is not in accordance with the specifications transfer the necessary number of shims from one side of the differential case to the other to obtain the desired setting. (Plate H.9.) Backlash will be changed approximately two-thirds of the thickness of shims transferred.

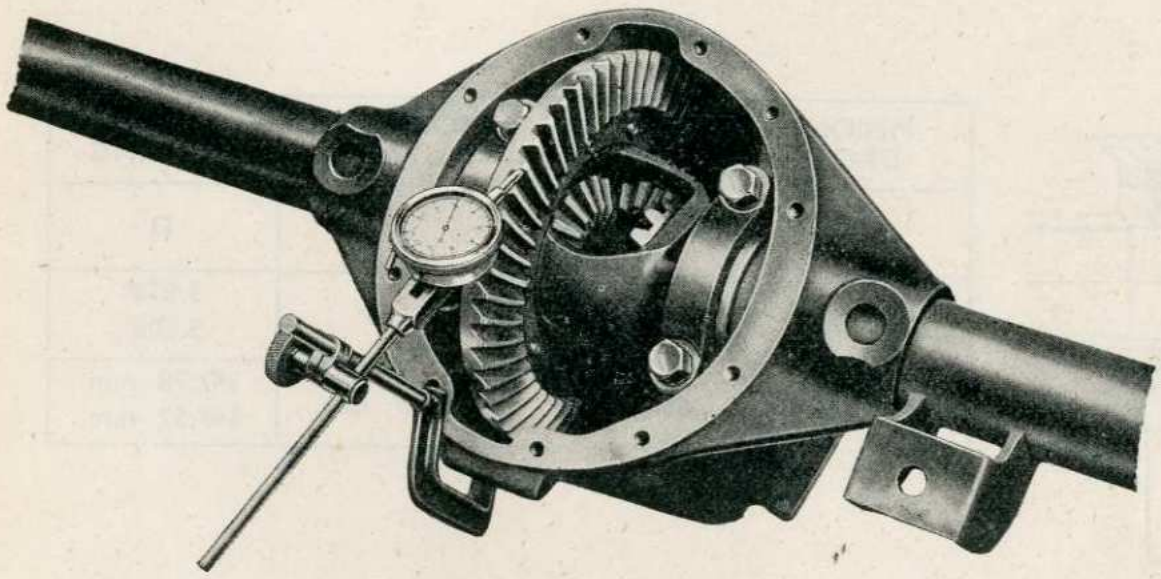


PLATE H.8. CHECKING RING GEAR BACKLASH

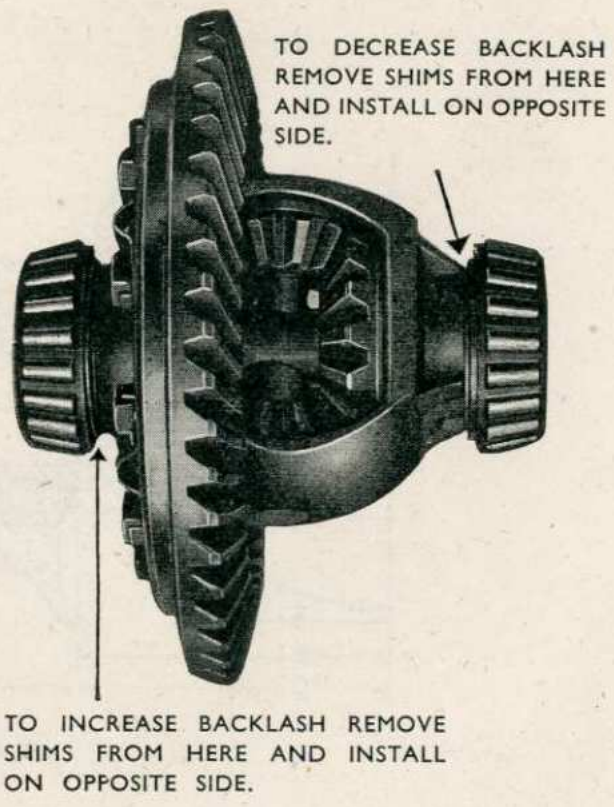


PLATE H.9
ADJUSTING RING GEAR BACKLASH

ADJUSTING PINION AND RING GEAR. After setting the backlash to the required figure use a small brush to paint eight or ten of the ring gear teeth with a mixture of ground red lead and engine oil. Move the painted ring gear teeth over the pinion until a good impression of the tooth contact is obtained. The resulting impressions should be similar to example 1 in Plate H.10.

If the tooth contact is high on the gear teeth as shown in example 2, the pinion should be moved towards the gear by adding shims between the rear bearing cup and the housing and adding the same thickness of shims between the pinion bearing spacer, or the shoulder of the bearing shaft and the forward bearing cone. If the tooth contact is low on the gear as in example 3 the pinion should be moved away from the gear by removing

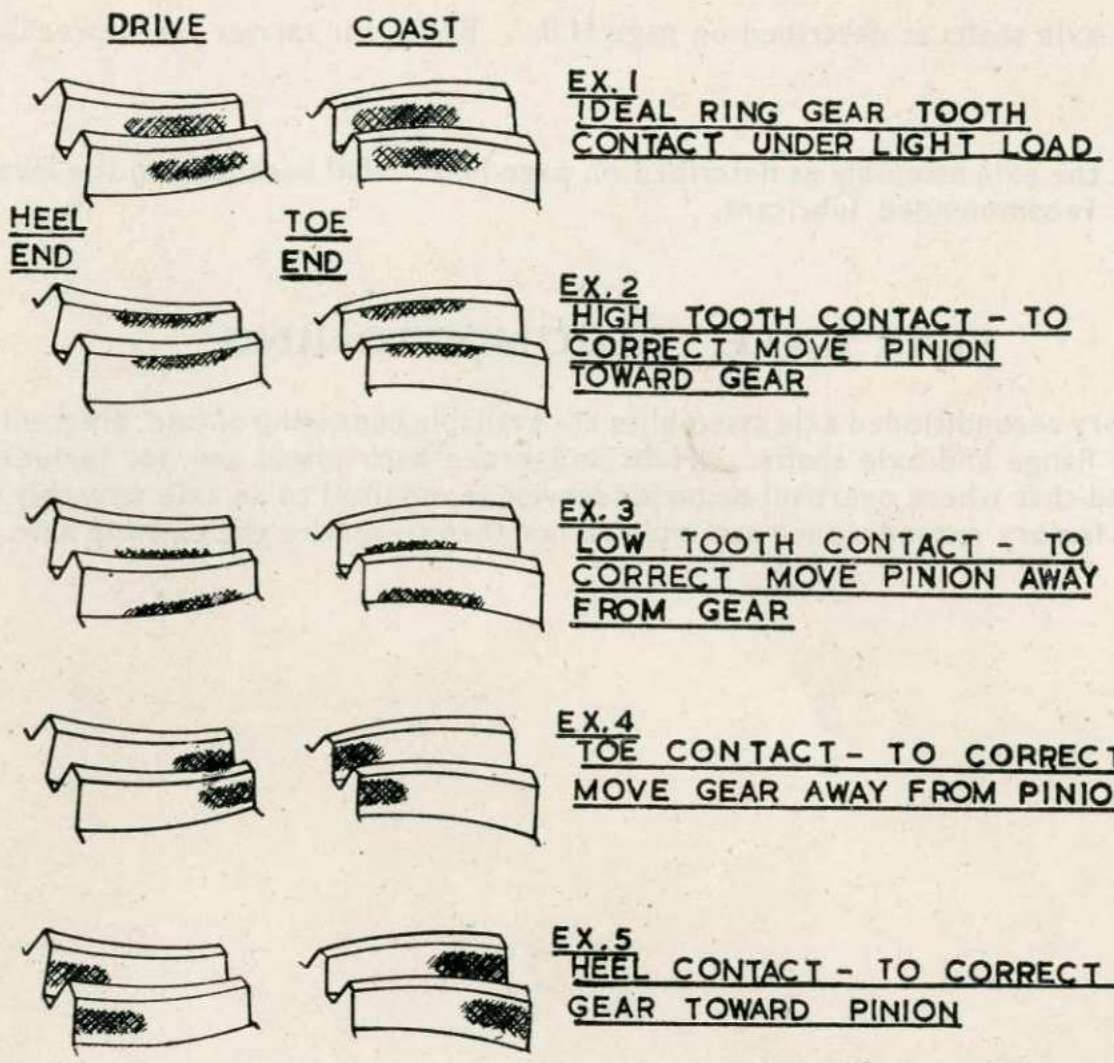


PLATE H.10. TOOTH CONTACT INDICATION

shims from between the rear bearing cup and the housing and removing the same thickness of shims from between the pinion bearing spacer or shoulder of the pinion and the forward bearing cone.

If the tooth contact is decidedly towards the toe or small end of the tooth as in example 4 the gear teeth should be moved away from the pinion by removing shims from the ring gear side of the differential case and adding the same thickness of shims to the opposite side. If the tooth contact is on the heel or large end of the tooth as shown in example 5 Plate H.10, the gear should be moved towards the pinion by removing shims from the side of the differential case opposite to the ring gear and adding the same thickness of shims on the ring gear side.

It must be remembered that in making adjustments to correct a heel or toe contact the backlash limits of from .003″ to .006″ (.76 mm. to 1.5 mm.) must be maintained. A reduction of the backlash within the above limits may correct an extreme heel contact while an increase of backlash may correct an extreme toe contact. Moving the ring gear .005″ (.13 mm.) will change the backlash approximately .0035″ (.09 mm.) while moving the pinion .005″ (.13 mm.) will change the backlash approximately .001″ (.03 mm.). Ordinarily it will not be desirable to move the pinion when making backlash correction as the movement of the ring gear has a much greater effect upon the backlash. Moving the gear out changes the bearing towards the heel and slightly raises the bearing. Moving the pinion out raises the bearing on the face of the tooth and slightly towards the heel.

FIT PINION OIL SEAL. Remove the propellor shaft companion flange from the pinion shaft and install the oil slinger, oil seal gasket and the oil seal. (Plate H.11.) Replace the companion flange, plain washer, slotted nut and lock with a new split pin.

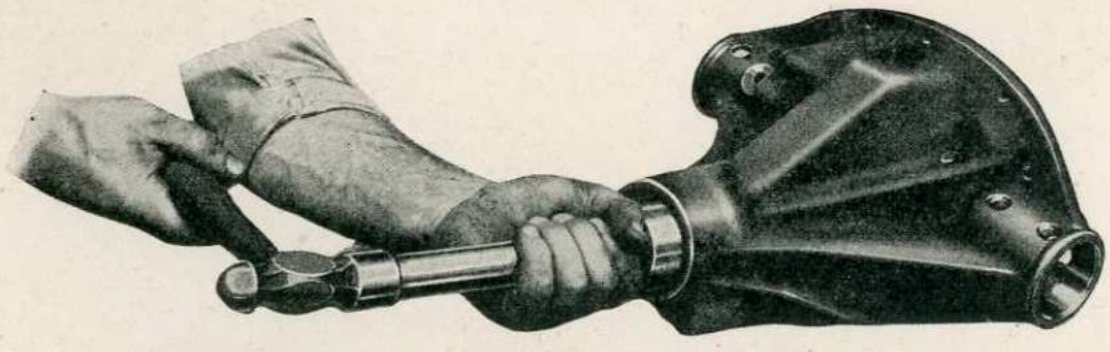


PLATE H.11. INSTALLING PINION OIL SEAL

REFIT AXLE SHAFTS. Refit axle shafts as described on page H.8. Refit gear carrier rear cover using a new gasket.

REFIT AXLE ASSEMBLY. Refit the axle assembly as described on page H.5. Fill back axle to the level of the filler plug with recommended lubricant.

REAR AXLE. RECONDITIONING

GENERAL. Factory reconditioned axle assemblies are available consisting of case, differential unit, propellor shaft flange and axle shafts. Hubs and brake back plates are not included unless specially ordered. It is considered that where overhaul or major service is required to an axle assembly it is desirable and more economical to fit a factory reconditioned assembly rather than to service the existing axle.

GENERAL. Two types of axle are in use both being hypoid semi floating type and to the same specification and therefore fully interchangeable as assemblies : individual parts are not interchangeable. Recognition features of the two types of axle are as follows :—

E.N.V. Differential unit bolted to axle casing and is withdrawn forward. Cover plate at rear welded to axle casing. Dipstick and filler plug situated at top left hand of pinion shaft housing. Hub lubricating nipples fitted on bottom face of axle extremities.

Salisbury. Differential unit not dismountable with axle casing in chassis. Cover plate bolted to rear of axle casing. No dipstick fitted, filler and level plug in rear cover plate. Hub lubricating nipples fitted on top face of axle extremities.

E.N.V. AXLE. The rear axle assembly Plate H1.2 is of the hypoid semi-floating type with shim adjustment of pinion shaft bearings but with adjusting nuts for the differential crown wheel. The axle shafts are splined at the inner ends to engage splines in the differential side gears, the outer ends being integral with the hub this assembly being attached to the flanges at either end of the axle casing by bolts passing through the bearing housings. The wheels are each supported on a taper roller bearing retained in the housing previously referred to and the side thrust from the wheels is transferable from one shaft to the other by a thrust button on the end of each axle shaft. The axle can be either partially dismantled, that is, for purposes of examination of half shafts and hub races, or fully dismantled, that is, for removal of differential without necessarily removing axle casing from chassis. The axle serial number and gear ratio is stamped on the flat rectangular face on top of the nose of the differential.

MAINTENANCE. Every 2,500 miles (4,000 kilometres) check the level of oil in the rear axle differential when the car is standing on level ground. A combined filler and dipstick is fitted on top of the nose of the differential. Top up, if necessary, to the high mark on the dipstick with the recommended grade of lubricant. Since hypoid oils of different brands may not mix satisfactorily, draining and refilling is preferable to topping up if the brand of oil in the axle is unknown.

Every 5,000 miles (8,000 kilometres) check and tighten, if necessary, the rear axle " U " bolts. It is desirable at this mileage to check and correct, if necessary, the axle shaft end float.

Every 5,000 miles (8,000 kilometres) lubricate the rear wheel bearings sparingly with recommended lubricant through the nipples provided. The nipples are situated on the bottom of the axle casing immediately behind the brake back plates. A bleed hole is provided above the nipple to indicate when an excess of lubricant has been applied.

Every 10,000 miles (16,000 kilometres) drain, flush out with flushing oil and refill with the recommended grade of lubricant. The drain plug is fitted at the base of the differential. The oil will drain more readily if the operation is carried out at the end of a journey when the oil is hot and consequently more fluid.

RECOMMENDED LUBRICANTS

	Vacuum	Wakefield	Shell	Essolube	Price's	S.A.E. Viscosity
Rear Axle	Mobilube GX 90	Castrol Hypoy.	Spirax 90 E.P.	Expee Compound 90	Energol E.P.	Hypoid 90
Wheel Bearings	Mobil Hub Grease	Castrolease (Heavy)	Retinax R.B.	Essolube Grease		

Rear axle capacity 3½ pints (2.0 litres).

AXLE RATIOS

2½ Litre. 4.55 : 1. (9 x 41)

3½ Litre. 4.30 : 1. (10 x 43)

REAR AXLE. TO REMOVE

GENERAL. Jack up the car at the rear and place blocks under chassis frame in front of road spring anchor bolts. Remove wheel spats, nave plates and road wheels. Release handbrake.

DISCONNECT BRAKES. Disconnect brake hydraulic pipe at each backplate by unscrewing union on operating cylinder. Disconnect flexible hydraulic pipe between axle and chassis frame. Drain fluid into clean container. Disconnect handbrake cables from operating cylinders by slackening main adjustment barrel nut and disengaging outer cables from clips on chassis rear cruciform frame members. Withdraw outer cables from spring steady clips on frame cross member and release cables from clips on axle casing. Remove setscrew and lock washer securing brass end covers to operating cylinders and withdraw cover to expose inner cable securing nut. Using a screw-driver unscrew nut anti-clockwise against spring loaded locking peg which will enable the inner cables to be disconnected from the outer end of the hydraulic operating plungers.
(Remove split pin and withdraw clevis pin securing cable jaw to operating lever on back plate. Later cars.)

REMOVE AXLE SHAFTS. Remove two setscrews locating each brake drum to axle shaft flange. Ease drums off register. Remove split pins, slotted nuts and spring washers from the six bolts securing each bearing housing and brake back plate to the flanges of axle casing. Ease axle shafts away from casing thus exposing adjusting shims between bearing housing and back plate (Plate H1.1). Remove back plate. Do not lose or transpose shims from side to side.

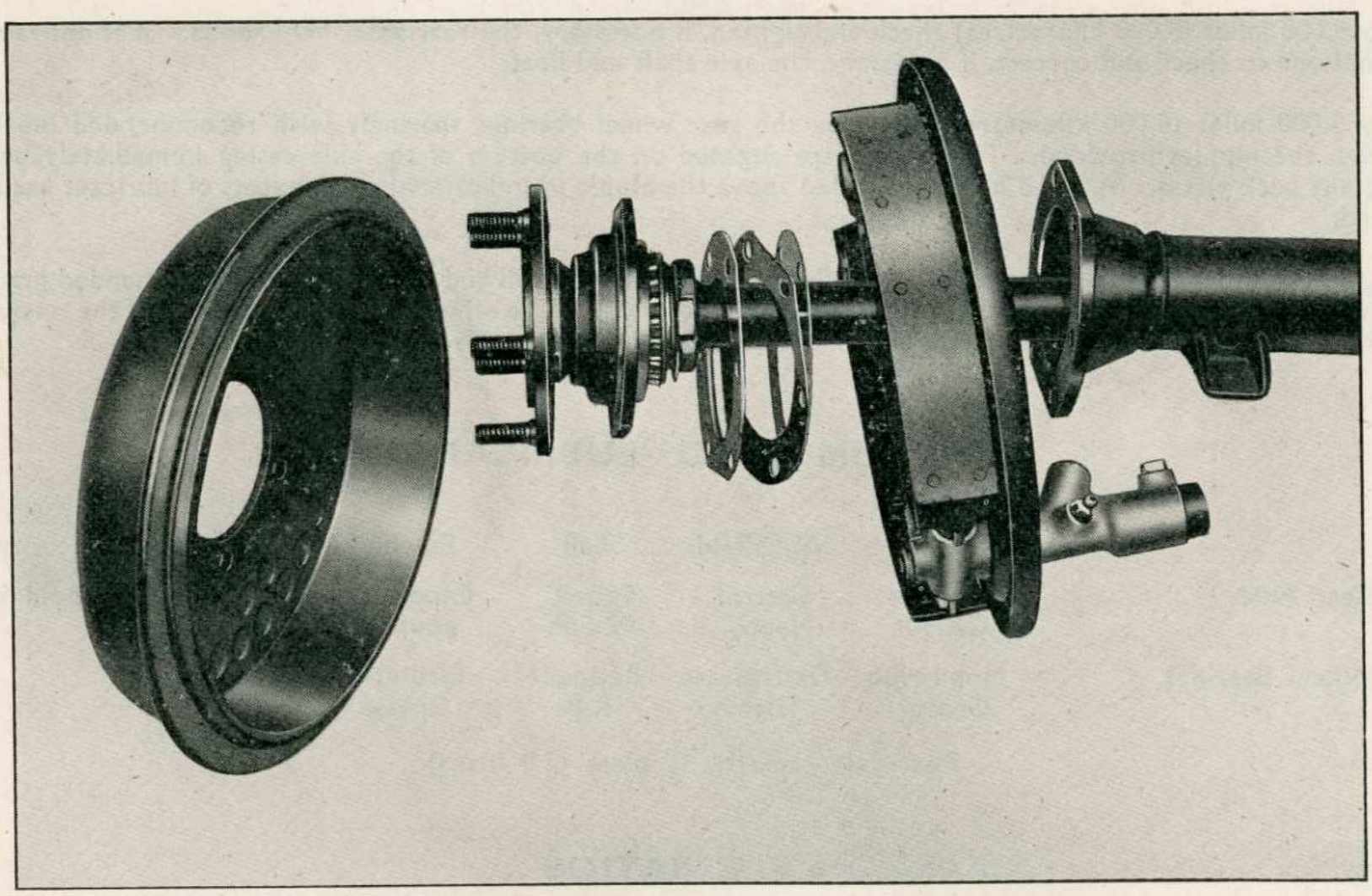


PLATE H1.1. AXLE SHAFT REMOVAL

DISCONNECT PROPELLOR SHAFT. Remove cotter pins and four slotted nuts securing rear axle companion flange to propellor shaft. Withdraw bolts, spring propellor shaft out of register and place clear.

REMOVE "U" BOLTS. Remove lock nuts and nuts from rear axle "U" bolts. Remove "U" bolts and "U" bolt plates.

REMOVE CHECK STRAPS. Remove two nuts and bolts per side securing check straps to chassis frame and withdraw check straps.

DISCONNECT SHOCK ABSORBERS. Disconnect rear shock absorbers by removing two cotter pins and slotted nuts from each link arm and tap link arms out of lugs on axle casing.

REMOVE AXLE. Slide axle assembly to the left until right hand end of case is clear of road spring and exhaust tail pipe. Lower to floor and withdraw under car.

REAR AXLE. TO REFIT

GENERAL. Refitting is the reverse of the above procedure but particular attention should be paid to the following points.

REFIT. When the rear axle assembly has been positioned above the rear springs it will be necessary to jack up each spring into engagement with the rear axle spring pad to facilitate the fitting of the "U" bolts and check straps. Ensure that the centre bolt of the spring seats in the dowel hole in the spring pad and observe that on a number of early cars a wedge is fitted between spring and axle spring pad. In such cases ensure that the wedge is refitted, taper end to the rear and that the hole in the wedge engages with the spring centre bolt.

REFIT AXLE SHAFTS. Fit a new oil seal into the housing at either end of the axle casing, lip of oil seal facing axle centre. Offer up brake back plate to axle shaft assembly and pass axle shaft into casing until the splined end engages with the differential side gear. Ensure that the same number of shims found on dismantling are positioned between the back plates and the bearing housing. The same number of shims should be fitted on either side to centralise the axle shafts, the combined end play on which should be from .005″ to .008″ (.13 mm. to .20 mm.). Secure the bearing housing to the flange of the axle casing with the six bolts, spring washers, nuts and new split pins. Full details on adjusting end play will be found on page H1.20.

CONNECT BRAKES. When the hydraulic system has been connected it will be necessary to bleed the brakes as described in section L "Brakes." To connect handbrake cable assembly to operating cylinder screw securing nut right home with a screw-driver ensuring that spring loaded peg has engaged in an appropriate slot. Replace brass end cover and lock with setscrew and tab washer. (On later cars refit clevis pin securing cable jaw to operating lever and secure with split pin.) Fit outer cables into clips and stops. Adjust cable with barrel nut ensuring that no pre-load is applied to the hydraulic operating piston in the rear brake cylinders. As a safeguard against this observe that the inner face of the operating plunger is flush with the housing when the handbrake is in the off position.

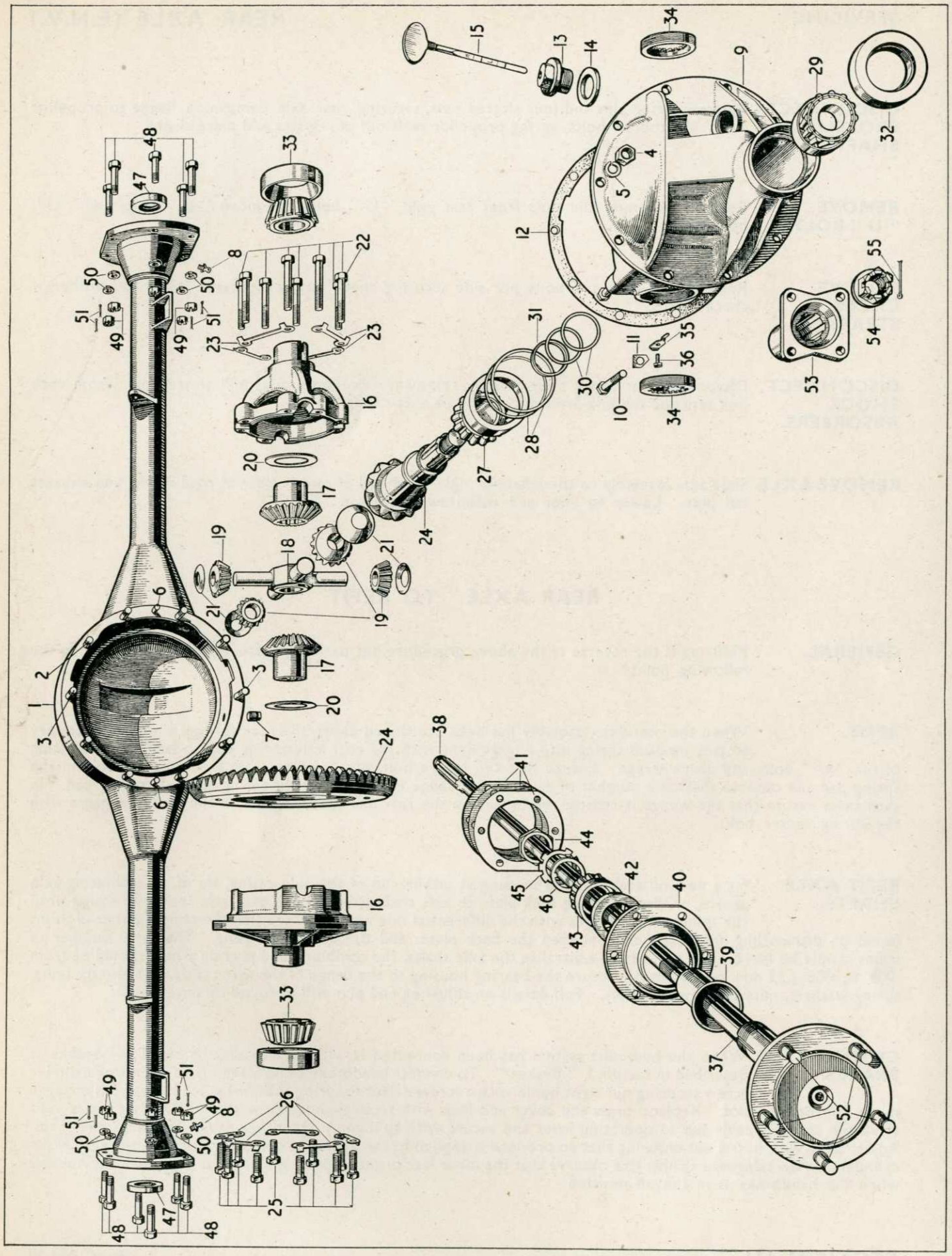


PLATE H1.2. REAR AXLE ASSEMBLY (E.N.V.). Exploded view

INDEX TO PLATE H1.2. REAR AXLE ASSEMBLY (E.N.V.). EXPLODED VIEW

Axle Casing 1
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Stud (Long) for the attachment of Pinion Housing ... 3
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Pin, Dowel, locating Pinion Housing on Casing 6
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Nipple, Grease, on outer end of Axle Casing 8
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Plate, locking Bearing Cap Bolts 11
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Washer, Jointing, for Oil Filler Plug 14
Dipstick 15
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Gear Side, for Differential 17
Piece, Star, for Differential Pinion Mate Gears 18
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Washer, Thrust, for Side Gears 20
Washer, Thrust, for Pinion Mate Gears 21
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Plate, locking Bolts 23
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Bolt, securing Crown-Wheel to Differential Case ... 25
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Bearing, Roller, Pinion Shank 29
Shim, adjusting Pinion Shank Bearing 30
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Bearing, Roller, for Hubs 43
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Washer, Tab, for Locknut 45
Washer, Tongued, between Tab Washer and Hub Bearing 46
Seal, Oil, for Axle Shaft 47
Bolt, securing Bearing Housing and Brake Anchor Plate to Axle Casing 48
Nut on Bolts 49
Washer, Spring, under Nuts 50
Pin, Split, through Nuts 51
Stud for Brake Drum and Road Wheels 52
Pinion Companion Flange 53
Nut, securing Companion Flange to Pinion 54
Pin, Split, through Nut 55

AXLE SHAFTS. TO REMOVE, DISMANTLE, REASSEMBLE AND REFIT

REMOVAL. Jack up the car at the rear and place blocks under chassis frame in front of road spring anchor bolts. Remove wheel spats, nave plates and road wheels. Release handbrake. Remove two setscrews locating each brake drum to axle shaft flanges. Ease drums off register. Remove split pins, slotted nuts and spring washers from six bolts securing each bearing housing and brake back plate to the flange of axle casing. Ease axle shafts away from casing thus exposing adjusting shims between bearing housing and back plate. Refit two bolts to secure back plate in position and thus avoid damage to brake hydraulic connections. Do not lose or transpose shims from side to side.

DISMANTLING. Bend back locking tab of tab washer and remove securing nut. Press axle shaft through housing noting that a distance piece is fitted on the shaft to locate the race inner member. (Plate H1.3.) Extractor slots are provided in the bearing housing for the purpose of removing outer ring of the hub bearing and oil seal. Remove and scrap oil seal situated in axle casing flange.

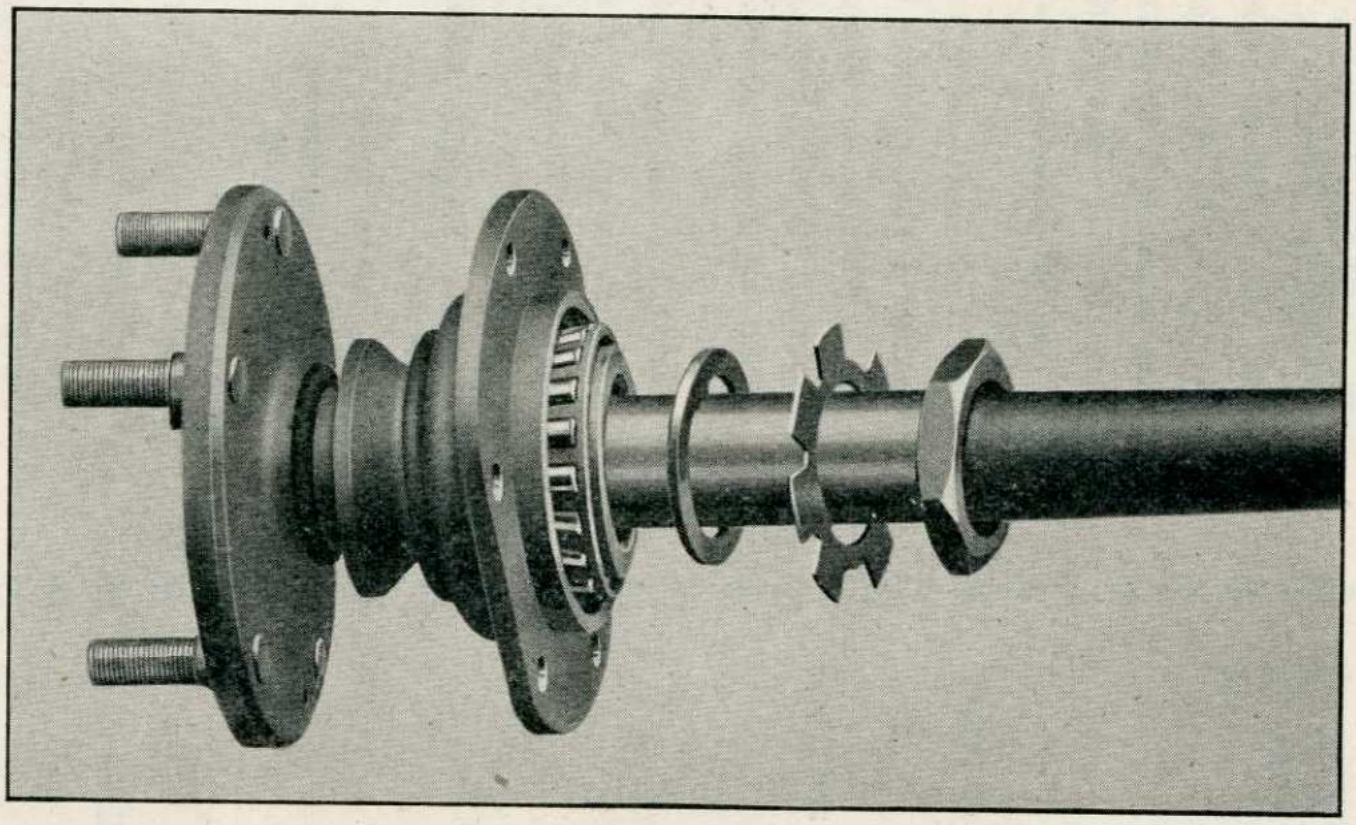


PLATE H1.3. AXLE SHAFT ASSEMBLY

REASSEMBLE. Drop bearing spacer on to axle shaft with large diameter facing flange and then assemble bearing housing taking care to ensure that a new oil seal is used and is correctly located on parallel section of spacer. Lip of oil seal should face axle centre.
Lubricate bearing with recommended lubricant and press inner member of hub bearing on to shaft, fit distance washer and tab washer and secure with nut, locking after finally tightening.

REFIT. Fit new oil seals into their housings in the axle flanges, lip of oil seal facing centre of axle. Install the axle shafts in the axle casing and secure each bearing housing with the six bolts, spring washers, slotted nuts and new split pins. Check the combined axle shaft end float which should be .005″ to .008″ (.13 mm. to .20 mm.). This will be just perceptible by hand. Add or subtract adjusting shims to obtain the correct axle shaft end play noting that adding shims increases and subtracting shims decreases end play. Remove or install approximately an equal number of shims at either end of the axle so that the axle shafts are retained in a central position. Shims are available in thicknesses of .002″, .006″, .010″, .032″ and .062″ (.05 mm., .13 mm., .25 mm., .81 mm. and 1.57 mm.). Always lubricate bearings through nipples with recommended lubricant until excess appears at bleed holes denoting that bearings are filled. The remaining operations are the reverse of the removal procedure.

AXLE SHAFTS. TO REMOVE, DISMANTLE, REASSEMBLE AND REFIT

REMOVAL. Jack up the car at the rear and place blocks under chassis frame in front of road spring anchor bolts. Remove wheel spats, nave plates and road wheels. Release handbrake. Remove two setscrews locating each brake drum to axle shaft flanges. Ease drums off register. Remove split pins, slotted nuts and spring washers from six bolts securing each bearing housing and brake back plate to the flange of axle casing. Ease axle shafts away from casing thus exposing adjusting shims between bearing housing and back plate. Refit two bolts to secure back plate in position and thus avoid damage to brake hydraulic connections. Do not lose or transpose shims from side to side.

DISMANTLING. Bend back locking tab of tab washer and remove securing nut. Press axle shaft through housing noting that a distance piece is fitted on the shaft to locate the race inner member. (Plate H1.3.) Extractor slots are provided in the bearing housing for the purpose of removing outer ring of the hub bearing and oil seal. Remove and scrap oil seal situated in axle casing flange.

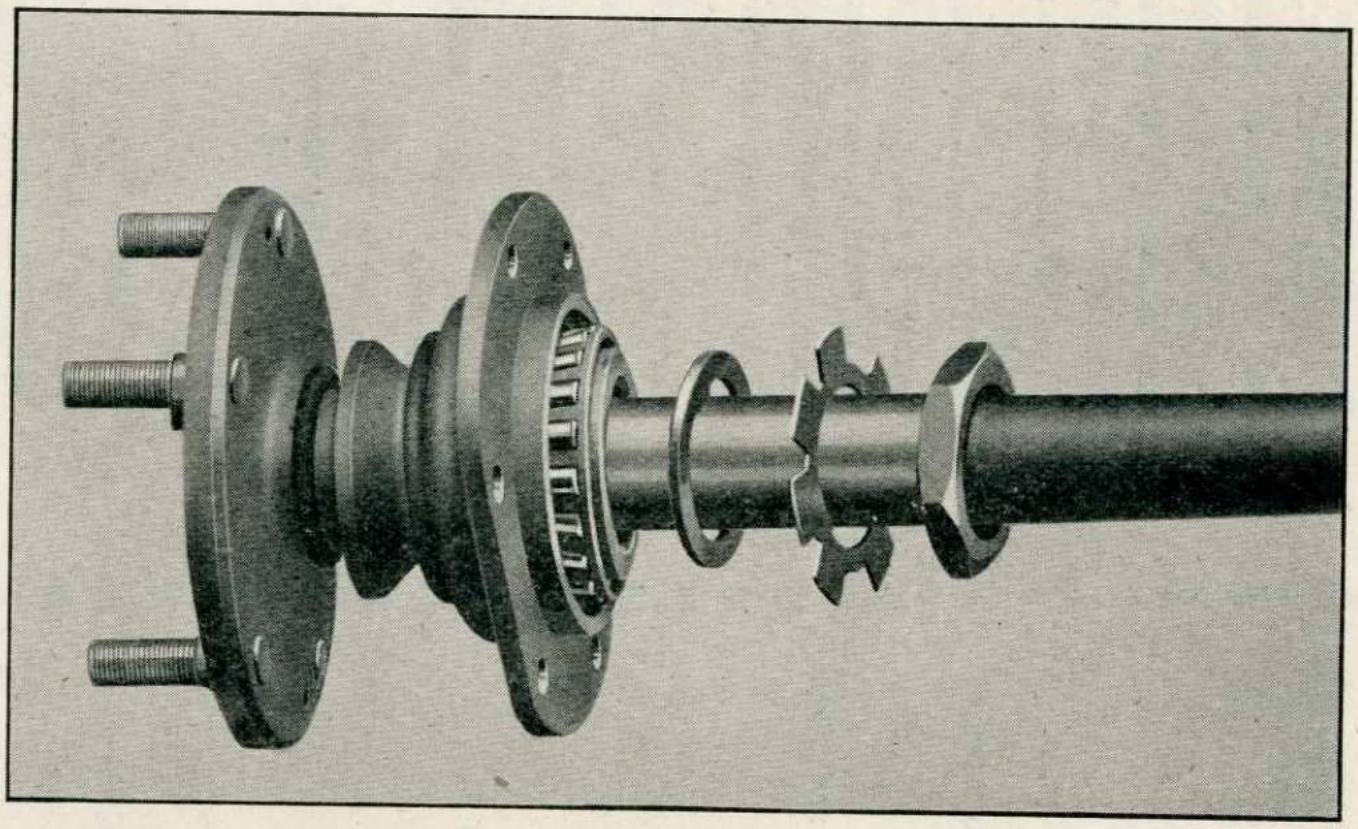


PLATE H1.3. AXLE SHAFT ASSEMBLY

REASSEMBLE. Drop bearing spacer on to axle shaft with large diameter facing flange and then assemble bearing housing taking care to ensure that a new oil seal is used and is correctly located on parallel section of spacer. Lip of oil seal should face axle centre.
Lubricate bearing with recommended lubricant and press inner member of hub bearing on to shaft, fit distance washer and tab washer and secure with nut, locking after finally tightening.

REFIT. Fit new oil seals into their housings in the axle flanges, lip of oil seal facing centre of axle. Install the axle shafts in the axle casing and secure each bearing housing with the six bolts, spring washers, slotted nuts and new split pins. Check the combined axle shaft end float which should be .005″ to .008″ (.13 mm. to .20 mm.). This will be just perceptible by hand. Add or subtract adjusting shims to obtain the correct axle shaft end play noting that adding shims increases and subtracting shims decreases end play. Remove or install approximately an equal number of shims at either end of the axle so that the axle shafts are retained in a central position. Shims are available in thicknesses of .002″, .006″, .010″, .032″ and .062″ (.05 mm., .13 mm., .25 mm., .81 mm. and 1.57 mm.). Always lubricate bearings through nipples with recommended lubricant until excess appears at bleed holes denoting that bearings are filled. The remaining operations are the reverse of the removal procedure.

DIFFERENTIAL. TO REMOVE

GENERAL. The differential may be withdrawn without disturbing the axle casing from the chassis. Jack up the car at the rear and place blocks under chassis frame in front of road spring anchor bolts. Remove wheel spats, nave plates and road wheels. Release handbrake. Drain oil from differential.

REMOVE AXLE SHAFTS. Remove two setscrews locating each brake drum to axle shaft flange. Ease drums off register. Remove split pins, slotted nuts and spring washers from the six bolts securing each bearing housing and brake back plate to the flanges of axle casing. Ease axle shaft away from casing thus exposing adjusting shims between bearing housing and back plate. Remove back plates. Do not lose or transpose shims from side to side.

DISCONNECT PROPELLOR SHAFT. Remove cotter pins and four slotted nuts securing rear axle companion flange to propellor shaft. Withdraw bolts, spring propellor shaft out of register and place clear.

REMOVE DIFFERENTIAL. Remove ten nuts with spring washers securing differential housing to studs on axle casing and withdraw the housing forward observing that this is located by dowels. (Plate H1.4.)

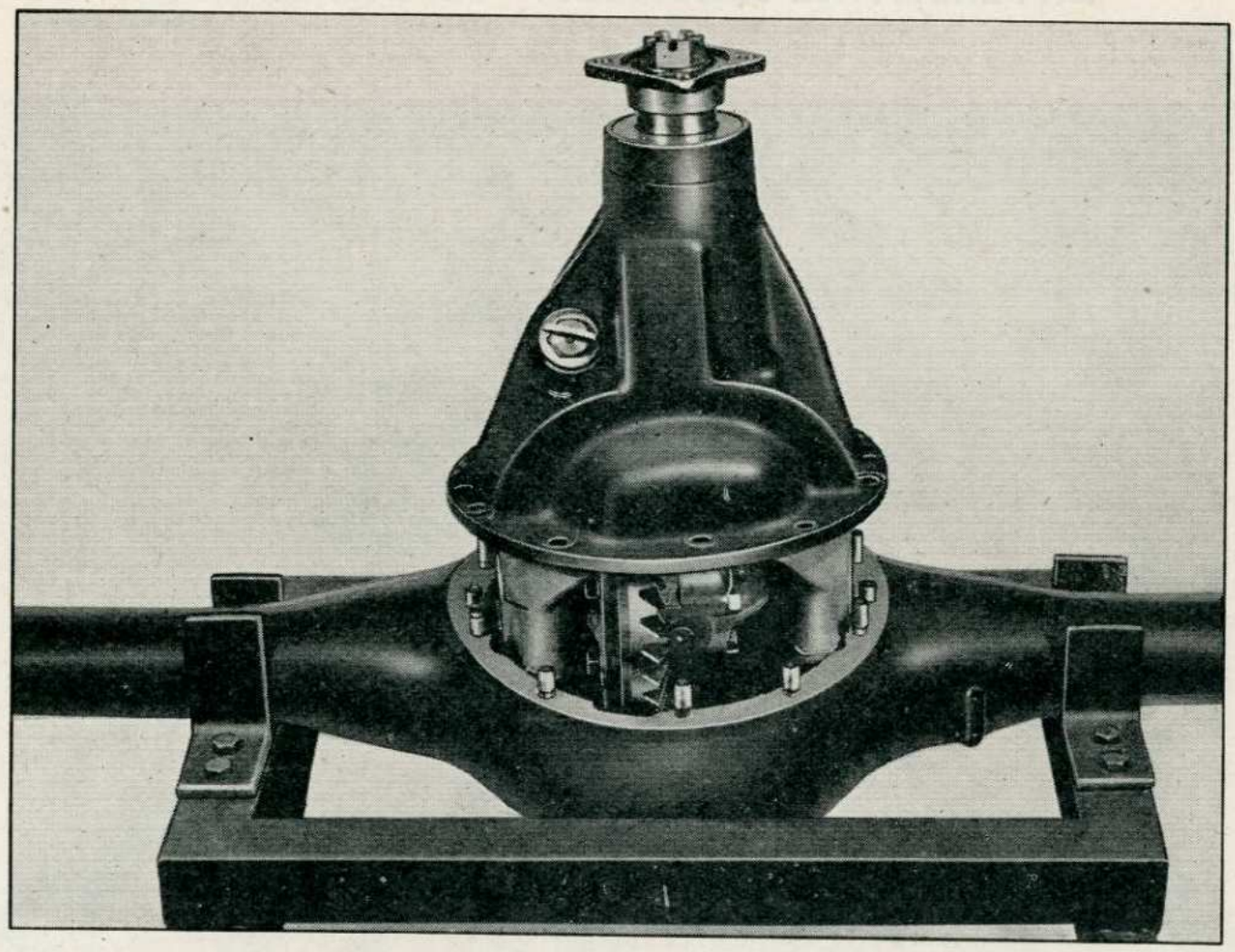


PLATE H1.4. DIFFERENTIAL REMOVAL

DIFFERENTIAL. TO REFIT

REFIT DIFFERENTIAL. Clean axle case and differential housing joint faces. Apply a new jointing washer and jointing compound over studs of axle casing. Assemble housing over studs and dowel pins and secure with ten nuts and spring washers.

RECONNECT PROPELLOR SHAFT. Assemble propellor shaft to pinion shaft flange and secure with nuts, bolts and new cotter pins.

REFIT AXLE SHAFTS. Fit new oil seals into their housings in the axle flanges, lip of oil seal facing centre of axle. Install the axle shafts in the axle casing and secure each housing bearing with the six bolts, spring washers, slotted nuts and new split pins. Check the combined axle shaft end float which should be .005″ to .008″ (.13 mm. to .20 mm.). This will be just perceptible by hand. Add or subtract adjusting shims to obtain the correct axle shaft end play noting that adding shims increases and subtracting shims decreases end play. Remove or install approximately an equal number of shims at either end of the axle so that the axle shafts are retained in a central position.

Shims are available in thicknesses of .002″, .006″, .010″, .032″ and .062″ (.05 mm., .13 mm., .25 mm., .81 mm. and 1.57 mm.). Always lubricate bearings through nipples with recommended lubricant until excess appears at bleed holes denoting that bearings are filled. The remaining operations are the reversal of the removal procedure. Refill differential with recommended lubricant.

DIFFERENTIAL ASSEMBLY. TO DISMANTLE

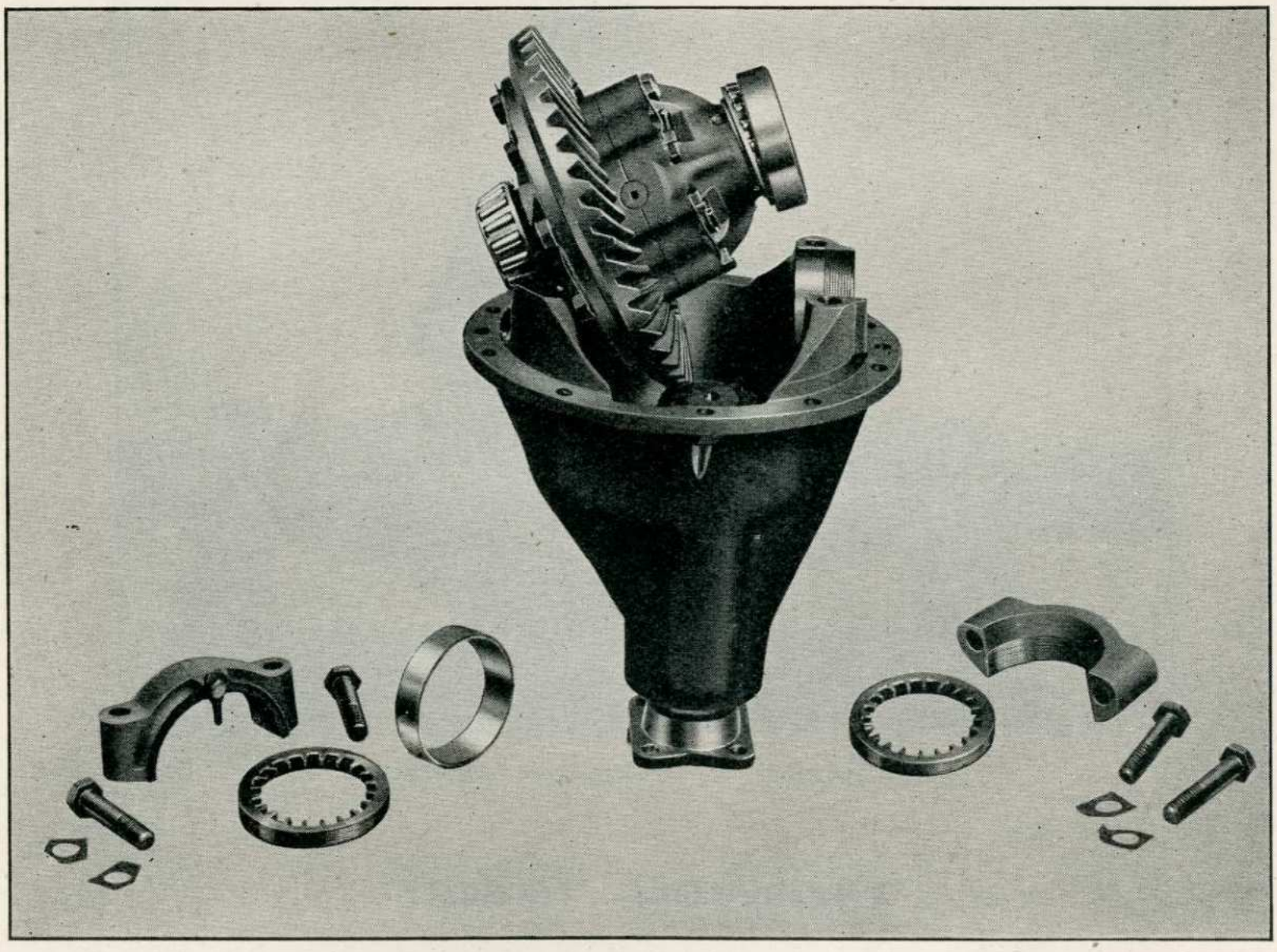


PLATE H1.5. DIFFERENTIAL BOX REMOVAL

REMOVE ADJUSTING NUTS. Remove setscrew and locking plates retaining the two differential adjusting nuts in the differential box. Remove adjusting nuts.

REMOVE DIFFERENTIAL BOX. Lift tab washers and remove four set bolts securing differential box bearing caps. Withdraw differential box complete with bearings.

REMOVE CROWN WHEEL. Release tab washers on the ten setscrews securing crown wheel to the differential box. Remove crown wheel.

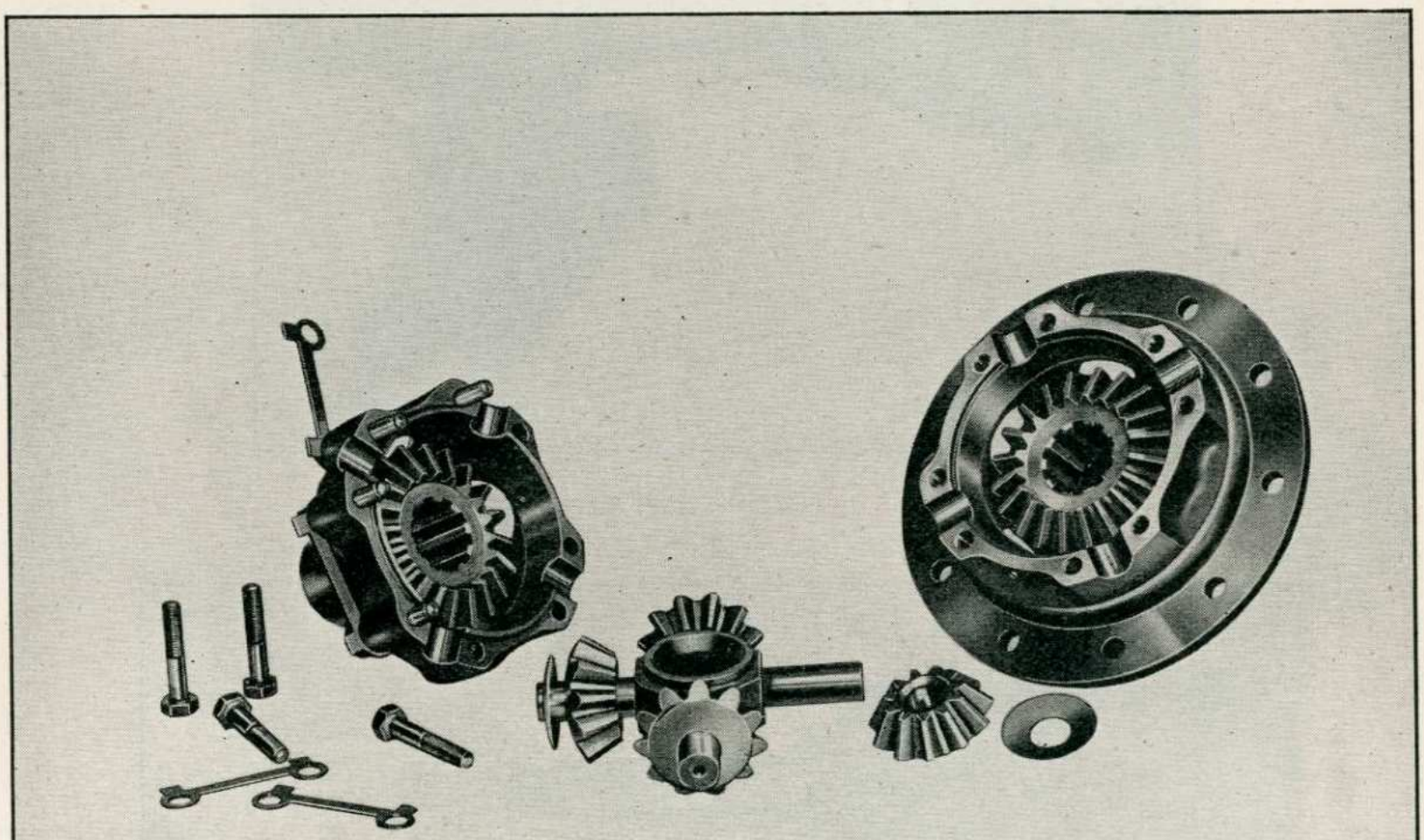
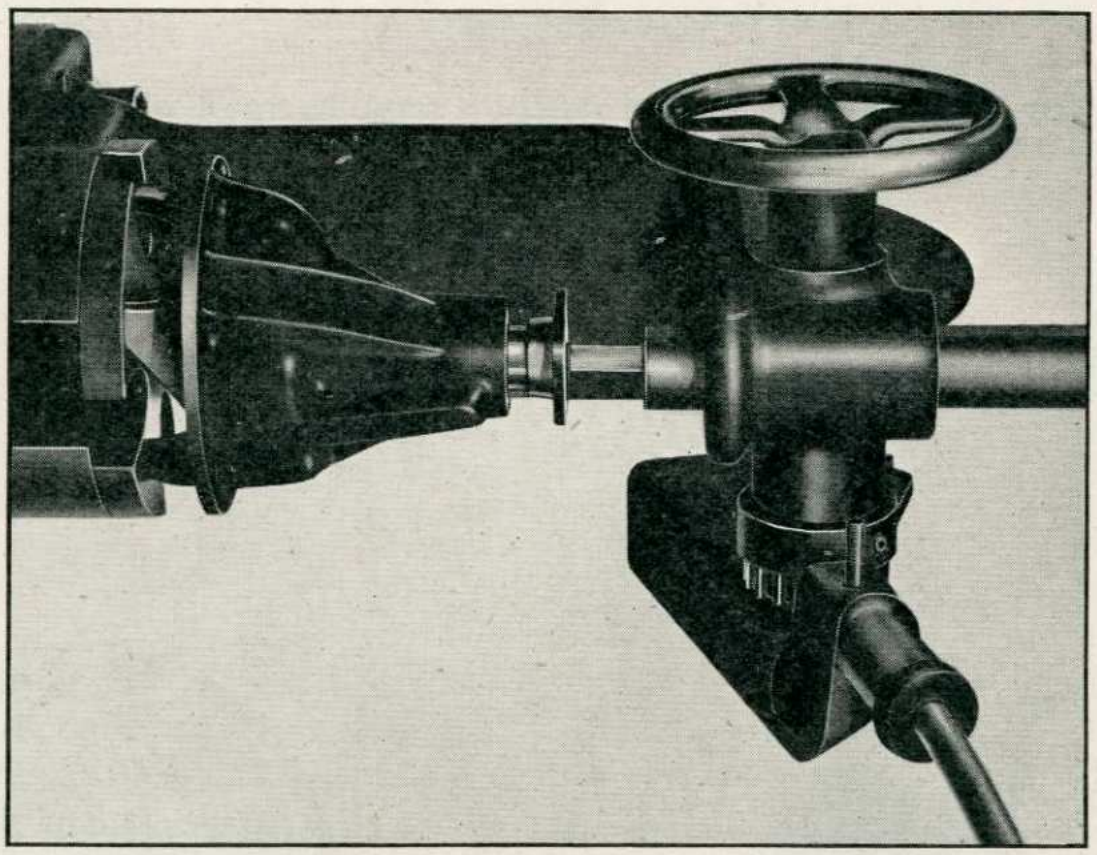


PLATE H1.6. DIFFERENTIAL DISMANTLED

REMOVE DIFFERENTIAL GEARS. Release tab washers and remove eight set bolts securing the two halves of the differential case together. Separate differential case at centre register. Remove differential pinion mate gears and thrust washers, side gears, thrust washers and star piece.

REMOVE PINION SHAFT. Remove split pin, slotted nut and plain washer from pinion shaft and press pinion through coupling flange and bearings. The inner cone of pinion head bearing will be left on the pinion shaft. Remove and scrap oil seal from recess in nose of differential case and press out the outer race of the pinion head bearing observing shims fitted behind bearing which control correct meshing of pinion in relationship to crown wheel. Press out the pinion tail bearing observing shims fitted behind shoulder of pinion and thrust face of bearing which control bearing pre-load. Draw the differential bearing off each half of the differential case.



H1.7. PINION SHAFT REMOVAL

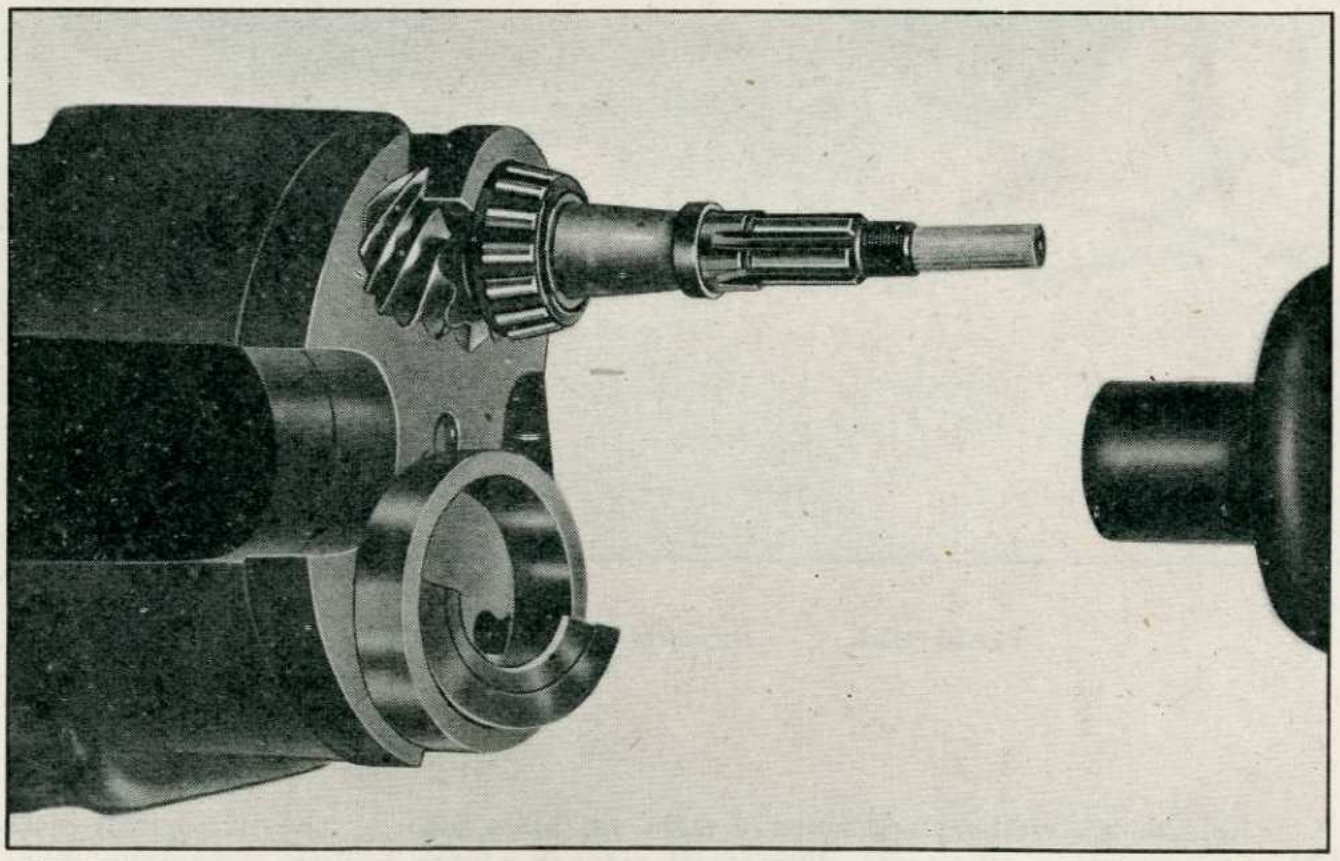


PLATE H1.8. REMOVAL OF INNER CONE. PINION HEAD BEARING

DIFFERENTIAL ASSEMBLY. TO REASSEMBLE

ASSEMBLE DIFFERENTIAL CASE. Mount the pinion mate gears and side gears with thrust washers on to the star piece and assemble the two halves of the differential case with star piece in position ensuring that the serial numbers of the case are together to maintain concentricity of differential case. Secure the two halves of the case together using eight new securing bolts and lock with new locking plates.

MOUNT CROWN WHEEL. Secure crown wheel to differential box with ten new set bolts and new locking plates. Bend the tabs of the locking plates against the heads of the set bolts.

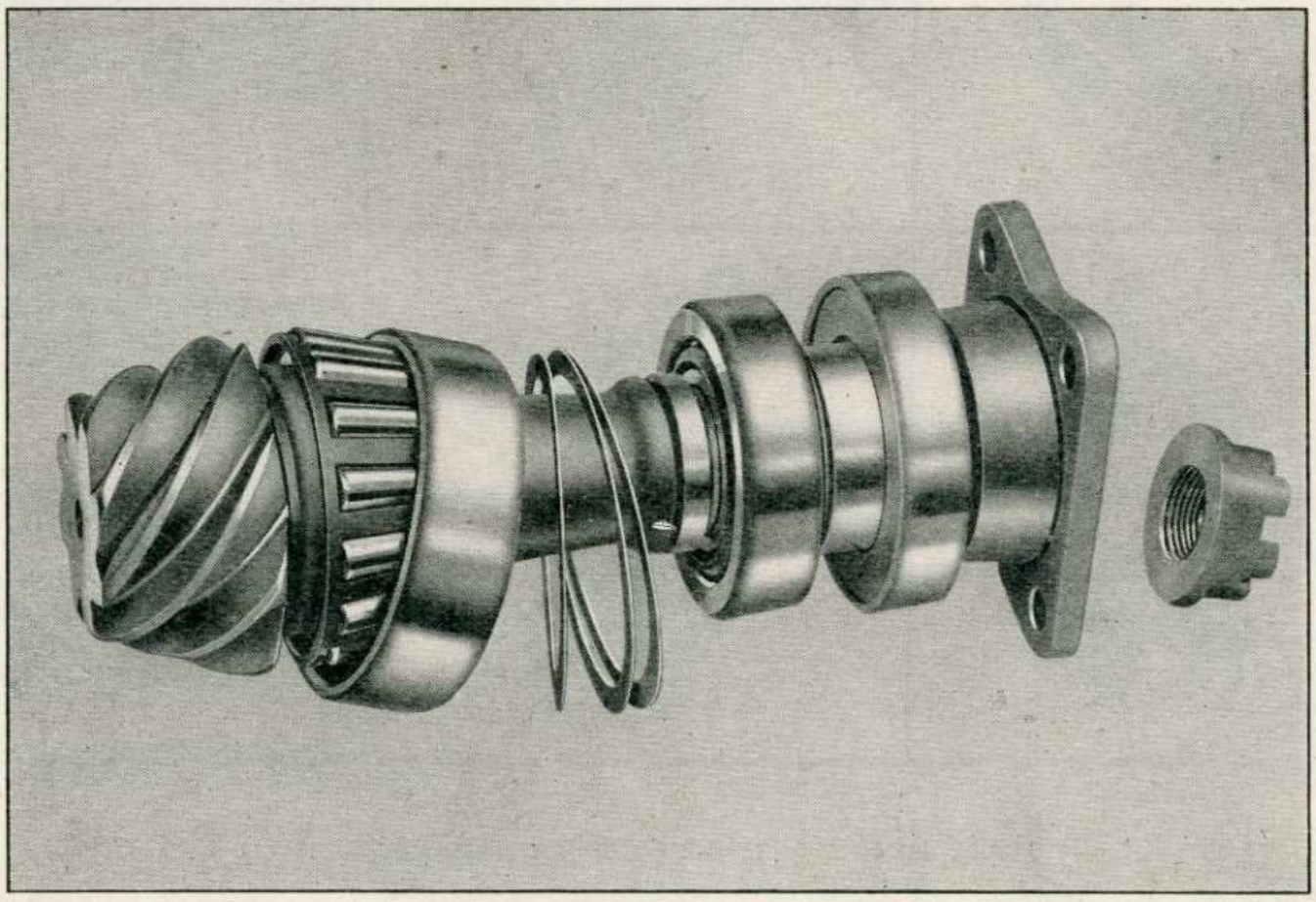


PLATE H1.9. PINION SHAFT ASSEMBLY

FIT PINION. Insert shims to equal .020″ (.51 mm.) in pinion head bearing housing and press outer ring of bearing into position, the thrust face of the bearing being against the shoulder of the housing. Shims are available in thicknesses of .004″, .006″ and .010″ (.10 mm., .15 mm., and .25 mm.). Press outer ring of tail bearing into housing with the thrust face of the bearing against the shoulder of the housing. Press inner member of head bearing on to pinion shank with thrust face of bearing against shoulder of pinion. Assemble distance piece together with .050″ (1.27 mm.) of shimming on to pinion shank tail shoulder and insert pinion through head bearing outer ring. Shims are available in thicknesses of .004″, .006″ and .010″ (.10 mm., .15 mm. and .25 mm.). Support pinion head and press inner members of tail bearing and flange coupling on to pinion and secure with plain washer, slotted nut and split pin. There should now be no end float in pinion bearings.

Adjust by reducing shims behind tail bearing inner member until a pre-load of 8 to 10 inch pounds (.092 to .115 mkg.) pull is obtained. Do not at this stage fit the oil seal into the recess in the nose of the differential since the pinion shaft may have to be removed during the adjustment of the crown wheel and pinion.

FIT AND ADJUST DIFFERENTIAL. Assemble differential box with crown wheel attached into the housing. Replace bearing caps, lightly tighten cap bolts, and fit adjusting nuts. Rotate the adjusting nuts until there is no end play in the bearings and backlash between gears equals .006″ (.15 mm.) measured at the periphery of the crown wheel. Paint gear teeth with marking and rotate gears in both directions and note marking on teeth.

CROWN WHEEL TEETH.

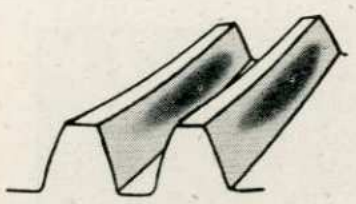
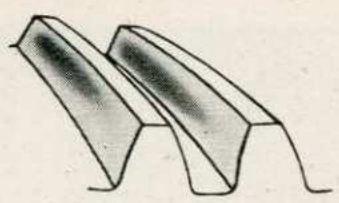
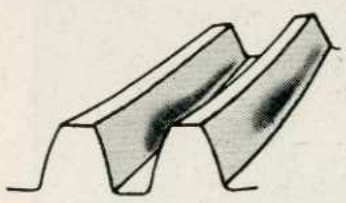
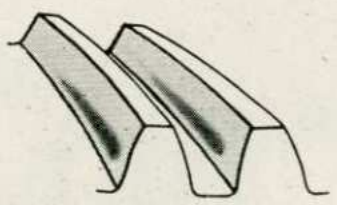
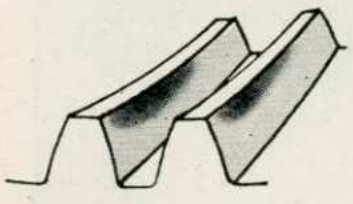
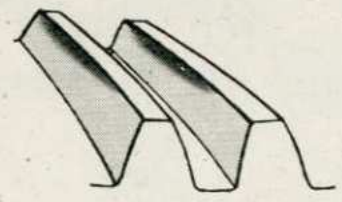
DRIVE SIDE.	OVERRUN SIDE.	REMARKS.
① 	① 	CORRECT POSITION OF MARKING MOUNTED IN RIGID BEARINGS. ·006"/-·008" BACKLASH PRIVATE CARS.
② 	② 	PINION TOO NEAR CENTRE OF CROWN WHEEL. MOVE PINION AWAY FROM CROWN WHEEL AND ADJUST CROWN WHEEL FOR BACKLASH TO OBTAIN CORRECT MARKING.
③ 	③ 	PINION AWAY FROM CENTRE OF CROWNWHEEL. MOVE PINION TOWARD CROWN WHEEL AND ADJUST CROWN WHEEL FOR BACKLASH TO OBTAIN CORRECT MARKING.

PLATE H1.10 TOOTH CONTACT INDICATION

Adjust pinion backwards or forwards as required by removing or adding an equal thickness of shims behind head bearing outer member and tail bearing inner member. This will move the pinion and at the same time maintain pre-load on the bearings. The efficiency and quietness of the gears is dependent upon correct setting and profile bearing. When making the final adjustment liberally smear the bearings with grease and press tail bearing oil seal into position, the location having previously been painted with jointing compound. It will also be necessary to pre-load the differential bearings this pre-load being obtained by rotating adjusting nuts until no end float exists and then tightening adjuster one extra castellation making sure that backlash between gear is maintained at .006″ (.15 mm.).

GENERAL. Replace all lock plates, finally tighten all set bolts and turn over tab washers and split cotter pins where required. The differential assembly is now ready for refitting to the axle casing. (Page H1.21.)

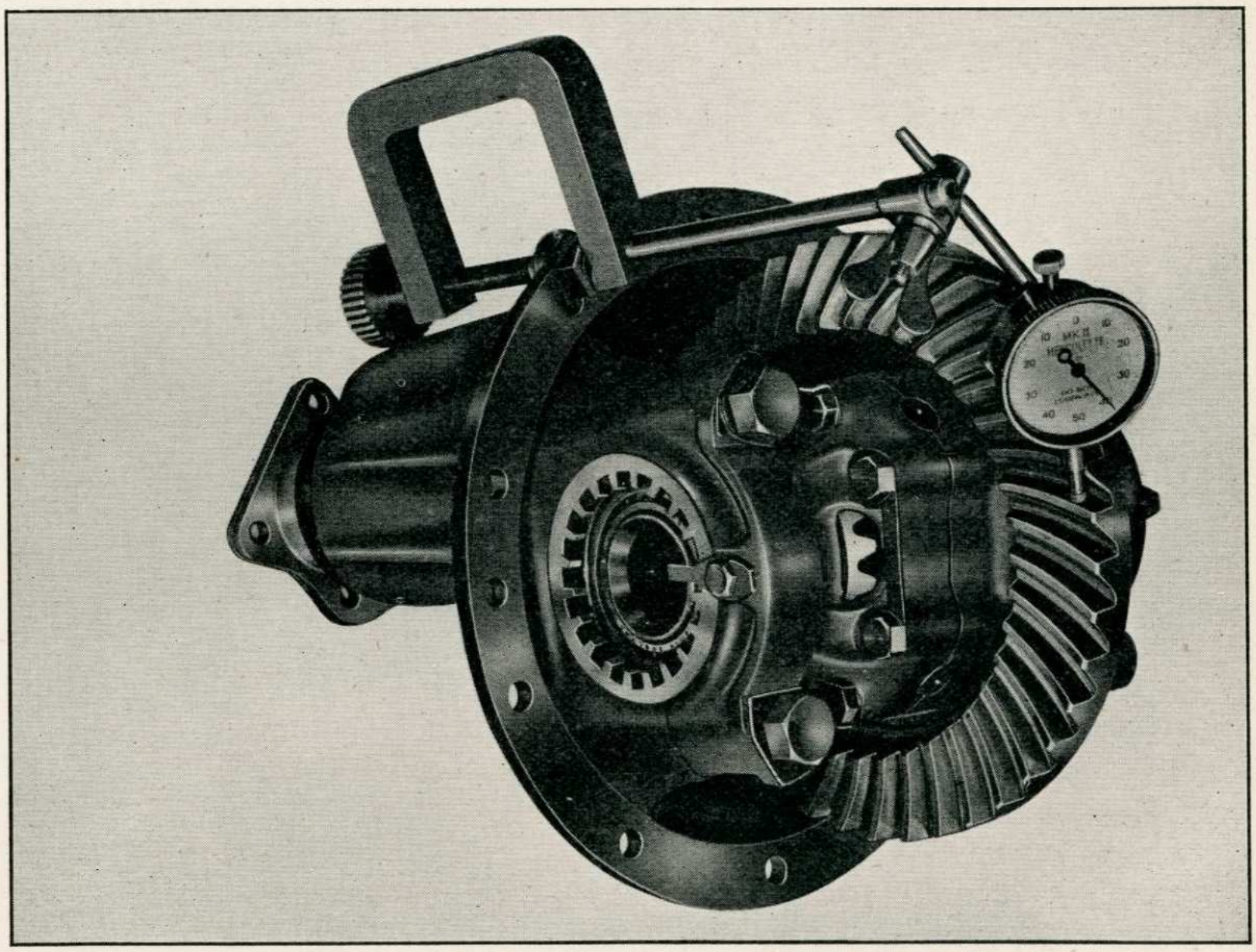


PLATE H1.11 TESTING BACKLASH BETWEEN GEARS

REAR AXLE. RECONDITIONING

GENERAL. Factory reconditioned differential units are available and it is recommended that advantage be taken of this scheme in preference to overhauling the existing unit.

Remove Watermark
Wondershare PDFelement

STEERING

MARK V

2½ and 3½ LITRE

CHASSIS NUMBERS

(Stamped at the front of the chassis left-hand side member)

2½ Litre	3½ Litre
Saloon	
520001 Right-Hand Drive	620001 Right-Hand Drive
527001 Left-Hand Drive	627001 Left-Hand Drive
Coupé	
540001 Right-Hand Drive	640001 Right-Hand Drive
547001 Left-Hand Drive	647001 Left-Hand Drive

The instructions in this section are presented under the following main headings which appear as sub-titles on the pages concerned and in the order shown :—

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Index to Plates - - - - - - Page I.3
General and Maintenance - - - - - Page I.4
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Steering Data	... ...	I. 5
Steering Thread Bearings	Description and Assembly	I. 6
Steering Track Rod. Rubber Bearings	Description and Assembly	I. 6
Steering Unit	Remove. (Right-Hand Drive)	I. 6
Steering Unit	Remove. (Left-Hand Drive)	I. 9
Steering Unit	Refit	I.10
Steering Unit	Dismantle	I.10
Steering Unit	Reassemble	I.12
Steering Column. Top Bush	Remove and Refit	I.13
Steering Unit. Rocker Shaft	Adjust	I.13
Steering Idle Lever Assembly	Remove, Dismantle, Reassemble and Refit	I.14
Steering Track Rod	Remove, Dismantle, Reassemble and Refit	I.15
Steering Connecting Tubes	Remove, Dismantle, Reassemble and Refit	I.17
Steering Swivel. Upper	Remove and Refit	I.17
Steering Swivel. Lower	Remove and Refit	I.18
Steering Arms	Remove and Refit	I.19
Steering Track	Adjust	I.19
Steering Lock	Adjust	I.19

Instructions on checking and setting castor and camber angles are given in Section J, "Front Suspension."

INDEX TO PLATES

Plate No.	Plate.	Page.
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I.2	Steering Wheel and Manette Control	I. 7
I.3	Centre Facia. Removal	I. 7
I.4	Steering Unit. Mounting	I. 8
I.5	Steering Unit. Exploded View	I.11
I.6	Steering Idle Lever Assembly	I.14
I.7	Steering Idle Lever	I.15
I.8	Track Rod Thread Bearing Assembly	I.16
I.9	Track Rod. Turn Buckle	I.16
I.10	Upper and Lower Steering Swivels	I.18

GENERAL. The steering gear (Plate I.5) is of the high efficiency type and comprises a hardened and ground single start worm on the end of the steering inner column. This worm is supported at each end by a ball bearing, the inner race of which is formed by the column itself, and the outer members by specially manufactured races. The top end of the column is supported by a fabric oilless bush and conical oil impregnated felt washer. The steering worm carries a sliding member in which is cut a helical groove. In this groove runs a series of balls which make contact with the column and are carried through a tube fixed to the sliding member. This member also carries a conical abutment which is surrounded by similar conical faces on the rocker shaft and a bearing pin which carries a roller which runs in a slot in the cover plate. The rocker shaft is supported in bushes in the steering housing and on its lower end are taper splines to which the drop arm is fixed by means of a castellated nut and split pin. The steering gear is carried in a split trunnion mounting which is, in turn, attached to the upper wishbone support bracket on the chassis frame (Plate I.4).

The drop arm (Plate I.1) is connected to the track rod by a thread bearing and a similar thread bearing connects the track rod at its other end to an idle lever and idle lever housing mounted on the opposite upper wishbone support bracket. On later cars these thread bearings are replaced by rubber bearings. The track rod tube is cranked to provide clearance for the engine starting handle. The track rod is connected to the steering arms by two short connecting tubes with a ball joint fitted at either end of each tube. The short connecting tubes are adjustable for length but it is most important that their lengths be maintained within $\frac{1}{16}$" (1.6 mm.) of 9" (22.86 cm.). This dimension ensures that the connecting tubes and upper wishbone arms operate through equal radii and thus maintain constant steering track irrespective of vertical position of road wheels.

The steering swivels (Plate I.10) consist of two ball assemblies per side attached to the outer extremities of the upper and lower wishbone members and to the stub axle carriers respectively.

These ball assemblies form both the steering pivot and front suspension articulation.

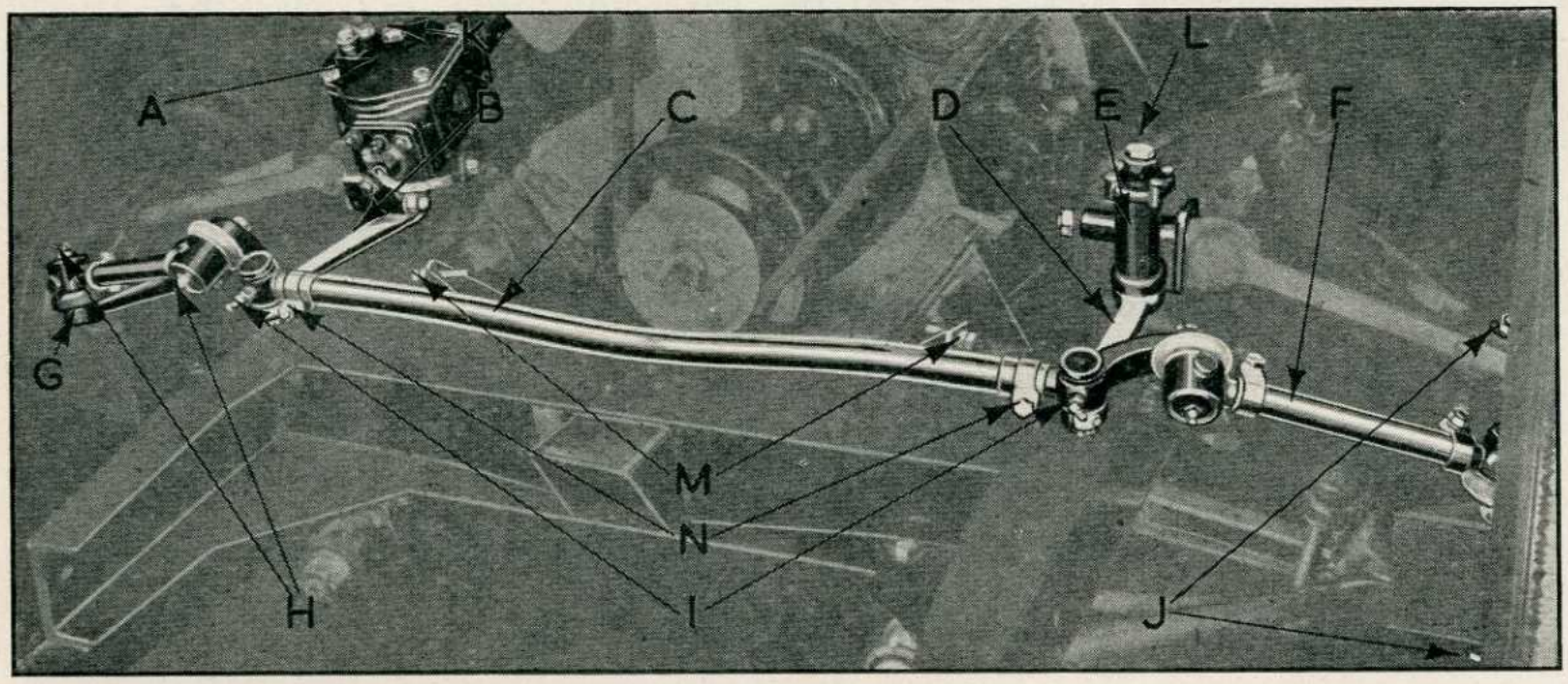


PLATE I.1. STEERING. GENERAL ARRANGEMENT

A. Steering Unit.
B. Steering Drop Arm.
C. Track Rod.
D. Idle Lever.
E. Idle Lever Housing.
F. Steering Connecting Tube.
G. Steering Arm.
H. Nipples. Connecting Tube.
I. Nipples. Track Rod.
J. Nipples. Upper and Lower Steering Swivels.
K. Filler Plug. Steering Unit.
L. Filler Plug. Idle Lever.
M. Steering Lock Stops.
N. Track Rod Tube Clamps.

MAINTENANCE. At the First Service, 750 miles (1,000 kilometres), check the fixing bolts of the steering box mounting trunnion and tighten, if necessary (Plate I.4). At the Second Service, 1,500 miles (2,000 kilometres), check the end float of the steering rocker shaft and adjust, if necessary, in accordance with the instructions given on page I.13.

Every 1,000 miles (1,500 kilometres) top up the steering box, if necessary, with the recommended lubricant through the filler plug provided (Plate I.1). Care should be taken to identify the filler plug correctly. Top up the idle lever bearing housing, if necessary, with the recommended lubricant through the $\frac{5}{8}$" hexagon plug situated on top. (Plate I.1.)

Every 1,000 miles (1,500 kilometres) lubricate the six nipples (four nipples on later cars) on the joints of the steering linkage and the four nipples on the wheel swivels with the recommended lubricant. The number of nipples and their location is as follows :—(Plate I.1.)

Two Nipples. Track Rod. (Not fitted on later cars with rubber bearings.)

Two Nipples. Connecting Tube. Right Hand.

Two Nipples. Connecting Tube. Left Hand.

Two Nipples. Wheel Swivel. Right Hand.

Two Nipples. Wheel Swivel. Left Hand.

Every 5,000 miles (8,000 kilometres) check the tightness of all steering mounting bolts and nuts, thread bearings (later cars rubber bearings at track rod ends) and ball joints.

RECOMMENDED LUBRICANTS

	Vacuum.	Wakefield.	Shell.	Essolube.	Price's	S.A.E. Viscosity.
Steering Gear Steering Idle Lever Housing.	Mobilube C.	Castrol D.	Spirax 140 EP.	Gear Oil 140 (Heavy)	Energol 140	140
All Steering Nipples.	Mobilgrease No. 4	Castrolease (Heavy)	Retinax R.B.	Essolube Grease.	Belmoline C.	

STEERING DATA

Steering Unit.	Type.	Burman Recirculating Ball.
	Adjustment Inner Column.	Shims under end plate.
	Adjustment Rocker Shaft.	Adjusting screw and pre-loading spring.
Steering Wheel.	Type.	Bluemels Adjustable.
Steering Wheel Diameter.		18" (45.7 cm.).
Castor Angle.		3/4° Negative.
Camber Angle.		$1\frac{3}{4}$° to 2° Positive.
Track (Toe in).		$\frac{1}{8}$" to $\frac{3}{16}$" (3.2 mm. to 4.8 mm.).
Turning Circle.		35 ft. (10.67 metres).

STEERING THREAD BEARINGS. DESCRIPTION AND ASSEMBLY

DESCRIPTION. Thread bearings are used at either end of the track rod (track rod thread bearings replaced by rubber bearings on later cars), and at the steering idle lever shaft. The track rod bearing housings (Plate I.8) and the idle lever housing (Plate I.6) are threaded internally. The male members in all cases have right hand threads and consequently are screwed into the housings clockwise. The track rod bearings have a pre-loading spring between male members and top of housings. (Plate I.8.) No spring is fitted to the idle lever housing but the lower end of the shaft operates in a plain bush in the housing. (Plate I.6.) The shanks of the male members are secured in the drop arm and idle lever respectively by a tapered and knurled fitting with lock nut.

It will thus be realised that when the steering is turned towards the left lock all the male members of the thread bearings are rotated into their respective housings and when the steering is turned towards right lock the male members are rotated out of their housings. This applies to both left hand and right hand steering.

ASSEMBLY. For this reason it is essential that when refitting the thread bearings the following procedure is adopted.

Track Rod. Screw the male members into their housings clockwise as far as they will go, overcoming the tension of the pre-loading springs and then unscrew half a turn anti-clockwise. The drop arm and idle lever must then be turned to full left lock and the shanks of the thread bearings entered into the companion tapers of the drop arm or idle lever, secured with a light blow from a soft metal hammer and then locked with the nut provided.

Idle Lever. Similarly the idle lever shaft must be screwed clockwise into its housing as far as it will go and then unscrewed half a turn anti-clockwise. The taper in the idle lever must now be attached to the companion taper on the idle lever shaft with the idle lever in the full left lock position, secured with a light blow from a soft metal hammer and then locked with the nut provided.

STEERING TRACK ROD. RUBBER BEARINGS
DESCRIPTION AND MAINTENANCE

GENERAL. On later cars the thread bearings at either end of the track rod are replaced by rubber bearings.

DESCRIPTION. These rubber bearings consist of a silent bloc bush pressed into the track rod end, containing a taper bolt which engages in the companion taper of the drop arm and idle lever. The taper bolt is retained in position by a plain nut and pegged tab washer.

ASSEMBLY. Since the rubber bearings are subjected to torsional loading when the steering is turned from lock to lock it is essential that the drop arm and idle lever are in the straight ahead position before the taper bolts of the bearings are engaged and located in position.

The following assembly procedure must, therefore, always be adopted or excessive load will be applied and damage will be caused to the rubber bearings. Turn the steering drop arm and idle lever to the straight ahead position. Enter the tapers of the bearing bolts into the companion tapers of the drop arm and idle lever. Locate with a light blow from a soft metal hammer and secure with plain nuts and new pegged tab washers.

STEERING UNIT. TO REMOVE. (RIGHT HAND DRIVE)

REMOVE BONNET AND SIDE PANEL. Release bonnet catches, by pushing forward the controls situated at either side under the facia board and with bonnet top panels open remove two screws from centre hinge front "T" piece. Raise front of bonnet and remove forward. Remove three countersunk screws from top face of bonnet right hand side panel and lift out side panel.

REMOVE STEERING WHEEL AND MANETTE CONTROL. Disconnect battery positive lead. Set road wheels in straight ahead position, that is, parallel to the centre line of the car. Disconnect manette control wiring from sockets in junction box on wing valance (3 wires) and from connector to horn relay (1 wire). Release two countersunk grub screws in steering wheel hub and withdraw manette control complete with column wiring harness. Rotate steering wheel adjustment knurled ring until it is free. Remove circlip at top of splined portion of inner column. Draw off steering wheel. (Plate I.2.)

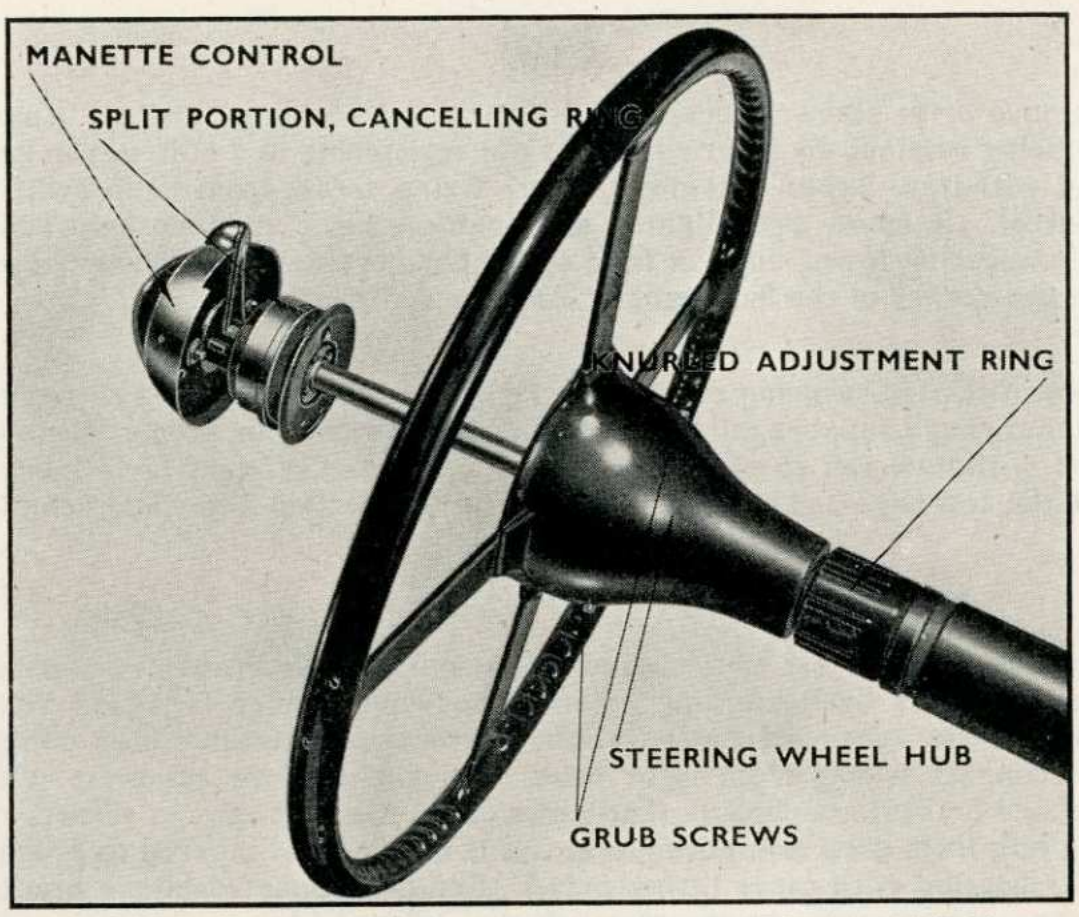


PLATE I.2 STEERING WHEEL AND MANETTE CONTROL

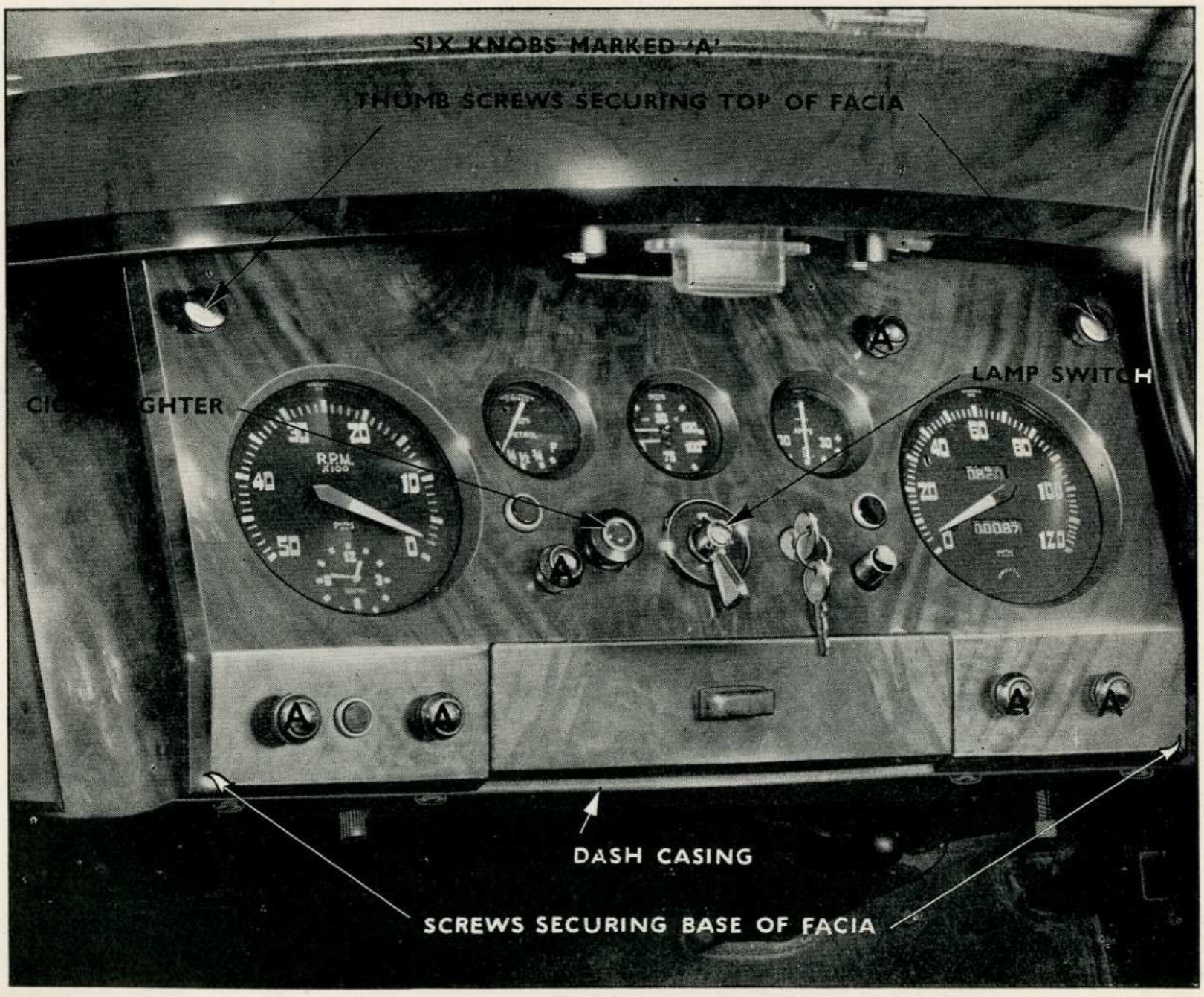


PLATE I.3 CENTRE FACIA. REMOVAL

REMOVE CENTRE FACIA AND GLOVE BOX FACIA. Remove drive screws securing dash casing and withdraw casing. Remove six control knobs all being retained by a spring loaded pin registering in a hole in the knob. Press in the pins and withdraw knobs. Remove centre fixing screw from lamp switch control and remove control. Remove cigar lighter and ignition key. Remove two screws, one from either side, securing lower edge of facia to support brackets. Remove two chrome plated screws, each passing through a top corner of the facia panel. Remove centre facia.

Remove two screws now disclosed securing edge of the right hand glove box facia adjacent to instrument carrier and three screws passing through support rail into bottom edge of glove box facia. Remove two screws at either end of support rail and withdraw rail to effect clearance for removal of right hand glove box facia. Tilt facia, away from operator at the top edge and towards operator at the bottom edge, and remove into car off steering column.

DISCONNECT CONNEC-TIONS. Remove driver's seat by withdrawing six nuts, three off each runner, and lift seat out of car. Remove bolts from steering column top clamp under facia and remove clamp. Remove radiator tie rods. Disengage rubber grommet between outer column and floating dash. (Disconnect wiring from right hand horn and remove complete with bracket, this being held by the upper wishbone bracket rear bolt.) (Early cars only.) Jack up car and remove right hand front wheel. Remove thread bearing bolt from drop arm noting that this is knurled and tapered to prevent rotation (Plate I.8). (Later cars have rubber bearing with taper fitting only.) Remove upper wishbone bracket front securing bolt which locates the steering unit trunnion to the chassis frame. (Plate I.4.)

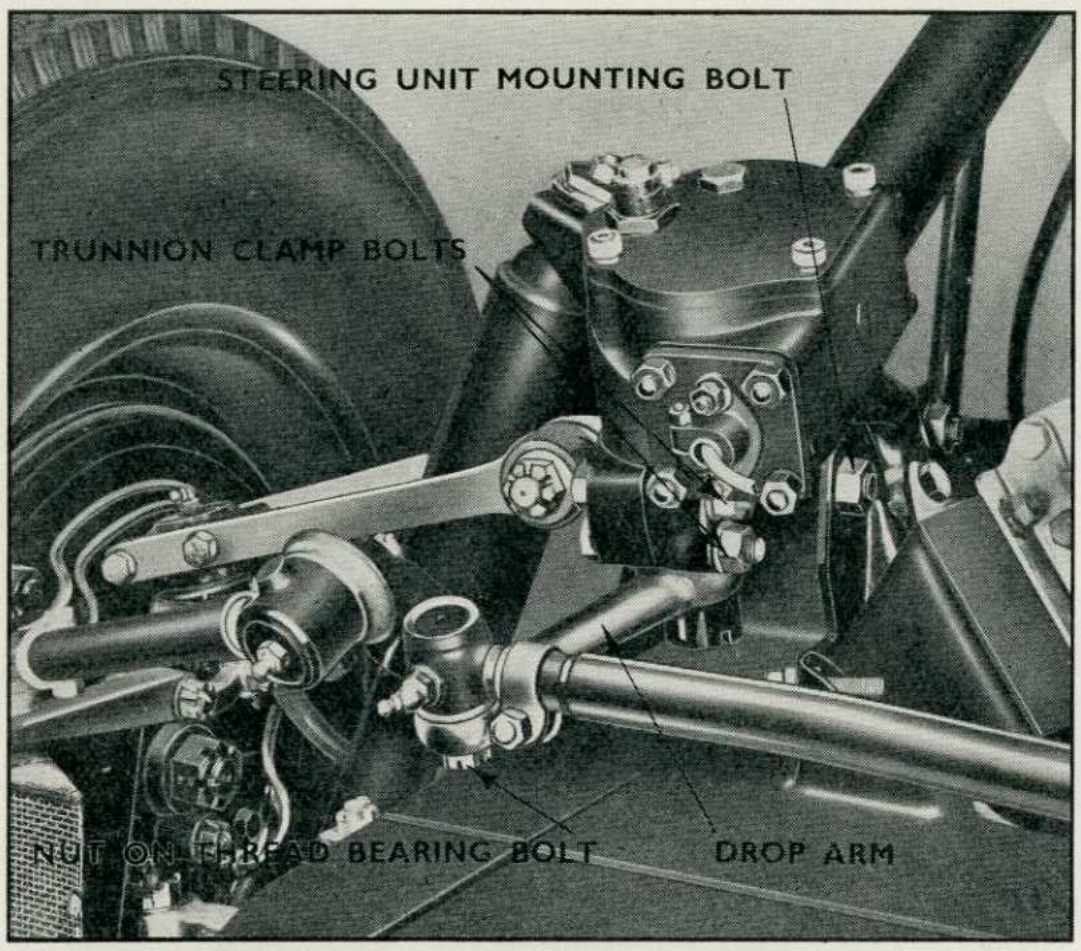


PLATE I.4. STEERING UNIT MOUNTING

REMOVE STEERING UNIT. Turn drop arm to full left lock. Draw unit backwards and inwards towards engine. Raise at lower (steering box) end and withdraw forward.

STEERING UNIT. TO REMOVE. (LEFT HAND DRIVE)

GENERAL. The procedure is similar to that detailed for right hand drive models as described on page 1.6 and the following remarks are intended to be read in conjunction with those given in paragraph "Steering Unit. To Remove. (Right Hand Drive)."

REMOVE BONNET AND SIDE PANEL. In this case remove left hand bonnet side panel. (Slide rubber sleeves off adaptors on radiator block and air conditioner motor and lift out heater air duct. Fitted to early cars only.)

REMOVE STEERING WHEEL AND MANETTE CONTROL. The procedure is the same as for right hand drive models.

REMOVE CENTRE FACIA AND GLOVE BOX FACIA. The procedure is the same as for right hand drive models. In this case the left hand glove box facia will be removed.

DISCONNECT CONNEC-TIONS. The procedure is the same as for right hand drive models except that the left hand front wheel will be removed and the following additional operations are necessary.

REMOVE AIR CONDITIONER MOTOR. Remove air conditioner motor and fan assembly from floating dash to provide clearance for removal of steering unit. (Early cars only.)

REMOVE AIR SILENCER AND MANIFOLD. Remove rocker cover centre dome nut and setscrew passing through steady bracket into front of air silencer body and remove silencer. Remove four nuts securing air silencer manifold to carburettor flanges and remove manifold.

REMOVE CAR-BURETTORS. Disconnect distributor vacuum feed pipe from front carburettor by unscrewing union. Disconnect petrol flexible feed pipe. Disconnect auxiliary starting carburettor solenoid wire at thermostat switch in water manifold. Disconnect solenoid feed wire. Unscrew auxiliary starting carburettor feed pipe union from cylinder head on $2\frac{1}{2}$ litre and self starting carburettor on $3\frac{1}{2}$ litre. Disconnect throttle linkage at rear flexible joint. Release overflow pipes. Remove four carburettor flange nuts and withdraw carburettors.

REMOVE DYNAMO. Disconnect wires from dynamo noting that "Yellow" wire is connected to terminal "D" (large terminal) and "Yellow with Green" wire to terminal "F" (small terminal). Remove adjusting bolt situated at top of dynamo and swing dynamo towards engine to free fan belt. Disengage fan belt from dynamo pulley. Remove two securing bolts situated under dynamo and lift out dynamo.

REMOVE STEERING UNIT. Turn drop arm to full right lock. Draw unit backwards and inwards towards engine. Raise at lower (steering box) end and withdraw forward.

STEERING UNIT. TO REFIT

GENERAL. Refitting is the reverse of the procedure for removal given on page 1.6. for right hand drive and page 1.9 for left hand drive. Special attention should, however, be given to the following points.

REFIT STEERING UNIT. Turn the drop arm to full left lock for right hand drive models and full right lock for left hand drive models before refitting. Do not forget to fit the rubber grommet to the column before offering up unit.

REFIT CONNECTIONS. Before tightening steering unit mounting bolt, trunnion clamp bolts and top clamp under facia ensure that the unit is not strained or distorted. (Plate 1.4.) When refitting thread bearing bolt to drop arm first turn drop arm to full left lock. (With rubber bearing, on later cars, turn drop arm to straight ahead position.) This applies to both right hand and left hand steering. Rotate thread bearing as far as it will go clockwise into its housing and then unscrew anti-clockwise half a turn. Enter the taper of the thread bearing bolt (or rubber bearing bolt on later cars) into the companion taper of the drop arm, lock with a light blow from a soft metal hammer and secure with slotted nut and new split pin. (Plain nut and new pegged tab washer on later cars.)

REFIT STEERING WHEEL AND MANETTE CONTROL. Set the road wheels in the straight ahead position. Fit steering wheel on splines of inner column and secure with circlip. Pass the column wiring harness down the centre of the inner column. Centralise the trafficator hand control and ensure that the split portion of the cancelling ring is facing the top centre of the steering wheel. (Plate 1.2.) Enter the manette control into the hub of the wheel exercising care not to damage the key and keyway of the stator tubes when they engage. When the manette control is in position locate with the two grub screws. Check that the trafficators cancel evenly on either side of the straight ahead position. Tighten knurled adjustment ring at base of steering wheel hub.

STEERING UNIT. TO DISMANTLE

(Refer to Plate 1.5.)

GENERAL. Remove the steering unit as described on page 1.6 for right hand drive cars and page 1.9 for left hand drive cars. Left hand and right hand steering units are not interchangeable.

REMOVE COVER PLATE. Remove three nuts and spring washers and one setscrew securing cover plate to steering box. Remove cover plate together with rocker shaft adjuster and pre-loading spring observing jointing washer fitted between cover and box. Withdraw pre-loading setscrew, locknut and adjuster.

REMOVE DROP ARM AND ROCKER SHAFT. Remove the split pin and castellated nut securing the drop arm to the rocker shaft. Observe line scribed on drop arm and rocker shaft to facilitate correct assembly. Using a suitable extractor draw the drop arm off the splines on the rocker shaft. (Under no circumstances must the drop arm be hammered off otherwise indentation and damage will be caused to the ball tracks.) If no extractor is available the gear should be turned over and the cover plate joint face of the steering box suitably supported leaving the rocker shaft clear when the rocker shaft can be driven through the drop arm using a soft metal hammer. Observe roller on spigot of main nut which should now be removed. Remove and scrap oil seal at base of rocker shaft lower bush.

REMOVE OUTER COLUMN. Remove four nuts and spring washers securing outer column to steering box and withdraw outer column observing jointing washer fitted between. Withdraw ball race observing packing washer fitted at column end of outer race. Ensure that no balls are lost during this operation. If necessary, the column top bush and felt washer may be withdrawn.

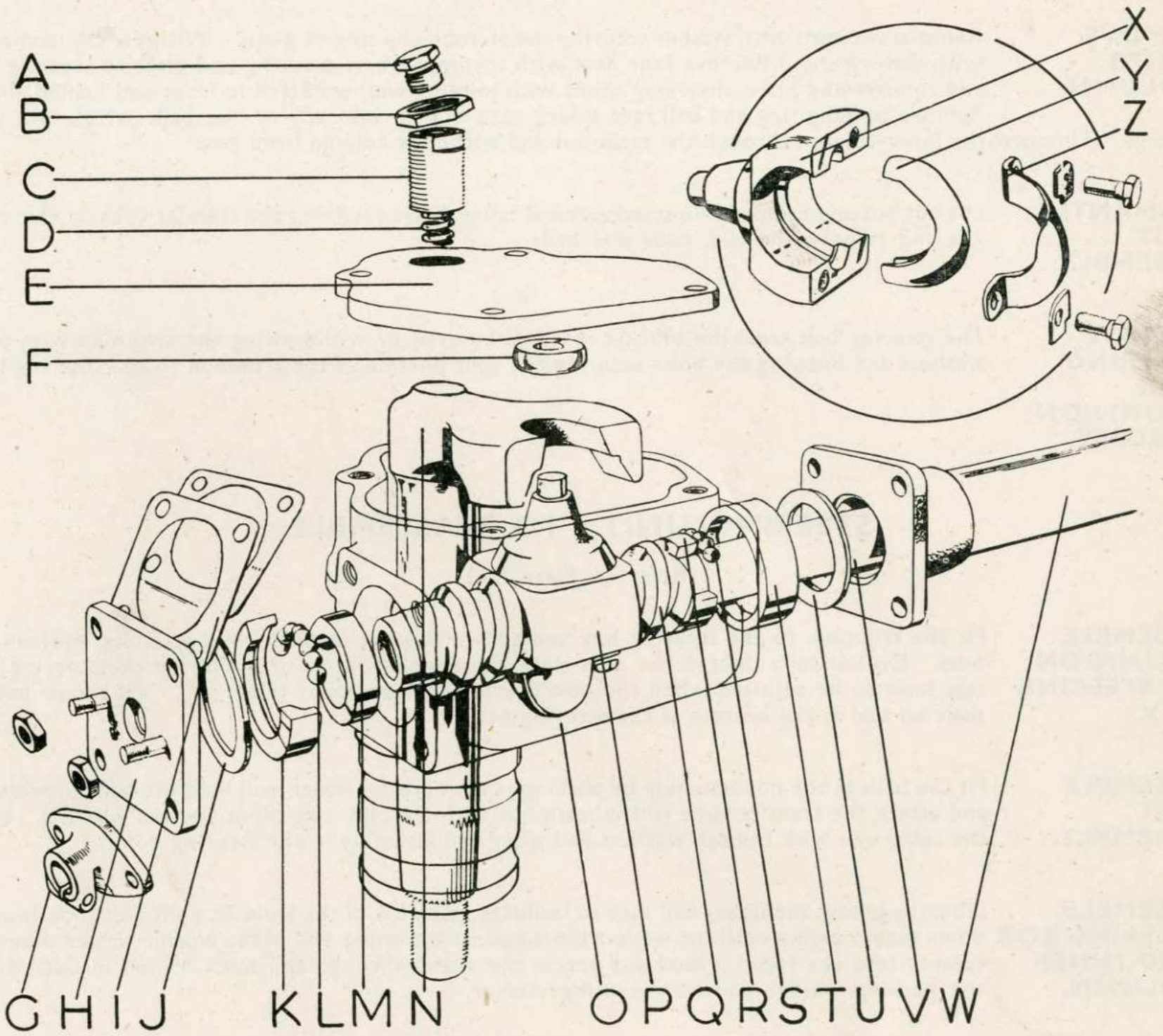


PLATE I.5. STEERING UNIT. (Exploded view)

A. Rocker Shaft Adjustment. Preload Setscrew.
B. Rocker-Shaft Adjustment. Locknut.
C. Rocker-Shaft Adjustment. Adjuster.
D. Rocker-Shaft Adjustment. Preload Spring.
E. Cover Plate.
F. Roller on Nut Spigot.
G. Stator Tube Clip.
H. End Plate.
I. Adjustment Shims. (Inner Column End Play.)
J. Packing Ring.
K. Ball Race. Lower.
L. Balls.
M. Washer.
N. Rocker-Shaft.
O. Steering Box.
P. Nut.
Q. Worm.
R. Washer.
S. Balls.
T. Ball Race. Upper.
U. Packing Ring.
V. Inner Column.
W. Outer Column.
X. Nut with Ball Track.
Y. Transfer Tube.
Z. Clip retaining Transfer Tube.

REMOVE INNER COLUMN Remove two nuts with washer securing stator tube clip to end plate. Withraw clip complete with stator tube. Remove four nuts with spring washers securing end plate to steering box and remove end plate observing shims with jointing washers fitted in front and behind shims. Remove packing ring and ball race taking care not to lose any of the balls which will now emerge. Unscrew the inner column through the main nut and withdraw column from box.

DISMANTLE NUT ASSEMBLY. Lift out nut and remove two setscrews and tab washers retaining the transfer tube to the main nut and remove the clip, tube and balls.

REMOVE STEERING BOX TRUNNION BRACKET. The steering box trunnion bracket may be removed by withdrawing the two nuts with plain washers and drawing the bolts securing the split portion of the trunnion to the steering box.

STEERING UNIT. TO REASSEMBLE

(Refer to Plate 1.5.)

ASSEMBLE TRUNNION TO STEERING BOX. Fit the trunnion to the steering box and secure in position with the two bolts, washers and nuts. Do not fully tighten the nuts since the position of the trunnion on the steering box may have to be adjusted when the unit is fitted to the chassis (Plate 1.4). Fit a new rocker shaft oil seal at the bottom of the steering box.

ASSEMBLE NUT ASSEMBLY. Fit the balls in the nut assembly by packing it with grease, which will hold the balls in position, and attach the transfer tube to the main nut with the clip, two studs and tab washers. Lock the setscrews with the tab washers and place the assembly in the steering box.

ASSEMBLE STEERING BOX AND INNER COLUMN. Liberally grease the upper ball race to facilitate assembly of the balls, fit balls and slide bearing down inner column until the washer butts against the upper end of the worm. Enter the inner column into the steering box and screw the worm through the nut. When in position fit the packing washer and new jointing washer.

FIT OUTER COLUMN. Slide the outer column over the inner column and secure in position with four nuts and spring washers.

REFIT END PLATE. Fit a new jointing washer to the bottom face of the steering box and assemble the lower ball race and packing washer. Grease should be used to facilitate assembly of the balls. Fit the ball race and packing washer followed by the necessary number of shims to eliminate all end float of the inner column. Finally fit a new jointing washer on the outside face of the shims followed by cover plate retaining this in position with four nuts and spring washers. It is important to observe that whilst there should be no end play in the inner column it is essential that the inner column is not pre-loaded otherwise indentation of the ball races may take place.

FIT STATOR TUBE. Refit stator tube and clip to the end cover and secure in position with two nuts and washers.

REFIT ROCKER SHAFT AND COVER PLATE. Ensure that the roller is in position on the spigot of the main nut. Insert the rocker shaft through the rocker shaft bushes and the oil seal already in position at the bottom of the steering box. Refit the cover plate with a new jointing washer interposed and secure in position with three nuts and spring washers and one setscrew.

REFIT DROP ARM. Refit the drop arm ensuring that the locating line scribed on it matches the similar line on the end of the rocker shaft. Secure in position with the castellated nut and fit a new split pin.

ADJUSTING ROCKER SHAFT END FLOAT. Turn the steering unit to the straight ahead position, that is, with the drop arm in line with the column when the nut will be in the centre of the worm. Fit the adjusting screw to the cover but with the pre-loading spring and setscrew removed. Screw down the adjuster until it just touches the rocker shaft and lock with the lock nut provided. It is of the utmost importance that this adjustment is made with the steering unit in the straight ahead position as the conical faces of the rocker shaft are so designed as to give slightly more backlash towards full lock since the majority of wear takes place in the straight ahead position. If the rocker shaft is adjusted without end play on full lock it will be tight in the straight ahead position. Having arrived at the correct adjustment in the straight ahead position with no end float on the rocker shaft refit the pre-loading spring and setscrew.

GENERAL. Test the gear for free rotation from one lock to another. Refit unit to chassis as described on page I.10. Remove the filler plug from the top cover and fill with recommended lubricant. Page I.5. Observe that the bush at the top end of the column requires no adjustment or lubrication.

STEERING COLUMN. TOP BUSH. REMOVE AND REFIT

GENERAL. The steering column top bush may be withdrawn without removing the steering unit from the chassis frame. It will be found in practice that this bush will not be affected by wear except after very high mileages.

REMOVE. Disconnect battery positive lead. Set road wheels in straight ahead position, that is, parallel to the centre line of the car. Disconnect manette control wiring from sockets in junction box on wing valance (3 wires) and from connector to horn relay. (1 wire.) Release two countersunk grub screws in steering wheel hub and withdraw manette control complete with column wiring harness. Rotate steering wheel adjustment knurled ring until it is free. Remove circlip at top of splined portion of inner column. Draw off steering wheel. Insert two small screws in the end of the bush diametrically opposite one another and engaging a suitable puller on the screws draw out the bush and remove the oil impregnated felt washer. (If a puller is not available it will be found that stout cord attached to the screws may be used to withdraw the bush.)

REFIT. Refitting is the reverse of the above procedure, but attention should be paid to the following points when refitting the steering wheel and manette control. Set the road wheels in the straight ahead position. Fit steering wheel on splines of inner column and secure with circlip. Pass the column wiring harness down the centre of the inner column. Centralise the trafficator hand control and ensure that the split portion of the cancelling ring is facing the top centre of the steering wheel (Plate I.2). Enter the manette control into the hub of the wheel exercising care not to damage the key and keyway of the stator tubes when they engage. When the manette control is in position locate with the two grub screws. Check that the traffi-cators cancel evenly on either side of the straight ahead position. Tighten knurled adjustment ring at base of steering wheel hub.

STEERING UNIT. ROCKER SHAFT. TO ADJUST

GENERAL. Jack up the front of the car and remove the road wheel adjacent to the steering box. Turn the steering unit to the straight ahead position. Check the end float in the rocker shaft by applying a light bar under the castellated nut attaching the drop arm to the rocker shaft. There should be no end float in the rocker shaft.

ADJUSTMENT. If adjustment is required retain the steering in the straight ahead position and remove the pre-loading setscrew and spring. (Plate I.5.) Release the adjusting screw lock nut and rotate the adjusting screw until there is no end float on the rocker shaft. Tighten lock nut. Replace and tighten the spring and pre-loading setscrew. (Plate I.5.) It is important that adjustment is carried out with the road wheels in the straight ahead position since the conical faces on the rocker shaft are so designed as to give slightly more backlash towards full lock since the majority of wear takes place in the straight ahead position.

If the rocker shaft is adjusted without end play on full lock it will be tight in the straight ahead position. Test the steering from lock to lock to ensure that it is free. Replace road wheel and remove jack.

STEERING IDLE LEVER ASSEMBLY. TO REMOVE, DISMANTLE, REASSEMBLE AND REFIT

REMOVE. Turn the steering to a position where the nut securing the track rod idle lever thread bearing may be removed. Withdraw split pin and slotted nut. (Pegged tab washer and plain nut on later cars.) Tap the track rod thread bearing (rubber bearing, later cars) out of the taper in the idle lever. Remove upper wishbone front mounting bolt which passes through the idle lever housing and the further retaining bolt fitted underneath. Lift out idle lever housing complete with idle lever.

DISMANTLE. Remove the split pin and slotted nut (pegged tab washer and plain nut on later cars) and draw the idle lever off the taper on the idle lever shaft. Remove the rubber seal at the bottom of the housing and unscrew the idle lever shaft anti-clockwise out of the housing. Remove four screws securing cover to top of housing and remove cover.

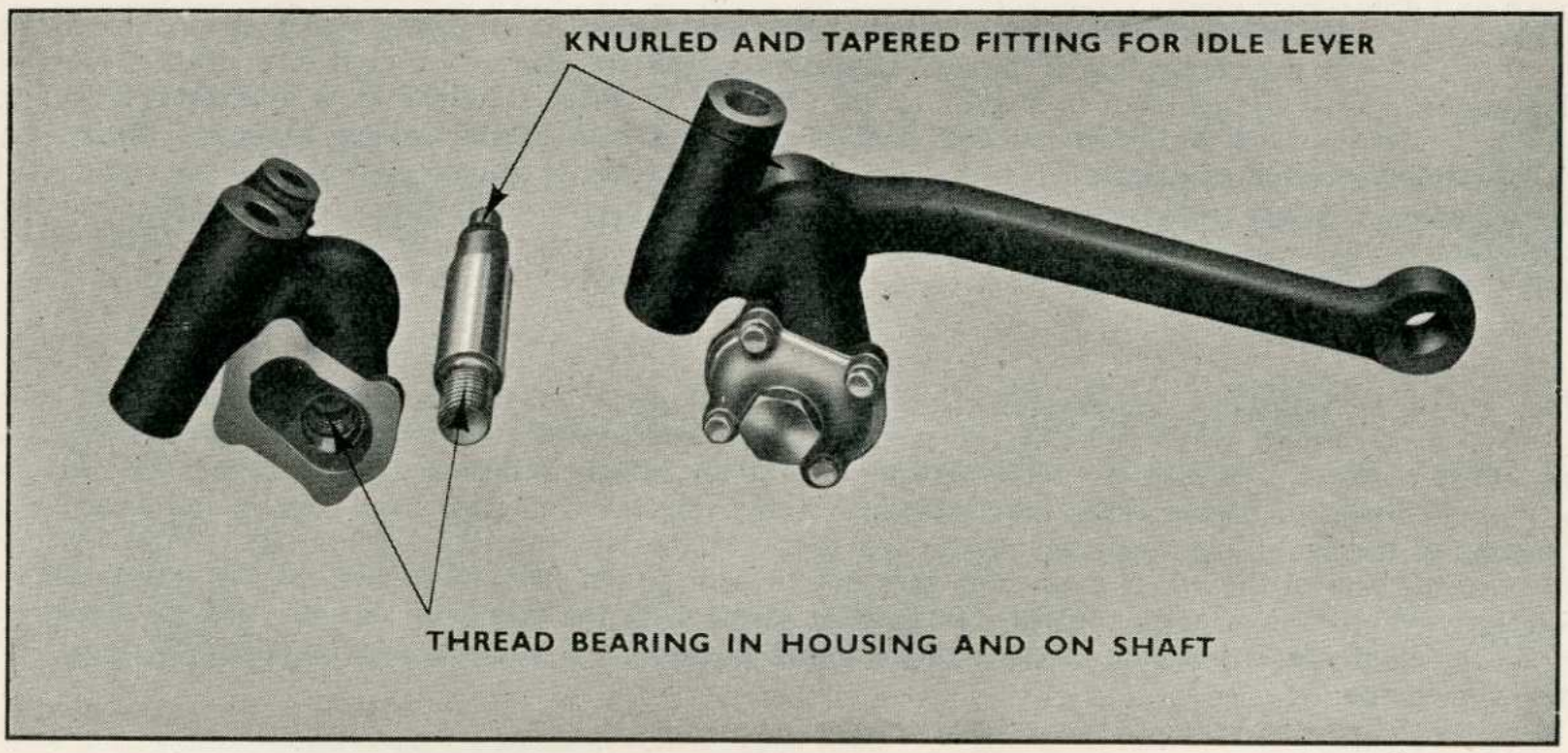


PLATE I.6. STEERING IDLE LEVER ASSEMBLY

REASSEMBLE. Replace the top cover and secure with four screws. Offer up the idle lever shaft into the housing and rotate clockwise as far as it will go. Fit a new rubber seal to the bottom of the shaft. Rotate the idle lever shaft anti-clockwise half a turn and offer up the idle lever to the taper on the shaft ensuring that the idle lever is in the full left lock position. Tap the idle lever on to the taper and secure in position with the slotted nut and new split pin (or plain nut and new pegged tab washer on later cars).



PLATE I.7. STEERING IDLE LEVER

REFIT. Mount the idle lever housing at the front of the upper wishbone securing bracket on the chassis frame and lock with the two bolts and nuts. Turn the idle lever to the full left lock position (this applies to both right hand and left hand steering). Rotate track rod thread bolt as far as it will go clockwise into its housing and then unscrew half a turn, tap in to the companion taper of the idle lever with a light blow from a soft metal hammer. (On later cars with rubber bearing turn idle lever to straight ahead position before fitting bearing.) Secure in position with slotted nut and new split pin (plain nut and new pegged tab washer on later cars). Remove the hexagon plug situated on top of the idle lever housing and fill with recommended lubricant. (Plate I.1.)

STEERING TRACK ROD. REMOVE, DISMANTLE, REASSEMBLE AND REFIT

REMOVE. Jack up car and remove both front road wheels. Moving the steering from side to side as necessary to gain access to the track rod ends, remove the split pins and slotted nuts securing the inner ball joint assemblies of the connecting tubes to the track rod ends and tap the ball joints out of the tapers. Remove the slotted nuts and split pins (plain nuts and pegged tab washers on later cars) retaining the track rod assembly to the steering drop arm and idle lever respectively. Tap the thread bearings (or rubber bearings, later cars) out of the drop arm and idle lever observing that these are a tapered and knurled fitting. Lift out track rod assembly.

DISMANTLE. Slacken the clamps at either end of the track rod tube and unscrew until the tube can be removed. Observe that the tube is cranked to allow the starting handle to engage the crankshaft dog and that the cranked portion must face the bottom when the track rod is in position. On later cars a turn buckle (Plate I.9) is fitted at the left hand end of the track rod and this may be dismantled by slackening the clamp securing the turn buckle to the track rod tube and unscrewing the turn buckle using a tommy bar engaging in the hole provided. Remove the rubber seals from the shanks of the thread bearings and rotate the thread bearings anti-clockwise out of their housing observing the pre-loading springs fitted in the recess at the top of the thread bearing bolts. Later type rubber bearings cannot be dismantled and must be renewed, if necessary, as assemblies.

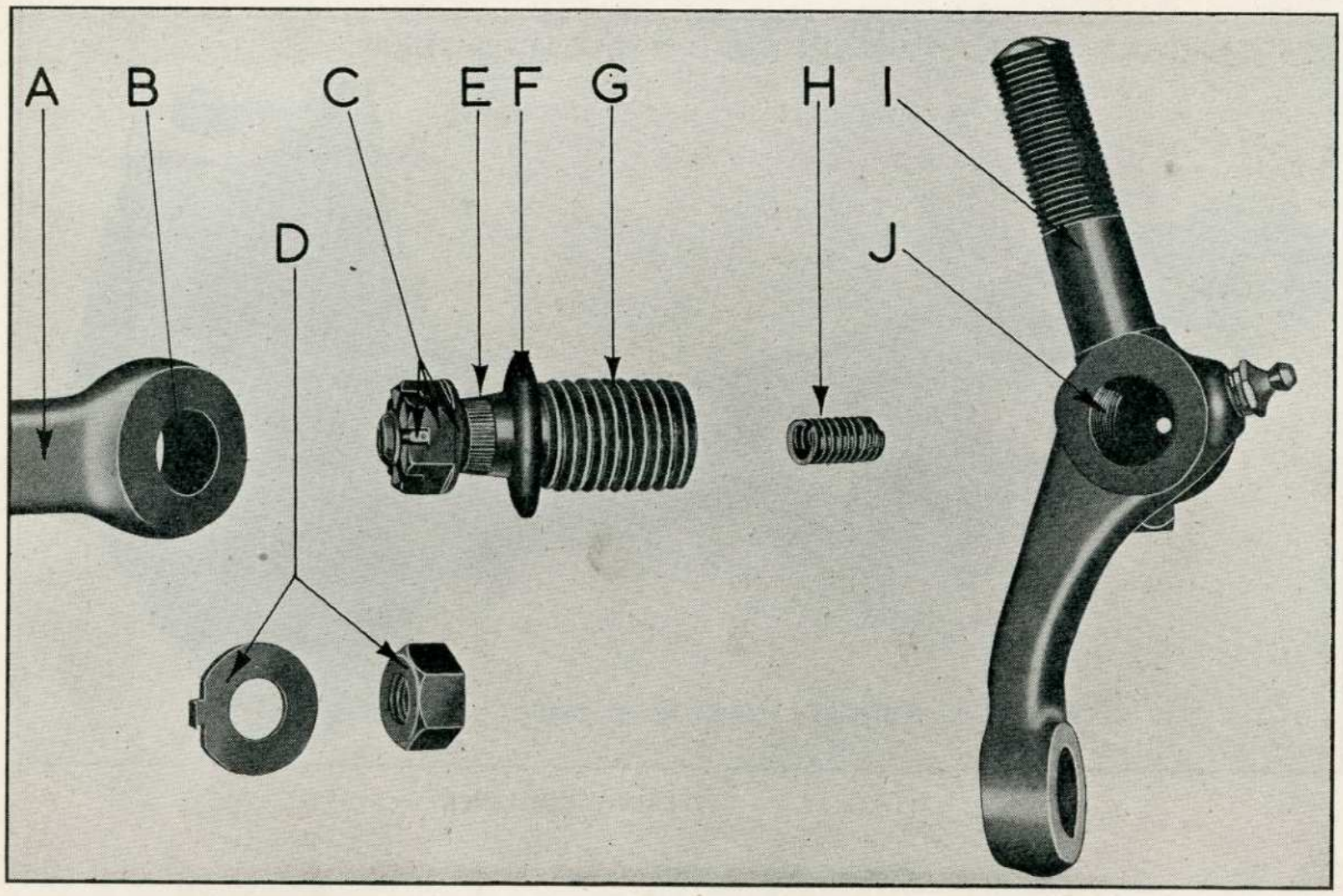


PLATE I.8. TRACK ROD THREAD BEARING ASSEMBLY

A. Steering Drop Arm (or Steering Idle Lever).
B. Taper Hole.
C. Slotted Nut, Plain Washer and Split Pin.
D. Plain Nut and Pegged Tab Washer.
(Alternative to "C", later cars.)
E. Knurled and Tapered Shank.
F. Rubber Seal.
G. Thread Bearing Bolt.
H. Preloading Spring.
I. Track Rod End.
J. Thread Bearing Housing.

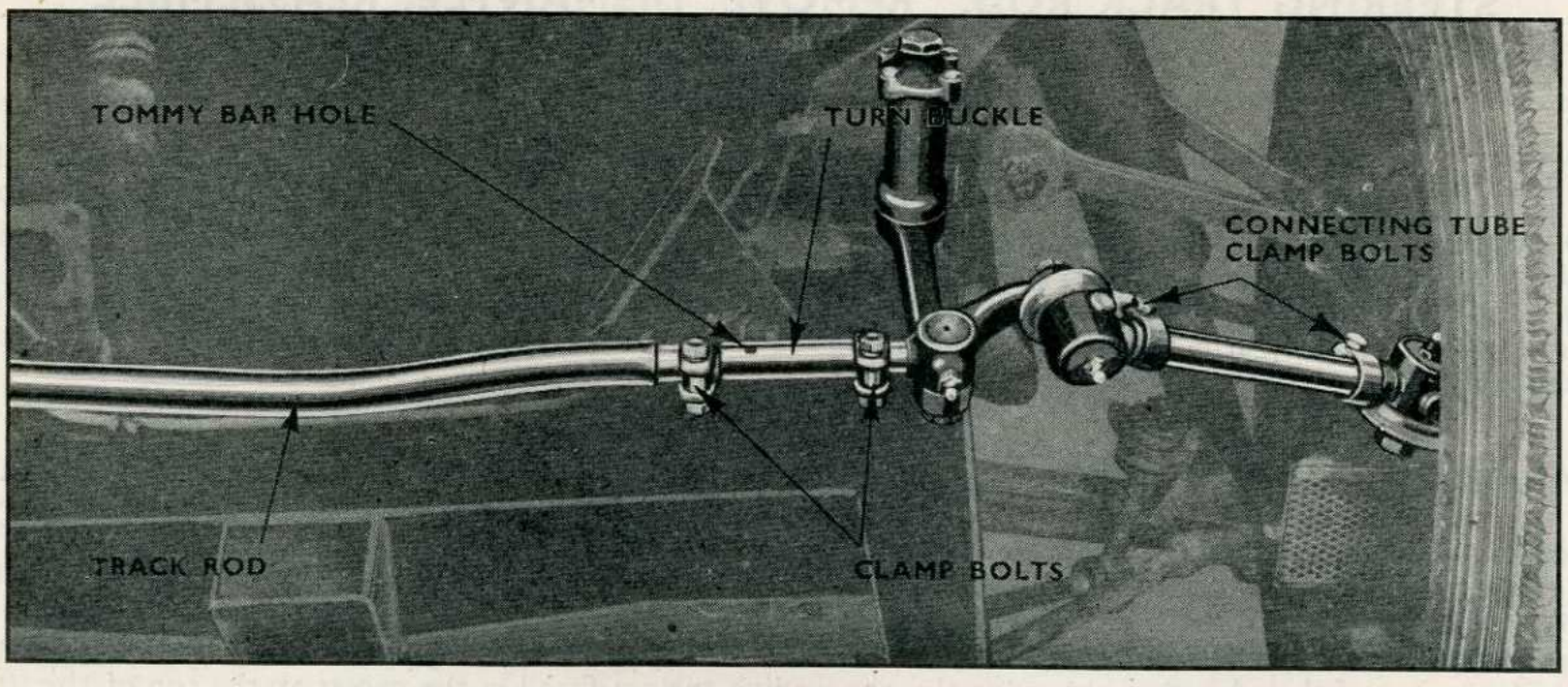


PLATE I.9. TRACK ROD. TURN BUCKLE

REASSEMBLE. Reassembly of the track rod tube (and turn buckle where fitted) is the reverse of the dismantling operation. To reassemble the thread bearings replace the pre-loading springs and screw the thread bearings clockwise into their housing as far as they will go. Fit new rubber seals to shanks of thread bearing bolts.

REFIT. Turn the drop arm and idle lever into the full left lock position. (Straight ahead position for rubber bearings.) Ensure that the two thread bearings are screwed clockwise as far as they will go and then unscrew them half-a-turn anti-clockwise. Enter the tapered and knurled shank of the thread bearings (rubber bearings, tapered only) into the companion tapers of the drop arm and idle lever respectively and secure in position with a light blow from a soft metal hammer. Secure the thread bearings with the slotted nuts and new split pins (plain nuts and new pegged tab washers, later cars). Enter the connecting tube ball joints into the extremities of the track rod and secure in position with slotted nuts and new split pins. In all cases where the track rod has been dismantled, reset steering track as described on page I.19.

STEERING CONNECTING TUBES. REMOVE, DISMANTLE, REASSEMBLE AND REFIT

REMOVE. Remove slotted nuts and split pins securing the ball joints at either end of each connecting tube to the steering arms and extremities of the track rod respectively. Tap the ball joints out of their tapers and remove connecting tubes.

DISMANTLE. Remove the clamps at either end of the connecting rod tubes and unscrew the ball joints from either end. The ball joint assemblies cannot be dismantled further and should be renewed, if necessary, as assemblies.

REASSEMBLE. Screw the ball joints into either end of the connecting tubes and secure in position with clamps provided. The clamp locking bolts should be positioned on the rear of the tubes to ensure that they do not foul the road wheel balance weights on full lock. It is of the utmost importance that the lengths of the connecting tubes be maintained within $\frac{1}{16}$" (1.6 mm.) of 9" (22.86 cm.) from ball centre to ball centre. Adjust the connecting tubes to this length before finally securing the clamps.

REFIT. Refit the tapers of the ball joint assemblies into the companion tapers of the steering arms and extremities of the track rod, tap with a soft metal hammer and lock in this position with the slotted nuts and new split pins. Check steering track and reset, if necessary, as described on page I.19.

STEERING SWIVEL. UPPER. REMOVE AND REFIT

GENERAL. The steering upper swivel also serves as the articulation between the outer extremity of the upper wishbone levers and the stub axle carrier.

REMOVE. Jack up front of car and remove road wheels. Release locking plates and remove nuts and bolts passing through the upper wishbone ball assembly and the two upper wishbone levers. Observe castor shims fitted between each face of the ball assembly and the respective wishbone lever (Plate I.10). Do not lose or transpose shims from front to rear or rear to front since this will alter castor angle. Remove brake drums. Withdraw split pins, slotted nuts and washers securing steering arms to stub axle carriers. Withdraw front bolt on each side through back plate to allow steering arms to be tilted. Remove steering arms and place clear. Remove split pin and slotted nut from ball pin and tap assembly out of stub axle carrier. Observe rubber seal between ball joint housing and stub axle carrier. The ball assembly cannot be dismantled further and should a replacement be required a new assembly should be fitted (Plate I.10).

REFIT. Refitting is the reverse of the above procedure but ensure that the same number of castor shims are fitted and in their original location. If any doubt exists as regards shimming check castor and reset, if necessary, as described in Section J. "Front Suspension."

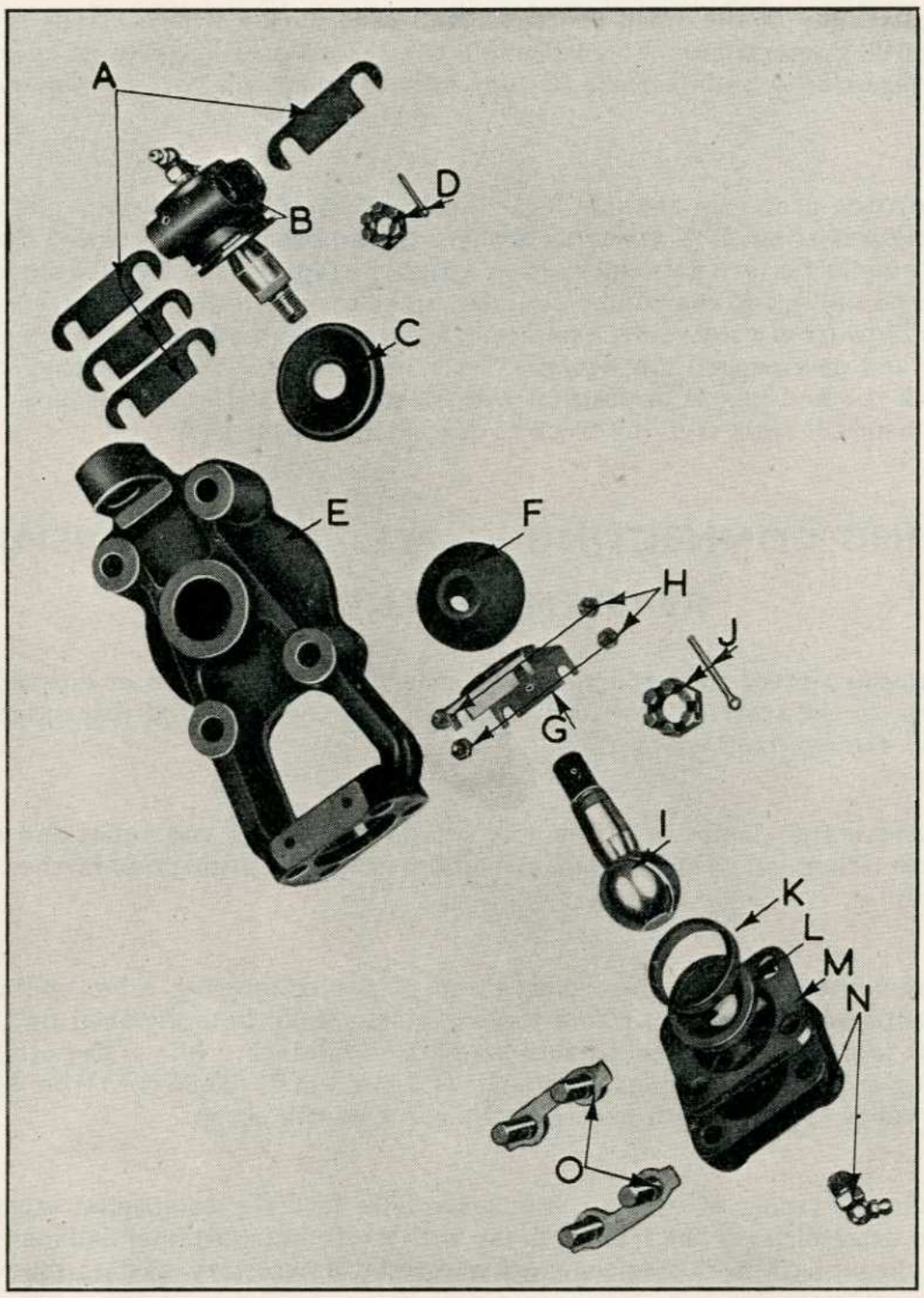


PLATE 1.10 UPPER AND LOWER STEERING SWIVELS

A. Castor Shims.
B. Upper Swivel Assembly with Grease Nipple.
C. Rubber Seal. Upper Swivel.
D. Split Pin and Slotted Nut.
E. Stub Axle Carrier.
F. Rubber Seal. Lower Swivel.
G. Seal Carrier.
H. Seal Carrier Retaining Screws.
I. Ball Pin.
J. Split Pin and Slotted Nut.
K. Spigot over Ball Pin.
L. Socket supporting Ball Pin.
M. Adjusting Shims.
N. Ball Socket Cap and Grease Nipple.
O. Ball Socket Cap Setscrews and Tab Washers.

STEERING SWIVEL. LOWER. REMOVE AND REFIT

GENERAL. The steering lower swivel also serves as the articulation between the outer extremities of the lower wishbone lever and the stub axle carrier.

REMOVE. Jack up front of car and remove road wheels. Release tab washers locating the four setscrews which retain the ball socket cap and remove cap. Observe shims (.004" (.10 mm.) thick), spigot over ball pin and socket supporting ball pin which can now be removed. Remove split pin and slotted nut from shank of ball pin and drive ball pin downwards out of its taper fixing in the outer extremity of the lower wishbone lever. The seal assembly will be left in position between lower wishbone lever and stub axle carrier. (Plate I.10.)

Should it be required to remove the seal assembly it will be necessary to remove the brake back plate. Remove four screws retaining seal carrier to stub axle carrier and remove seal assembly.

REFIT. Refitting is the reverse of the above procedure. When refitting the ball socket cap position a suitable number of shims between cap and stub axle carrier to eliminate all end float between ball and housing.

STEERING ARMS. TO REMOVE

REMOVE. Jack up and remove the road wheel and brake drum adjacent to the steering arm affected. Remove grid from brake air scoop. Withdraw split pin and slotted nut securing connecting tube ball joint to steering arm. Tap joint out of taper in steering arm and place clear. Remove split pins and slotted nuts securing steering arm to bolts passing through brake back plate and stub axle carrier. Remove steering arm.

REFIT. Refitting is the reverse of the above procedure.

STEERING TRACK. TO ADJUST

Check tyre pressures and correct, if necessary, to front 23lbs. per sq. in. (1.6 kg/cm^2), rear 25lbs. per sq. in. (1.8 kg/cm^2).

Spin wheels and check for running true. Set wheels in straight ahead position. Check the lengths of the two short outer track rods. It is of the utmost importance that their lengths be maintained within $\frac{1}{16}$" (1.6 mm.) of 9" (22.86 cm) from ball centre to ball centre. Check the track setting using an approved track-setting gauge. This should be $\frac{1}{8}$"—$\frac{3}{16}$" (3.2 mm. to 4.8 mm.) toe in. Check again after rolling car forward to turn wheels through 180°. If adjustment is required slacken off clamp bolts at either end of the track rod and rotate as necessary bearing in mind that the cranked portion must come to the bottom in order to provide clearance for the engine starting handle. Retighten clamp bolts. Should it not be possible to get the required toe in by adjustment at the centre track rod, final adjustment may be made by altering equally the length of both the short connecting tubes providing they are kept to the limits mentioned above, that is, 9" (22.86 cm.) from ball centre to ball centre, plus or minus $\frac{1}{16}$" (1.6 mm). When finally checking track, roll car forward so that wheels rotate 180° and recheck.

On later cars the track rod is modified and incorporates an adjustable turn buckle at the nearside (left hand) end of the rod. (Plate I.9.) Where a turn buckle is fitted it is no longer necessary to rotate the track rod to alter steering track and all adjustments are made at the turn buckle as follows :—

Check tyre pressures and correct, if necessary, to front 23lbs. per sq. in. (1.6 kg/cm^2), rear 25lbs. per sq. in. (1.8 kg/cm^2.)

Spin wheels and check for running true. Set wheels in straight ahead position. Check the lengths of the two short outer track rods. It is of the utmost importance that their lengths be maintained within $\frac{1}{16}$" (1.6 mm.) of 9" (22.86 mm.) from ball centre to ball centre. Check the track-setting using an approved track-setting gauge. This should be $\frac{1}{8}$" to $\frac{3}{16}$" (3.2 mm. to 4.8 mm.) toe in. Check again after rolling car forward to turn wheels through 180°. If adjustment is required first ensure that the cranked portion of the track rod comes to the bottom to provide clearance for the engine starting handle.

Slacken off clamp bolts at either end of the turn buckle and rotate turn buckle with a small tommy bar, engaging in the hole provided, until the correct setting is obtained. Retighten clamp bolts. When finally checking the track, roll the car forward so that wheels rotate 180° and recheck.

STEERING LOCK. TO ADJUST

The steering lock stops are situated on the chassis frame front cross member and consist of brackets welded to the frame with inserted setscrews and lock nuts. Rotate the steering lock stop setscrews (Plate I.1) to a position which allows $\frac{1}{4}$" (6.4 mm.) clearance between the wheel and chassis on full lock. Secure the setscrews in this position with the lock nuts provided. The locking straps on the outer ends of the two short track rods should be secured with the locking bolts at the rear to ensure that they do not foul the road wheel balance weights on full lock.

Remove Watermark
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FRONT SUSPENSION

MARK V

2½ and 3½ LITRE

CHASSIS NUMBERS

(Stamped at the front of the chassis left-hand side member)

2½ Litre	3½ Litre
Saloon	
520001 Right-Hand Drive	620001 Right-Hand Drive
527001 Left-Hand Drive	627001 Left-Hand Drive
Coupé	
540001 Right-Hand Drive	640001 Right-Hand Drive
547001 Left-Hand Drive	647001 Left-Hand Drive

The instructions in this section are presented under the following main headings which appear as sub-titles on the pages concerned and in the order shown :—

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Torsion Bar	Refit	J. 7
Torsion Bar Setting	Check and Adjust	J. 7
Upper Wishbone Lever Assembly	Remove and Refit	J. 9
Upper Wishbone Lever Assembly	Dismantle and Reassemble	J. 9
Lower Wishbone Lever Assembly	Remove and Refit	J.10
Lower Wishbone Lever Assembly	Dismantle and Reassemble	J.11
Bound Buffer	Remove and Refit	J.11
Shock Absorber	Remove and Refit	J.11
Shock Absorber	Description and Service	J.11
Anti-Roll Bar	Remove and Refit	J.13
Castor Angle	Check and Reset	J.13
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J.3	Lower Wishbone Lever. Distance Piece	J. 7
J.4	Torsion Bar Rear Reaction Lever	J. 8
J.5	Upper Wishbone Lever Assembly	J. 9
J.6	Lower Wishbone Lever Assembly	J.10
J.7	Newton Shock Absorber	J.12
J.8	Castor and Camber Shims	J.13

Remove Watermark
Wondershare PDFelement

DESCRIPTION. The torsion bars, which are 52″ (127 cm.) long, are positioned along the inner vertical faces of the chassis frame side members. The front ends of the bars occupy a position on the axis of the front wheels and the rear ends on the centre line of the chassis cruciform bracing. Both ends of the torsion bar have raised splines, a reaction lever with companion splines and clamp bolt being attached to the rear end while a splined muff is fitted to the front end (Plate J.1). The reaction lever is forked and the forks are supported on a trunnion positioned by an adjusting barrel nut and bolt, the bolt being attached to the chassis frame (Plate J.4). The splined muff at the front end is spigoted and bolted to the inner end of the lower wishbone lever.

The lower wishbone lever is mounted at its inner end to a bracket bolted to the underside of the chassis frame side member. The outer end of the lower wishbone lever carries the ball pin of the lower ball assembly which combines the function of lower steering swivel and suspension articulation. Bolted to the outer extremity of the lower wishbone lever is a tie bar which runs forward to the front end of the lower wishbone lever bracket attached to the chassis frame.

Attached to the outer extremities of both lower wishbone levers by brackets is an anti-roll torsion bar which is further supported by a rubber bush and bracket attached to the bottom face of each side member of the chassis frame at the point where the anti-roll bar passes under the frame.

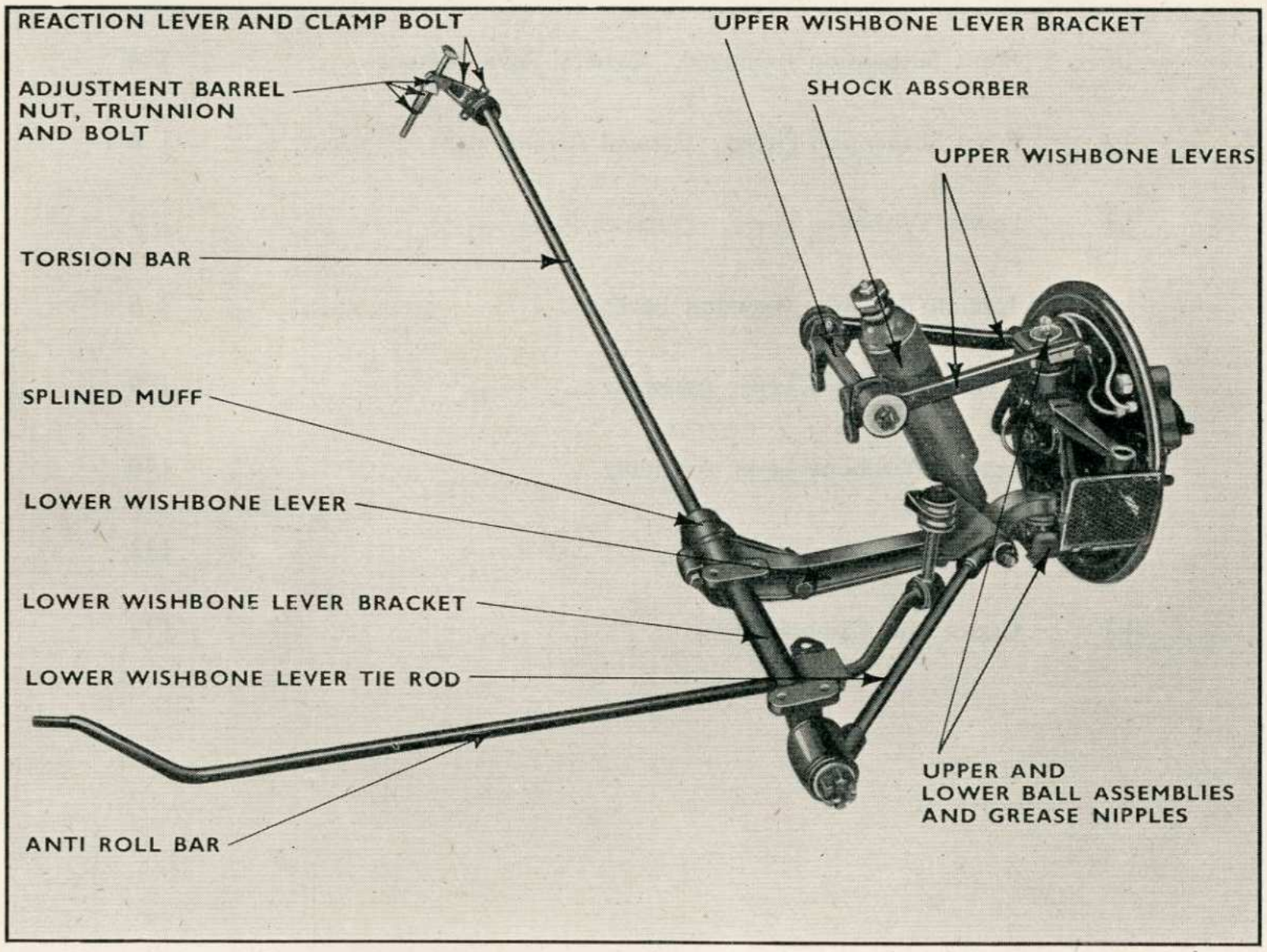


PLATE J.1. FRONT SUSPENSION REMOVED. GENERAL ARRANGEMENT

The two upper wishbone levers on each side form a triangle with their respective mounting brackets which are bolted to mounting posts situated above the chassis frame side members on the axis of the road wheels. Situated between the outer extremities of the two upper wishbone levers is the upper ball assembly which combines the function of upper steering swivel and suspension articulation.

Mounted between the outer extremities of the lower wishbone levers and the upper wishbone lever bracket mounting posts are Newton telescopic shock absorbers. Tapered rubber bushes are fitted in pairs at the front and rear ends of the brackets for both the upper and lower wishbone levers. The lower ends of the shock absorbers are mounted on Harris type bushes pre-loaded by washers and inserted split pins. If any of the above assemblies are dismantled, either for examination or replacement, it is essential that the car is in the normal riding position either before pre-loading is applied to any of the rubber bushes mentioned above or assemblies finally locked. If these precautions are not taken excessive load will be applied with consequent damage and possible premature failure of rubber bushes.

MAINTENANCE. Every 1,000 miles (1,500 kilometres) lubricate two nipples per side of the upper and lower wishbone ball assemblies with the recommended lubricant (Plate J.1.)

(Already referred to in Section I "Steering".)

Every 5,000 miles (8,000 kilometres) jack up the front of the car under the chassis front cross member until the road wheels are clear of the ground. Care must be exercised not to damage the anti-roll bar with the jack. Thoroughly clean the shock absorbers and remove the filler plugs situated on the lower members. (Plate J.8). Using a pressure oil can pump in the recommended grade of oil until excess runs out of the filler. It is of the utmost importance that the shock absorber body should be clean before this operation is carried out since grit or dirt will damage the internal parts of the shock absorber. (See page J.11 for full details of shock absorber maintenance.)

Every 5,000 miles (8,000 kilometres) check the front suspension nuts and bolts and tighten, if necessary. It is advisable at this mileage to check torsion bar settings and correct, if necessary, as described on page J.7.

RECOMMENDED LUBRICANTS

	Vacuum.	Wakefield.	Shell.	Essolube.	Price's.
Upper and Lower Wishbone Ball Assemblies. (Steering Swivels.)	Mobilgrease No. 4	Castrolease (Heavy)	Retinax R.B.	Essolube Grease	Belmoline C.

Newton Front Shock Absorbers : S.A.E. 10 Engine Oil.

FRONT SUSPENSION DATA

Type	Independent Torsion Bar.
Shock Absorbers.	Newton Hydraulic.
Castor Angle.	3/4° Negative.
Camber Angle.	1.3/4° to 2° positive.
Ground Clearance (Unladen).	7½" (19 cm.).

TORSION BAR. TO REMOVE

GENERAL. Jack up car and remove road wheel adjacent to torsion bar affected.

REMOVE SHOCK ABSORBER. Disconnect shock absorber by removing hexagon nuts at top mounting and draw shock absorber clear of mounting post. Remove split pin and washer from shock absorber lower mounting and draw off shock absorber. (If the original torsion bar is to be refitted it is only necessary to disconnect the shock absorber at the top mounting.)

RELEASE TENSION ON TORSION BAR. Remove reaction lever locking set bolt with washer passing through rear of chassis cross member into lever. Rotate adjustment barrel nut in an anti-clockwise direction until the nut is almost off the threads on the bolt (Plate J.4). (If the original torsion bar is to be refitted scribe a line at either end of bar, on muff coupling and on the reaction lever to mark their relative positions and facilitate reassembly.)

RELEASE MUFF COUPLING. Remove setscrew with spring washer passing through lower wishbone lever into muff. Remove split pin, slotted nut, washer and bolt passing through wishbone lever and muff. Tap muff coupling off register on wishbone lever to rear down raised splines on bar.

REMOVE TORSION BAR. Remove nut, washer and bolt clamping reaction lever to torsion bar and withdraw bar forward under lower wishbone bracket. Remove muff coupling.

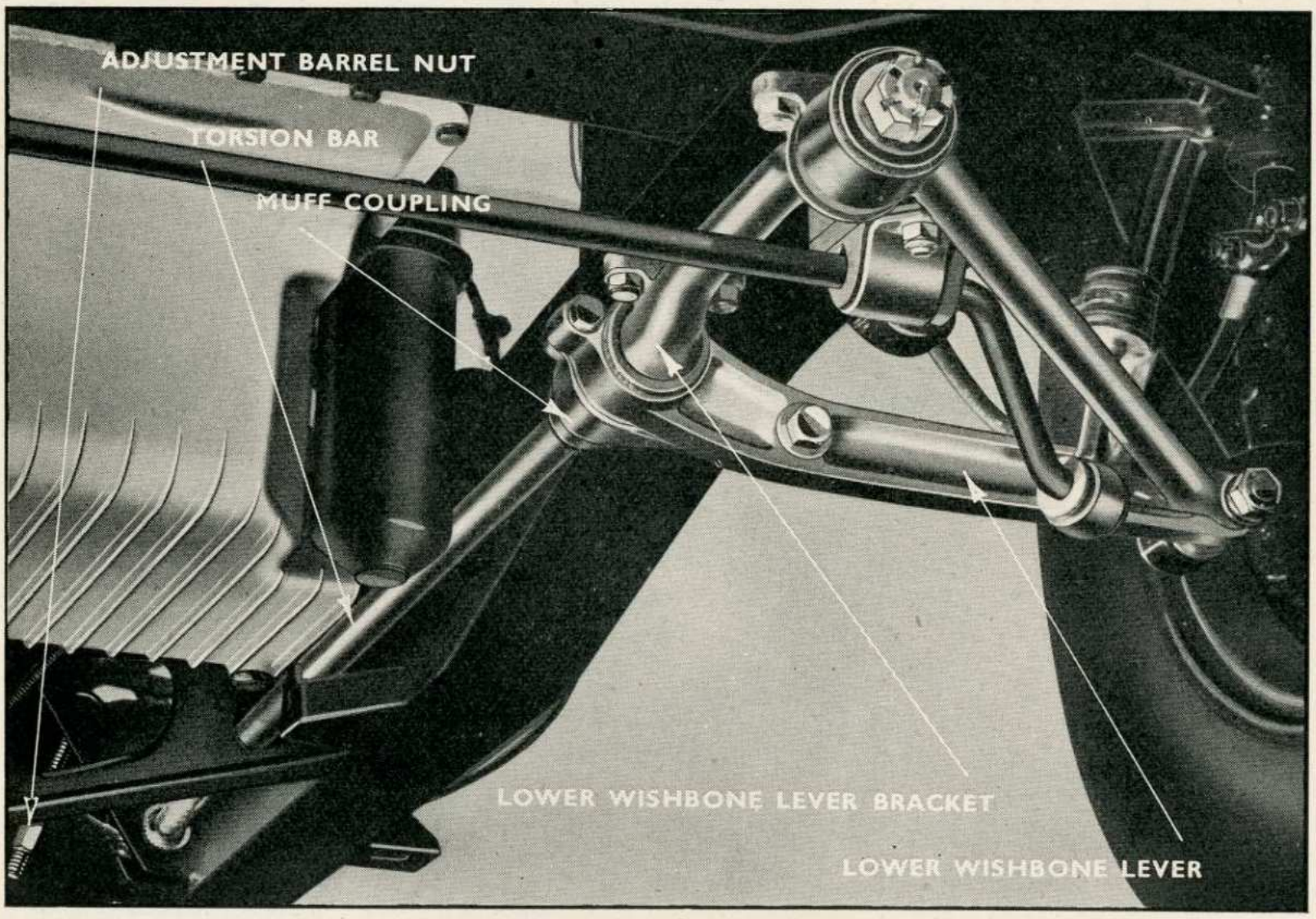


PLATE J.2. FRONT SUSPENSION FITTED. GENERAL ARRANGEMENT

TORSION BAR. TO REFIT

GENERAL. Note that torsion bars are stamped " O.S." (i.e. offside, right hand) or " N.S." (i.e. nearside, left hand) on the rear end face and are not interchangeable from side to side.

REFIT TORSION BAR. Enter the muff coupling, shoulder to rear, over the splines on the forward end of the bar. Enter the rear splines of the torsion bar into the reaction lever and fit the clamping bolt, washer and nut.

ATTACH MUFF COUPLING. If a new torsion bar is to be fitted it will be necessary to engage the muff on the correct torsion bar splines to enable final adjustments to be correctly made at the barrel nut. To do this ensure that the adjustment barrel nut is just entered on the threads of the bolt and fit the distance piece (Plate J.3) between the shock absorber mounting points. This will correctly position the lower wishbone lever in relationship to the torsion bar. Enter the muff on to the splines of the bar and the register on the lower wishbone lever and secure in position using the setscrew with spring washer, bolt, washer, slotted nut and new split pin. (In the absence of the distance piece the centre point of the shock absorber lower mounting pin should be maintained at a distance of 13⅝" (34.6 cm.) from the lower face of the shock absorber top mounting hole when the muff is entered on the splines and secured in position.)

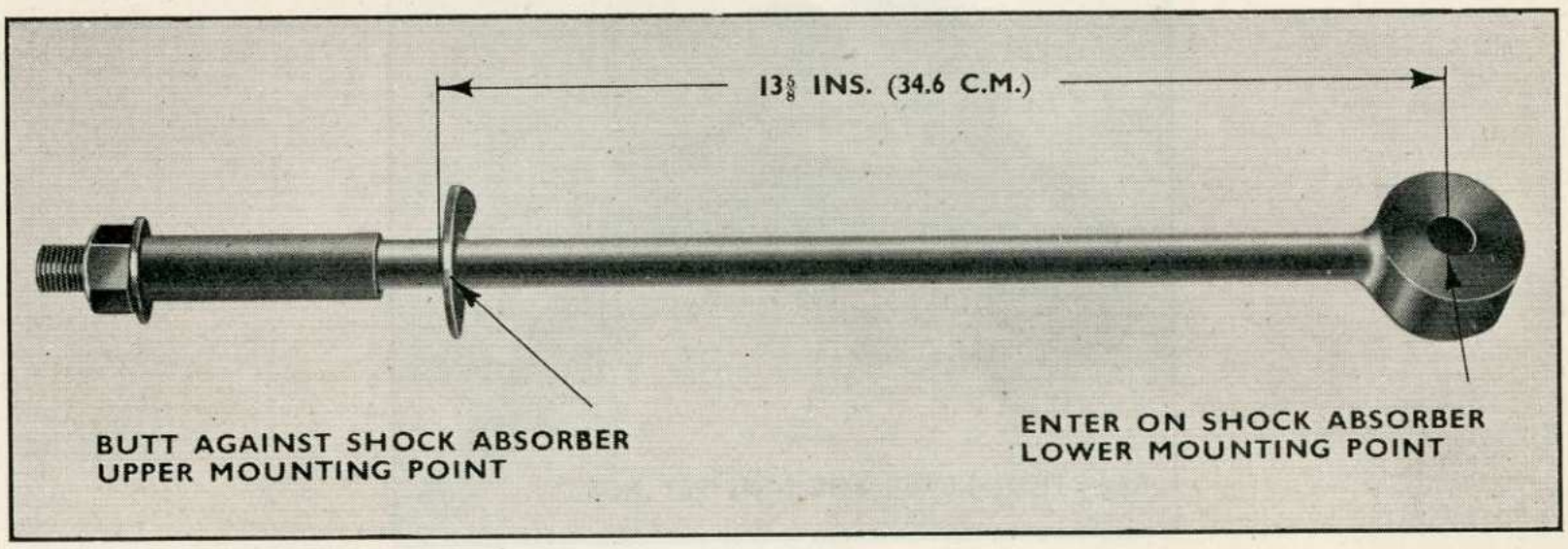


PLATE J.3. LOWER WISHBONE LEVER. DISTANCE PIECE

APPLY TENSION TO ROD. Rotate the adjustment barrel nut clockwise until the locking setscrew hole in the reaction lever appears in the centre of the slot cut in the rear of the chassis cross member. Fit the locking set bolt with washer but do not tighten until final adjustments have been made.

CHECK TORSION BAR SETTINGS. Refit shock absorber and road wheel. Test torsion bar settings and correct, if necessary, as described on page J.8. Do not forget to tighten the reaction lever locking set bolt when adjustments are complete.

TORSION BARS. TO CHECK AND ADJUST

GENERAL. It is assumed that the car is full of petrol, oil and water. If not, additional weight must be added to compensate for, say, a low level of petrol. (The weight of ten gallons of petrol is approximately 80 lbs. (36.0 kg.).)

Before any check on torsion bar settings is made the car must be placed on a **perfectly level surface,** wheels in the straight ahead position and tyre pressures correctly adjusted as follows :—

Front. 23 lbs. per sq. inch. (1.6 kg/cm².)
Rear. 25 lbs. per sq. inch. (1.8 kg/cm².)

All pressures adjusted cold.

CHECK. 1. Place two 100-lb. (two 45.4 kg.) weights in the car, one in front of each front seat. 2. Bounce the front of the car on its suspensions to ensure that it is free of all stickiness. Finally depress the front and allow it to RISE SLOWLY. Conditions 1 and 2 having been fulfilled, the appropriate test pieces for this model, that is, $7\frac{1}{4}$", (18.4 cm) should just pass under the lower face of the most forward parallel section of the chassis frame side member on either side.

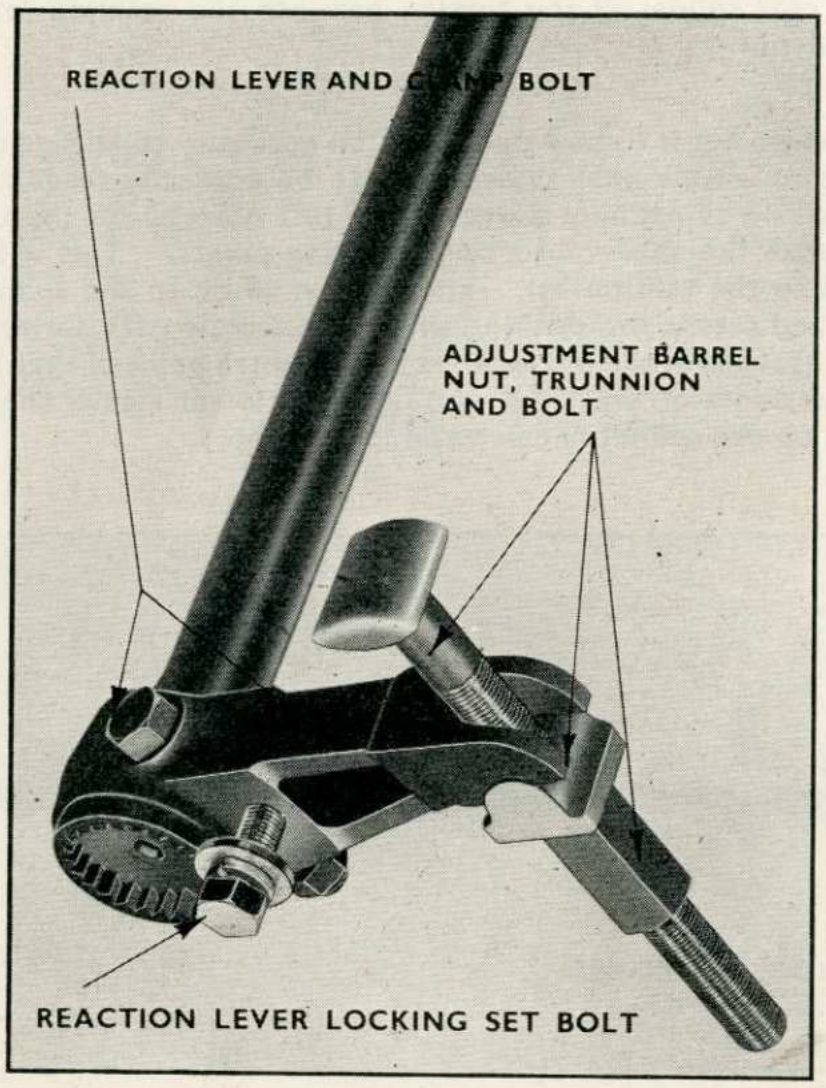


PLATE J.4. TORSION BAR REAR REACTION LEVER

ADJUST. If a correction is necessary check the position of the rear reaction lever locking set bolts in the slots to make sure that adjustment in the desired direction is possible. Clockwise rotation of the brass adjusting nut will increase torsion in the rod, move the lock bolt towards the top of the slot and raise the car. Anti-clockwise rotation will have the reverse effect. Adjustment should only be carried out with the locking bolts released and the front of the car jacked up to reduce load on the adjustment nuts to a minimum. If the locking set bolts have reached the end of their slots and the desired adjustment is not possible, it will be necessary to reposition the torsion rod in relationship to the lower wishbone member as follows :—

Jack up front of the car, remove the rear reaction lever locking set bolts, slack off the torsion bar adjusting barrel nuts to the end of their threads, remove the setscrews and bolts retaining each of the front splined muffs to its respective lower wishbone lever and turn the muff one spline on the torsion bar.

N.B. Viewing the car from the rear, turning the offside (right hand) muff clockwise will increase torsion in the rod, that is, raise the car, and turning it anti-clockwise will decrease torsion, that is, lower the car. Conversely, turning the nearside (left hand) muff anti-clockwise will increase, or clockwise, decrease torsion.

Screw up torsion bar adjustment nuts, lower the car on to its wheels, depress the front and recheck the height of the chassis frame. It is important to note that should correction be required on both torsion rods then adjustment should take place a little at a time on each until the required results are obtained, finally retightening the locking set bolts. The front of the car should be jacked up each time an adjustment is made so that the load on the adjusting nuts is reduced to a minimum.

UPPER WISHBONE LEVER ASSEMBLY. REMOVE AND REFIT

REMOVE. Jack up and remove road wheel adjacent to wishbone affected. Disconnect shock absorber by removing hexagon nuts at top mounting and draw shock absorber clear of mounting post. Release locking plates and remove two nuts and bolts passing through the upper wishbone ball assembly and the two upper wishbone levers. Observe castor shims fitted between each face of the ball assembly and the respective wishbone lever. (Plate J.8.) Do not lose or transpose shims from front to rear or rear to front since this will alter castor angle. Remove self locking nuts from the two top bolts securing the wishbone bracket to chassis frame mounting posts observing distance tube on rear bolt. Remove self locking nuts from the two bottom bolts securing wishbone bracket to flange of chassis frame mounting posts.

Note camber shims fitted between wishbone bracket and chassis frame which must be replaced in their original locations or camber angle will be affected. Lift out wishbone levers complete with mounting bracket.

Should it be desired to remove the upper wishbone ball assembly remove brake drum and withdraw split pins and slotted nuts securing steering arm to stub axle carrier. Draw front bolt through stub axle carrier and tilt steering arm to clear brake air scoop. Withdraw steering arm to gain access to ball pin slotted nut. Remove split pin, washer and slotted nut from ball pin. Tap shank of ball assembly out of taper in stub axle carrier and remove ball assembly.

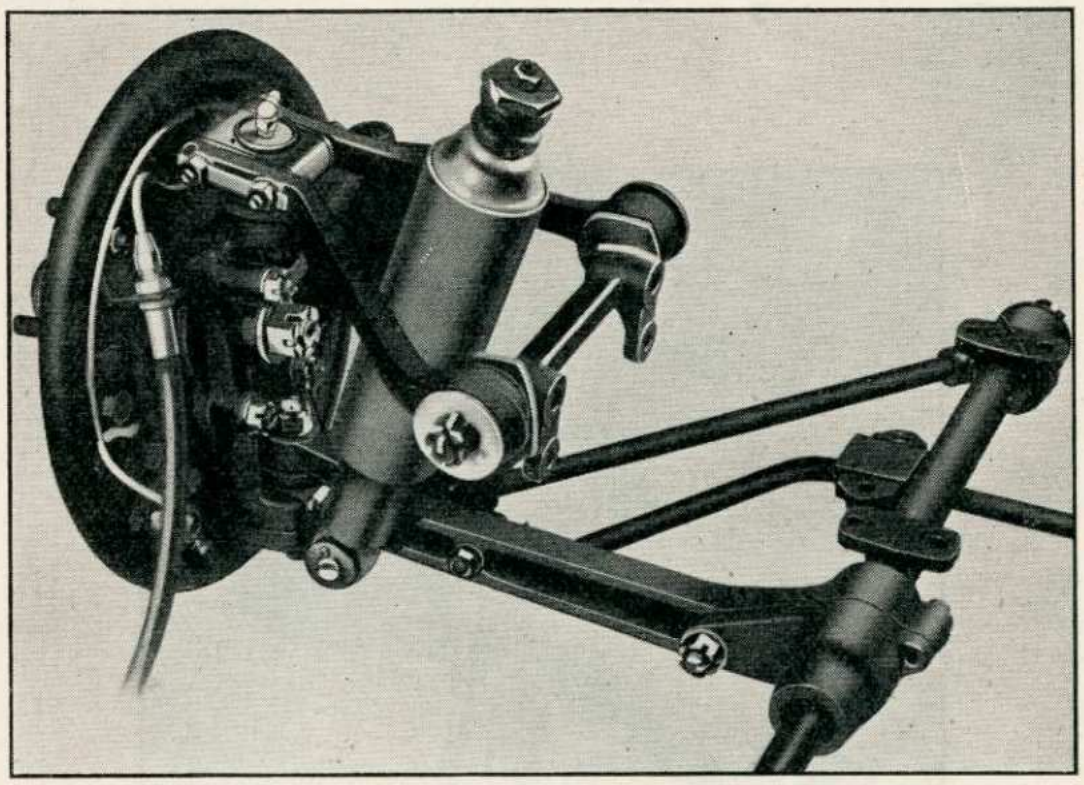


PLATE J.5. UPPER WISHBONE LEVER ASSEMBLY

REFIT. Refitting is the reverse of the above procedure. Ensure that the same number of castor and camber shims found on dismantling are refitted and in their original locations. If any doubt exists regarding shimming check castor and camber angles and reset, if necessary, as described on pages J.13 and J.14.

UPPER WISHBONE LEVER ASSEMBLY. DISMANTLE AND REASSEMBLE

DISMANTLE. Remove the upper wishbone assembly as described in the previous paragraph. Observe that the upper ball assembly cannot be dismantled and if any parts are worn the complete assembly must be removed. Remove the split pin, slotted nut and plain washer from either end of the upper wishbone bracket and tap the levers off the ends of the bracket. Observe that each lever is mounted on two tapered metalastic bushes.

REASSEMBLE. Reassembly is the reverse of the above procedure. It is essential that the car is in the normal riding position either before pre-loading is applied to any of the rubber bushes or before assemblies are finally locked up. If these precautions are not taken excessive load will be applied with consequent damage and possible premature failure of the rubber bushes. The rubber bushes should not in any circumstances be lubricated. Refit the assembly as described above.

LOWER WISHBONE LEVER ASSEMBLY. REMOVE AND REFIT

REMOVE. Jack up and remove road wheel adjacent to wishbone affected. Remove shock absorber by withdrawing hexagon nuts on top mounting and draw shock absorber clear of mounting post. Remove split pin and washer from shock absorber lower mounting and draw off shock absorber. Release tab washers locating the four setscrews which retain the ball socket cap and remove cap. Observe shims (.004" (.10 mm.) thick), spigot over ball pin and socket supporting ball pin which can now be removed. Remove split pin and slotted nut from shank of ball pin and drive ball pin downwards out of its taper fixing in the outer extremity of the lower wishbone lever. The seal assembly will be left in position between the lower wishbone lever and stub axle carrier. Scribe a line denoting relative position of torsion bar and torsion bar muff to facilitate reassembly. Remove reaction lever locking set bolt with washer passing through rear of chassis cross member into lever. Rotate adjustment barrel nut in an anti-clockwise direction until the nut is almost off the threads of the bolt. Remove setscrew with spring washer passing through lower wishbone lever into muff. Remove split pin, slotted nut, washer and bolt passing through wishbone lever and muff. Tap muff coupling off register on wishbone lever to rear down raised splines on bar. Remove split pin and slotted nut securing anti-roll bar to bracket on extremity of lower wishbone lever. Lift wishbone lever up off anti-roll bar observing disposition of plain washer and rubber buffers. Remove four self locking nuts from bolts securing lower wishbone bracket to bottom face of chassis frame side member and lift out assembly.

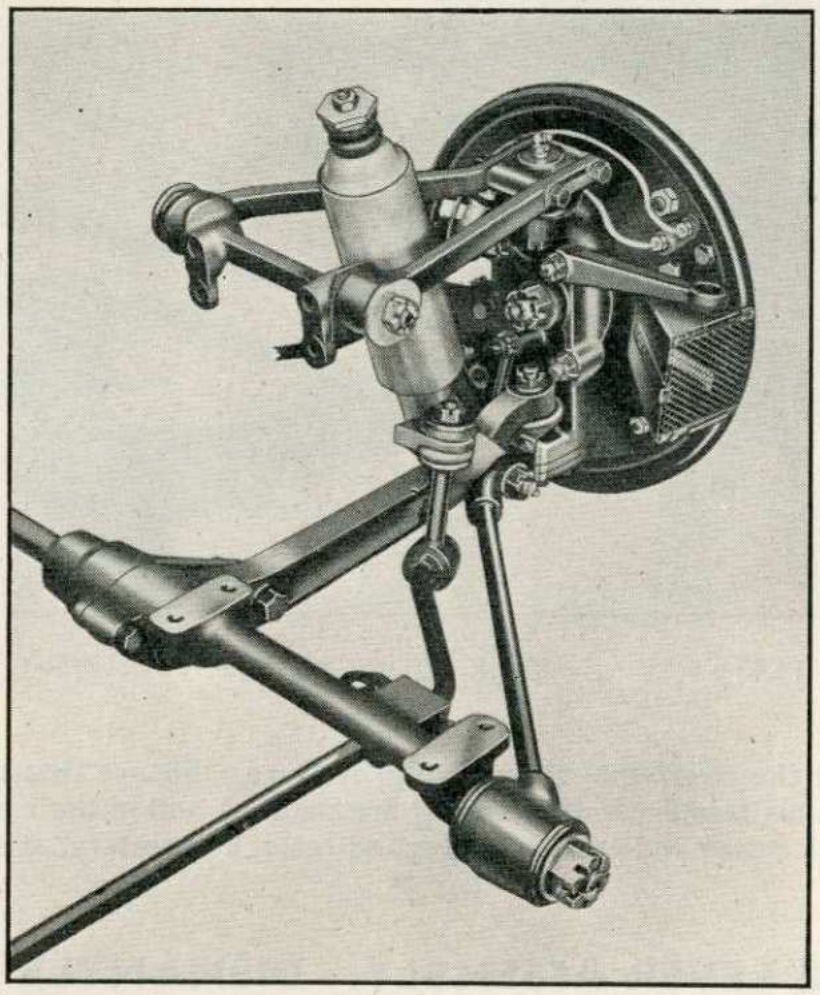


PLATE J.6. LOWER WISHBONE LEVER ASSEMBLY

REFIT. Refitting is the reverse of the above procedure. When fitting the muff coupling it is necessary to engage the muff on the correct torsion bar splines and the lines previously scribed should be aligned to ensure that this is so. When the muff has been engaged on the correct spline and on the register at the inner extremity of the wishbone lever secure in position using the setscrew with spring washer, bolt, washer, slotted nut and new split pin. Rotate the adjustment barrel nut clockwise until the locking setscrew hole in the reaction lever appears in the centre of the arc cut in the rear of the chassis cross member.

Fit the locking set bolt with washer but do not tighten until final adjustments have been made. Test torsion bar settings and correct, if necessary, as described on page J.7.

LOWER WISHBONE LEVER ASSEMBLY. DISMANTLE AND REASSEMBLE

DISMANTLE. Remove lower wishbone lever assembly as described in the previous paragraph. Remove the split pin, slotted nut and plain washer securing the outer extremity of the lower wishbone lever tie rod to the lever. Remove split pin, slotted nut and plain washer from either end of the lower wishbone bracket and tap the tie rod and wishbone lever off the ends of the bracket. Observe that the lever and tie rod are each mounted on two tapered bushes. Tap the pin, which supports the lower end of the shock absorber and the tie rod, from the outer extremity of the wishbone lever. Remove the nut and bolt securing the tie rod bracket to the wishbone lever and remove bracket. Should it be required to remove the ball joint seal assembly it will be necessary to remove the brake back plate. Remove four screws retaining seal carrier to stub axle carrier and remove seal assembly.

REASSEMBLE. Reassembly is the reverse of the above procedure. It is essential that the car is in the normal riding position either before pre-loading is applied to any of the rubber bushes or before assemblies are finally locked up. If these precautions are not taken excessive load will be applied with consequent damage and possible premature failure of the rubber bushes. The rubber bushes should not in any circumstances be lubricated. Refit the assembly as described in the previous paragraph and check torsion bar settings as described on page J.7.

BOUND BUFFER. REMOVE AND REFIT

REMOVE. Remove two nuts, spring washers and bolts securing bound buffer to bottom face of chassis frame wishbone bracket mounting post. Remove buffer.

REFIT. Refitting is the reverse of the above procedure.

SHOCK ABSORBERS. REMOVE AND REFIT

REMOVE. Disconnect shock absorber by removing hexagon nuts at top mounting and draw shock absorber off mounting post.

Remove split pin and washer from shock absorber lower mounting and draw off shock absorber.

REFIT. Refitting is the reverse of the above procedure using a hand clamp to press the eye at the bottom of the shock absorber over the rubber bush. Observe that it is essential that the car is in the normal riding position before pre-loading is applied to the lower mounting rubber bush. If these precautions are not taken an excessive load will be applied which will damage the rubber bush and possibly cause premature failure.

SHOCK ABSORBERS. DESCRIPTION AND SERVICE

GENERAL. It is recommended that the shock absorber be dismantled and re-assembled only by an authorised agent of Messrs. Newton and Bennett Limited. Replacements are available on an exchange basis and it is recommended that advantage be take of this service.

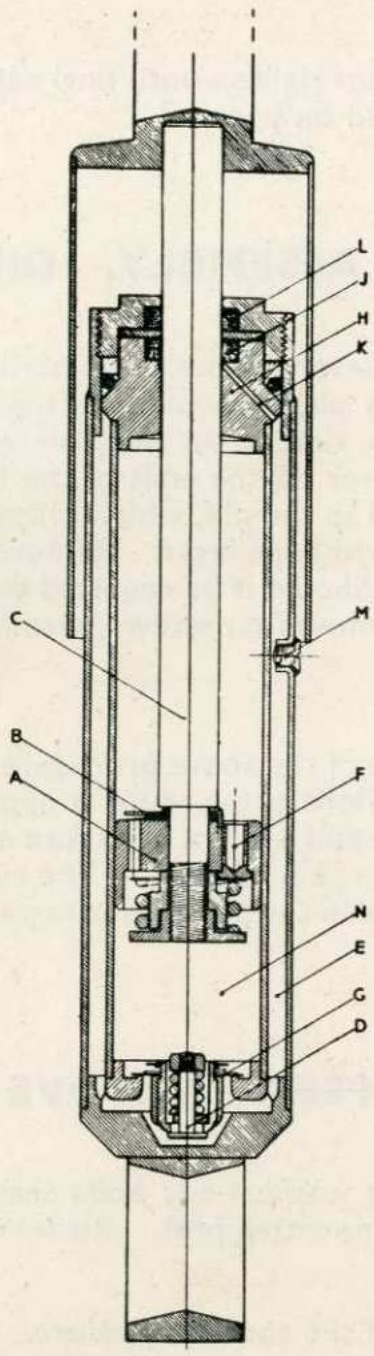


PLATE J.7
NEWTON SHOCK ABSORBER

DESCRIPTION. Suspension control is effected by the movement of a piston in a fluid-filled chamber. When the torsion bar is compressed as the road wheel passes over a bump the piston (A) travels down the cylinder and transfers fluid through the lightly loaded valve (B) to the upper side of the piston head, a volume of fluid equal to the volume of the piston rod (C) entering, passes through the spring loaded valve (D) to the outer chamber (E). The combined action of these valves gives the correct resistance on compression. As the suspension rebounds the piston (A) travels upwards and fluid from its upper side is transferred through the spring loaded piston valves (F) to the underside of the head. At the same time the volume of fluid displaced on compression is drawn back into the working chamber through the lightly loaded valve (G). The control valves are designed to give a regulated fluid resistance appropriate to the speed of the suspension—the working parts are few in number and of particularly robust construction.

The gland (H) is virtually leak-proof as any fluid adhering to the piston rod is wiped off by the seal (J) and drains back to the reserve chamber through the leak off ports (K). The outer seal (L) prevents the ingress of water or foreign matter.

SERVICE. A simple filling arrangement is provided thus eliminating damage due to over-filling and ensuring the correct fluid level. In order to obtain the best result it is recommended that the units should be removed from the vehicle for service. Clean the unit externally, particularly the area surrounding the filling orifice at (M). Stand the unit upright with the bottom eye held in a vice and work the unit up and down through the full length of the stroke—uniform resistance in both directions, which will not be equal, will indicate that the working chamber (N) is full of fluid, a deficiency being indicated by a " flat spot " at the end of the stroke. Extend the unit fully, remove the filler screw at (M), lay the unit flat and fill with recommended fluid. Stand upright and allow fluid to drain to the level of the hole, replace the filler screw and work the unit up and down as above until uniform resistance is felt. Leave the unit fully extended and recheck the fluid level. When correctly filled the fluid should reach the level of the filling hole with the unit standing vertically and fully extended.

ANTI-ROLL BAR. REMOVE AND REFIT

REMOVE. Remove split pin, slotted nut and plain washer from either extremity of the anti-roll bar. Remove two nuts and bolts securing bearing brackets to support brackets on bottom face of each chassis side member. Tap the anti-roll bar out of the brackets on either lower wishbone lever and draw from under car. Observe disposition of rubber buffers at either end between anti-roll bar and mounting bracket.

REFIT. Refitting is the reverse of the above procedure.

CASTOR ANGLE. CHECK AND RESET

GENERAL. It is assumed that the car is full of petrol, oil and water. If not, additional weight must be added to compensate for, say, a low level of petrol. (Ten gallons of petrol weigh approximately 80 lbs. (36.0 kg.).) It is essential to observe that it is useless to check castor until a check has been made on torsion bar settings and any correction necessary carried out. The car must be placed on a **perfectly level surface,** wheels in the straight ahead position and tyre pressures correctly adjusted as follows :—

Front. 23 lbs. per sq. inch. (1.6 kg/cm^2.)
Rear. 25 lbs. per sq. inch. (1.8 kg/cm^2.)
All pressures adjusted cold.

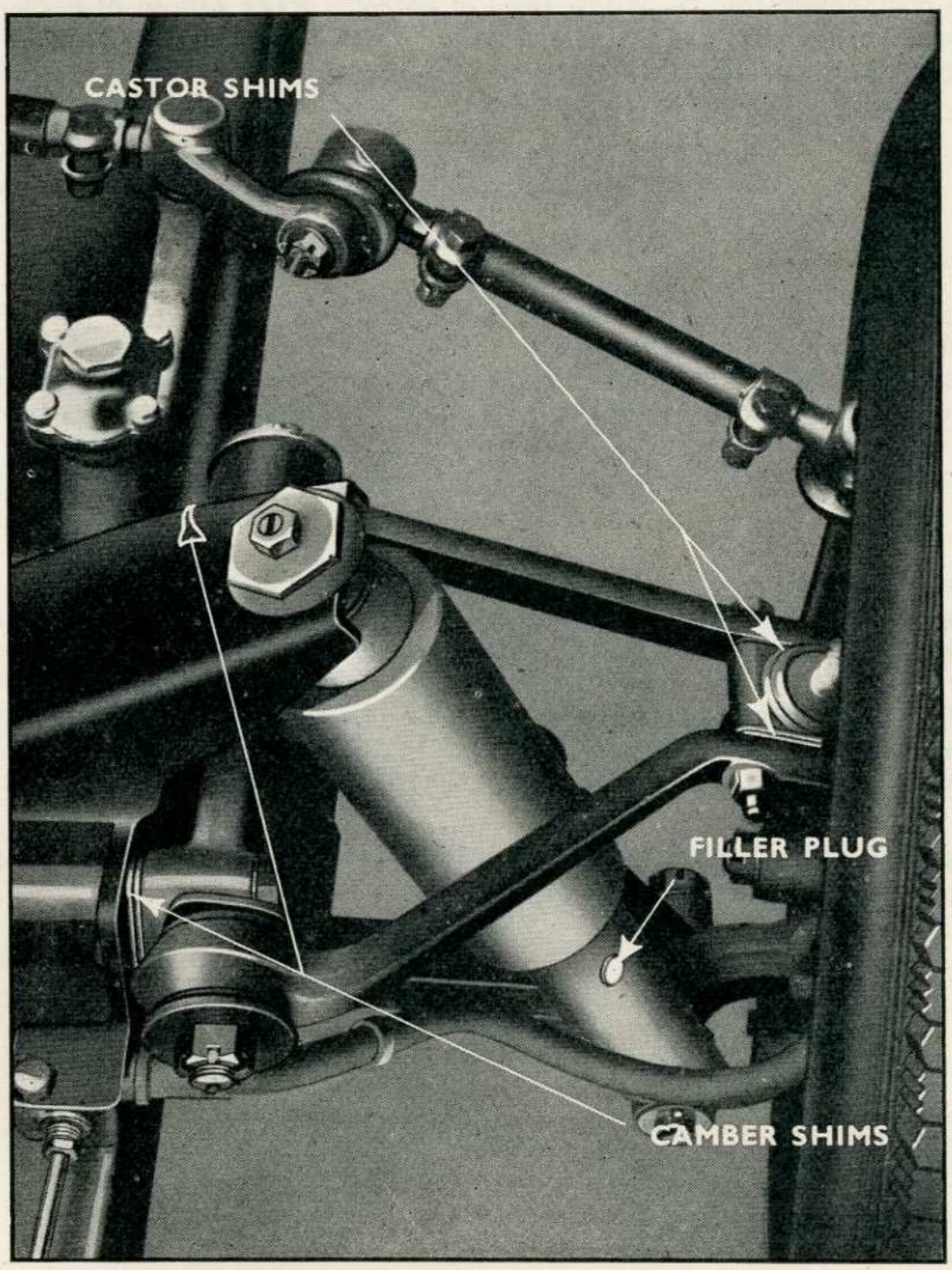


PLATE J.8. CASTOR AND CAMBER SHIMS

CHECK. Insert four test pieces appropriate to the model to be checked, that is, 7¼″ (18.4 cm.) between the chassis frame and the ground at the forward and rear ends of the parallel section of the chassis frame side members. Jack up the rear of the car, remove rear road wheels and lower until the chassis frame rests on the two rear test pieces. Load the front of the car until the chassis frame rests on the two front test pieces. Using an approved castor gauge check castor, which should be ¾° Negative.

RESET. To alter castor release tab washers and slack back the two bolts securing the front suspension upper wishbone members to the ball assembly. Either remove or add shims from front to rear or rear to front as necessary (Plate J.8). To increase negative castor, remove shims from front of member and insert in rear, and to decrease negative castor, remove shims from rear and insert in front. It should be noted that 1/16″ (1.6 mm.) of shimming will alter castor by approximately ½° in either direction. Tighten the two bolts loosened for purposes of extracting shims and lock with new tab washers. Recheck castor. The front of the car should be jacked up if the equipment used necessitates turning the wheels from lock to lock during checking. The front wheel track must always be checked and, if necessary, reset as described on page I.19 when adjustment has been carried out to castor.

CAMBER ANGLE. CHECK AND RESET

GENERAL. It is assumed that the car is full of petrol, oil and water. If not, additional weight must be added to compensate for, say, a low level of petrol. (Ten gallons of petrol weigh approximately 80lbs. (36.0 kg.).) It is essential to observe that it is useless to check camber until a check has been made on torsion bar settings and any corrections necessary carried out. The car must be placed on a **perfectly level surface,** wheels in the straight ahead position and tyre pressures correctly adjusted as follows :—

Front. 23lbs. per sq. inch. (1.6 kg/cm².)
Rear. 25lbs. per sq. inch. (1.8 kg/cm².)

All pressures adjusted cold.

CHECK. Insert four test pieces appropriate to the model to be checked, that is, 7¼″ (18.4 cm.) between the chassis frame and the ground at the forward and rear ends of the parallel section of the chassis frame side members. Jack up the rear of the car, remove rear road wheels and lower until the chassis frame rests on the two rear test pieces. Load the front of the car until the chassis frame rests on the two front test pieces. Line up the front wheel being checked parallel to the centre line of the car. Using an approved camber gauge check camber. Rotate the wheel being checked through 180° and recheck. Camber should be 1¾°—2° positive.

RESET. Release self locking nuts from the two top bolts securing the wishbone bracket to chassis frame mounting posts and self locking nuts from the two bottom bolts securing wishbone bracket to flange of chassis frame mounting posts. Adjustment is effected by removing or adding shims between the chassis frame side members and the front suspension top wishbone brackets. Inserting shims increases, removing shims decreases camber. It should be noted that 1/16″ (1.6 mm.) of shimming equals approximately ½° of camber. Shims are available in the following thicknesses .036″, .048″ and .064″ (.91 mm., 1.2 mm. and 1.63 mm.). Tighten self locking bolts, loosened to make adjustments, and recheck. Check the other front wheel in a similar manner.

Front wheel track must always be checked and, if necessary, reset in accordance with the instructions given on page I.19 when adjustment has been carried out to camber.

REAR SUSPENSION

MARK V

2½ and 3½ LITRE

CHASSIS NUMBERS

(Stamped at the front of the chassis left-hand side member)

2½ Litre	3½ Litre
Saloon	
520001 Right-Hand Drive	620001 Right-Hand Drive
527001 Left-Hand Drive	627001 Left-Hand Drive
Coupé	
540001 Right-Hand Drive	640001 Right-Hand Drive
547001 Left-Hand Drive	647001 Left-Hand Drive

The instructions in this section are presented under the following main headings which appear as sub-titles on the pages concerned and in the order shown :—

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Suspension Rubber Bushes	... ...	Servicing	... ...	K.6
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Road Spring	... ...	Refit	... ...	K.7
Road Spring	... ...	Dismantle and Reassemble	... ...	K.7
Road Spring Gaiters	... ...	Remove and Refit	... ...	K.7
Check Strap	... ...	Remove and Refit	... ...	K.7
Rebound Buffer	... ...	Remove and Refit	... ...	K.7
Bound Buffer	... ...	Remove and Refit	... ...	K.8
Shock Absorber	... ...	Remove and Refit	... ...	K.8
Shock Absorber Link Arm	... ...	Remove and Refit	... ...	K.8
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DESCRIPTION. The rear suspension consists of semi-elliptical springs controlled by hydraulic piston type shock absorbers. The road springs are mounted on spring saddles situated on the lower face of the axle casing and are retained in position on the saddles by " U " bolts and " U " bolt plates. The front ends of the springs are mounted on anchor bolts passing through silentbloc or metalastic bushes pressed into the spring eyes. The anchor bolts are located in brackets attached to the outside face of the chassis frame side members. The rear ends of the springs are mounted on the lower arm of "C" shaped shackles, with Harris type bushes interposed between arm and spring eye. The upper arms of the "C" shaped shackles are mounted in the chassis frame with Harris type bushes interposed between arm and frame. (Plate K.2.) The road springs are fitted with gaiters which serve to keep the springs clean and also to retain lubricant on the spring leaves. Lubricating nipples are fitted to the gaiters. (Plate K.3.)

The shock absorbers are mounted on the inside vertical face of the chassis frame side members immediately in front of the rear axle casing. (Plate K.1.) Short link arms connect the shock absorber main arms to lugs on the rear axle casing. Rubber bushes are pressed into the eyes of the link arms composite with the assembly bolts.

The chassis frame side members are arched sharply over the rear axle. A plate is attached to the chassis frame at the apex of the arch on either side which carries the axle bound rubbers. (Plate K.3.) Attached to each chassis frame side member in front and behind the rear axle are "U" shaped check straps which carry the rebound buffers at the bottom of the strap. (Plate K.1.)

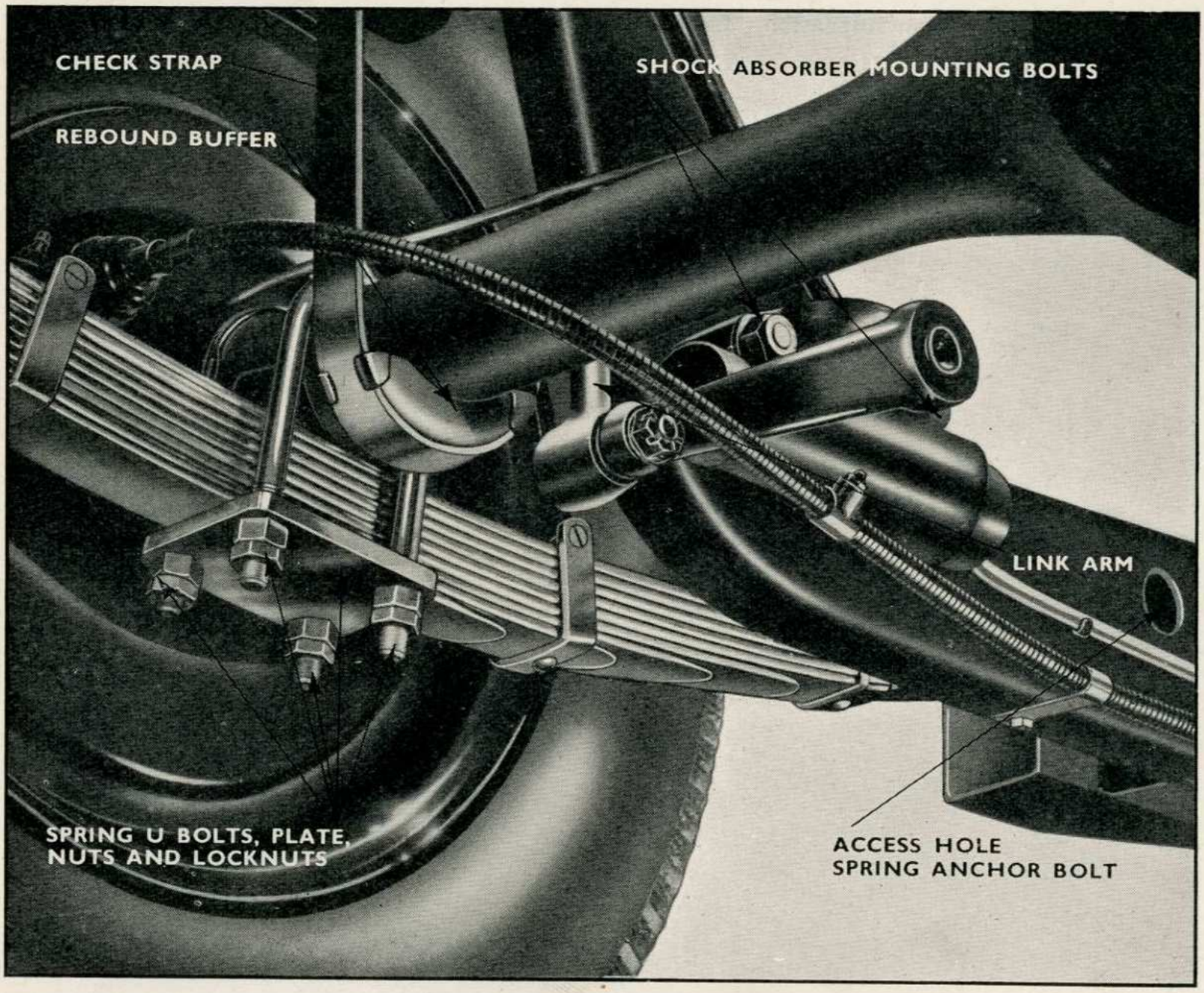


PLATE K.1. REAR SUSPENSION. GENERAL ARRANGEMENT

DESCRIPTION. The rear suspension consists of semi-elliptical springs controlled by hydraulic piston type shock absorbers. The road springs are mounted on spring saddles situated on the lower face of the axle casing and are retained in position on the saddles by " U " bolts and " U " bolt plates. The front ends of the springs are mounted on anchor bolts passing through silentbloc or metalastic bushes pressed into the spring eyes. The anchor bolts are located in brackets attached to the outside face of the chassis frame side members. The rear ends of the springs are mounted on the lower arm of "C" shaped shackles, with Harris type bushes interposed between arm and spring eye. The upper arms of the "C" shaped shackles are mounted in the chassis frame with Harris type bushes interposed between arm and frame. (Plate K.2.) The road springs are fitted with gaiters which serve to keep the springs clean and also to retain lubricant on the spring leaves. Lubricating nipples are fitted to the gaiters. (Plate K.3.)

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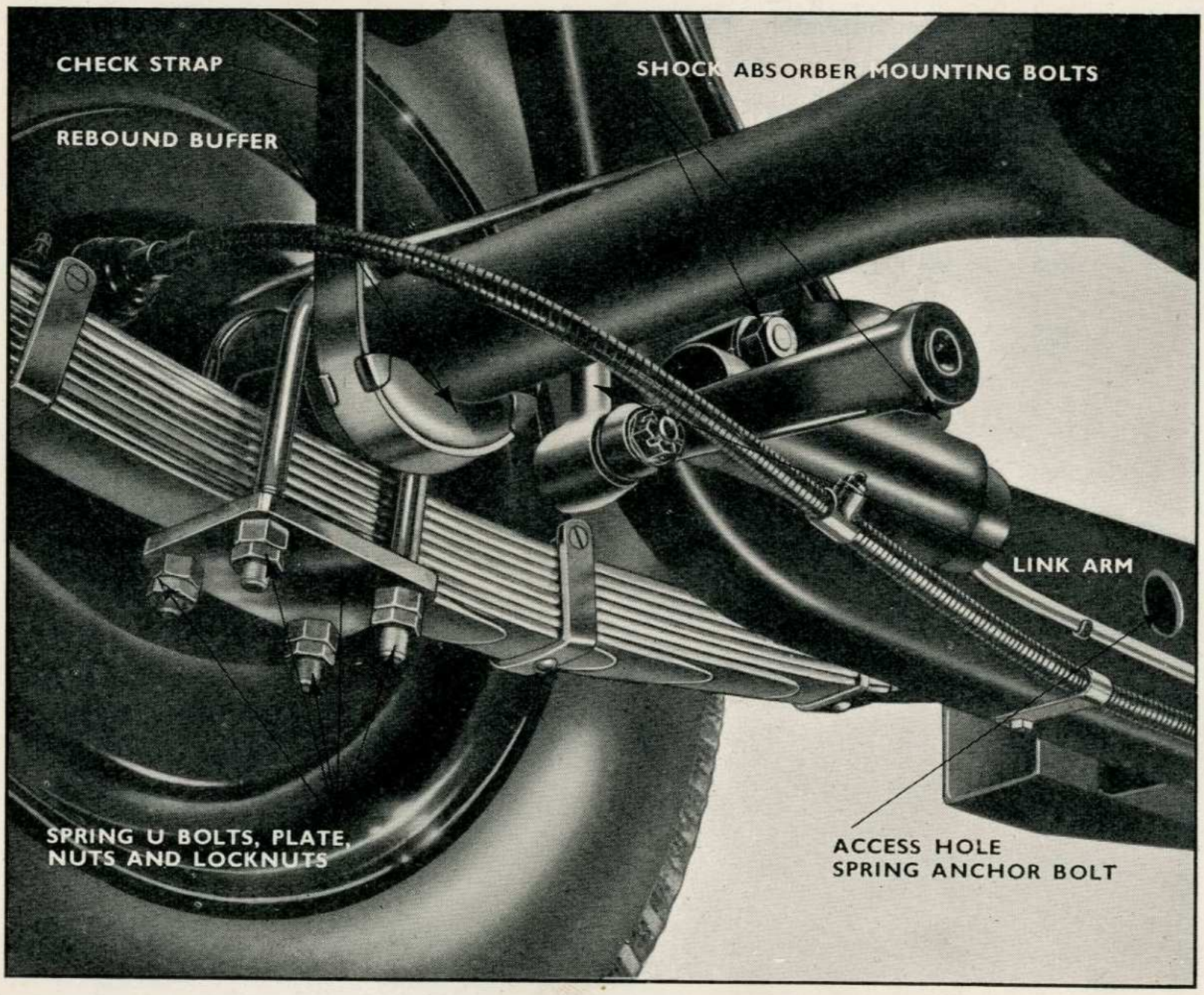


PLATE K.1. REAR SUSPENSION. GENERAL ARRANGEMENT

MAINTENANCE. When the rear road wheels are removed lubricate the rear springs, through the four nipples provided on the gaiters, with the recommended lubricant.

Every 5,000 miles (8,000 kilometres) thoroughly clean the rear shock absorbers, examine the fluid level and top up, if necessary, using the recommended grade of fluid. The filler is situated on top of the shock absorber body and the body should be completely filled. Since grit or dirt will damage the shock absorber movement it is vitally important to clean thoroughly before removing the filler plug. (See page K.10 for full details regarding service.)

Every 5,000 (8,000 kilometres) check tightness of rear axle "U" bolts, shackle and anchor bolts, shock absorber mounting bolts and check strap mounting bolts. Tighten, if necessary.

RECOMMENDED LUBRICANTS

	Vacuum.	Wakefield	Shell.	Essolube	Price's
Road Springs.	Mobilgrease No. 4	Castrolease (Heavy)	Retinax R.B.	Essolube Grease	Belmoline C.

Shock Absorbers. Use only Girling Piston Type Thin Oil.

REAR SUSPENSION DATA

Road Springs.	Type.	Semi-elliptic leaf spring
	Number of leaves.	9
	Type of leaves.	Tapered and speared
	Free Camber.	$6\frac{3}{4}$" (17.14 cm).
	Laden Camber	0" (zero) at 950lbs. (431 kg.).
Shock Absorbers.	Type.	Piston type hydraulic.
	Make.	Girling P.V.7.

SUSPENSION RUBBER BUSHES. SERVICING

SERVICING. Whenever any of the rubber bushes fitted to the road spring anchor bolts, road spring shackles and shock absorber link arms are dismantled either for examination or replacement it is essential that the car is in the normal riding position, either before pre-loading is applied to any of the rubber bushes mentioned above or assemblies finally locked up. If these precautions are not taken, excessive load will be applied with consequent damage and possible premature failure of rubber bushes. The rubber bushes should not in any circumstances be lubricated.

ROAD SPRING. REMOVE

GENERAL. Jack up car under rear axle and place stands beneath chassis frame in front of rear spring front anchorages. Remove wing valance, nave plate and road wheel. Lower jack until axle casing rests on check straps.

RELEASE SPRING FROM AXLE. Remove four lock nuts and four nuts from "U" bolts. Remove "U" bolt plates and "U" bolts. (Plate K.1.) (On early cars a wedge may be found between the spring and axle spring pad which must be replaced when reassembling.)

REMOVE ANCHOR BOLT. Remove self locking nut and washer from anchor bolt. Draw anchor bolt through access hole cut in inner vertical face of chassis frame side member. (Plate K.1.)

REMOVE SHACKLE. Remove lock nuts, nuts and washers from both arms of the "C" shaped shackle using the hole cut in the inner vertical face of the chassis frame side member to gain access to the top nuts. Removal of the nuts will release the tension on the Harris bushes. Support spring and withdraw shackle.

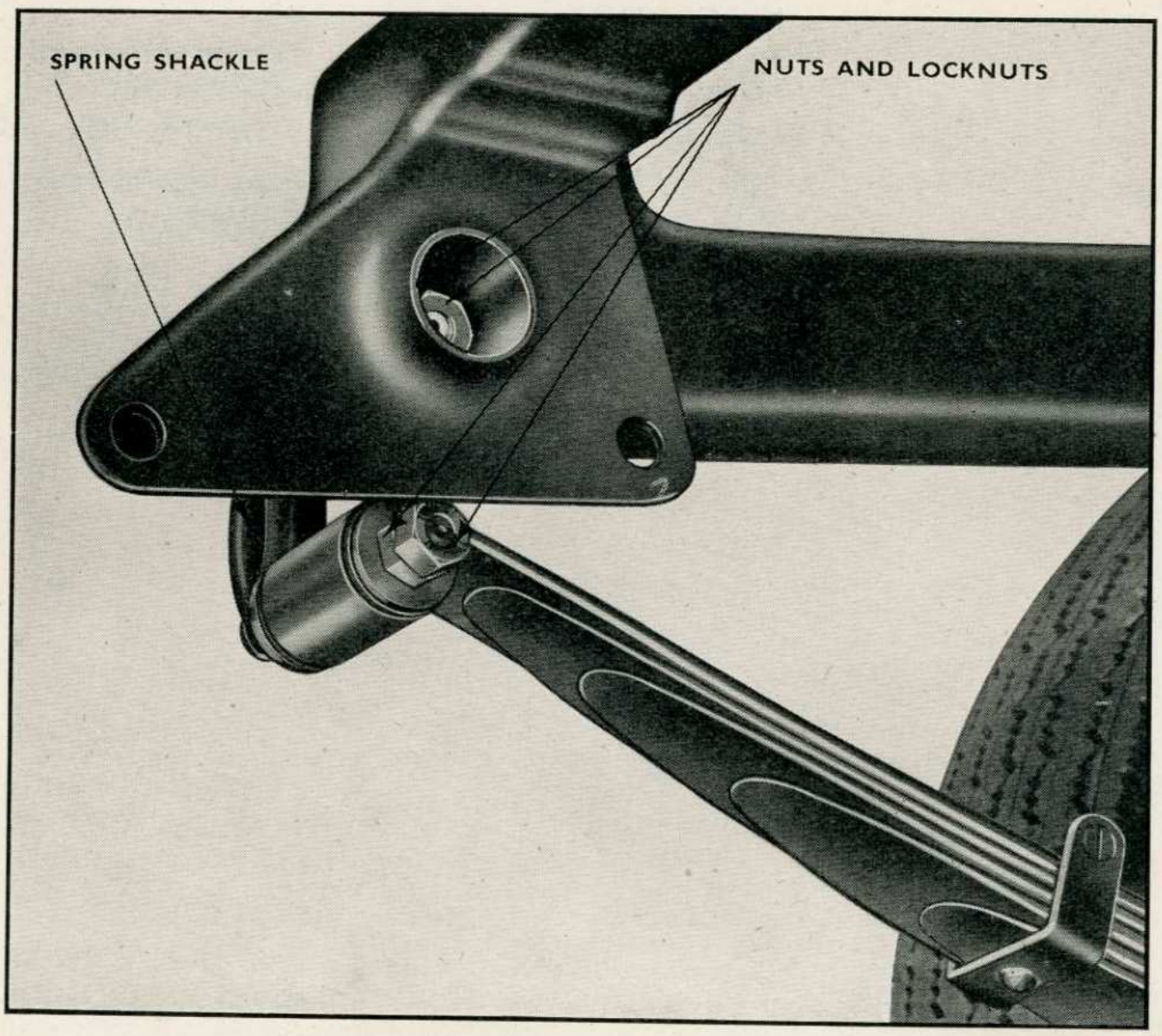


PLATE K.2. ROAD SPRING. REAR SHACKLE

REMOVE SPRING. Withdraw spring from front anchorage towards rear of car.

ROAD SPRING. REFIT

FIT SHACKLE. Offer up spring into position and fit shackle but do not fully tighten nuts.

FIT ANCHOR BOLT. Pass anchor bolt through hole in inner face of chassis side member but do not fully tighten nut.

FIT SPRING AXLE. Jack spring up into engagement with axle spring pad ensuring that spring centre bolt engages in hole provided in pad. (If a wedge was found between spring and spring pad on removal this must be refitted, thick end to front and with the hole in the wedge engaging with the spring centre bolt.) Fit the "U" bolts and "U" bolt plate securing with four nuts and lock nuts.

TIGHTEN ANCHOR BOLT AND SHACKLES. Remove stands and lower car into normal riding position. Tighten anchor bolt self locking nut and shackle bolt nuts. Finally fit shackle bolt lock nuts, road wheel, nave plate and wing valance.

ROAD SPRING. DISMANTLE AND REASSEMBLE

DISMANTLE. Remove road spring as described on page K.6. Release gaiter laces and remove gaiters. (Plate K.3.) Thoroughly clean road springs. Withdraw four bolts from the spring clips. Clamp spring in vice with the jaws of the vice engaging on the top and bottom leaves. Remove nut from centre bolt and release vice slowly.

Withdraw spring leaves from vice. The Harris bush may be now pressed out of the spring rear eye and the silent-bloc (or metalastic) bush out of the front eye.

REASSEMBLE. Reassembly is the reverse of the above procedure. Replacement road springs are available on an exchange basis and where a spring has settled, or is worn, it is recommended that advantage be taken of this scheme. Always fit replacement springs in pairs. Refit road spring as described in the preceding paragraph.

ROAD SPRING GAITERS. REMOVE AND REFIT

REMOVE. Raise car on a lift to a height convenient for working on the road springs. Release gaiter laces and draw off gaiters. Observe that each road spring has two gaiters with a grease nipple fitted to each. (Plate K.3.)

REFIT. Liberally coat the spring leaves with recommended lubricant and fit the gaiters securing in position with the laces provided. Lower car from lift.

CHECK STRAP. REMOVE AND REFIT

REMOVE. Raise car on lift to a height convenient for working on check strap. Remove nut, bolt and washer securing either end of the check strap to chassis frame side member and withdraw check strap downwards clear of rear axle casing. (Plate K.1.)

REFIT. Refitting is the reverse of the above procedure.

REBOUND BUFFER. REMOVE AND REFIT

REMOVE. Remove check strap as described in previous paragraph. Release clips securing buffer to check strap and remove buffer. (Plate K.1.)

REFIT. Fit new buffer into angle of check strap and secure in position by bending clips round check strap. Refit check strap as described in previous paragraph.

BOUND BUFFER. REMOVE AND REFIT

REMOVE. Jack up car and remove wing valance, nave plate and road wheel adjacent to buffer affected. Remove two nuts, washers and bolts securing buffer to chassis frame bracket and remove buffer.

REFIT. Refitting is the reverse of the above procedure.

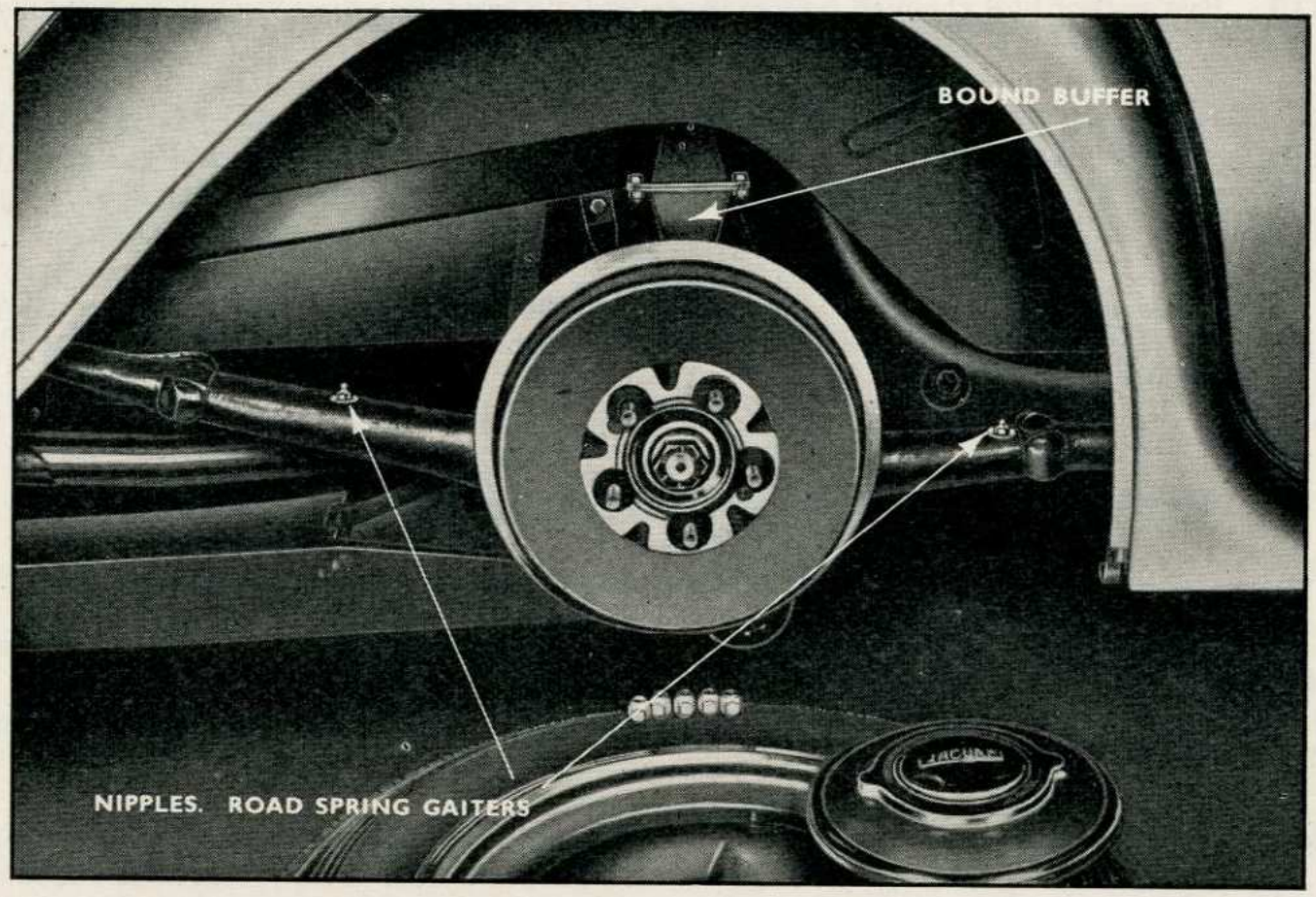


PLATE K.3. BOUND BUFFER

SHOCK ABSORBER. REMOVE AND REFIT

REMOVE. Raise car on lift to a height convenient for working on shock absorber. Remove split pin, slotted nut and washer securing link arm to lug on axle casing. Remove two self locking nuts, washers and bolts securing shock absorber to chassis frame side member. Support shock absorber and tap link arm out of lug on axle casing. Remove shock absorber. (Plate K.1.)

REFIT. Refitting is the reverse of the above procedure. Observe that the shock absorber link arm can be incorrectly positioned in relationship to the shock absorber main arm. Reference to Plate K.1. will show that the link arm passes downward from the lug on the axle casing to the main arm. (The link arm must **not** be fitted so that it passes from the lug upward to the main arm.)

SHOCK ABSORBER LINK ARM. REMOVE AND REFIT

REMOVE. Raise the car on a lift to a height convenient for working on shock absorber. Remove split pins, washers and slotted nuts securing either end of the link arm to the shock absorber main arm and axle casing lug respectively. Tap out and remove link arm. (Plate K.1.)

REFIT. Refitting is the reverse of the above procedure, but observe that the car should be in the normal riding position before the slotted nuts are finally tightened. Observe that the shock absorber link arm can be incorrectly positioned in relationship to the shock absorber main arm. Reference to Plate K.1. will show that the link arm passes downward from the lug on the axle casing to the main arm. (The link arm must **not** be fitted so that it passes from the lug upward to the main arm.)

SHOCK ABSORBER. DESCRIPTION AND SERVICE

GENERAL. The general construction of the unit is extremely robust, comprising a cast-iron body, in which operate two cast-iron pistons, flexibly linked together and actuated by a hardened steel rocker-arm bearing on hardened steel pads. The cylinder and pistons being of the same material ensures that a constant clearance is maintained between pistons and cylinder walls at all temperatures, which contributes materially towards consistent performance. The recuperation valves have been so designed that no flexing of the shim steel discs takes place in operation thus obviating the possibility of fractured valves. The high pressure relief valves in the P.V. Type are located in a separate chamber in the main body of the damper, and are especially designed to facilitate accurate setting to the pressures required. They are far less susceptible to the presence of small particles of dirt or solid matter than the original disc valves employed in previous piston types ; and by their location in a separate chamber, end to end discharge of the working chambers is assured, so that even at the highest piston speeds there will be positive and immediate filling of each working chamber in readiness for the next stroke in the reverse direction. Any wear between pistons and rocker is taken up by high-tensile steel spring connectors, and as there is a free and ample passage for fluid through the recuperating valve of the returning piston, there is a minimum of drag which prevents the occurrence of hydraulic or mechanical knocks.

To seal the cylinders the use of gaskets has been completely avoided and both cylinder ends are closed by special steel inserts (later types screwed plugs) which ensure complete closure and freedom from leaks. The standard type of robust forged steel linkage is used, fitted with tight rubber bearings.

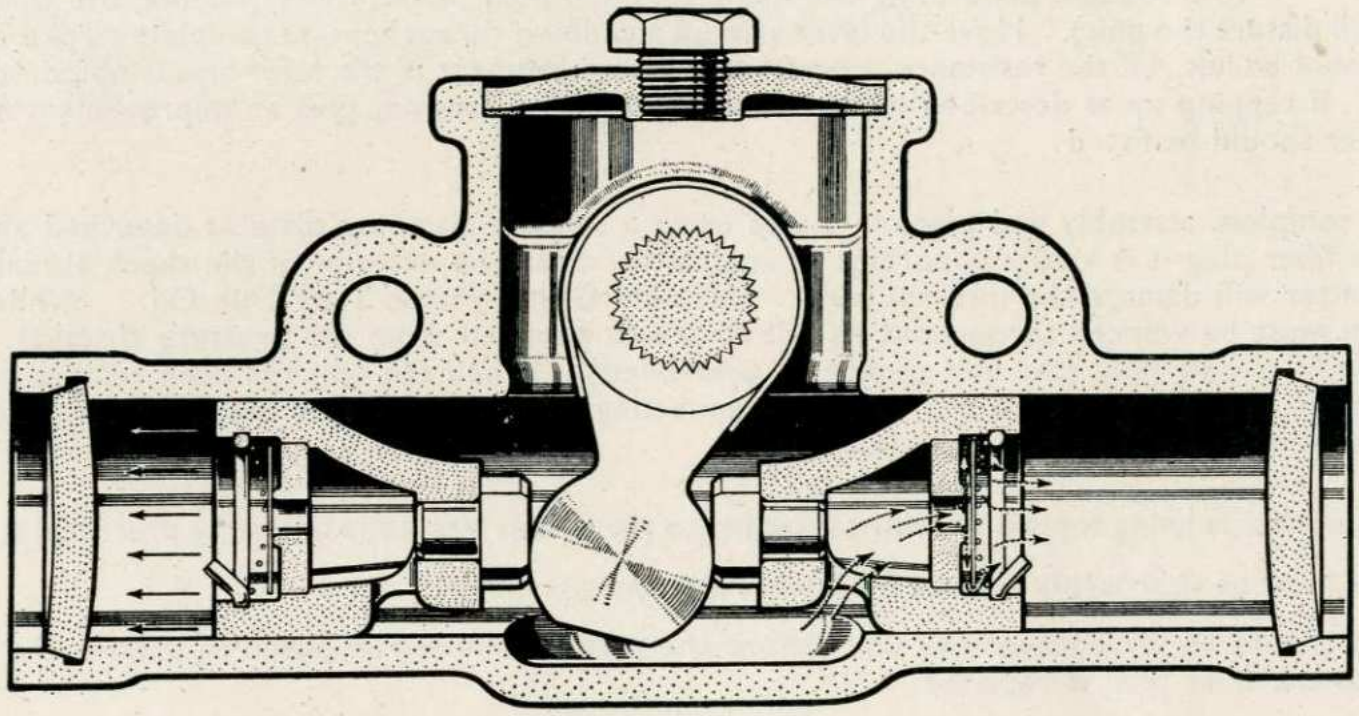


PLATE K.4. GIRLING SHOCK ABSORBER. (Side elevation)

DESCRIPTION. The flexing of the vehicle suspension causes rotary movement of the rocker which actuates the pistons in the working chamber. Movement of the piston towards the end of the chamber forces the fluid through a channel into the valve chamber, which is cast integral with the main body. On generation of sufficient pressure, the fluid lifts the spring-loaded sleeve valve off its seating and escapes to the low pressure side of the main chamber. While one piston is forcing the fluid at high pressure through the sleeve valve concerned the pressure in the other cylinder falls, allowing the recuperating disc valve to open in order to recuperate the very small volume of fluid that has escaped past the piston, into the reserve chamber, thus maintaining the pressure chambers full of fluid ready for a change in direction of movement and reversal of the direction of flow of the fluid. To control the bleed for slow movement of the rocker, a bleed valve is incorporated in the valve body. This valve is pre-set before leaving the factory and operates in both directions. The setting of both pressure and bleed valves is highly critical and is carried out with extreme accuracy on special test rigs by the manufacturers and subsequently the adjustment is plugged and sealed. Under no circumstances should any attempt be made to interfere with these adjustments as the riding qualities will be impaired and serious damage may be caused to the unit. No responsibility can be accepted for any units where this adjustment has been tampered with.

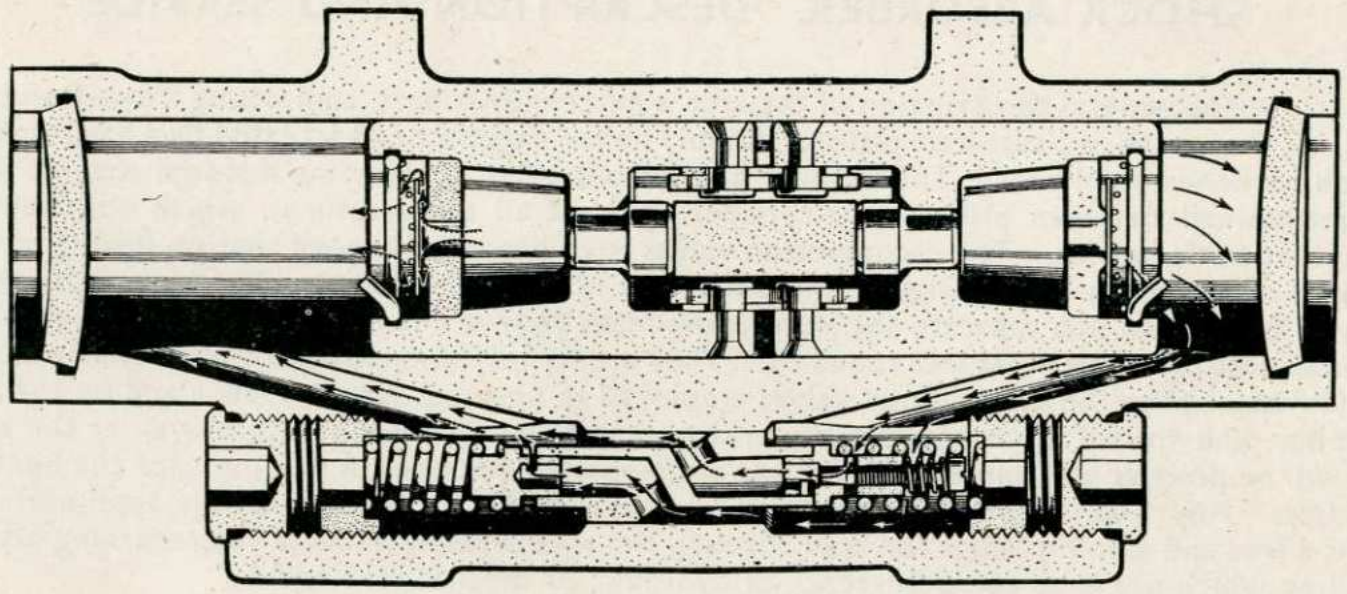


PLATE K.5. GIRLING SHOCK ABSORBER (Plan view)

SERVICE. To check the shock absorbers remove them from the chassis as described on page K.8. Bolt to a suitable plate using the fixing lugs and hold plate in vice (holding the chamber directly in the vice will distort the unit). Move the lever arm up and down throughout its complete stroke, when an even resistance should be felt. If the resistance is erratic and free movement of the lever arm is noted, it may indicate lack of fluid. If topping up as described in the following remarks does not give an improvement a replacement shock absorber should be fitted.

Remove the complete assembly and place in a vice using a suitable clamping plate as described above. Before removing the filler plug it is vitally important to completely clean the exterior of the shock absorber since dirt or foreign matter will damage the internal parts. Use only Girling Piston Type Thin Oil. While adding fluid the lever arm must be worked throughout its full stroke to expel air from the pressure chamber. Fill to the bottom of the filler plug hole (the unit cannot be over-filled). When the unit has been refitted to the chassis, (Page K.8), after bolting in position but before reconnecting the link arm work the main arm through the full stroke several times to make sure no air is present.

If the shock absorber is being topped up whilst attached to the chassis frame the following precautions are essential.

(*a*) The unit must be thoroughly cleaned before the filler plug is moved.

(*b*) A shield should be placed over the unit before the plug is removed in order to protect the unit and not removed until the filler plug is replaced.

(*c*) The filler can must be absolutely clean internally and externally.

(*d*) Use only Girling Piston Type Thin Oil.

BRAKES

MARK V

2½ and 3½ LITRE

CHASSIS NUMBERS

(Stamped at the front of the chassis left-hand side member)

2½ Litre	3½ Litre

FIXED PIVOT TYPE BRAKES

Saloon

Right-Hand Drive 520001 - 520657	Right-Hand Drive 620001 - 622581
Left-Hand Drive 527001 - 527120	Left-Hand Drive 627001 - 627776

Coupé

Right-Hand Drive Not fitted	Right-Hand Drive 640001 - 640005
Left-Hand Drive Not fitted	Left-Hand Drive 647001 - 647009

SLIDING PIVOT TYPE BRAKES

Saloon

Right-Hand Drive 520658 ONWARDS	Right-Hand Drive 622582 ONWARDS
Left-Hand Drive 527121 ONWARDS	Left-Hand Drive 627777 ONWARDS

Coupé

Right-Hand Drive 540001 ONWARDS	Right-Hand Drive 640006 ONWARDS
Left-Hand Drive 547001 ONWARDS	Left-Hand Drive 647010 ONWARDS

The instructions in this section are presented under the following main headings which appear as sub-titles on the pages concerned and in the order shown :—

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Remove Watermark Wondershare PDFelement

DESCRIPTION. Differences between the early fixed pivot type and later sliding pivot type are confined to the handbrake rear cable assemblies, back plate assemblies and shoe assemblies. Chassis numbers to which the alternative type of brake is fitted are given on page L.1. Points of recognition between the two types of brakes are as follows :—

FIXED PIVOT TYPE.

HANDBRAKE CABLE. The handbrake rear cables have their rear abutment points at the operating cylinders on the rear brake back plates and the inner cables are attached direct to the hydraulic operating plungers.

OPERATING CYLINDERS. The operating cylinders, both front and rear, are fixed to the back plates and are therefore not free to float.

SHOE ASSEMBLIES. The liners are rivetted to the brake shoes. The shoes are not free to float on their respective fixed pivots or expander tappets.

SLIDING PIVOT TYPE.

HANDBRAKE CABLE. The handbrake rear cables have their rear abutment points on brackets bolted to the extremities of the rear axle casing. The inner cables are attached to separate mechanical expander mechanisms contained in the rear of the hydraulic operating cylinders.

OPERATING CYLINDERS. The operating cylinders at the front are fixed to the back plates but the operating cylinders at the rear are free to float on the back plates.

SHOE ASSEMBLIES. The liners are bonded to the brake shoe. The shoes, both front and rear, are free to float on their respective fixed pivots and expander tappets.

The hydraulic operation of both types of brakes is provided by a master cylinder, which may be positioned on the left-hand or right-hand chassis frame side member depending on whether the car is left or right-hand drive. The master cylinder is fed by a supply tank which is mounted in an accessible position on the scuttle under the bonnet. (Plate L.6.) The hydraulic piston in the master cylinder is operated by the brake pedal which is mounted behind the cylinder. The master cylinder is connected by suitable metal and flexible pipes to the operating cylinders situated on the front and rear brake back plates. The supply tank, master cylinder, pipe lines and operating cylinders are charged with brake fluid. Pressure on the brake pedal will move the piston in the master cylinder, generate fluid pressure in the pipe lines and expand the pistons in the operating cylinders of both front and rear brakes. The pistons in the operating cylinders actuate the brake shoes through suitable tappets and thus bring the friction material of the shoes into contact with the brake drums. The system is virtually frictionless and applies an equal force at each operating cylinder. Efficient hydraulic operation is dependent on the complete absence of air from the system. When the pressure on the brake pedal is released the pull-off springs on the brake shoes force the operating cylinder pistons into their cylinders and the fluid passes down the pipe lines to the master cylinder ready for the next application.

The handbrake operates on the rear brake shoes only and is entirely mechanical in operation. The pistol grip type handbrake is situated under the facia next to the steering column and incorporates a ratchet mechanism to retain the brake in the "ON" position. The rod of the handbrake grip is connected to a swinging lever situated at the rear of the chassis frame cruciform bracing by a flexible cable. (Plate L.5.) The rear cable assembly, also a flexible cable, is connected to the swinging lever by a bisector yoke, screwed rod and adjusting hexagon nut. The handbrake rod free travel may be adjusted with this barrel nut. The handbrake rear cable assembly is attached to the operating mechanism on the back plates in the alternative manner, for fixed pivot and sliding pivot type brakes, described at the commencement of this section. (Above.) Lubricating nipples are incorporated in the outer cables and should receive attention at the recommended intervals.

The front brake back plates are attached to the stub axle carriers by through going bolts and carry the operating cylinders and shoe assemblies. The back plates are similar for both types of brake in that each plate has two operating cylinders and two adjustment points, one for each shoe. Gridded air scoops are fitted to the inner leading face of each back plate to ensure satisfactory ventilation of the shoes and drums. On the fixed pivot type the operating cylinders are attached to the back plates and the shoes are not free to float on their respective anchor points and operating tappets. On the later sliding pivot type the operating cylinders are fixed to the back plates but the shoes are free to float on their respective anchor points and operating tappets and are thus self-centralising.

The rear brake back plates are attached to the flanges of the rear axle casing by through going bolts and are similar for both types of brakes (fixed pivot and sliding pivot type) in that each plate carries the operating cylinder, adjuster unit and shoe assemblies. On the fixed pivot type the operating cylinder and adjuster unit are fixed to the back plate and two leading shoe operation is obtained by bell cranks and a push rod which transfers motion to the true trailing shoe. (Plate L.12.) The shoes are not free to float on their respective anchor points and operating tappets. The handbrake cables are attached to the inner ends of the hydraulic operating plungers. On the sliding pivot type the operating cylinder is free to float on the back plate and the shoes, which have single leading shoe operation, are also free to float on their respective anchor points and operating tappets. The handbrake cables are attached to expander wedges which operate the rear shoes through rollers and entirely separate tappets. (Plate L.13.)

MAINTENANCE. Every 1,000 miles (1,500 kilometres) examine the fluid level in the brake supply tank and, if necessary, top up with recommended grade of fluid. (Plate L.6.) Never allow the fluid level to fall more than 1" (25·0mm.) from the top of the supply tank. Should it be found that the fluid level falls rapidly, indicating leakage from the system, an immediate examination should be carried out to ascertain the cause.

Every 1,000 miles (1,500 kilometres) lubricate the nipple on the foot brake pedal boss with the recommended grade of lubricant. (Plate L.7.)

Every 1,000 miles (1,500 kilometres) lubricate the three nipples on the handbrake cables with the recommended grade of lubricant. These are accessible from underneath the car, one on the front cable is located at the left-hand rear of the engine sump (Plate L.1) and the other two on the rear cables either side of the rear propellor shaft.

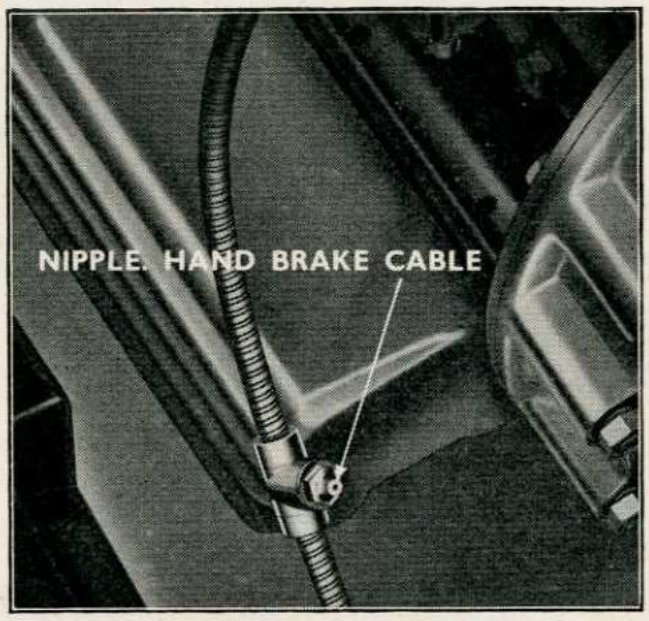


PLATE L.1

NIPPLE. HANDBRAKE FRONT CABLE

Every 5,000 miles (8,000 kilometres) check and tighten, if necessary, the brake back plate mounting bolts and hydraulic pipe unions.

Every 10,000 miles (16,000 kilometres) remove road wheels and brake drums, clean out brakes and examine liners. Should replacements be required always use genuine factory relined shoes, available on an exchange basis.

RECOMMENDED LUBRICANTS

	Vacuum.	Wakefield.	Shell.	Essolube.	Price's.
Foot Brake Pedal. Handbrake Cables.	Mobilgrease. No. 4	Castrolease. (Heavy)	Retinax. R.B.	Essolube. Grease.	Belmoline. C.

BRAKE FLUID

Genuine Girling Crimson Hydraulic Brake Fluid,

or, if not obtainable,

Lockheed Orange Hydraulic Brake Fluid.

Before a change from one type of brake fluid to the other is made it is necessary to completely drain the system of one fluid before the alternative is used. The system must be topped up with the brand of fluid in use or trouble may be experienced.

BRAKE DATA

FIXED PIVOT TYPE.

Make.	Girling Full Hydraulic.
Type.	Two Leading Shoe Front and Rear.
Drum Diameter.	12″ (30·5 cm.)
Friction Lining Material.	Ferodo MZ.41 (rivetted to shoe)
Area.	183 sq. in. (1181 sq. cm.)
Length. Front.	$11\frac{1}{2}$″ (29·2 cm.)
Length. Rear.	$11\frac{1}{2}$″ (29·2 cm.)
Width. Front.	$2\frac{1}{4}$″ (57·2 mm.)
Width. Rear.	$1\frac{3}{4}$″ (44·5 mm.)
Thickness. Front.	$\frac{1}{4}$″ (6·4 mm.)
Thickness. Rear.	$\frac{1}{4}$″ (6·4 mm.)

SLIDING PIVOT TYPE.

Make.	Girling Full Hydraulic.
Type.	Two Leading Shoe Front. Single Leading Shoe Rear.
Drum Diameter.	12″ (30·5 cm.)
Friction Lining Material.	Mintex M.14. (Bonded to shoe.)
Area.	226·2 sq. ins. (1459·4 sq. cm.)
Length. Front.	$12\frac{21}{32}$″ (32·1 cm.)
Length. Rear.	Leading Shoe $12\frac{5}{16}$″ (31·3 cm.) Trailing Shoe $12\frac{21}{32}$″ (32·1 cm.)
Width. Front.	$2\frac{1}{4}$″ (5·7 cm.)
Width. Rear.	$2\frac{1}{4}$″ (5·7 cm.)
Thickness. Front.	$\frac{1}{4}$″ (6.4 mm.)
Thickness. Rear.	$\frac{1}{4}$″ (6.4 mm.)

GENERAL. The necessity for adjustment of the brakes cannot be laid down on a mileage or time basis but can best be judged by observing the amount of brake pedal free travel before solid resistance is felt. When this free travel is three quarters or more of the total available pedal pad travel adjustment should be made as follows :—

FRONT. (Fixed Pivot Type.) Jack up one front wheel. Spin the wheel and rotate the two hexagon adjustment bolts one at a time, in a **clockwise** direction until the brake shoes just contact the drum. Then slacken back the adjustment until the wheel rotates freely and without dragging. Observe that each adjustment bolt operates on its individual shoe and therefore adjustment must be made at both bolts. (Plate L.2.) Repeat for other front wheel.

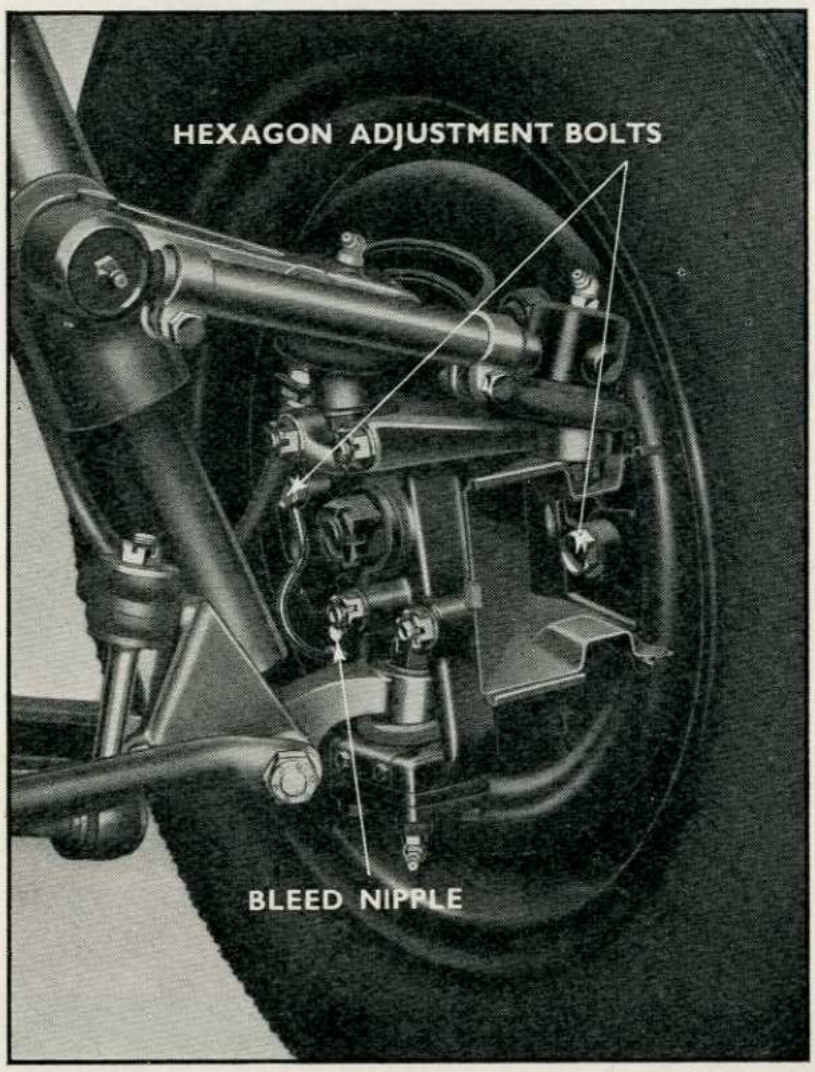


PLATE L.2
FRONT BRAKES. ADJUSTMENT AND BLEED NIPPLE

(Sliding Pivot Type.) Jack up one front wheel. Spin the wheel and rotate the two hexagon adjustment bolts, one at a time, in a clockwise direction until the brake shoes just contact the drum. Then slacken back the adjustment until the wheel rotates freely and without dragging. Spin the wheels and apply the brakes hard to centralise the shoes in the drum. A further adjustment check should then be made. Observe that each adjustment bolt operates on its individual shoe and therefore adjustment must be made on both bolts. (Plate L.2.) Repeat for the other front wheel.
To gain access to the front adjustment bolt, which is situated inside the air scoop, the grid covering the scoop must first be removed. To bring the shoes closer to the drum the adjustment bolts should be rotated **clockwise** and to bring the shoes further away from the drums the adjustment bolts should be rotated anti-clockwise.

REAR. (Fixed Pivot Type.) Release the handbrake and jack up one rear wheel. The square-headed adjuster is situated at the leading edge of the brake back plate. Rotate the adjuster clockwise until solid resistance is felt, that is, the shoes contact the brake drum. Slacken the adjuster two clicks, which can be heard and felt, when the brakes should be free. Repeat for the other rear wheel. Since the rear shoes are not self centralising, it is necessary to centralise them in the drums from time to time as follows :—
Slacken the two adjuster housing set pins approximately one complete turn, which will allow the adjuster

housing to float on the brake back plate, rotate the adjuster clockwise until solid resistance is felt, that is, when shoes contact the drums. Make one firm application of the foot brake pedal, securely tighten the adjuster housing set pins and slacken the adjuster two clicks, which can be heard and felt, when the brakes should be free. Repeat for the other rear wheel.

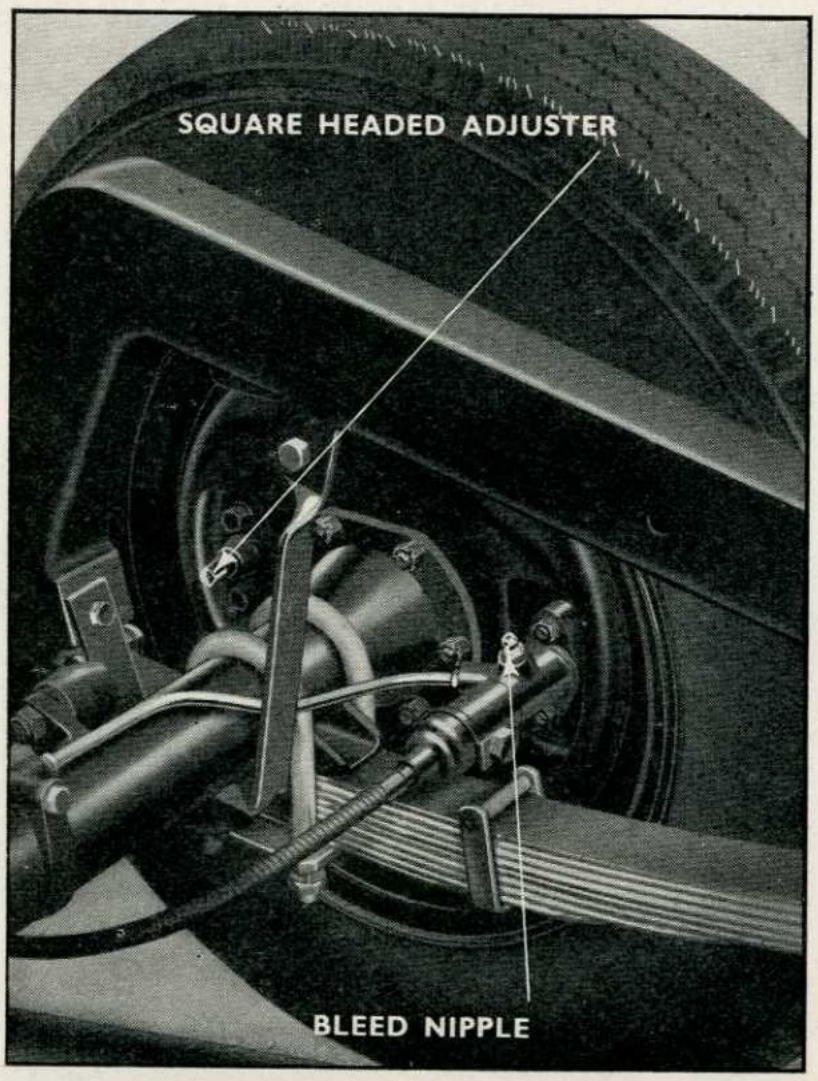


PLATE L.3. REAR BRAKES. ADJUSTMENT AND BLEED NIPPLE. (FIXED PIVOT TYPE)

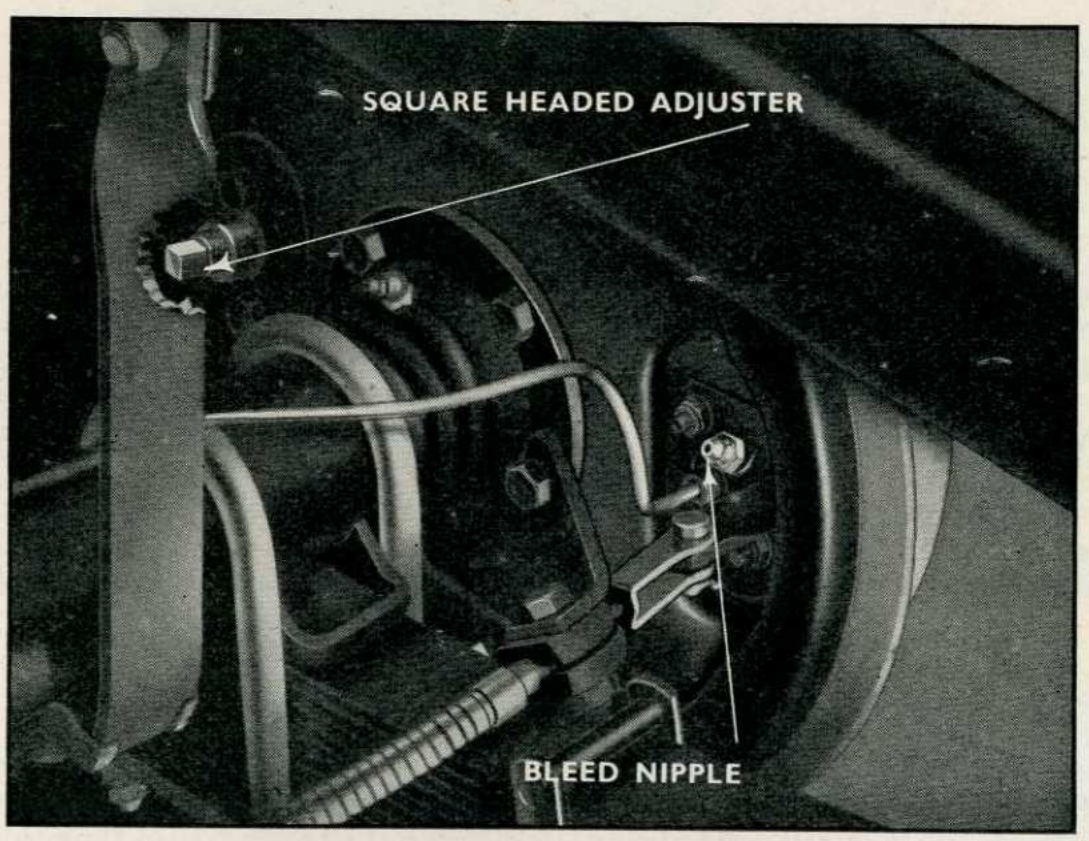


PLATE L.4. REAR BRAKES. ADJUSTMENT AND BLEED NIPPLE. (SLIDING PIVOT TYPE)

(Sliding Pivot Type.) Release the handbrake and jack up one rear wheel. The square-headed adjuster is situated at the leading edge of the brake back plate. Rotate the adjuster clockwise until solid resistance is felt, that is, the shoes contact the brake drum. Slacken the adjuster two clicks, which can be heard and felt, when the brakes should be free. Spin the wheel and apply the brakes hard to centralise the shoes in the drums. A further adjustment check should then be made. Repeat for the other rear wheel.

HAND. Adjustment of the rear brakes will automatically adjust the handbrake. However, it may be found that with the foot brake in correct adjustment excessive handbrake free travel is obtained. The handbrake operates on the two rear wheels only and is cable operated. When correctly adjusted there should be three notches free movement at the pistol grip. Adjustment of the handbrake free travel is obtained by rotating the hexagon nut in the yoke linkage attached to the central cross member. To effect adjustment jack up both rear wheels, lock shoes by means of the adjuster and then set cable at yoke to give the required three notches free movement by rotating the hexagon nut as necessary. Slacken off brake adjusters two notches when wheels should rotate freely. Adjustment must on no account be made other than in the manner described, as haphazard adjustment to the cable may preload the hydraulic operating piston to which it is attached (fixed pivot type), or lift the shoes off the hydraulic expander tappets (sliding pivot type), causing the brake shoes to bind. When the handbrake is released no tension should exist in the cable.

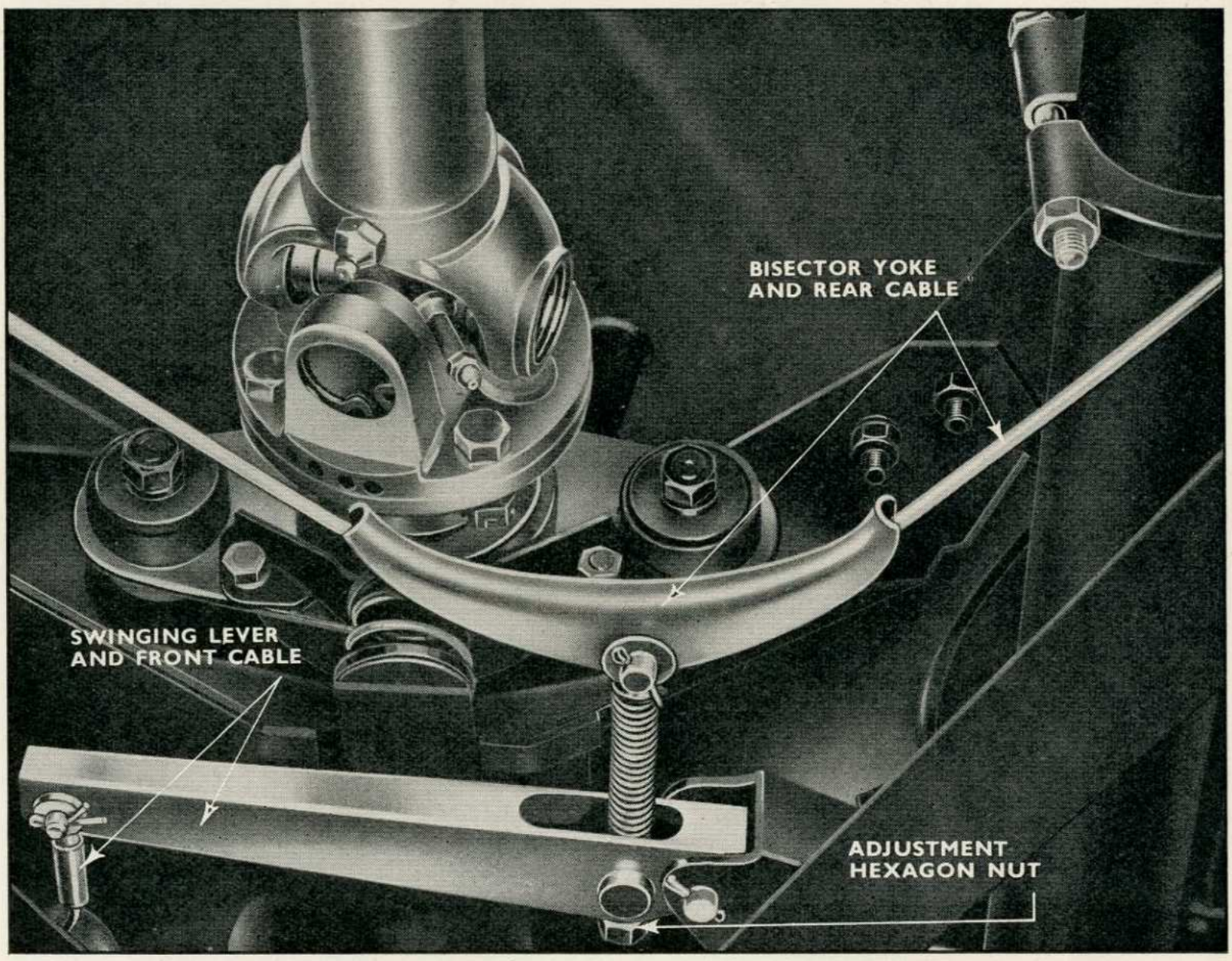


PLATE L.5. HANDBRAKE. ADJUSTMENT

HYDRAULIC SYSTEM. Should the resistance from the brake pedal become "spongy," this indicates that air is present in the hydraulic system possibly caused by the level of fluid in the supply tank having been allowed to fall too low, or by a portion of the system having been disconnected, thus permitting air to enter. In these circumstances it is necessary to bleed the brakes, which consists of driving all air from the system, as follows :—

Remove Watermark Wondershare PDFelement

First slacken back shoe adjusters to zero on all brakes. THIS IS IMPORTANT. Fill up the supply tank with fluid, exercising great care to prevent entry of dirt. Take one brake at a time, remove rubber cover from bleeder nipple and fit rubber bleed tube, allowing this to hang in a clean container or glass jar. Unscrew the nipple about three-quarters of a turn and operate the brake pedal its full travel a few times, allowing two or three seconds between each stroke. Pumping must be continued until the fluid is entirely free of air, care being taken to see that the reservoir is replenished frequently during this operation, for should it be allowed to empty, more air will enter. After expelling all traces of air, tighten nipple and replace rubber dust excluder. Repeat procedure on the other three brakes. The location of front and rear bleed nipples is shown on Plates L.2, L.3 and L.4.

On completion, top up reservoir to correct level and reset brake shoe adjusters as described. Do not on any account use the fluid which has been bled through the system to replenish the reservoir as it will have become aerated. Always use fresh fluid straight from the tin. The system must be topped up with the brand of fluid in use or trouble may be experienced. Before a change from one type of brake fluid to the other is made it is necessary to completely drain the system of one fluid before the alternative is used.

BRAKE OVERHAUL. GENERAL INSTRUCTIONS

CLEANLINESS. The importance of absolute cleanliness when dealing with hydraulic parts such as the master cylinder and operating cylinders cannot be over-stressed. Clean off road dirt and grease before removing the units from their mountings. Dismantle on a clean bench and do not handle internal parts with dirty or greasy hands. Never use petrol, paraffin or other similar cleaning agents to wash the unit or internal components since this will have the tendency to destroy rubber parts. Place the parts in a tin containing brake fluid and after soaking, wipe clean with a clean lintless rag. Similarly brake linings must never be touched with greasy hands or their efficiency may be permanently impaired.

EXAMINATION. When all parts have been cleaned as described above and are thoroughly dry, carry out an examination and scrap all rubber cups and rubbers which show signs of deterioration. If doubt exists, comparison with new parts will indicate whether replacements are required. Never endeavour to clear out the internal bore of flexible hydraulic pipes with a probe since this will undoubtedly result in rupture of the pipe. Where the flexible pipes are choked or perished, fit replacements.

ASSEMBLY. Ensure that castings are perfectly clean and bear no traces of cleaning fluid other than genuine brake fluid. Dip all internal parts in clean brake fluid and assemble wet. The importance of absolute cleanliness during assembly is again stressed. Always use Girling Crimson Brake Fluid to top up the system. If Girling fluid is not available, Lockheed Orange Brake Fluid may be used, but it is essential to drain the system of one fluid before the alternative is used. The system must be topped up with the brand of fluid in use. Attention is drawn to the instructions given on removing and refitting hydraulic pipes given on page L.14.

TESTING. Before the brakes are tested check tyre pressures and correct, if necessary. Correct pressures are : front 23 lbs. sq. in. (1·6 kg./cm.^{2}), rear 25 lbs. sq. in. (1·8 kg./cm.^{2}).

STORAGE. Special care is required in the storage and handling of brake equipment parts, particularly caps and rubbers, since distortion or damage will affect their correct functioning when fitted.

SUPPLY TANK. REMOVE AND REFIT

REMOVE. Open right-hand bonnet top panel by pushing forward control situated under right-hand side of facia. Remove three screws securing side panel and removal panel. Clean all dirt from exterior of pipe connecting supply tank to master cylinder. Release lower hose clip on flexible pipe beneath supply tank, draw off pipe and drain contents into a clean container. Cover the end of the supply pipe to prevent ingress of dirt. Remove two nuts and spring washers securing supply tank strap to bracket on dash. Lift out supply tank. (Plate L.6.)

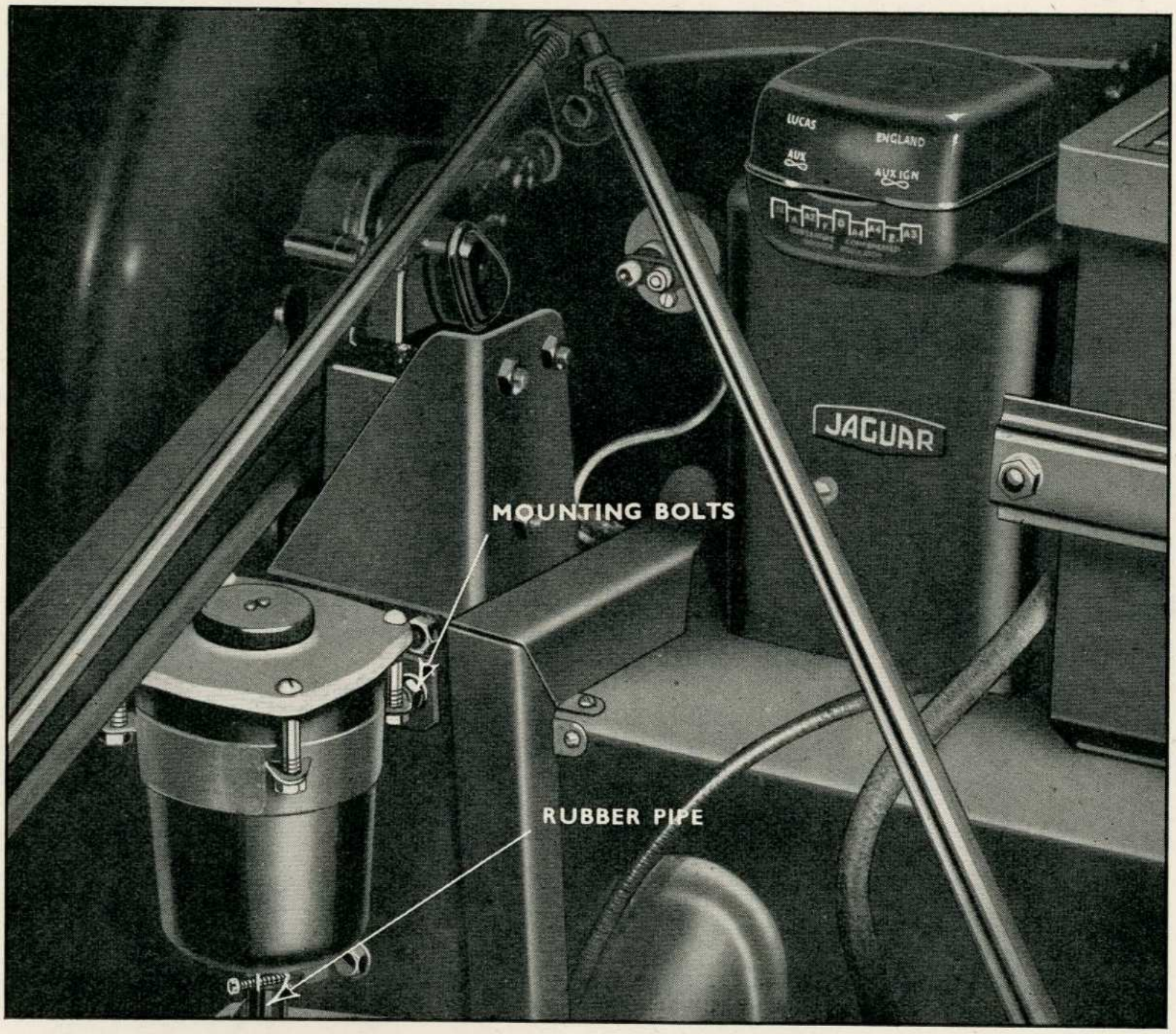


PLATE L.6. SUPPLY TANK

REFIT. Refitting is the reverse of the above procedure. Do not omit to replenish the supply tank with the same grade of fluid that is at present in use. (See instructions on page L.6.) Ensure that the breather hole in the filler cap is clear.

MASTER CYLINDER. REMOVE AND REFIT

REMOVE. Disconnect lower hose clip from rubber pipe beneath the supply tank. Drain contents of tank into a clean container. Disconnect the feed pipe by unscrewing union on top of master cylinder. Unscrew outlet union on top of master cylinder. Remove two bolts, nuts and plain washers securing retainer plate and body of master cylinder to chassis frame bracket. Remove split pin and clevis pin retaining master cylinder push rod to brake pedal. Remove master cylinder mounting bolts and draw master cylinder off downwards. (Plate L.7.)

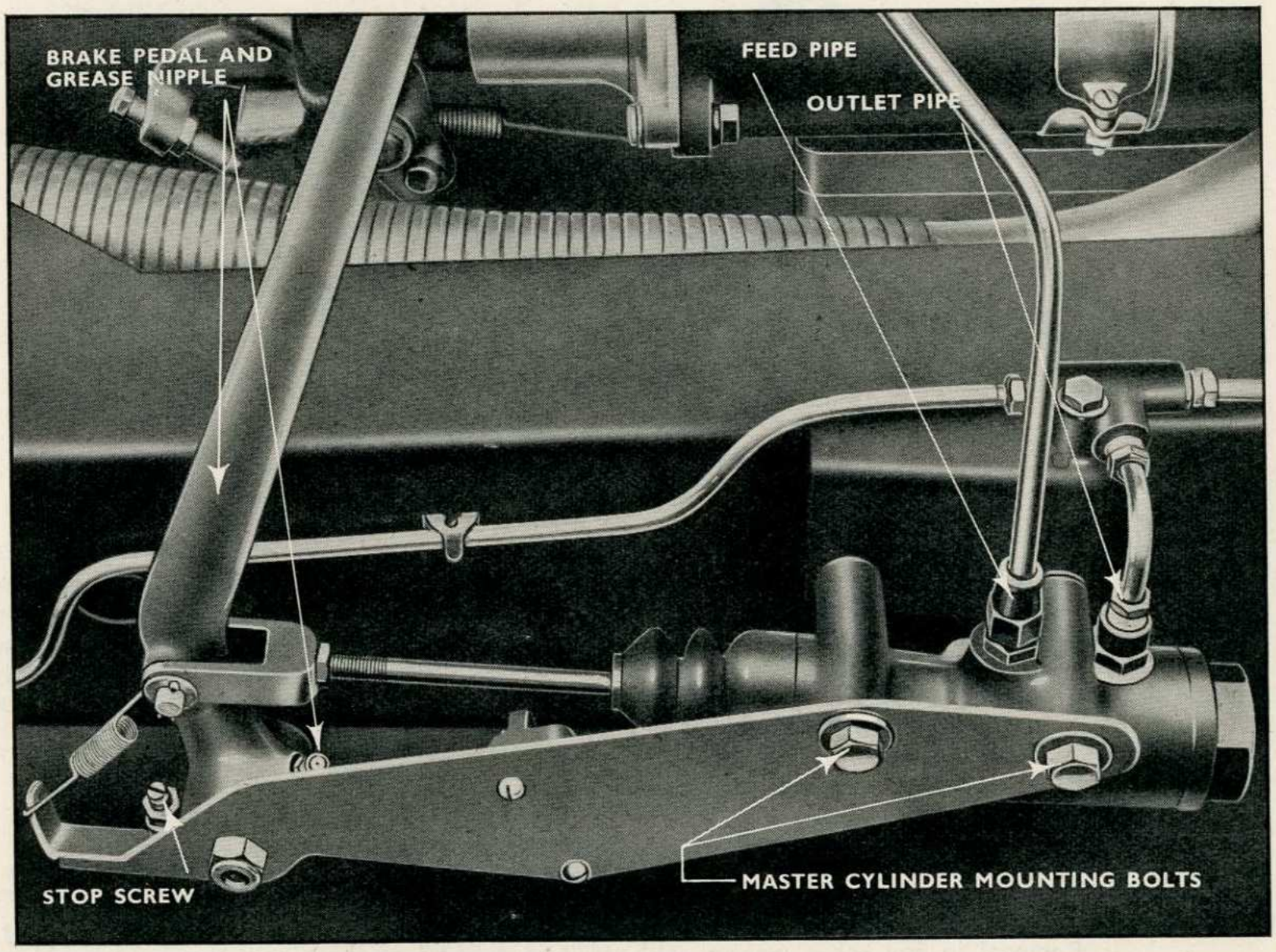


PLATE L.7. MASTER CYLINDER. FITTED

REFIT. Refitting is the reverse of the above procedure. It will be necessary to bleed the brakes as described on page L.9 when all connections have been attached. When reconnecting the master cylinder push rod to the brake pedal ensure that the master cylinder push rod has the correct end float of ·025" (·64 mm.). Refer to page L.26, " Footbrake Pedal. Adjust."

MASTER CYLINDER. DISMANTLE AND REASSEMBLE

DISMANTLE. Remove the master cylinder as described in the previous paragraph. Unscrew the end cover and remove complete with gasket. (Plate L.8.) Withdraw the plunger return spring. Remove brake pedal jaw, lock nut and rubber boot from the push rod. Withdraw circlip, retaining washer and push rod. The plunger complete with seal retainer and end seal is withdrawn from the pressure end of the cylinder, that is, it is withdrawn through the end occupied by the push rod. Remove recuperating seal from the body. (Plate L.8.) Carefully examine the various parts and renew any that appear worn or damaged. It is especially important to renew any of the seals which are perished or worn. See instructions given on page L.11.

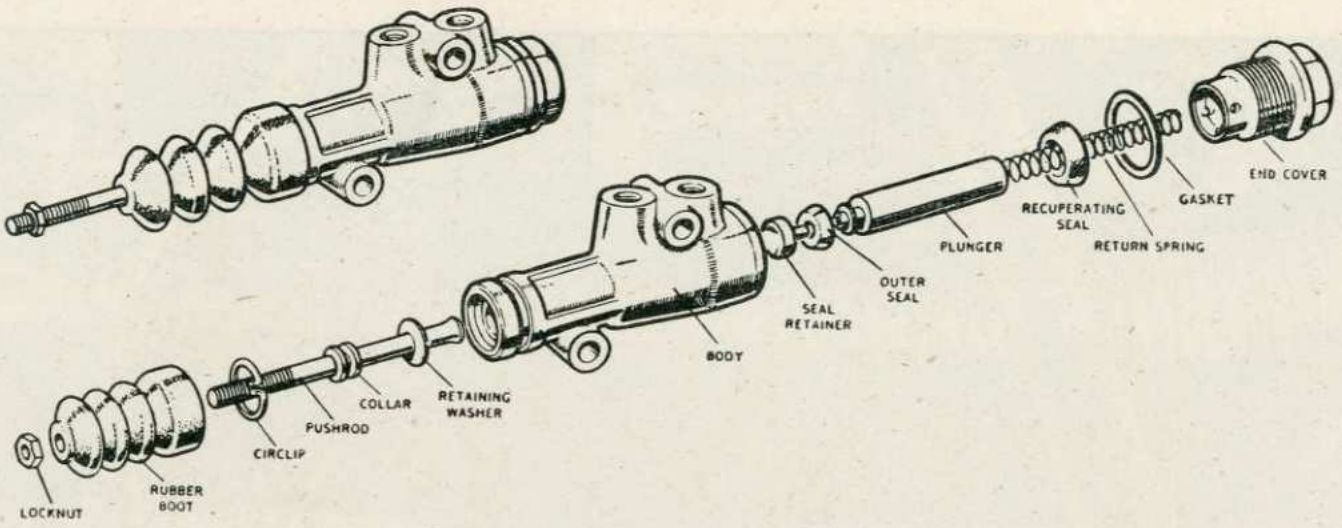


PLATE L.8. MASTER CYLINDER (Exploded view)

REASSEMBLE. Fit recuperating seal with lips facing the pressure end, that is, towards the push rod and make sure that it is correctly situated. Assemble the outer seal and seal retainer with the wider end of the seal next to the plunger and mount into the cylinder from the operating end. Reassemble push rod and circlip and replace plunger return spring, end cover and gasket. Screw the end cover firmly into position and replace rubber boot on the cylinder packing it first with rubber grease. Refit brake pedal jaw and locknut. Refit the master cylinder to the chassis as described in the previous paragraph.

HYDRAULIC PIPES. REMOVE AND REFIT

REMOVE. The flexible pipes must always be disconnected at the support clip end first. (Plate L.9.) Removal in any other manner will result in rupture of the pipe. Unscrew union securing metal pipe. Hold fixed hexagon nut on flexible pipe. Remove lock nut and draw pipe out of bracket. Unscrew other end, allowing flexible pipe to rotate, and remove pipe. Metal pipes may be removed by unscrewing the union but care should be taken not to strain the pipe and thus cause fracture.

REFIT. Refitting is the reverse of the above procedure. It is, however, essential that the following procedure be adopted when refitting all hydraulic pipe connections.

1. Tighten up. 2. Slacken off. 3. Retighten.

Observe that it will be necessary to bleed the brakes whenever an hydraulic pipe union has been disconnected, as described on page L.9.

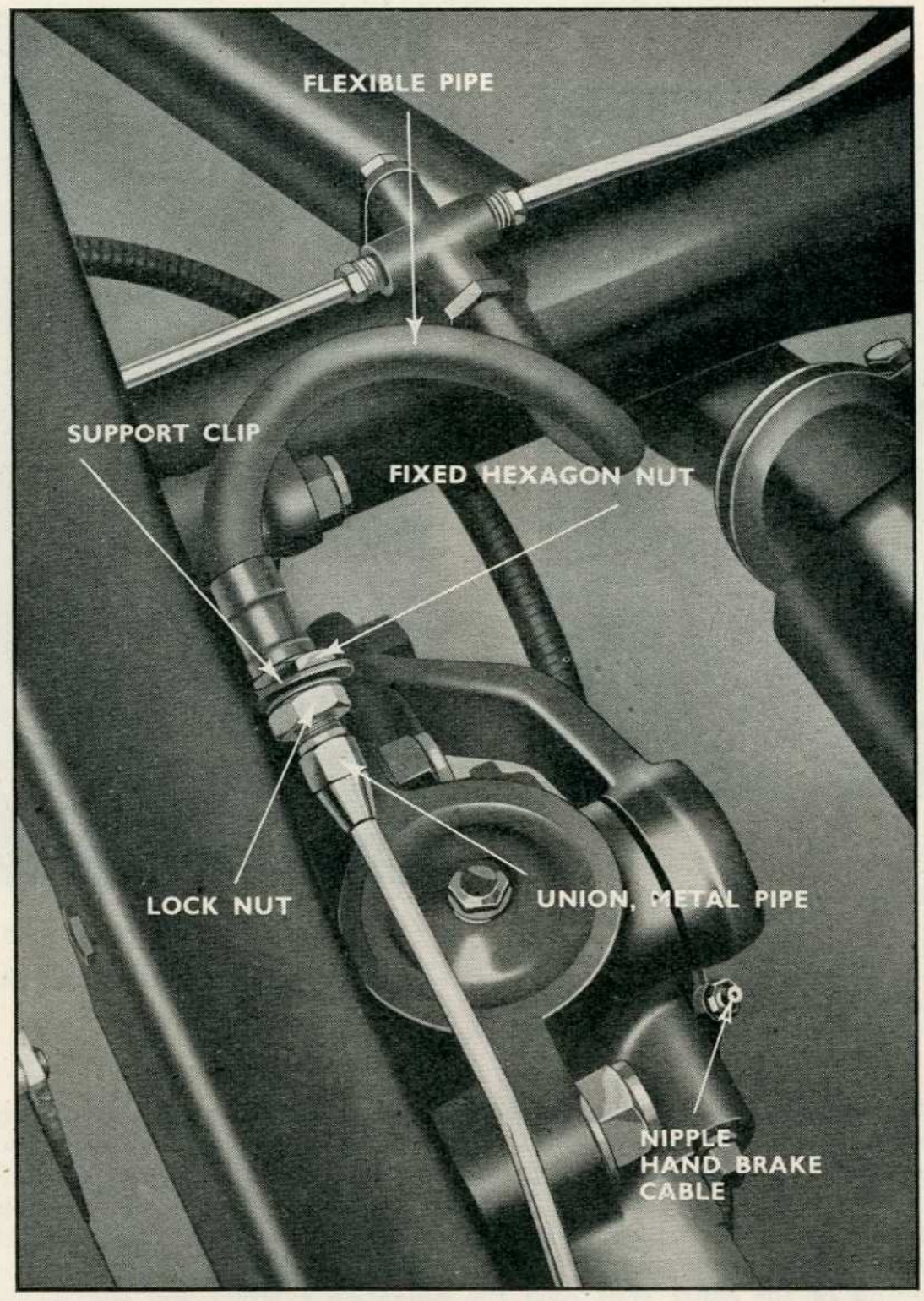


PLATE L.9. HYDRAULIC PIPE CONNECTIONS

SHOE ASSEMBLIES. FRONT. REMOVE AND REFIT

REMOVE. Jack up car and remove the nave plates and front road wheels. Remove two countersunk screws securing each brake drum to hubs and ease drums off register. Remove drums. Lever one shoe end out of expander tappet, lift forward clear of operating cylinder and release. Withdraw the other end of the same shoe from its anchor point on the opposite operating cylinder, draw forward and release. The tension now being released from the pull off springs, disconnect other shoe and remove the shoe assemblies. Note that on sliding pivot type the pull off springs are attached to the shoe leading end and to a peg on the back plate. Repeat for the other brake shoe assembly. Care should be exercised not to touch the brake linings with greasy hands or the efficiency of the linings may be permanently impaired.

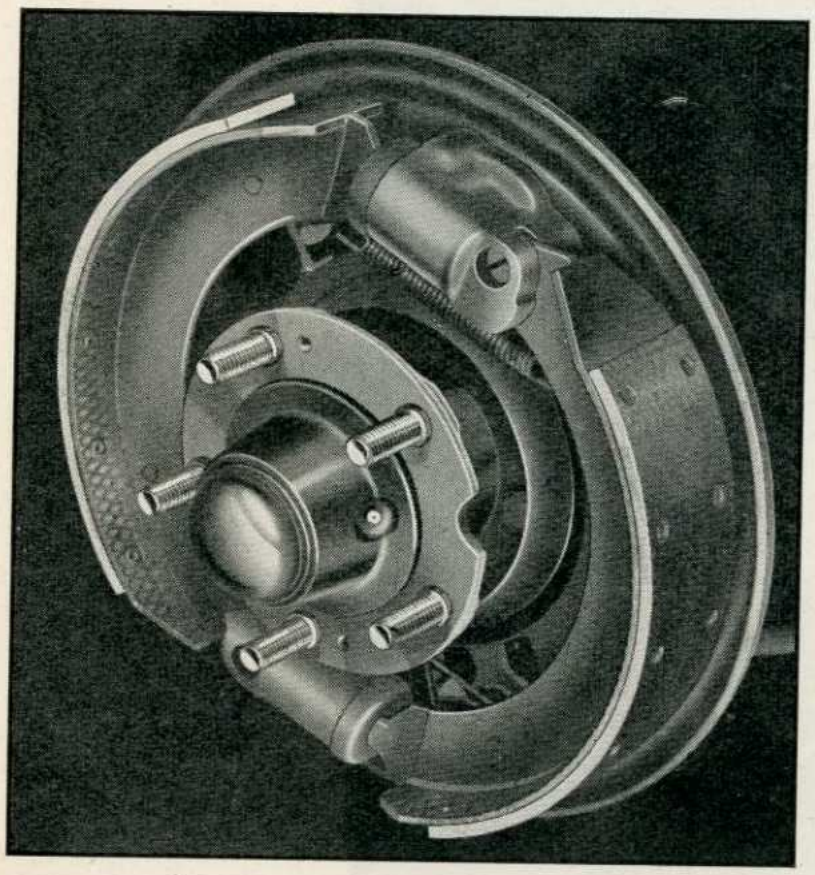


PLATE L.10
FRONT SHOE ASSEMBLIES. (FIXED PIVOT TYPE)

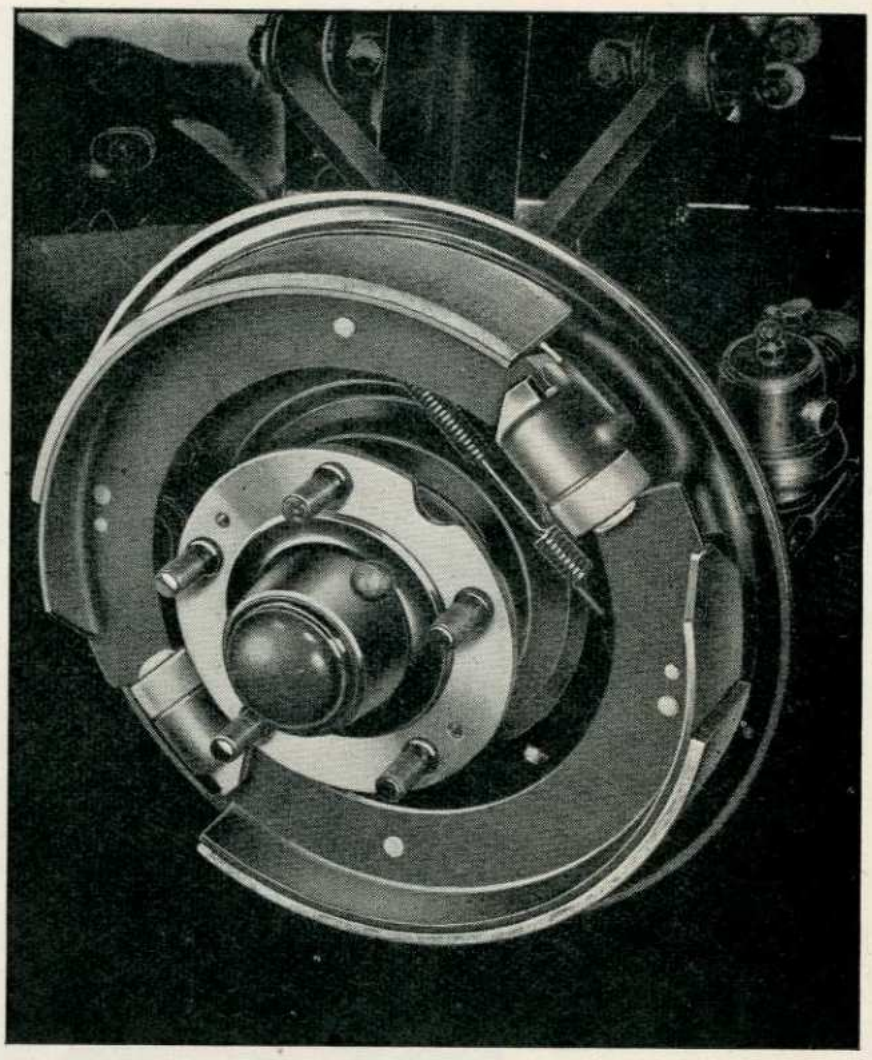


PLATE L.11
FRONT SHOE ASSEMBLIES. (SLIDING PIVOT TYPE)

REFIT. Attach the pull off springs to the brake shoes. Observe that on both types of brakes the springs have long and short ends and the long ends in all cases are attached to the shoe ends engaging the expander tappets. Offer up the shoe assembly and check for correct positioning. The heels of fixed pivot type are slotted at one end and the slot engages on the anchor pin. On sliding pivot type the linings are cut away at one end of each shoe. The cut-away end is the leading end of each shoe in relationship to forward rotation of the brake drum. Engage one shoe on its respective anchor point and expander tappet. Draw the appropriate end of the other shoe over the operating cylinder and engage heel of the shoe on its anchor point. Finally draw the toe of the shoe over the operating cylinder and engage on the expander tappet. Check that the shoes are correctly seated on expander tappets and anchor points and that the pull off springs are correctly engaged. Repeat for the other brake shoe assembly. Refit drums and adjust brakes as described on page L.7. Refit road wheels and nave plates.

SHOE ASSEMBLIES. REAR. (FIXED PIVOT TYPE)

REMOVE AND REFIT

REMOVE. Jack up car, remove rear wing valances, nave plates and road wheels. Remove two countersunk screws securing each brake drum to hubs and ease drums off register. Remove drums. Lever true leading shoe, that is, the shoe without push rod and bell cranks out of expander tappet, lift forward clear of housing and release. Withdraw the other end of the same shoe out of its anchor point (adjuster tappet), draw forward and release. The tension now being released from the pull off springs, disengage the other shoe and remove shoe assemblies. Repeat for the other brake shoe assembly. Care should

be exercised not to touch the brake linings with greasy hands or the efficiency of the linings may be permanently impaired.

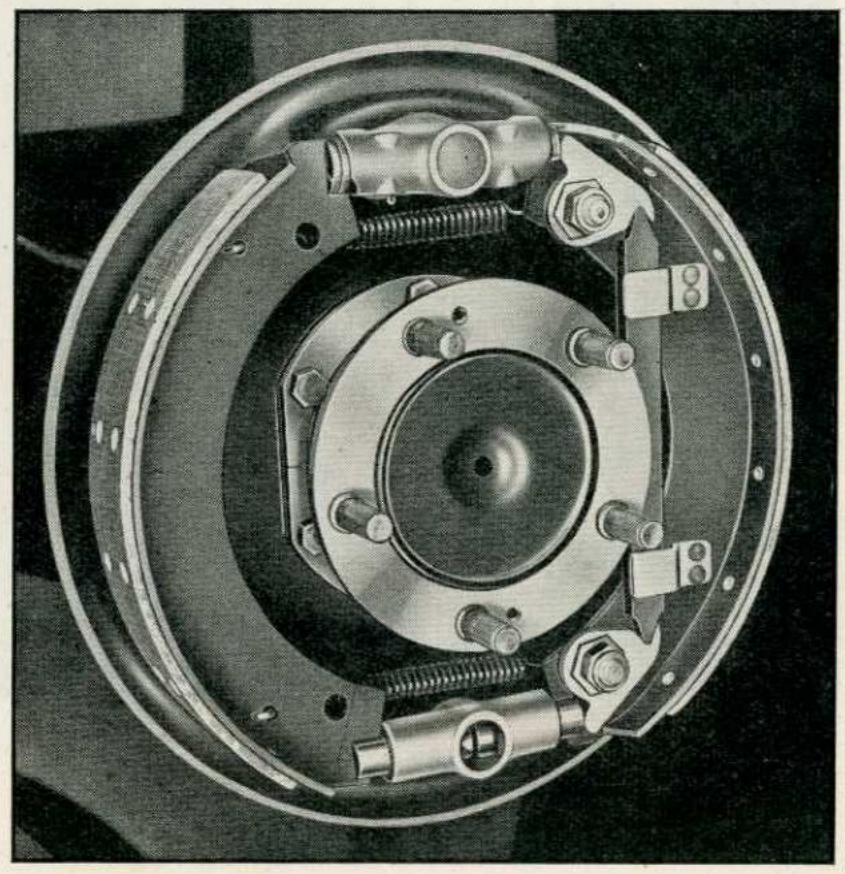


PLATE L.12

REAR SHOE ASSEMBLIES. (FIXED PIVOT TYPE)

REFIT. Attach the pull off springs to the brake shoes and check the shoe for correct assembly. Counting from the expander housing in the direction of forward rotation of the brake drum, the first shoe has no bell cranks and the second shoe has push rod and bell cranks. Offer up the shoe assembly engaging one shoe on its respective adjuster tappet and expander tappet. Draw the appropriate end of the other shoe over the adjuster housing and engage the heel of the shoe on its adjuster tappet. Finally draw the toe of the shoe over the expander housing and engage on the expander tappet. Check that the shoes are correctly seated on the expander tappets and adjuster tappets and that the pull off springs are correctly engaged. Loosen lock nut on eccentric bell crank pins and rotate eccentrics until there is just perceptible end float in the push rod. Tighten lock nuts. Repeat for the other brake shoe assembly. Refit drums, adjust and centralise brakes as described on page L.7. Refit road wheels, nave plates and wing valances.

SHOE ASSEMBLY. REAR. (SLIDING PIVOT TYPE)

REMOVE AND REFIT

REMOVE. Jack up car. Remove rear wing valances, nave plates and road wheels. Remove two countersunk screws securing each brake drum to hubs and ease drums off register. Remove drums. Lever one shoe end out of expander tappet, lift forward clear of operating cylinder and release. Withdraw the other end of the same shoe from its anchor point on the expander tappet, draw forward and release. The tension now being released from the pull off springs, disengage other shoe and remove the shoe assemblies. Repeat for other brake shce assembly. Care should be exercised not to touch the brake linings with greasy hands or the efficiency of the linings will be permanently impaired.

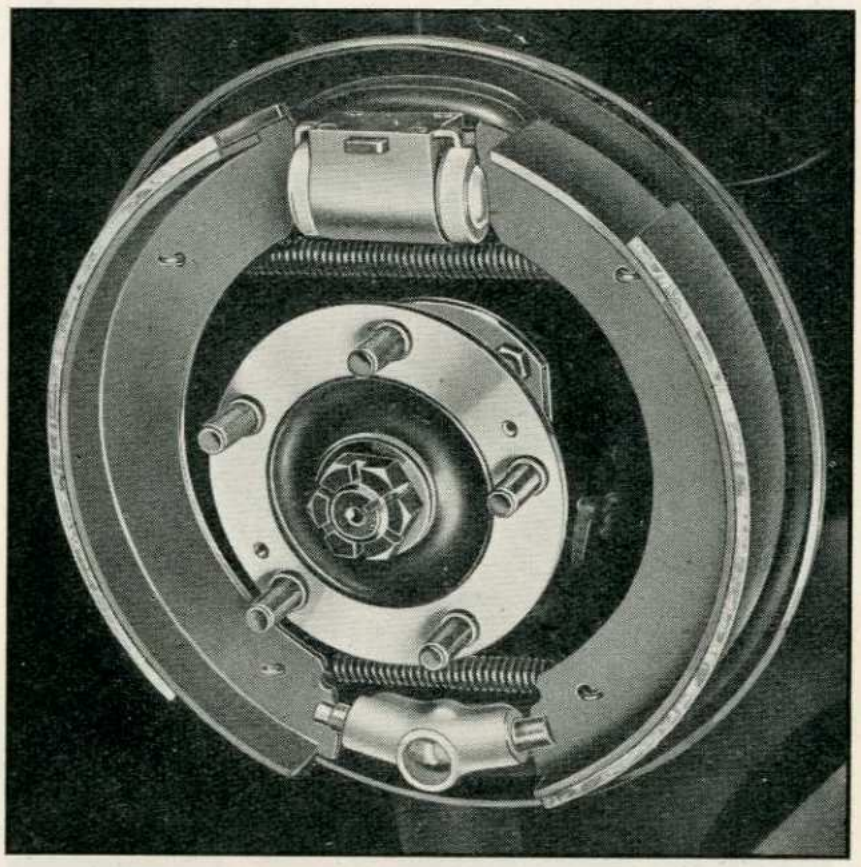


PLATE L.13

REAR SHOE ASSEMBLIES. (SLIDING PIVOT TYPE)

REFIT. Attach the pull off springs and check the shoes for correct assembly. Observe that the brake linings are cut away at one end of each shoe. The cut-away end is the leading end of each shoe in relationship to forward rotation of the brake drum. Ensuring that shoes are assembled in the correct manner offer up the shoe assembly engaging one shoe on its respective adjuster tappet and expander tappet. Draw the appropriate end of the other shoe over the adjuster housing and engage the heel of the shoe on its adjuster tappet. Finally draw the toe of the shoe over the operating cylinder and engage on the expander tappet. Check that the shoes are correctly seated on the expander tappets and adjuster tappets and that the pull off springs are correctly engaged. Repeat for the other brake shoe assembly. Refit drums and adjust brakes as described on page L.7. Refit road wheels, nave plates and wing valances.

BACK PLATE ASSEMBLY. FRONT

REMOVE AND REFIT

REMOVE. Jack up car, remove nave plate and road wheel adjacent to the back plate affected. Remove two countersunk screws and withdraw brake drum. Disconnect hydraulic flexible pipe at inner face of back plate in the manner described on page L.14. If it is intended to dismantle the back plate assembly following removal it is easier to remove the shoe assemblies at this stage as described on page L.15.

Remove split pins and two slotted nuts from top bolts passing through back plate, stub axle carrier and steering arm. Remove bolts. Remove split pins and two slotted nuts from bottom bolts passing through back plate and stub axle carrier. Tilt steering arm out of air scoop and remove back plate assembly complete.

REFIT. Refitting is the reverse of the above procedure. It will be necessary to bleed the brake following assembly as described on page L.9.

BACK PLATE ASSEMBLY. FRONT

DISMANTLE

GENERAL. The back plate assemblies may be dismantled without necessarily removing them from the stub axle carriers. Jack up car, remove nave plate and road wheel adjacent to brake affected.

REMOVE SHOE ASSEMBLIES. Remove shoe assemblies as described on page L.15.

REMOVE HYDRAULIC PIPES. Disconnect unions at rear face of back plate and remove feed pipe and pipe linking operating cylinders.

REMOVE OPERATING CYLINDERS. Remove two set screws with spring washers and nut with spring washer securing each operating cylinder to the back plate. (Two set screws only on Sliding Pivot Type brakes.) Remove operating cylinders.

DISMANTLE OPERATING CYLINDERS (Fixed Pivot Type). Attention is drawn to the general instructions given on page L.11. Withdraw anchor bolt. Remove dust cover and withdraw piston, piston seal, seal spreader and spring. Unscrew bleed screw, remove screw and ball.

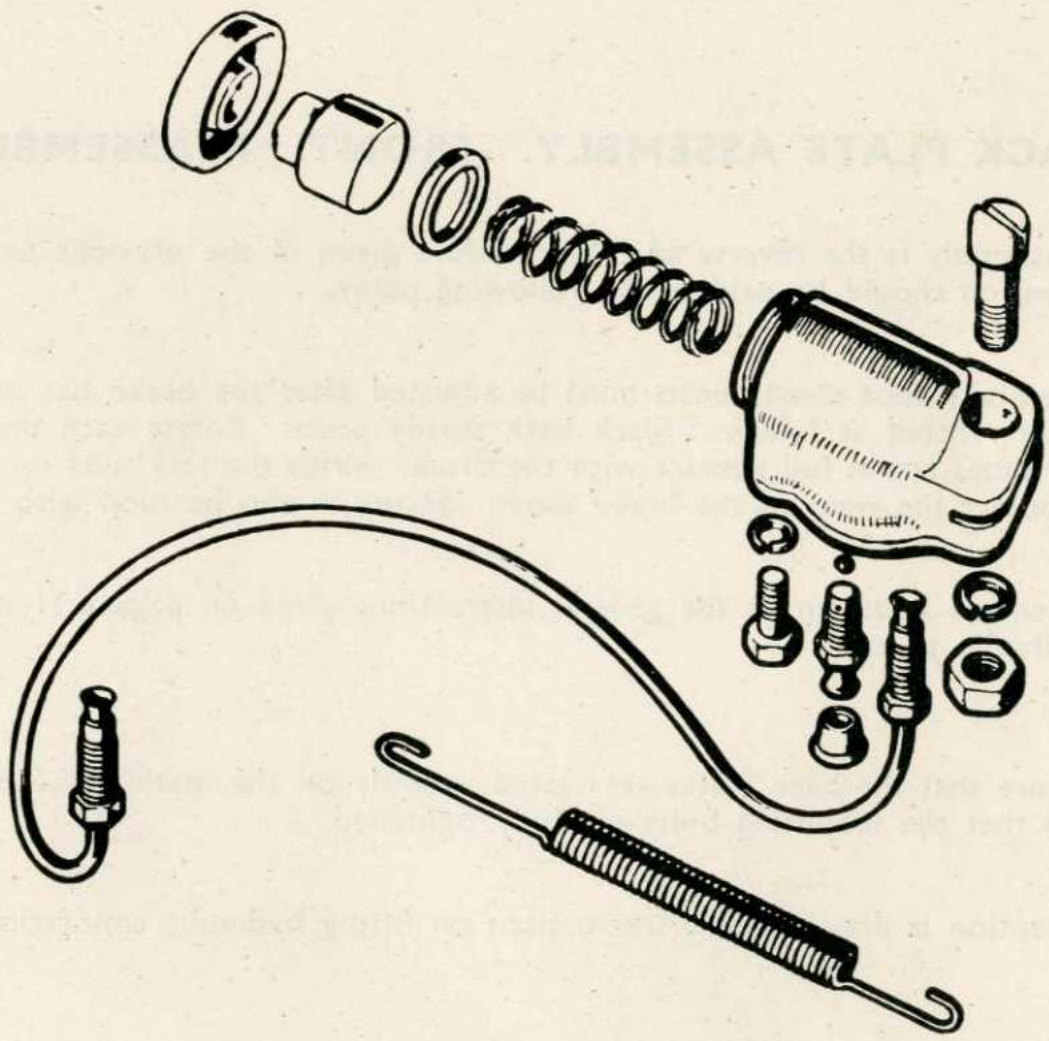


PLATE L.14

OPERATING CYLINDER. FRONT. (FIXED PIVOT TYPE)

DISMANTLE OPERATING CYLINDERS (Sliding Pivot Type).

Attention is drawn to the general instructions given on page L.11. Remove dust cover complete with piston. Withdraw piston seal, seal spreader and spring. Unscrew bleed screw, remove screw and ball.

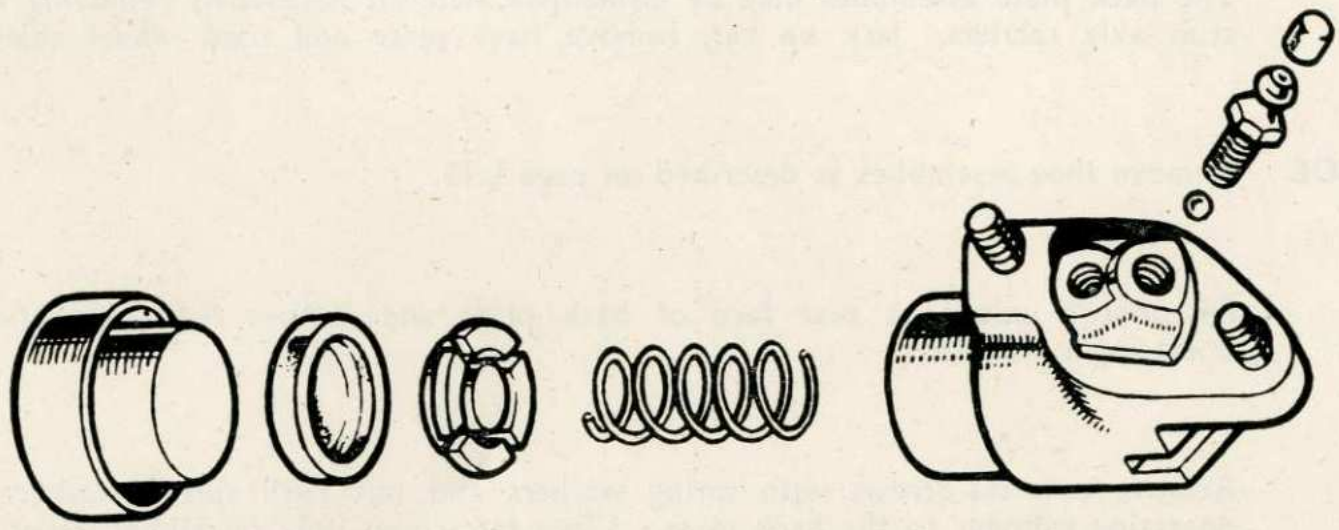


PLATE L.15

OPERATING CYLINDER. FRONT. (SLIDING PIVOT TYPE)

REMOVE STEADY POSTS.

Remove lock nuts from the two brake shoe steady posts and screw posts out of back plate.

BACK PLATE ASSEMBLY. FRONT. REASSEMBLE

GENERAL.

Reassembly is the reverse of the procedure given in the previous paragraph, but particular attention should be paid to the following points.

REFIT STEADY POSTS.

The brake shoe steady posts must be adjusted after the brake has been assembled and the drum refitted as follows : Slack back steady posts. Rotate each brake shoe adjuster until the shoes are in full contact with the drum. With the lock nuts released, rotate the steady posts until they just contact the webs of the brake shoes. Secure in this position with the lock nuts.

ASSEMBLE OPERATING CYLINDERS.

Attention is drawn to the general instructions given on page L.11 in regard to assembling hydraulic parts.

REFIT BACK PLATES.

Ensure that the back plates are seated squarely on the mating face of the stub axle carrier and that the mounting bolts are fully tightened.

REFIT HYDRAULIC PIPES.

Attention is drawn to the instructions on fitting hydraulic connections given on page L.14.

REFIT SHOE ASSEMBLIES.

Full details in regard to fitting shoe assemblies are given on page L.15. Refit drum, adjust and bleed the brakes as described on page L.9. Fit road wheel and nave plate.

BACK PLATE ASSEMBLY. REAR. (SALISBURY AXLE)

REMOVE

GENERAL. Refer to Section H for recognition feature of the two types of axle (Salisbury and E.N.V.). Jack up car, remove wing valance, nave plate and road wheel adjacent to wheel affected. Remove the two countersunk screws and withdraw brake drum.

REMOVE HUB. Withdraw cotter pin and slotted nut with washer securing hub to axle shaft and draw off hub with suitable puller.

DISCONNECT BRAKES. Disconnect brake hydraulic pipe at back plate by unscrewing union on operating cylinder. Slacken handbrake adjustment hexagon nut situated at front of rear brake cable and disconnect cables at back plates as follows :—

(Fixed Pivot Type.) Remove set screw and lock washer securing brass end cover to operating cylinder and withdraw cover to expose inner cable securing nut. Using a screwdriver, unscrew nut anti-clockwise against spring-loaded peg which will enable the inner cable to be disconnected from the outer end of the hydraulic operating plunger.

(Sliding Pivot Type.) Disconnect handbrake cable by removing split pin and withdraw clevis pin securing cable jaw to operating lever on back plate.

REMOVE BACK PLATE. If it is intended to dismantle the back plate assembly following removal it is easier to remove the shoe assemblies at this stage as described on page L.16. Remove back plates by withdrawing five nuts and bolts securing the back plate to flange of axle case. Observe plate retaining hub bearing with two joint washers and oil seal assembly on the outside face of the plate and shims behind the plate. Do not lose or transpose shims to the other side.

BACK PLATE ASSEMBLY. REAR. (SALISBURY AXLE)

REFIT

GENERAL. Refitting is the reverse of the above procedure, but particular attention should be paid to the following points.

REFIT BACK PLATE. Ensure that the same number of shims found on dismantling are positioned behind the back plate when refitting. These shims control end play in the axle half shafts and full details on adjusting will be found in Section H. Always use new jointing washers on either side of the bearing retainer plate or an oil leak into the brake drum may be experienced. Connect brakes. When the hydraulic system has been connected it will be necessary to bleed the brakes as described on page L.19. The handbrake cable assembly is reconnected as follows :—

(Fixed Pivot Type.) Screw securing nut right home with a screw-driver, ensuring that the spring loaded peg has engaged in an appropriate slot. Replace brass end cover and lock with set screw and tab washer.

(Sliding Pivot Type.) Refit clevis pin securing cable jaw to operating lever and secure with a new split pin.

Adjust handbrake cable with hexagon nut, ensuring that no preload is applied, as described on page L.9. Adjust brakes as described on page L.7.

BACK PLATE ASSEMBLY. REAR. (E.N.V. AXLE)

REMOVE

GENERAL. Refer to Section H for recognition features of the two types of axle (Salisbury and E.N.V.). Jack up car, remove wing valance, nave plate and road wheel adjacent to brake affected. Remove the two countersunk screws and withdraw the brake drum.

DISCONNECT BRAKES. Disconnect brake hydraulic pipe at each back plate by unscrewing union at operating cylinder. Slacken handbrake adjustment hexagon nut situated at front of rear brake cable and disconnect cables at back plates as follows :—

(Fixed Pivot Type.) Remove set screw and lock washer securing brass end cover to operating cylinder and withdraw cover to expose inner cable securing nut. Using a screwdriver unscrew nut anti-clockwise against spring loaded peg which will enable the inner cable to be disconnected from the outer end of the hydraulic operating plunger.

(Sliding Pivot Type.) Disconnect handbrake cable by removing split pin and withdraw clevis pin securing cable jaw to operating lever on back plate.

REMOVE AXLE SHAFT AND BACK PLATE. Remove split pins, slotted nuts and spring washers from the six bolts securing bearing housing and brake back plate to the flange of the axle casing. Ease axle shaft away from casing thus exposing adjusting shims between bearing housing and back plate. Remove axle shaft. Do not lose or transpose shims to other side. Remove back plate assembly.

BACK PLATE ASSEMBLY. REAR. (E.N.V. AXLE)

REFIT

GENERAL. Refitting is the reverse of the above procedure, but particular attention should be paid to the following points.

REFIT BACK PLATE AND AXLE SHAFT. Ensure that the same number of shims found on dismantling are fitted between bearing housing and back plate. These shims control end play in the axle shafts and full details on adjusting will be found in Section H.1. When the hydraulic system has been connected it will be necessary to bleed the brakes as described on page L.9. The handbrake cable assembly is reconnected as follows :—

(Fixed Pivot Type.) Screw securing nut right home with a screw-driver, ensuring that the spring loaded peg has engaged in an appropriate slot. Replace brass end cover and lock with set screw and tab washer.

(Sliding Pivot Type.) Refit clevis pin securing cable jaw to operating lever and secure with a new split pin.

Adjust handbrake cable with hexagon nut, ensuring that no preload is applied, as described on page L.9. Adjust brakes as described on page L.7.

BACK PLATE ASSEMBLY. REAR. (E.N.V. AXLE)

REMOVE

GENERAL. Refer to Section H for recognition features of the two types of axle (Salisbury and E.N.V.). Jack up car, remove wing valance, nave plate and road wheel adjacent to brake affected. Remove the two countersunk screws and withdraw the brake drum.

DISCONNECT BRAKES. Disconnect brake hydraulic pipe at each back plate by unscrewing union at operating cylinder. Slacken handbrake adjustment hexagon nut situated at front of rear brake cable and disconnect cables at back plates as follows :—

(Fixed Pivot Type.) Remove set screw and lock washer securing brass end cover to operating cylinder and withdraw cover to expose inner cable securing nut. Using a screwdriver unscrew nut anti-clockwise against spring loaded peg which will enable the inner cable to be disconnected from the outer end of the hydraulic operating plunger.

(Sliding Pivot Type.) Disconnect handbrake cable by removing split pin and withdraw clevis pin securing cable jaw to operating lever on back plate.

REMOVE AXLE SHAFT AND BACK PLATE. Remove split pins, slotted nuts and spring washers from the six bolts securing bearing housing and brake back plate to the flange of the axle casing. Ease axle shaft away from casing thus exposing adjusting shims between bearing housing and back plate. Remove axle shaft. Do not lose or transpose shims to other side. Remove back plate assembly.

BACK PLATE ASSEMBLY. REAR. (E.N.V. AXLE)

REFIT

GENERAL. Refitting is the reverse of the above procedure, but particular attention should be paid to the following points.

REFIT BACK PLATE AND AXLE SHAFT. Ensure that the same number of shims found on dismantling are fitted between bearing housing and back plate. These shims control end play in the axle shafts and full details on adjusting will be found in Section H.1. When the hydraulic system has been connected it will be necessary to bleed the brakes as described on page L.9. The handbrake cable assembly is reconnected as follows :—

(Fixed Pivot Type.) Screw securing nut right home with a screw-driver, ensuring that the spring loaded peg has engaged in an appropriate slot. Replace brass end cover and lock with set screw and tab washer.

(Sliding Pivot Type.) Refit clevis pin securing cable jaw to operating lever and secure with a new split pin.

Adjust handbrake cable with hexagon nut, ensuring that no preload is applied, as described on page L.9. Adjust brakes as described on page L.7.

BACK PLATE ASSEMBLY. REAR. DISMANTLE

GENERAL. The back plate assemblies may be dismantled without necessarily removing them from the rear axle. Remove wing valance, nave plate and road wheel adjacent to brake affected.

REMOVE SHOE ASSEMBLIES. Remove shoe assemblies as described on page L.16.

DISCONNECT BRAKES. Disconnect brake hydraulic pipe at back plate by unscrewing union on operating cylinder. Slacken handbrake adjustment hexagon nut situated at front of rear brake cable and disconnect cables at back plates as follows :—

(Fixed Pivot Type.) Remove set screw and lock washer securing brass end cover to operating cylinder and withdraw cover to expose inner cable securing nut. Using a screw-driver unscrew nut anti-clockwise against spring loaded peg which will enable the inner cable to be disconnected from the outer end of the hydraulic operating plunger.

(Sliding Pivot Type.) Disconnect handbrake cable by removing split pin and withdraw clevis pin securing cable jaw to operating lever on back plate.

REMOVE AND DISMANTLE ADJUSTER HOUSING. Remove two nuts with spring washers and withdraw adjuster housing. Withdraw links (tappets) and unscrew wedge out of housing.

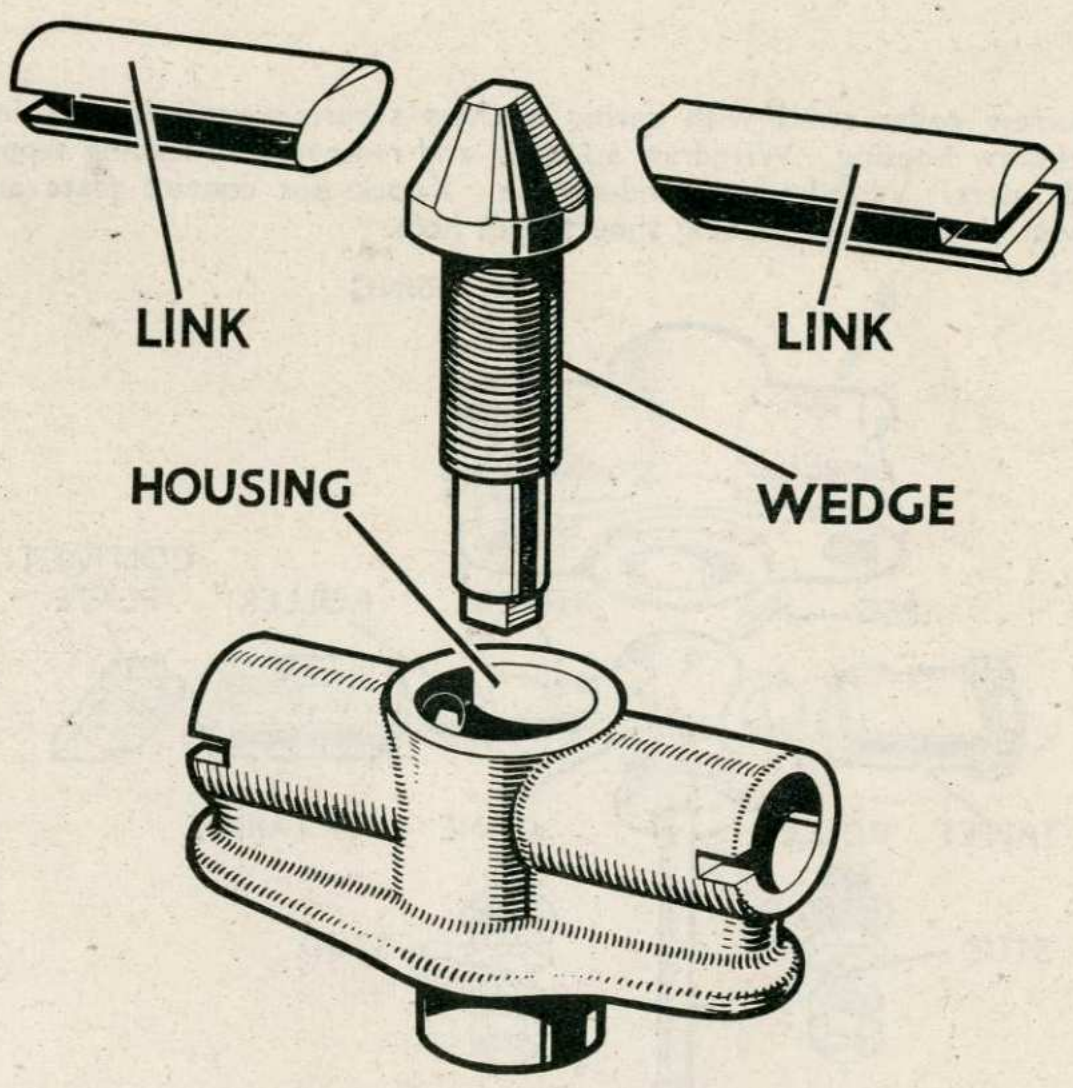


PLATE L.16 ADJUSTER HOUSING. REAR

REMOVE OPERATING CYLINDER (Fixed Pivot Type).

Turn internal sleeve anti-clockwise thus unscrewing the slotted nut inside the sleeve off the expander pull rod. Remove two nuts with shakeproof washers securing operating cylinder to studs on back plate and remove operating cylinder.

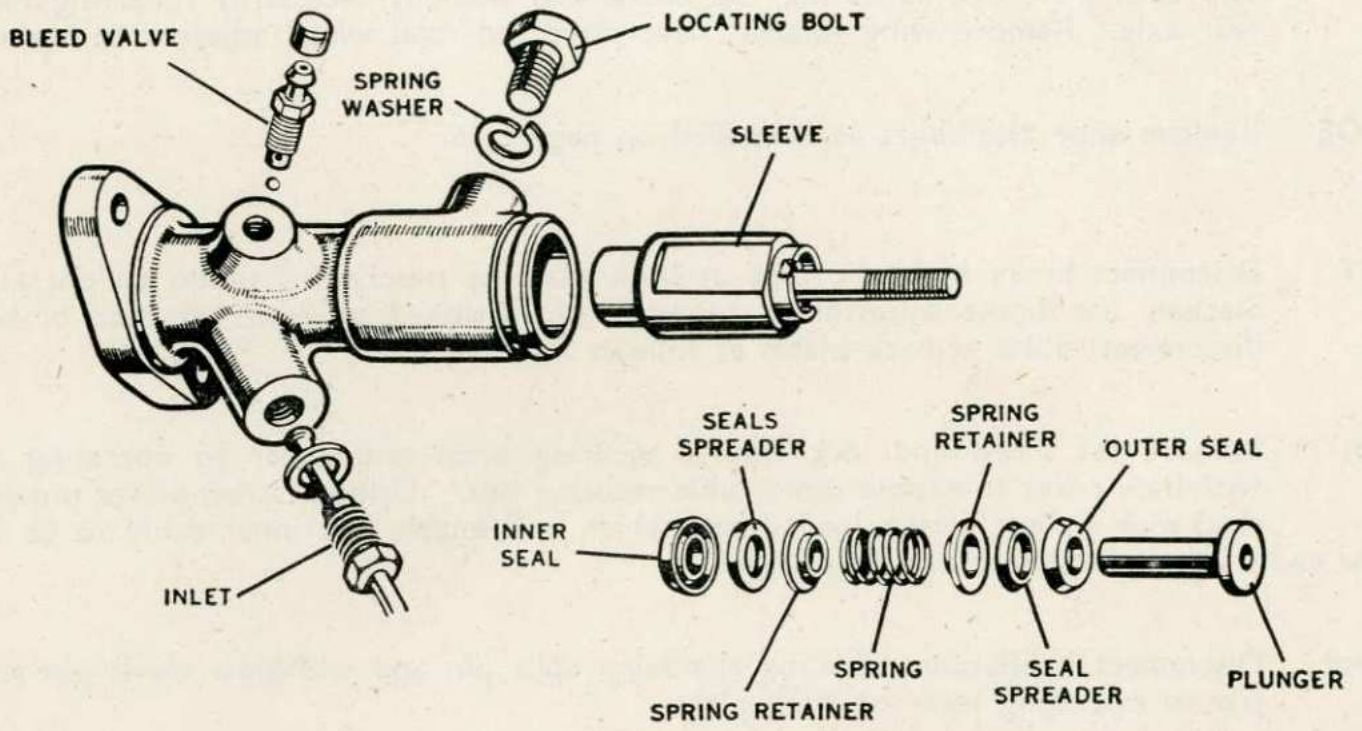


PLATE L.17. OPERATING CYLINDER. REAR. (FIXED PIVOT TYPE)

DISMANTLE OPERATING CYLINDER (Fixed Pivot Type).

Remove plunger complete with seals, seal spreaders, spring retainers and spring. Unscrew bleed nipple ensuring that ball is not lost.

REMOVE AND DISMANTLE EXPANDER HOUSING (Fixed Pivot Type).

Unscrew collar studs with spring washers securing expander housing to back plate and withdraw housing. Withdraw split pin and remove true leading tappet. Shake out rollers and insert. Withdraw expander cone. Knock out contact plate and push second shoe tappet through true leading shoe tappet hole.

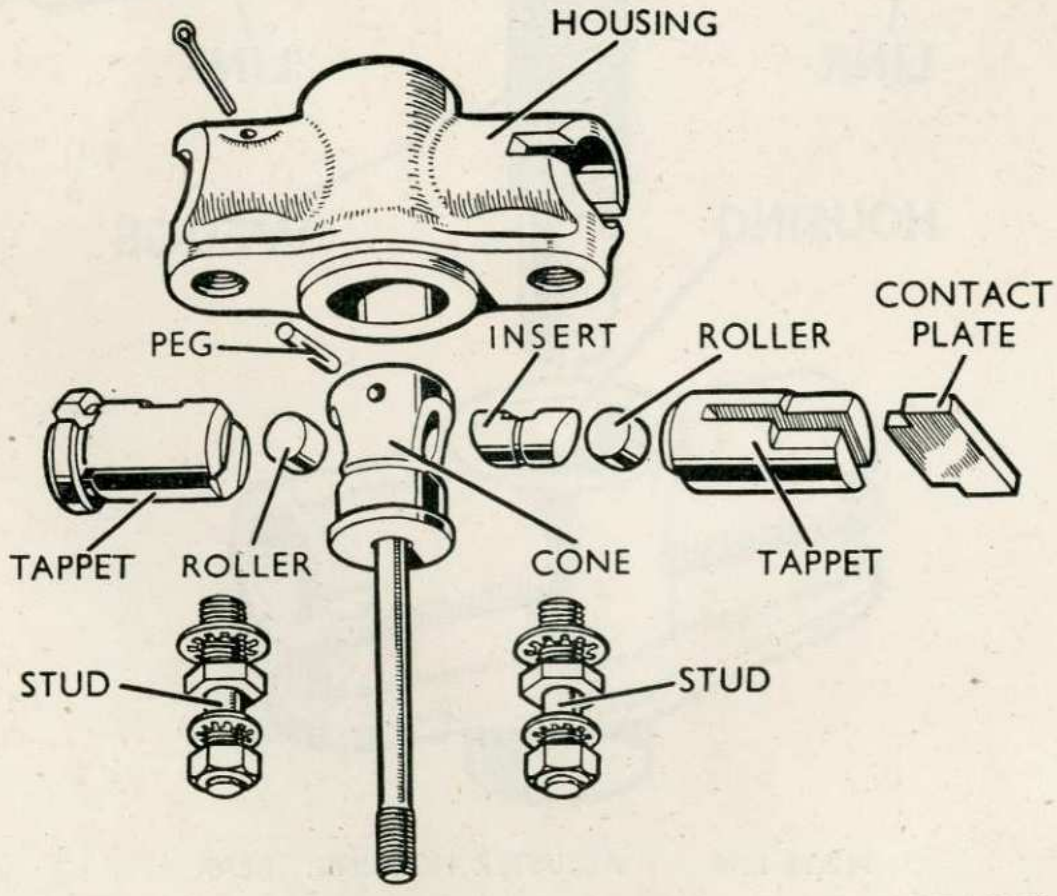


PLATE L.18. EXPANDER HOUSING. REAR. (FIXED PIVOT TYPE)

REMOVE OPERATING CYLINDER (Sliding Pivot Type).

Remove three self locking nuts with spring washers and bleed nipple. Ease plate off studs and withdraw operating cylinder.

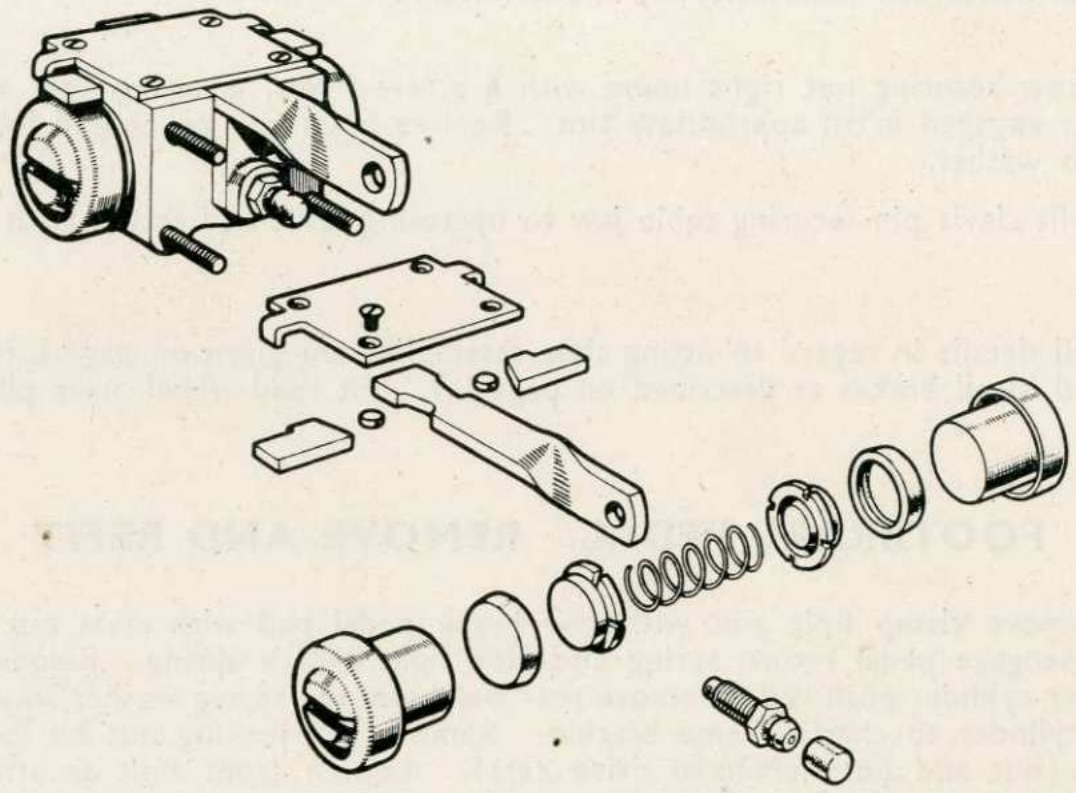


PLATE L.19. OPERATING CYLINDER. REAR. (SLIDING PIVOT TYPE)

DISMANTLE OPERATING CYLINDER (Sliding Pivot Type).

Attention is drawn to the general instructions given on page L.11. Remove dust covers complete with pistons from either end of cylinder. Withdraw seals, seal spreaders and spring. Remove four screws securing handbrake operating lever cover plate. Remove plate, operating lever, rollers and tappets.

REMOVE STEADY POSTS.

Remove lock nuts from the two brake shoe steady posts and screw posts out of back plate.

BACK PLATE ASSEMBLY. REAR. REASSEMBLE

REFIT STEADY POSTS.

The brake shoe steady posts must be adjusted after the brake has been assembled and the drum refitted as follows : Slack back steady posts. Rotate brake shoe adjuster until the shoes are in full contact with the drum. With the lock nuts released, rotate the steady posts until they just contact the webs of the brake shoes. Secure in this position with the lock nuts.

ASSEMBLY EXPANDER HOUSING (Fixed Pivot Type).

Ensure that all parts are a free fit and assemble into housing well packed with brake grease.

ASSEMBLE OPERATING CYLINDERS.

Attention is drawn to the general instructions given on page L.11 in regard to assembling hydraulic parts.

ASSEMBLE ADJUSTER HOUSING.

Assemble into housing well packed with brake grease.

REFIT HYDRAULIC PIPE. Attention is drawn to instruction on fitting hydraulic connections given on page L.14.

REFIT HAND-BRAKE CABLE. The handbrake cable assembly is reconnected as follows :—

(Fixed Pivot Type.) Screw securing nut right home with a screw-driver, ensuring that the spring loaded peg has engaged in an appropriate slot. Replace brass end cover and lock with set screw and tab washer.

(Sliding Pivot Type.) Refit clevis pin securing cable jaw to operating lever and secure with a new split pin.

REFIT SHOE ASSEMBLIES. Full details in regard to fitting shoe assemblies are given on page L.16. Refit drum, adjust and bleed brakes as described on page L.9. Fit road wheel, nave plate and wing valance.

FOOTBRAKE PEDAL. REMOVE AND REFIT

REMOVE. Remove clamp bolt and withdraw brake pedal pad with stem out of brake pedal lever. Disengage pedal return spring and stop light switch spring. Remove split pin and clevis pin from jaw on master cylinder push rod. Remove rear bolt, nut and spring washer securing the retainer plate and body of master cylinder to chassis frame bracket. Remove self locking nut on footbrake pedal spindle, right-hand drive cars (nut and bolt left-hand drive cars). Loosen front bolt securing retainer plate and master cylinder to chassis frame bracket, disengage and tilt plate clear to allow brake pedal to be withdrawn. Withdraw brake pedal.

REFIT. Refitting is the reverse of the above procedure. If a new pedal has been fitted or if the adjustment screw on the boss of the pedal has been disturbed it will be necessary to adjust the pedal as described in the following paragraph.

FOOTBRAKE PEDAL. ADJUST

GENERAL. It is essential that when the footbrake pedal is in the off position the master cylinder push rod is also fully at the end of its travel in the off position. Before making any alteration to the setting ensure that the brake pedal is not obstructed in any way and that the piston is not sticking in the bore of the master cylinder. Master cylinder push rod end float ·025" (·64mm.).

ADJUST. When the above conditions have been fulfilled the clevis pin should enter the jaw on the master cylinder push rod and the hole in the brake pedal without force. At the same time the brake pedal stop screw (Plate L.13) should be in contact with the lip of the retainer plate. Adjust the master cylinder push rod jaw and/or the stop screw on the boss of the brake pedal to obtain the correct adjustment.

HANDBRAKE GRIP ASSEMBLY. REMOVE AND REFIT

REMOVE. Release two clips securing handbrake front cable to engine side of dash. Remove two nuts, washers and bolts securing bracket at front of handbrake assembly to dash. Remove clamp bolt securing stem of handbrake assembly to bracket under dash. Draw handbrake assembly into car. Remove pinch bolt at front and disengage inner cable. Remove handbrake grip assembly.

REFIT. Refitting is the reverse of the above procedure.

HANDBRAKE FRONT CABLE. REMOVE AND REFIT

REMOVE. Disengage cable from handbrake grip assembly as described in the previous paragraph. Remove the return spring from the swinging lever (later cars only). Remove split pin, washer and clevis pin from other end (rear) of cable. Release clamp bolt and disengage outer cable from abutment point on chassis cruciform member. Remove cable.

REFIT. Refitting is the reverse of the above procedure.

HANDBRAKE ADJUSTMENT MECHANISM. REMOVE AND REFIT

REMOVE. Remove the return spring from the swinging lever (later cars only). Unscrew the hexagon adjustment nut off rod on rear cable assembly. The screwed rod is attached to the bisector yoke of the rear cable assembly by a clevis pin secured by split pin and washer. Remove spring and trunnion now released. Remove split pin, washer and clevis pin from other end of swinging lever and remove lever.

REFIT. Refitting is the reverse of the above procedure. When adjustments are being made at the hexagon nut refer to instructions given on page L.9.

HANDBRAKE REAR CABLE. REMOVE AND REFIT

REMOVE. Remove split pin, washer and clevis pin securing bisector yoke to adjustment rod. Release outer cables from front abutment points and from spring steady clips on chassis frame members. Release cables from clips on axle casing. Disconnect cables from back plates as follows :—

(Fixed Pivot Type.) Remove set screw and lock washer securing brass end cover to operating cylinder and withdraw cover to expose inner cable securing nut. Using a screw-driver unscrew nut anti-clockwise against spring loaded peg which will enable the inner cable to be disconnected from the outer end of the hydraulic operating plunger.

(Sliding Pivot Type.) Disconnect handbrake cable by removing split pin and withdraw clevis pin securing cable jaw to operating lever on back plate.

Remove cable assembly forward.

REFIT. Refitting is the reverse of the above procedure. The handbrake cable assembly is reconnected as follows :—

(Fixed Pivot Type.) Screw securing nut right home with a screw-driver, ensuring that the spring loaded peg has been engaged in an appropriate slot. Replace brass end cover and lock with set screw and tab washer.

(Sliding Pivot Type.) Refit clevis pin securing cable jaw to operating lever and secure with a new split pin.

Remove Watermark
Wondershare PDFelement

CHASSIS

MARK V

2½ and 3½ LITRE

CHASSIS NUMBERS

(Stamped at the front of the chassis left-hand side member and on a plate attached to the scuttle under the right-hand bonnet top panel)

2½ Litre	3½ Litre
Saloon	
520001 Right-Hand Drive	620001 Right-Hand Drive
527001 Left-Hand Drive	627001 Left-Hand Drive
Coupé	
540001 Right-Hand Drive	640001 Right-Hand Drive
547001 Left-Hand Drive	647001 Left-Hand Drive

The instructions in this section are presented under the following main headings which appear as sub-titles on the pages concerned and in the order shown :—

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Exhaust Mountings	Remove and Refit	M. 7
Hub Bearings. Front	Remove and Refit	M. 7
Hub Bearings. Front	Adjust	M. 7
Revolution Counter	Remove and Refit	M. 8
Revolution Counter Cable	Remove and Refit	M. 8
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DESCRIPTION. The chassis frame side members are of deep box section which taper, in plan view, towards the front of the car from a point on the axis of the rear spring anchor bolts. Mounted on the axis of the front road wheels are mounting posts which carry the upper wishbone members and also provide the top mounting for the telescopic shock absorbers. The steering box is attached to one of these mounting posts and the steering idle lever housing to the other depending on whether the car is left hand or right hand drive. Immediately in front of these mounting posts the side members are joined by a heavy box section cross member with webs running back to give additional support to the mounting posts. The centre section of the side members is reinforced by cruciform bracing with a second cross member joining the intersection of the cruciform members to the side members. A third and fourth cross member support the side members on the axis of the rear road spring anchor bolts and shackle bolts respectively.

In side elevation the top and bottom faces of the side members are parallel from the rear road spring anchor bolts to a point in line with the rear of the engine sump. From the front of this parallel section the frame slopes up on its lower surface to meet the front cross member. At the rear the side members are sharply upswept over the rear axle. The entire construction given a chassis frame of immense strength and rigidity with lightness.

The exhaust system consists of a branched down pipe, with flexible inserts to allow for engine movement and to absorb vibration, which is connected to the twin exhaust manifolds on the offside (right hand) of the engine. The rear end of the down pipe is flange bolted to an intermediate pipe which passes through holes provided in the offside (right hand) cruciform bracing members. The intermediate pipe is in turn secured by a split clip to a large single silencer with tail pipe discharging at the offside (right hand) rear of the chassis. Flexible mountings are provided on the intermediate pipe, silencer and tail pipe.

The front hub bearings consist of two adjustable taper roller bearings on each side mounted on a stub axle pin bolted to the stub axle carrier. A grease nipple is provided in each front hub and a bleed hole in the hub dust cap to indicate when an excess of lubricant has been applied.

The road wheels are attached to the front and rear hubs with a five stud mounting and are fitted with detachable nave plates.

The speedometer and revolution counter are connected to their respective drive gears in the gearbox and the nearside (left hand) of the engine by flexible cables.

MAINTENANCE. Every week check tyre pressures, when tyres are cold, with an approved tyre pressure gauge and adjust the pressures to front 23lbs. per sq. inch, rear 25 lbs. per sq. inch (1.6 kg/cm^2 and 1.8 kg/cm^2). Ensure that all valves are fitted with valve caps. Periodically remove all flints and chips from the tyres and check that all wheel nuts are tight. For fast driving conditions where comfort is not of primary importance maintain pressures at front 25lbs. per sq. inch, and rear 27lbs. per sq. in. cold (1.8 kg/cm^2 and 1.9 kg/cm^2).

Every 2,500 miles (4,000 kilometres) interchange the road wheels diagonally, that is, change left hand front with right hand rear and right hand front with left hand rear.

Every 5,000 miles (8,000 kilometres) lubricate the front wheel bearings sparingly with recommended lubricant through the nipples provided. The nipples are situated on the wheel hub and are accessible when the front wheels are removed.

Every 5,000 miles (8,000 kilometres) check tightness of all chassis nuts and bolts and exhaust mountings. Tighten if necessary.

RECOMMENDED LUBRICANTS

	Vacuum.	Wakefield.	Shell.	Essolube.
Wheel Bearings.	Mobil Hub Grease.	Castrolease (Heavy).	Retinax R.B.	Essolube Grease.

TYRE PRESSURES

	Front.	Rear.
$2\frac{1}{2}$ and $3\frac{1}{2}$ Litre.	23lbs. per sq. in. Cold. (1.6 kg/cm^2)	25lbs. per sq. in. Cold. (1.8 kg/cm^2).
	26lbs. per sq. in., Hot (1.8 kg/cm^2)	28lbs. per sq. in., Hot. (2.0 kg/cm^2)

For fast driving when comfort is not of primary importance use 25lbs. per sq. in. Front, and 27lbs. per sq. in Rear, Cold (1.8 kg/cm^2 and 1.9 kg/cm^2).

CHASSIS FRAME ALIGNMENT. TO CHECK

GENERAL. Correct chassis frame alignment is particularly important where independent front wheel suspension is concerned. The following remarks are intended to act as a guide in checking Mark V chassis frames where damage is suspected. But it must be realised that each particular case may require individual treatment.

Reference to Section J " Front Suspension " will disclose that castor and camber angles are checked with the car on a perfectly level surface and the chassis frame supported by four test pieces. It is recommended that where special trammels are not available, or where it is suspected that chassis distortion has affected the upper wishbone lever mounting points, that checking should be carried out in the following manner.

CHECKING. Place the car on a **perfectly level surface** and insert four test pieces of $7\frac{1}{4}$" (18.4 cm.) between the chassis frame and the ground at the forward and rear ends of the parallel section of the chassis frame side members. Jack up the car, remove all road wheels and allow the chassis frame to rest on the four test pieces.

Plumb lines can now be dropped vertically from convenient opposite points of the frame to the ground and marks scribed on the ground to indicate the plan of the chassis frame. Suggested points for a preliminary check are the front mounting bolts of the front bumper brackets and the rear spring shackle bolts in the chassis frame. Checking in the manner suggested will give a rectangle scribed on the ground, the sides and diagonals of which should be of equal length within $\frac{1}{8}$" (3.2 mm.).

Since the chassis frame is supported parallel to the ground on the test pieces a further check should be made of the heights of opposite points of the frame from the ground when a discrepancy of more than $\frac{1}{8}$" (3.2 mm.) indicates that some distortion has taken place.

It will be realised that castor and camber angles are controlled by shims fitted respectively at the extremities of the upper wishbone levers and behind the upper wishbone lever mounting brackets. It is thus important that the abutment faces for the upper wishbone lever mounting brackets on the chassis frame side members are at right angles to the ground, when the chassis frame is standing on the test pieces.

RESETTING. Resetting of chassis frame is the work of specialists and in all cases where distortion, greater than the limits given above, is found it is recommended that a replacement chassis frame is obtained from the Factory.

EXHAUST SYSTEM. REMOVE AND REFIT

REMOVE. Remove four nuts, spring washers and bolts securing flanges of down pipe and intermediate pipe. Observe jointing washer interposed between flanges. Remove four nuts and spring washers securing each flange of the branched down pipe to its respective exhaust manifold flange. Lower down pipe and remove from under car, observing jointing washer fitted between flanges.

Remove nut, washer and bolt clamping split clip at rear of intermediate pipe. Remove nut, washer and bolt securing intermediate pipe to flexible mounting. Remove intermediate pipe forward.

Remove nut and spring washer securing rear of tail pipe to flexible mounting. Support silencer. Remove bolt, with spring washer and plate passing through centre of rubber pad into bracket on silencer, observing distance tube fitted in rubber pad. Remove silencer and tail pipe. (On early cars tail pipe is serviced separately and is secured to the rear of the exhaust silencer by a split clip.) (Plate M.3.)

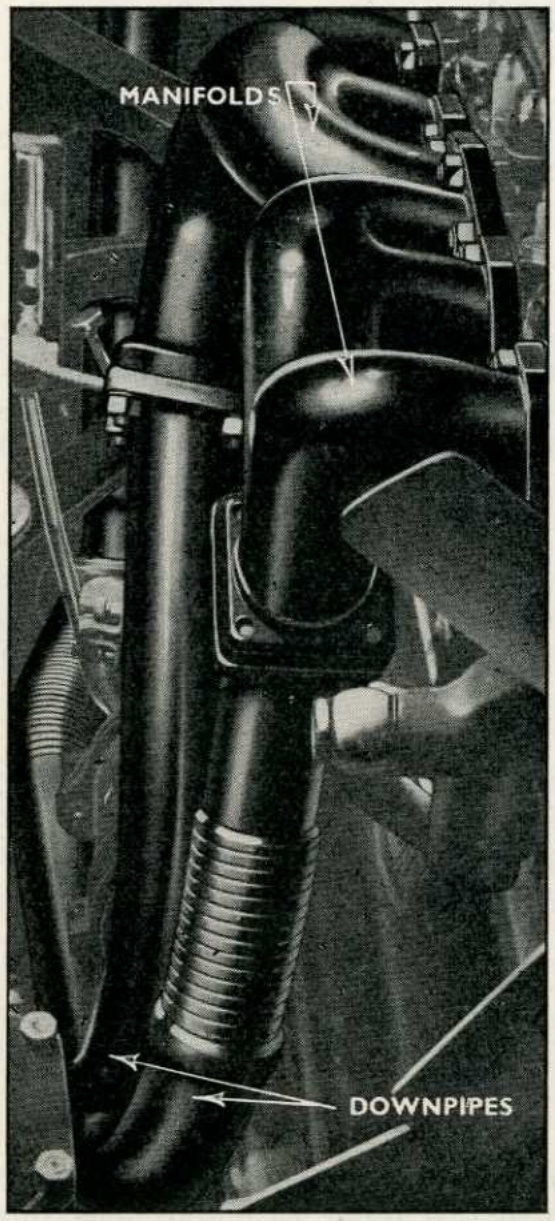


PLATE M.1. EXHAUST DOWN PIPES

REFIT. Refitting is the reverse of the above procedure, but ensure that the exhaust system is correctly aligned and is not placing an excessive strain on any of the three mountings. Conversely, ensure that the system is clear of the chassis frame and that flexible inserts in the down pipe are not strained.

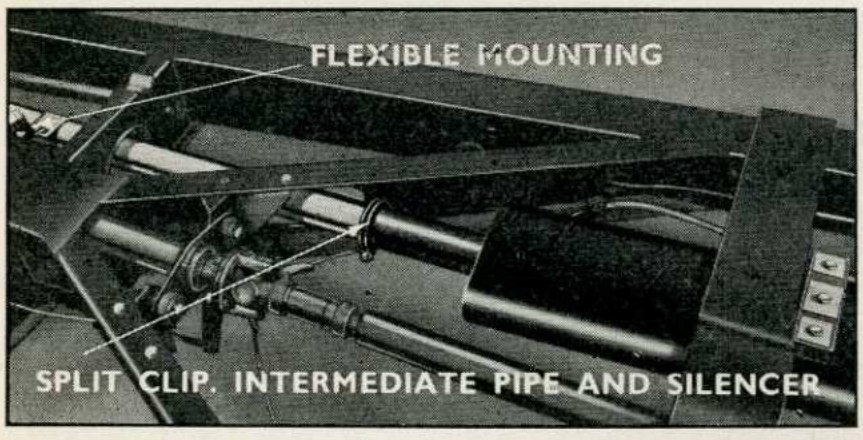


PLATE M.2
EXHAUST INTERMEDIATE PIPE

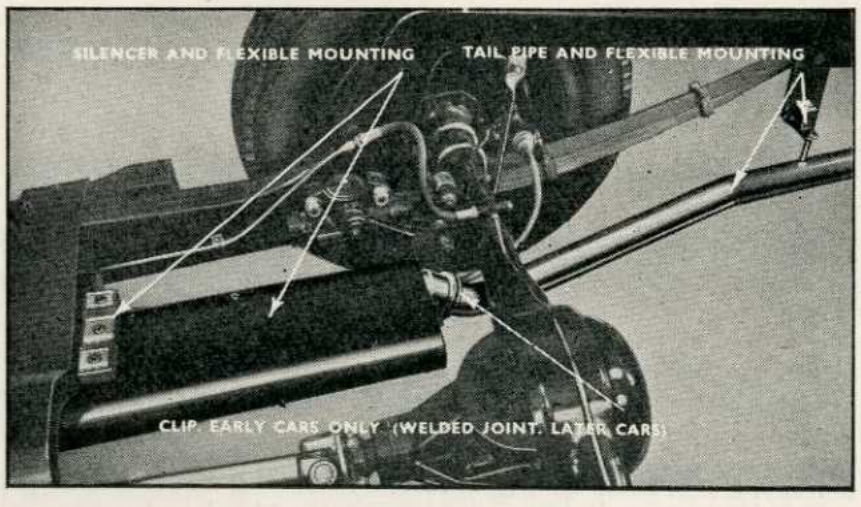


PLATE M.3
EXHAUST SILENCER AND TAIL PIPE

EXHAUST MOUNTINGS. REMOVE AND REFIT

REMOVE. **(Intermediate Pipe.)** Remove, nut, washer and bolt securing intermediate pipe to flexible mounting. Remove two nuts, spring washers and bolts securing mounting to chassis frame. (Plate M.2.) Remove mounting.

(Silencer.) Remove bolt with spring washer and plate passing through centre of rubber pad into bracket on silencer. Remove two nuts, washers, plates and bolts securing rubber pad to brackets on chassis frame. Remove rubber pad observing three distance tubes fitted in rubber pad. (Plate M.3.)

(Tail Pipe.) Remove nut and spring washer securing tail pipe to flexible mounting. Remove two nuts, spring washers, and bolts securing mounting to chassis plate. (Plate M.3.)

REFIT. Refitting is the reverse of the above procedure, but particular attention is drawn to the points raised on refitting "Exhaust System. Remove and Refit."

HUB BEARING. FRONT. REMOVE AND REFIT

REMOVE. Jack up, remove nave plate, road wheel and brake drum from hub affected. Prise off dust cap, remove split pin, washer and castellated nut. Pull off hub with outer bearing. Remove inner bearing, felt grease retainer and cover plate. (Plate M.4.)

REFIT. Refitting is the reverse of the above procedure. Adjust hub bearing as described in the following paragraph. Pack hub bearing with recommended lubricant by applying grease gun to nipple until excess exudes from bleed hole in dust cap.

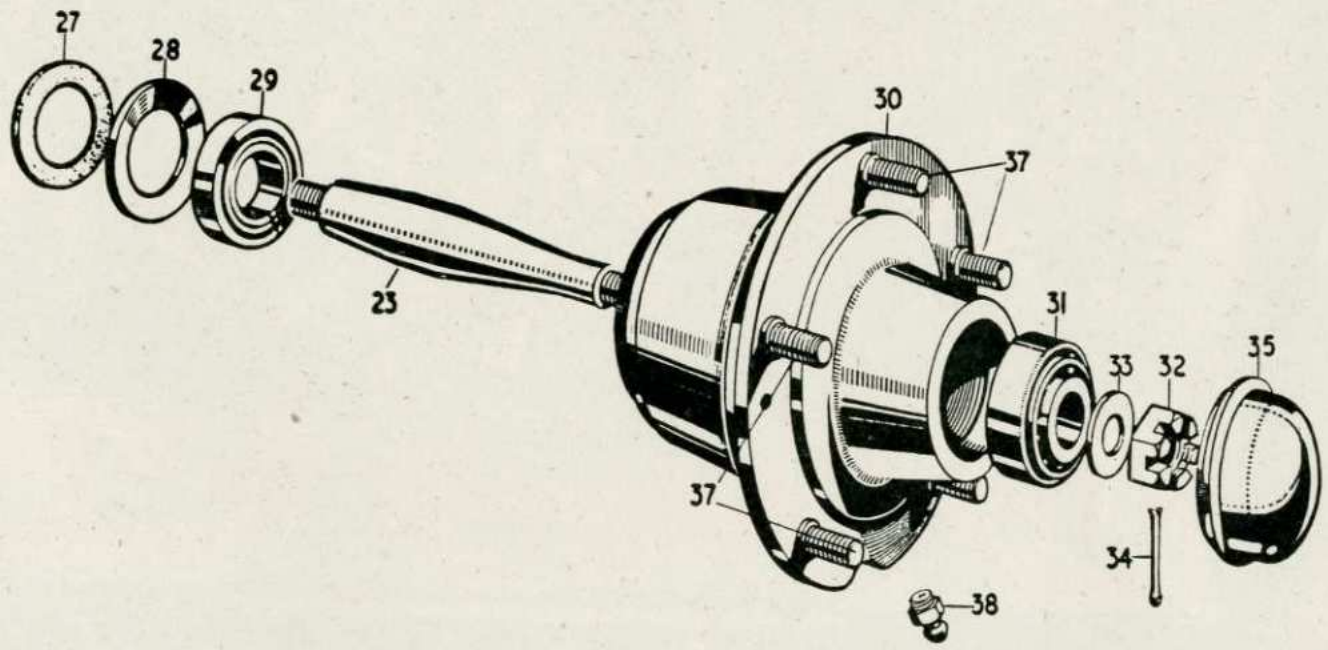


PLATE M.4 FRONT HUB

Shaft, Stub Axle	23	Retainer, Grease (Felt) on Stub Axle Shafts	27
Plate, Cover, over Grease Retainer ...	28	Bearing, Inner, for Hub	29
Hub, Front (complete with Studs)	30	Bearing, Outer, for Hub	31
Nut, securing Hubs and Bearings to Stub Axle Shafts	32	Washer, "D," under Nuts	33
Pin, Split, locking Nuts	34	Cap for Hub	35
Studs in Hubs	37	Nipple, Grease, on Hubs	38

HUB BEARING. ADJUST

ADJUST. Jack up, remove nave plate, road wheel and brake drum from hub affected. Prise off dust cap and remove split pin. Rotate castellated nut clockwise until there is no end float in the hub. Turn nut anti-clockwise one castellation and secure with new split pin. Recheck end float which should just be perceptible by hand.

REVOLUTION COUNTER. REMOVE AND REFIT

REMOVE. Remove drive screws securing dash casing and withdraw casing. Remove six control knobs all being retained by a spring loaded pin registering in a hole in the knob. Press in the pins and withdraw knobs. Remove centre fixing screw from lamp switch control and remove control. Remove cigar lighter and ignition key. Remove two screws, one from either side securing lower edge of facia to support brackets. Remove two chrome plated thumb-screws each passing through top corner of the facia panel. Remove centre facia. (Plate M.5.) Disconnect feed wire to the electric clock by removing screw. Disconnect two earth wires from back of instrument case. Disconnect revolution counter cable by rotating knurled ring. Remove three screws securing instrument to instrument carrier and withdraw revolution counter.

REFIT. Refitting is the reverse of the above procedure.

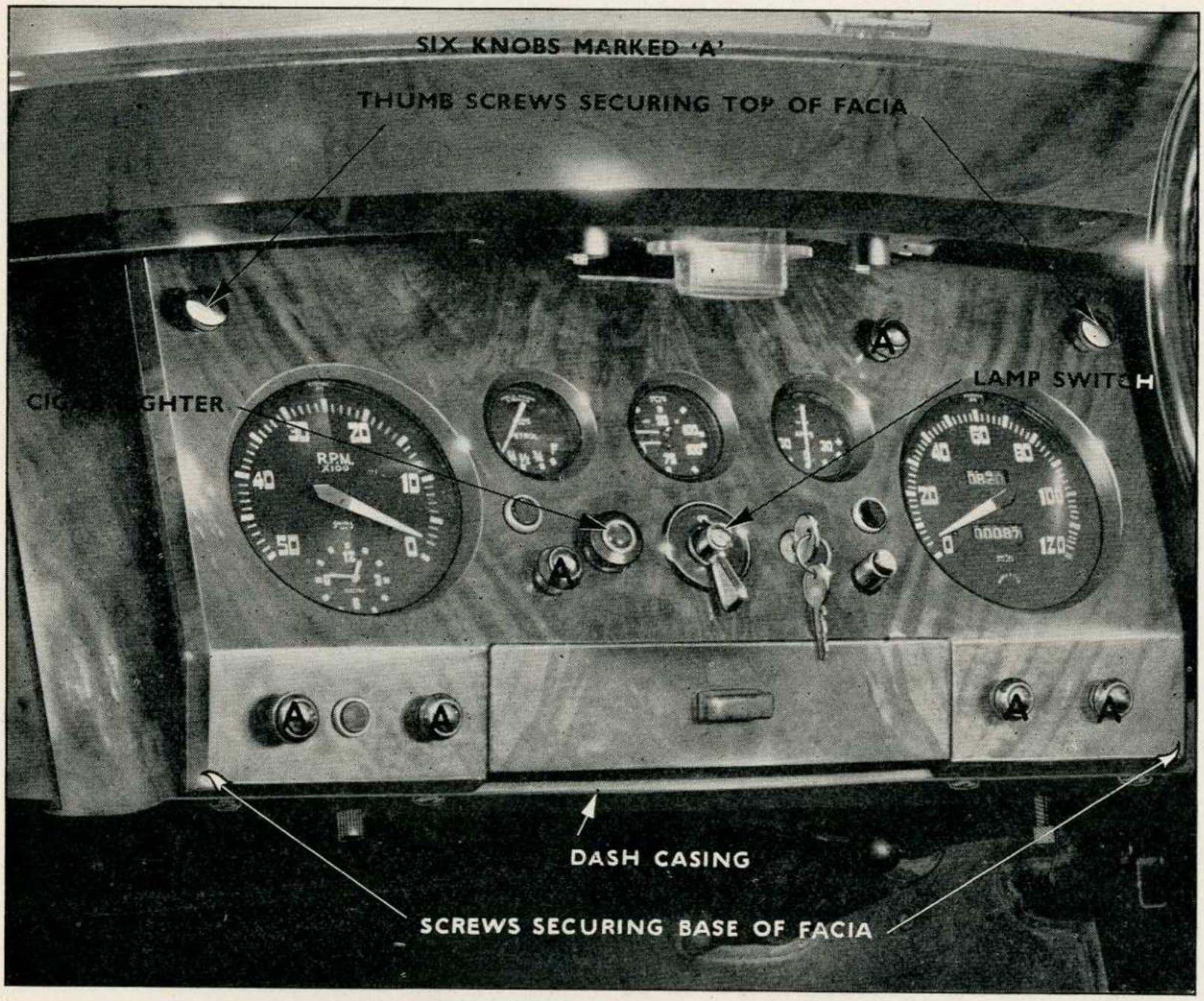


PLATE M.5. CENTRE FACIA. REMOVAL

REVOLUTION COUNTER CABLE. REMOVE AND REFIT

REMOVE. Release bonnet catches by pushing forward controls under either side of facia. With both bonnet top panels open remove two screws from centre hinge front "T" piece, raise front of bonnet and remove forward. Disconnect and remove battery. On 2½ litre disconnect revolution counter cable at elbow drive at side of rocker cover. (On 3½ litre remove rocker cover centre dome nut and setscrew passing

through steady bracket into front of silencer body and remove silencer. Remove air silencer manifold by withdrawing four nuts securing manifold to carburettor flanges. Disconnect cable at revolution counter elbow drive.) Remove dash casing. Unscrew knurled ring securing cable to instrument. Disengage cable grommet in dash and remove cable forward.

REFIT. Refitting is the reverse of the above procedure. Whenever the cable assembly is removed it is advisable to withdraw the inner cable and reassemble well greased. Position cable in as straight a line as possible between attachment points or noise may be experienced which will appear to come from the instrument.

ROAD WHEELS AND TYRES. GENERAL INSTRUCTIONS

TYRE AND TUBE BALANCE MARKS. It may be found that the tyres are fitted with a rubber patch inside the casing. This patch is associated with the balance of the tyre and should under no circumstances be removed. These balance patches should not be confused with tyre gaiters to which they are somewhat similar in appearance. White spots may be visible in the neighbourhood of the cover bead and coloured spots on the underside of the tube. These are also associated with tyre balance and when fitting care should be taken to ensure that the white spots on the cover coincide with the coloured spots on the tube. (Plate M.6.)



PLATE M.6. ROAD WHEEL AND TYRE ASSEMBLY

WHEEL AND TYRE BALANCE. It is of the utmost importance that wheel and tyre assemblies are in a state of static and dynamic balance. All wheel and tyre assemblies on new cars are statically and dynamically balanced at the Works and balance weights (Plate M.6) may be fitted on the inner and outer wheel rims. When tyres are removed from wheels care should be taken to mark the relationship of tyre to wheel rim and of balance weights to wheel rim to facilitate reassembly in the original position. When new tyres have been fitted, or if the balance weights have been disturbed, it is necessary to balance the wheel and tyre assemblies using approved static and dynamic balancing equipment. Static and dynamic balance should be maintained within the limits of $\frac{1}{2}$ ounce (.014 kg.) measured at the wheel rim.

NAVE PLATES. It will be observed that the nave plates are attached to the wheels by three mounting posts. (Plate M.6.) When fitting nave plates apply a light smear of grease to the posts and enter the lip of the plate over the shoulder of any two posts. Attach the plate with a sharp tap from the hand at a point in line with the third post noting that the lip of the plate engages over the shoulder of the third post. If the plate is fitted in a haphazard manner it may be thrown off due to flexing of the road wheel.

WHEEL AND TYRE INTER-CHANGING. It is strongly recommended that after 2,500 miles (4,000 kilometres) road wheels are interchanged from left hand front to right hand rear and from right hand front to left hand rear.

When tyres are used in the same road wheel position for distances greater than those quoted above, the resulting tread wear can set up tyre noise which is often mistaken for transmission noise at speeds between 20-40 m.p.h. (32-64 k.p.h.). Regular interchanging of wheels will also give increased tyre life.

SPEEDOMETER. REMOVE AND REFIT

REMOVE. Remove drive screws securing dash casing and withdraw casing. Remove six control knobs all being retained by a spring-loaded pin registering in a hole in the knob. Press in the pins and withdraw knobs. Remove centre fixing screw from lamp switch control and remove control. Remove cigar lighter and ignition key. Remove two screws, one from either side securing lower edge of facia to support brackets. Remove two chrome plated thumb-screws each passing through top corner of the facia panel. Remove centre facia. (Plate M.5.) Disconnect head lamp warning light by pulling bulb carrier out of socket in instrument case. Disengage speedometer cable by rotating knurled ring. Remove three screws securing instrument to instrument carrier and withdraw speedometer.

REFIT. Refitting is the reverse of the above procedure.

SPEEDOMETER CABLE. REMOVE AND REFIT

REMOVE. Release bonnet catches by pushing forward controls under either side of facia. With both bonnet top panels open remove two screws from centre hinge front "T" piece, raise front of bonnet and remove forward. Disconnect and remove battery. Disconnect speedometer cable at gearbox (drive end) by rotating knurled ring. Remove dash casing and disconnect cable from instrument by rotating knurled ring. Disengage grommet in dash and remove cable forward.

REFIT. Refitting is the reverse of the above procedure. Whenever the cable assembly is removed it is advisable to withdraw the inner cable and reassemble well greased. Position cable in as straight a line as possible between attachment points or noise may be experienced which will appear to come from the instrument.

TOOL KIT. DESCRIPTION

Jack, Lifting. Wheel Brace (combining Handle for Jack).	Housed in spare wheel compartment.
Oil Gun, Hydraulic. Extractor for Tyre Valve. Starting Handle. Spanner, Adjustable. Spanner, Open ended, $\frac{7}{16}$″ x $\frac{1}{2}$″ A/F. Spanner, Open ended, $\frac{9}{16}$″ x $\frac{5}{8}$″ A/F. Spanner, Open ended, $\frac{3}{4}$″ x $\frac{7}{8}$″ A/F. Spanner, Open ended, $\frac{1}{8}$″ x $\frac{3}{16}$″ B.S.F. Spanner, Open ended, $\frac{5}{16}$″ x $\frac{3}{8}$″ B.S.F. Spanner, Box, $\frac{3}{16}$″ x $\frac{1}{4}$″ B.S.F. Spanner, Box, $\frac{5}{16}$″ x $\frac{3}{8}$″ B.S.F. Spanner, Box, $\frac{7}{16}$″ x $\frac{1}{2}$″ B.S.F. Spanner, Box, for Rear Axle. Spanner, Box, for Sparking Plugs. Spanner, Box, for Torsion Bar Adjustment. Tommy-Bar (long). Tommy-Bar (short). Screw-Driver. Pliers. Pump, Tyre (complete with Flex). Tyre Levers. Screw-Driver for Distributor. Feeler Gauge for Plugs and Tappets (.012″ and .018″). Tube, Bleed, and Container. Key, Tee, for Budge Locks.	Housed in the special tool compartment in the boot lid.

Remove Watermark
Wondershare PDFelement

COACHWORK

MARK V

2½ and 3½ LITRE

CHASSIS NUMBERS

(Stamped at the front of the chassis left hand side member and on a plate attached to the scuttle under the right hand bonnet top panel).

2½ Litre		3½ Litre	
	Saloon		
520001	Right-Hand Drive	620001	Right-Hand Drive
527001	Left-Hand Drive	627001	Left-Hand Drive
	Coupe		
540001	Right-Hand Drive	640001	Right-Hand Drive
547001	Left-Hand Drive	647001	Left-Hand Drive

BODY NUMBERS

(The body number is embossed on a plate attached to the left hand side of the scuttle and is also stamped on the chassis number plate attached to the right hand side of the scuttle. Both plates are visible when the respective bonnet top panels are open.)

The instructions in this section are presented under the following main headings which appear as sub-titles on the pages concerned and in the order shown :—

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DESCRIPTION

GENERAL. The following remarks are intended to give some indication of the construction of the Mark V body shell which in conjunction with the illustration plates N.1 to N.5 should assist in clarifying the removal and refitting operations which are detailed in this section. An indication of the general construction of the body should also prove of assistance where extensive accidental damage repairs have to be undertaken.

CONSTRUCTION. The body shell consists of various pressings which are welded together to form sub assemblies. These sub assemblies are then welded together to form a body shell which combines lightness with great strength.

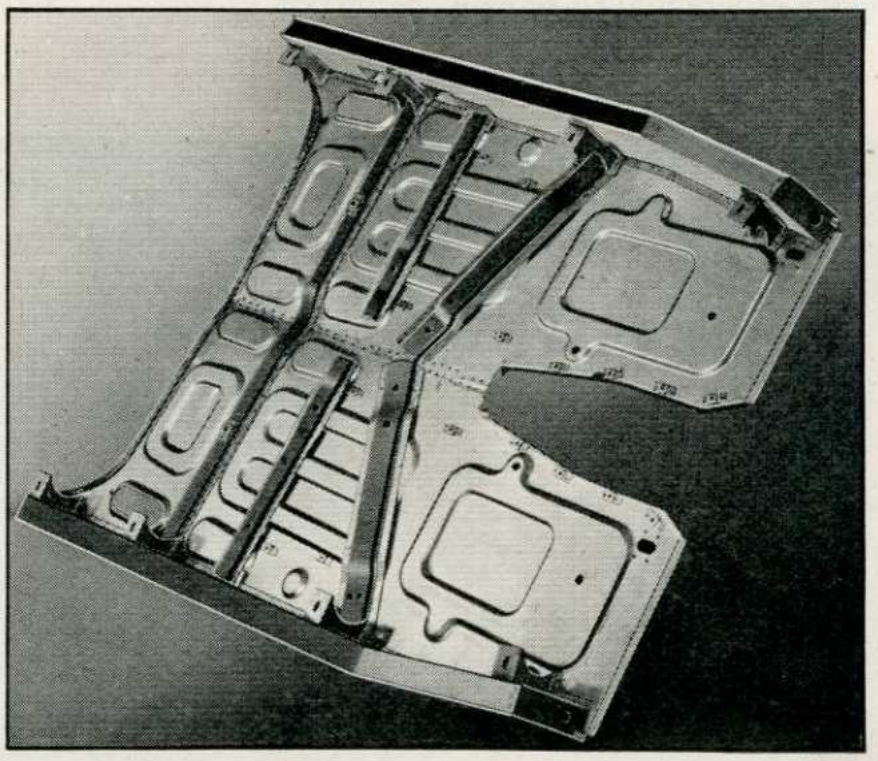


PLATE N.1
BODY MAIN FLOOR AND ROCKER SUB ASSEMBLY

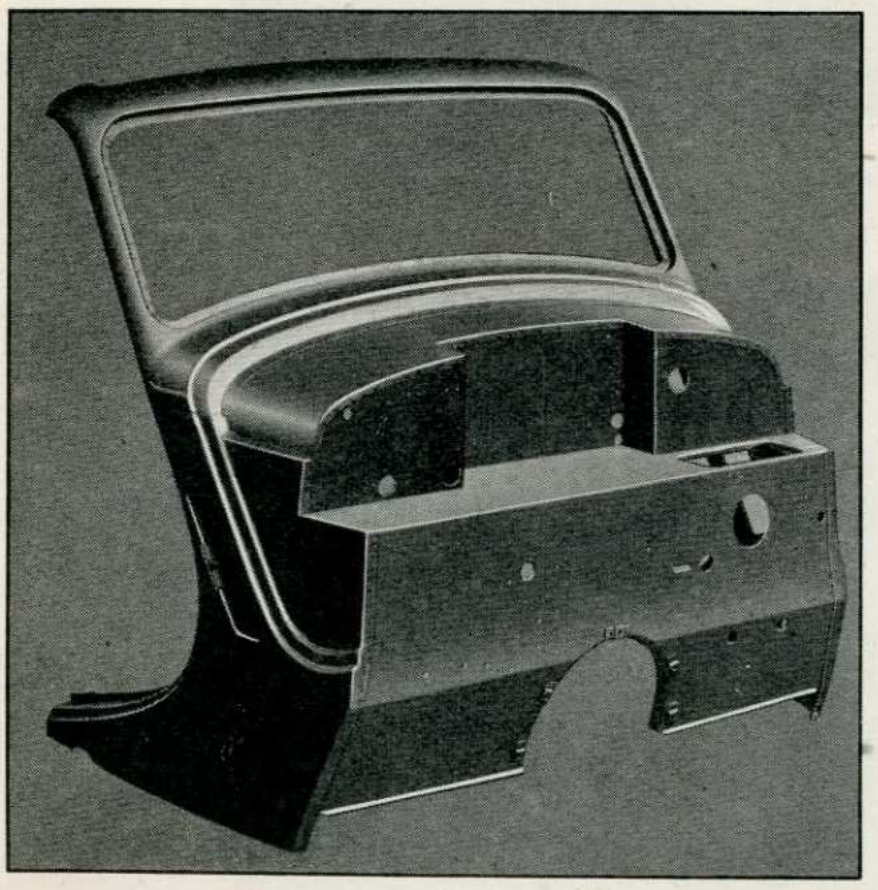


PLATE N.2
SCUTTLE AND SCREEN FRAME SUB ASSEMBLY

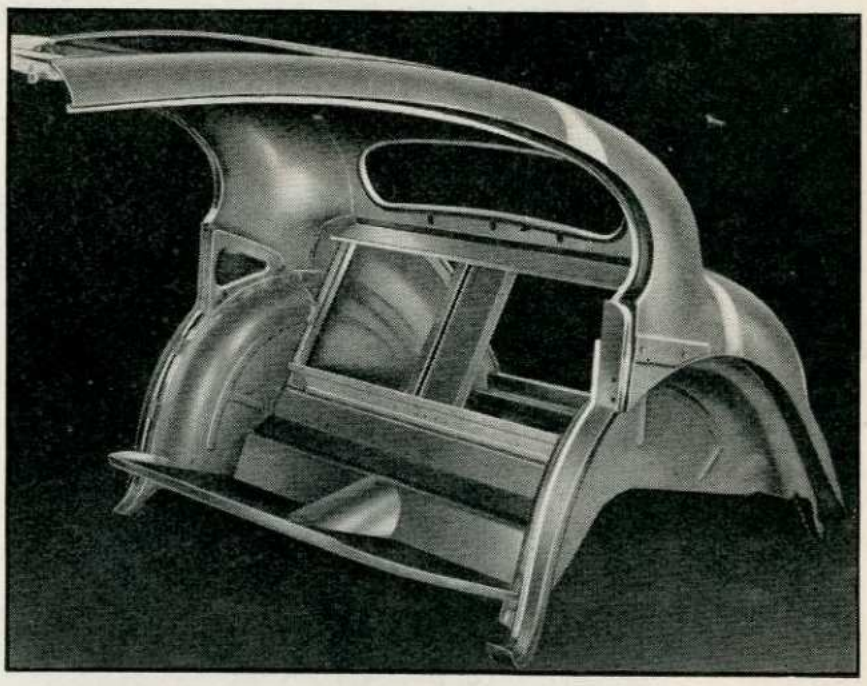


PLATE N.3
ROOF, QUARTER AND WHEEL ARCH SUB ASSEMBLY

Plate N.1 shows a view from underneath the main floor and body rocker sub assembly. The main mounting points between body shell and chassis frame will be observed. Mounted on the front of this platform is the scuttle and screen frame sub assembly (Plate N.2) and at the rear the roof, quarter and wheel arch sub assembly (Plate N.3). The construction of the coupe body (Plate N.4) closely follows that of the saloon with the obvious exception of the roof section which is not required.

General views of the assembled body shell are shown on Plates N.4 and N.5. It will be seen that the centre pillars (saloon) and doors have been fitted and several of the main welded joints are indicated. Where a portion of the body shell has been damaged to an extent which precludes a satisfactory repair by beating out the section affected, the damaged section may be cut out and a replacement section welded into position. The various sections and sub assemblies which make up the body shell are serviced separately and when carrying out body repairs it will be found, in many instances, more economical to replace the section or sections affected in preference to effecting a panel beating repair.



PLATE N.4. BODY SHELL. DROP HEAD COUPE. (View three-quarter front)

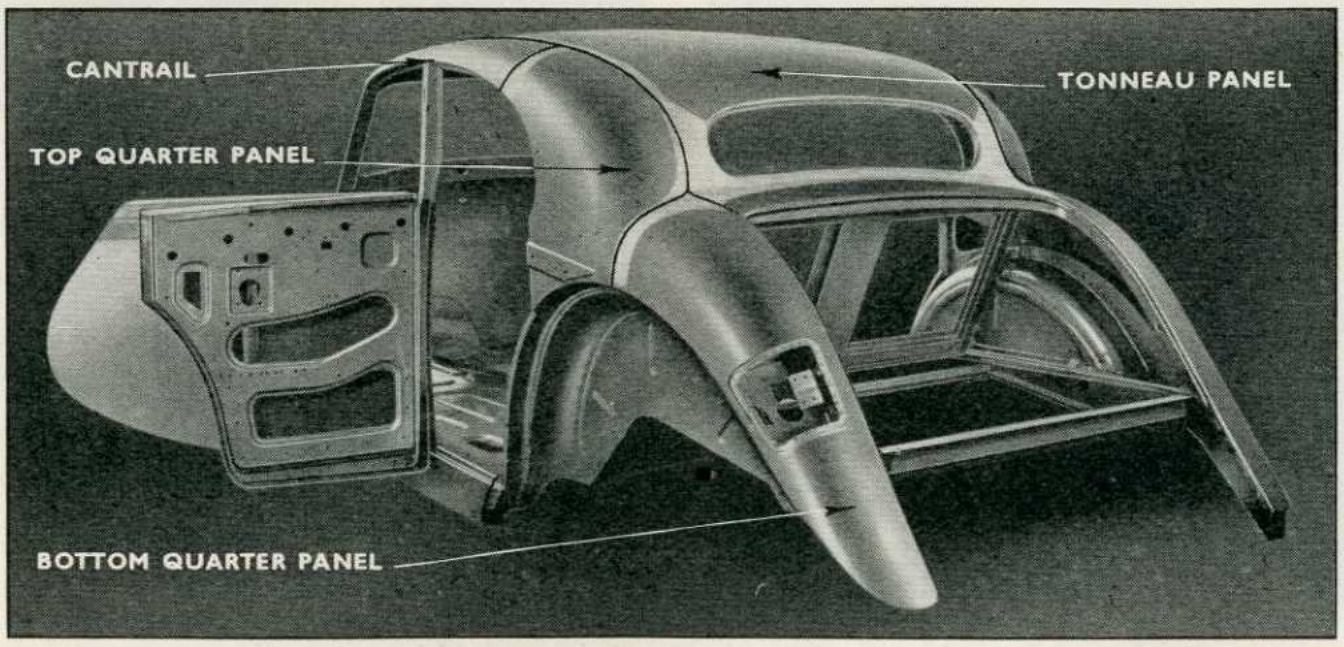


PLATE N.5. BODY SHELL. SALOON. (View three-quarter rear)

MAINTENANCE

Every 1,000 miles (1,500 kilometres) lubricate the door hinges through the eight nipples provided using recommended lubricant. The nipples are accessible when the doors are open and are situated one on each door hinge.

Every 5,000 miles (8,000 kilometres) carry out oil can lubrication of such points as boot lid hinges and locks, tail panel hinges and locks, door locking mechanism, bonnet hinges and catches and petrol filler cover lock and hinges.

Check and tighten, if necessary, all body screws, nuts and bolts.

RECOMMENDED LUBRICANTS

	Vacuum.	Wakefield.	Shell.	Essolube.	Price's.	S.A.E. Viscosity.
Oil Can Lubrication ...	Mobiloil A.	Castrol X.L.	Double Shell.	Essolube 30.	Energol.	30.
Door Hinge Nipples ...	Mobilgrease No. 4.	Castrolease (Heavy).	Retinax R.B.	Essolube Grease.	Belmoline C.	

CLEANLINESS. Carpets. These should be kept free from dirt by the use of a vacuum cleaner or air line. Alternatively, the carpets may be brushed clean, using a soft brush. Stains or marks can be removed by light rubbing with a cloth soaked in petrol.

CELLULOSE. Never clean the cellulose other than by washing with a soft sponge and hose pipe. Use a steady flow of water and sponge lightly. Dry and polish the cellulose with a good quality wash leather. Tar may be removed with a clean soft cloth moistened in petrol or with a proprietary brand of tar remover. The cellulose may be polished from time to time with a good quality proprietary polish, either wax or emulsion type.

CHROMIUM PLATE. It is desirable to clean chromium plate occasionally to remove deposits which in time, if left undisturbed, will discolour the bright finish. It is, however, necessary to ensure that an abrasive cleaner is not employed as this will scratch and destroy the chrome. Use an approved brand of chrome shine and apply this with a soft cloth.

HEAD LINING. Dirt may be removed by the use of a vacuum cleaner. Alternatively, clean with a soft hand brush or pad of mutton cloth soaked in petrol and applied briskly but without pressure.

INTERIOR HIDE. The seat upholstery may be kept clean by brisk rubbing with a wash leather well wrung out in water. Grease marks should be removed by light rubbing with a soft cloth moistened in petrol.

POLISHED WOODWORK. A good quality wax polish applied occasionally will retain the high finish of the woodwork.

DROP HEAD COUPE. CARE OF THE HOOD. Never stow the hood when it is damp. When rolling the canopy rail do so with the head lining inwards or damage may be caused to the hood outer covering. If the hood catches are lubricated at any time carefully wipe dry all metal surfaces before stowing the hood or the head lining will be soiled.

When cleaning the hood care is necessary to ensure that the waterproof qualities of the material are not destroyed. Grease marks may be removed by light rubbing with a soft cloth moistened in petrol. When the hood is quite dry dust and dirt may be brushed off with a clean soft brush. Clean the head lining with a soft brush or pad of mutton cloth soaked in petrol and applied briskly, but without pressure.

ARM RESTS. REAR QUARTER. REMOVE AND REFIT

REMOVE. Remove rear seat cushion. Remove two setscrews with plain and shakeproof washers passing through front of respective rear wheel arch panel into each arm rest. (Plate N.6.) Push arm rests downwards out of engagement with rear squab and withdraw into car.

REFIT. Refitting is the reverse of the above procedure.

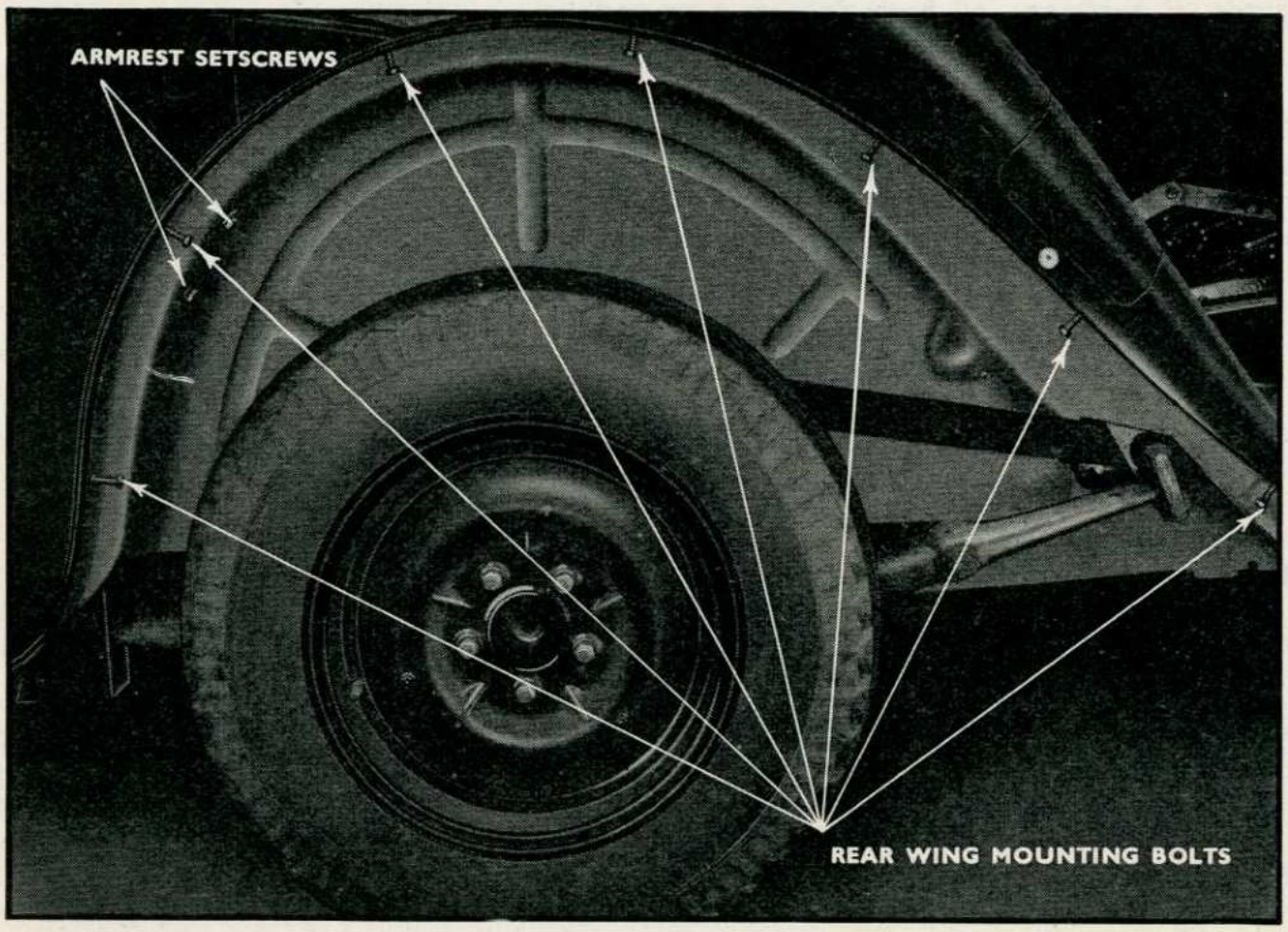


PLATE N.6. ARM REST. SECURING SCREWS

BODY ASSEMBLY. SEQUENCE OF OPERATIONS. REMOVE AND REFIT

GENERAL. It will be appreciated that the operations necessary to remove the body assembly from the chassis may be carried out in many differing sequences. The suggested sequence of operations which follows is, therefore, only offered as a guide and is the order in which the body removal operations are carried out at the Factory. The information in brackets following each operation refers to the section or page in which full details of the procedure will be found.

REMOVAL. Remove bonnet, bonnet side panels and support rails. (Page N.9.) Remove radiator shell and block assembly and tie rods. (Section D.) Remove battery. Disconnect tail lamps. Remove head lamps, fog lamps, head lamp relay and junction box. Disconnect side lamps, horns and manette control wiring. Disconnect tail panel wiring. Disconnect wiring loom clips and place chassis loom, relay and junction box on scuttle. (Section P.) Remove manette control, steering wheel and steering unit. (Section I.) Remove brake and clutch pedals. Disconnect accelerator. Disconnect water temperature gauge bulb from thermostat housing. (Section D.) Remove petrol pipe clips on scuttle. (Section M.) Disconnect petrol feed pipe to carburettors. (Section C.) Disconnect brake supply tank. (Section L.) Disconnect earth strap from clutch bell housing. Disconnect starter motor lead. Disconnect air conditioner pipes. (Section P.) Disconnect oil pressure gauge flexible pipe. Disconnect handbrake. (Section L.) Disconnect revolution counter and speedometer cables. (Section M.) Remove front seats and slides. (Page N.33.) Remove carpets and underfelts. (Page N.16.) Remove gearbox cowl. (Page N.20.) Remove boot main floor board. (Page N.10.) Drain petrol tank. (Section C.) Remove front bumper. (Page N.12.) Remove rear bumper. (Page N.13.) Remove front wings. (Page N.38.) Disconnect body mountings. (Page N.9.) Lift off body.

BODY MOUNTING BOLTS. LOCATION

GENERAL. The location of, and means of access to, the twenty body mounting bolts should be clear from the following remarks if reference is made to Plate N.7.

MOUNTING BRACKETS. These consist of four brackets on each side attached to the outer face of the chassis frame side members with companion brackets on the body shell. Access is gained to the eight nuts and bolts, which are situated behind the body rockers, from underneath the car. Cork packing washers are positioned between body shell brackets and chassis frame brackets.

REAR MOUNTING. Two bolts pass through the chassis frame rear cross member and the body rear cross rail. The bolts and nuts are accessible with the rear boot main floor board removed and spare wheel compartment lid open. Cork packing washers are fitted on the bolts between body rail and chassis frame. Two additional cork washers are positioned at the outer extremities of the cross member.

BODY FLOOR. Ten setscrews with plain and shakeproof washers pass through the floor into cage nuts on the chassis cruciform members. Access is gained to the setscrews following removal of front seats, seat slides, carpets and felts Rubber packing washers are positioned on the setscrews between body floor and chassis frame.

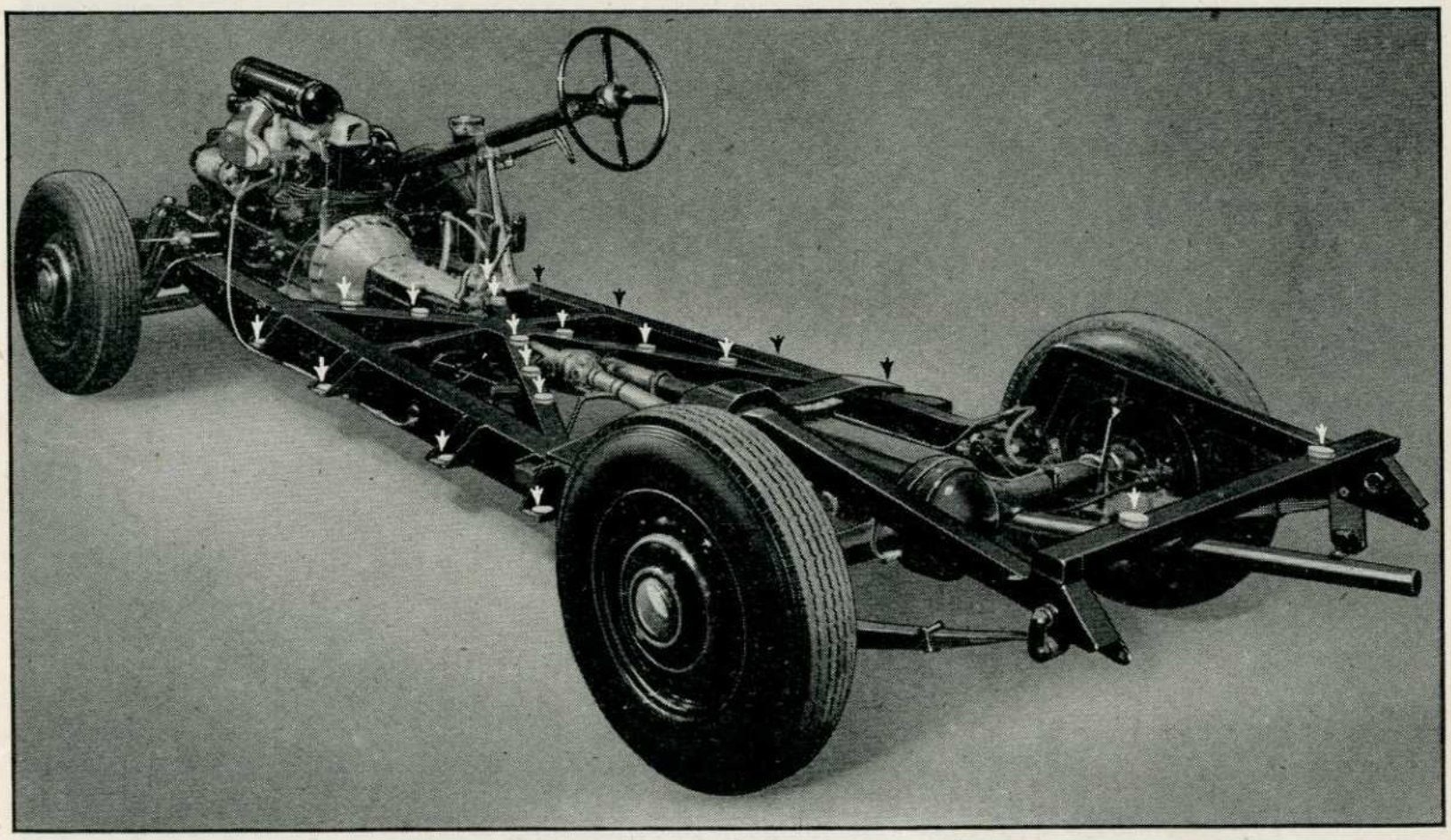


PLATE N.7. BODY SHELL MOUNTING POINTS

BONNET. REMOVE AND REFIT

REMOVE. Release bonnet side catches by pushing forward control levers situated at each side under facia panel. Remove two screws securing bonnet hinge front support bracket to radiator shell. (Plate N.8.) Slacken two screws securing hinge rear support bracket to scuttle. Raise front of bonnet and draw off forward.

REFIT. Refitting is the reverse of the above procedure.

BONNET CHROME CENTRE HINGE. REMOVE AND REFIT

REMOVE. Remove bonnet as described in the previous paragraph. Stand bonnet upright on the ground, scuttle end down with suitable soft packing interposed to prevent damage to paint. Withdraw one top panel from the other. Draw off chrome centre hinge.

REFIT. Stand the two halves of the bonnet upright on the ground with suitable soft packing interposed to prevent damage to paint. Enter centre hinge on to the lips of the two panels and slide into position.

BONNET SIDE PANELS AND SUPPORT RAILS. REMOVE AND REFIT

REMOVE. Remove three screws securing top lip of each side panel to support rail. Lift each side panel out of two clips bolted to the wing inner valances. Remove split pin and withdraw clevis pin at rear of operating rod. Remove two setscrews from rear end of rail and two nuts and screws from front end of rail. (Plate N.8.) Withdraw support rail.

REFIT. Refitting is the reverse of the above procedure.

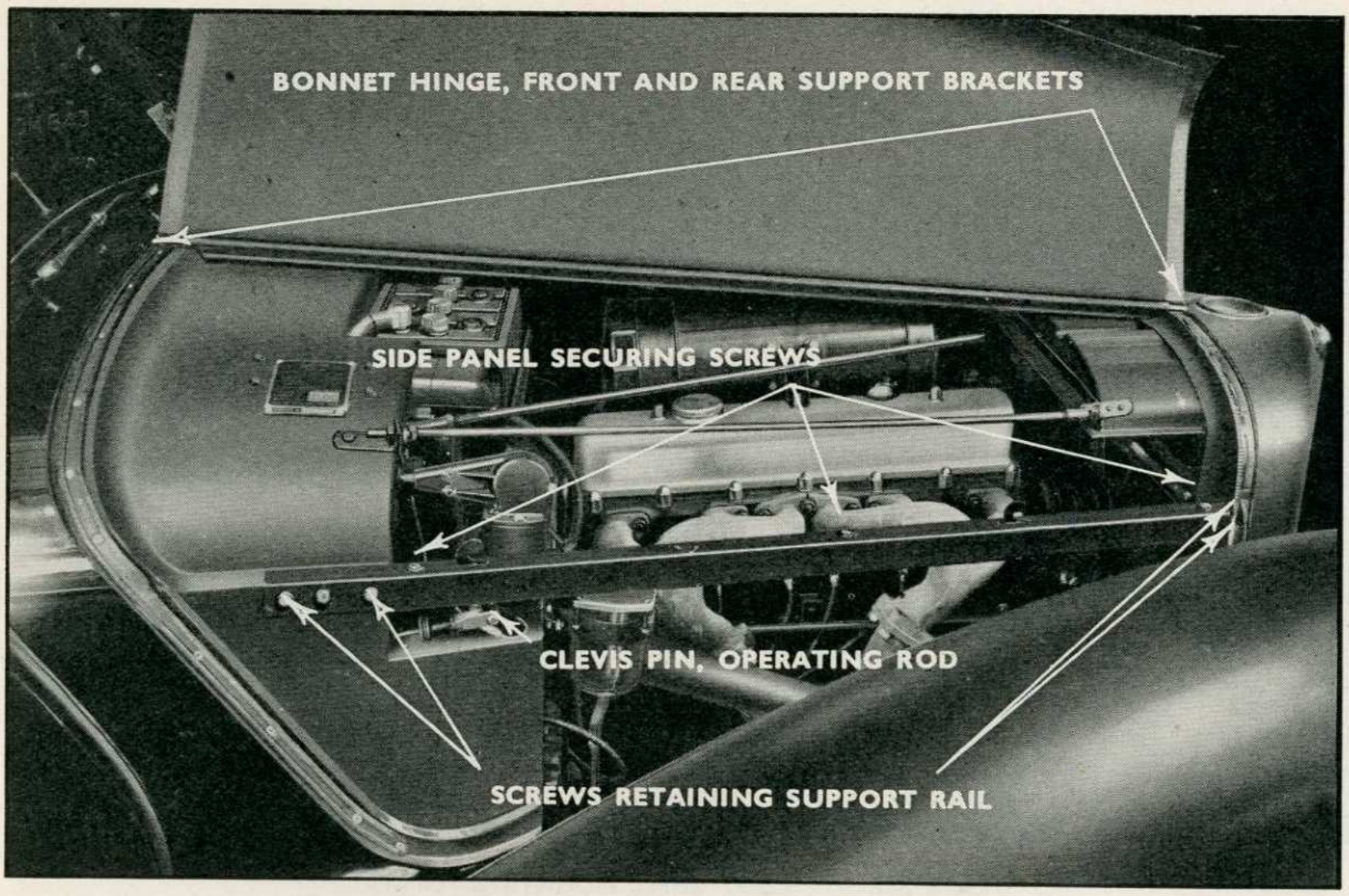


PLATE N.8. BONNET SIDE PANEL AND SUPPORT RAIL

BOOT FLOOR BOARD AND SIDE CASINGS. REMOVE AND REFIT

REMOVAL. Remove twelve countersunk screws and cup washers securing boot main floor board. Remove nut from nearside (left hand) quadrant hinge stud, remove knurled locking nut from support stud and pull off hinge arm. Remove hinge stud and support stud. Raise nearside (left hand) edge of floor board and remove main floor board. Remove eleven drive screws securing nearside (left hand) side casing and withdraw casing. Replace hinge stud and support stud. Fit hinge arm and nut to support boot lid while offside (right hand) casing is removed. Remove nut from offside (right hand) quadrant hinge stud, remove knurled

locking nut from support stud and pull off hinge arm. Remove hinge stud and support stud and eleven drive screws securing offside (right hand) side casing and withdraw casing. Remove eight drive screws securing rear casing and withdraw casing. The rear floor board will now be found to be free and can be withdrawn.

REFIT. Refitting is the reverse of the above procedure. It will be observed that the felt at the back of the rear casing is solutioned in position. Ensure that the side casing strip rubbers are in position before replacing casings.

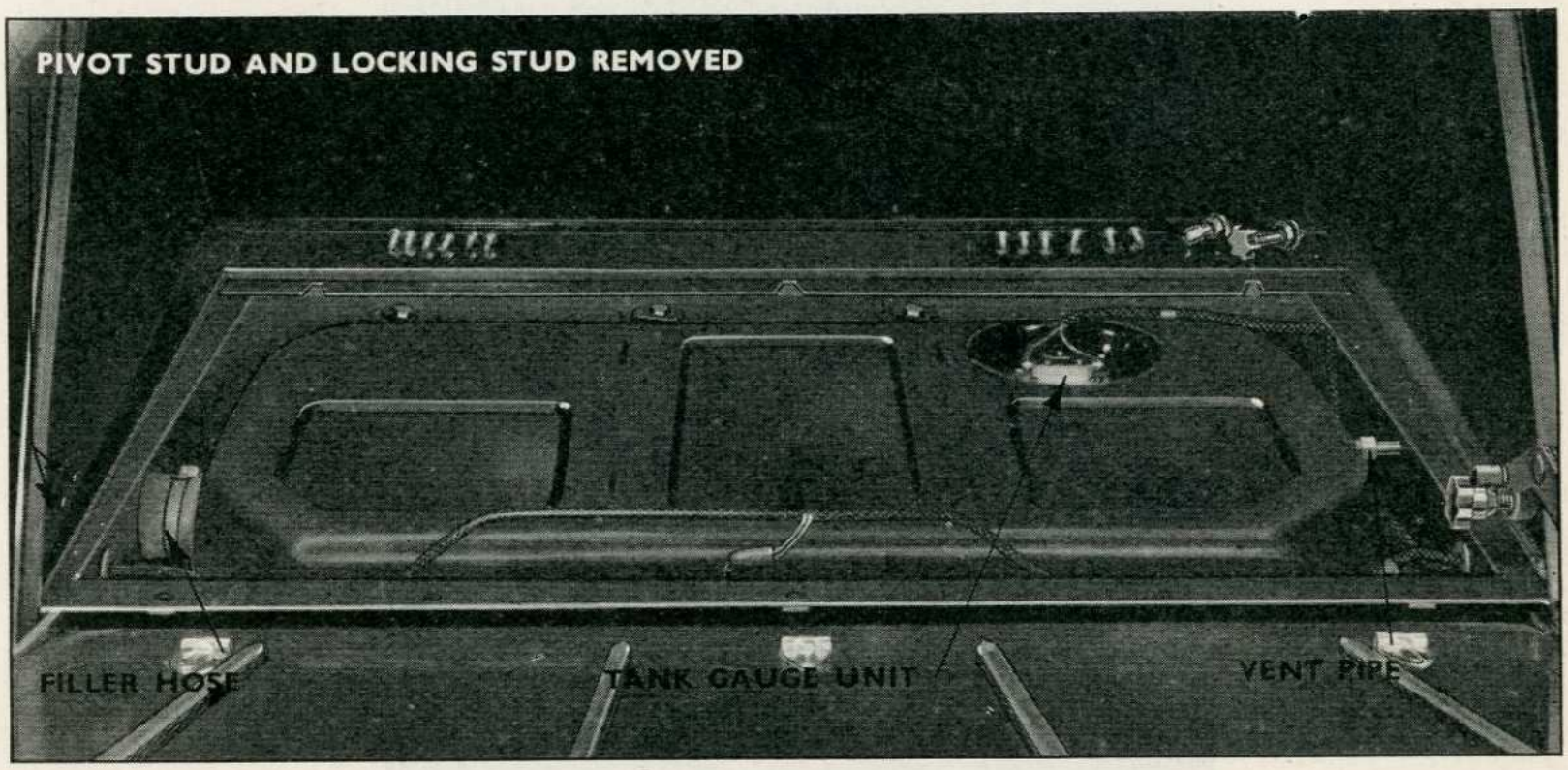


PLATE N.9. REAR BOOT INTERIOR

BOOT LID ASSEMBLY. REMOVE AND REFIT

REMOVE. Remove all tools from boot lid assembly. Remove two screws retaining tool light frame rim, withdraw rim and cover. Remove two screws securing lamp to tool lid, withdraw lamp and disconnect wiring. Release light cable clip and withdraw wiring out of tool tray lid and boot lid Prise off approximately 6″ (15.2 cm.) of green baize from tool lid bottom right hand corner. Remove two screws now disclosed securing quadrant top bracket to lid. Remove fourteen screws holding tool container in position and lift out tool container. Support boot lid. Withdraw four screws on each side passing through hinge arms into lid. (Plate N.10.) Draw off boot lid.

REFIT. Refitting is the reverse of the above procedure.

BOOT LID ASSEMBLY. DISMANTLE AND REASSEMBLE

DISMANTLE. Remove two screws securing tool container light chrome frame and withdraw frame and cover. (Plate N.10.) Remove two screws securing light interior. Withdraw light and disconnect wiring. Retain tool container lid in open position and prise off approximately 6″ (15.2 cm.) of green baize from bottom offside (right hand) corner of surround channel. Remove two screws now disclosed securing quadrant top bracket to lid. Remove screw securing light cable clip and pull cable from tool container lid. Remove two screws securing each hinge to the lid and remove tool container lid. Remove fourteen screws holding tool container in position and lift out container. Remove two screws and nuts from the under side of tool container and remove tool lid quadrant. Remove six screws securing lock rod assembly. Pull rods to nearside (left hand) and withdraw offside (right hand) rod. Remove complete assembly to offside (right hand). Remove two screws securing tool container light switch, remove switch and disconnect wiring. Remove bottom screw from each hinge arm on boot lid. Remove three nuts situated under tool lid surround and withdraw three screws. Remove boot lid shell. Should it be necessary to renew the tool lid hinges, prise green baize from channel behind hinges. Remove three screws securing each hinge and withdraw hinge.

REASSEMBLE. Reassembly is the reverse of the above procedure. It is not essential to dismantle the boot lid to remove the locking handle. Turn handle to open position, remove two screws and withdraw locking handle.

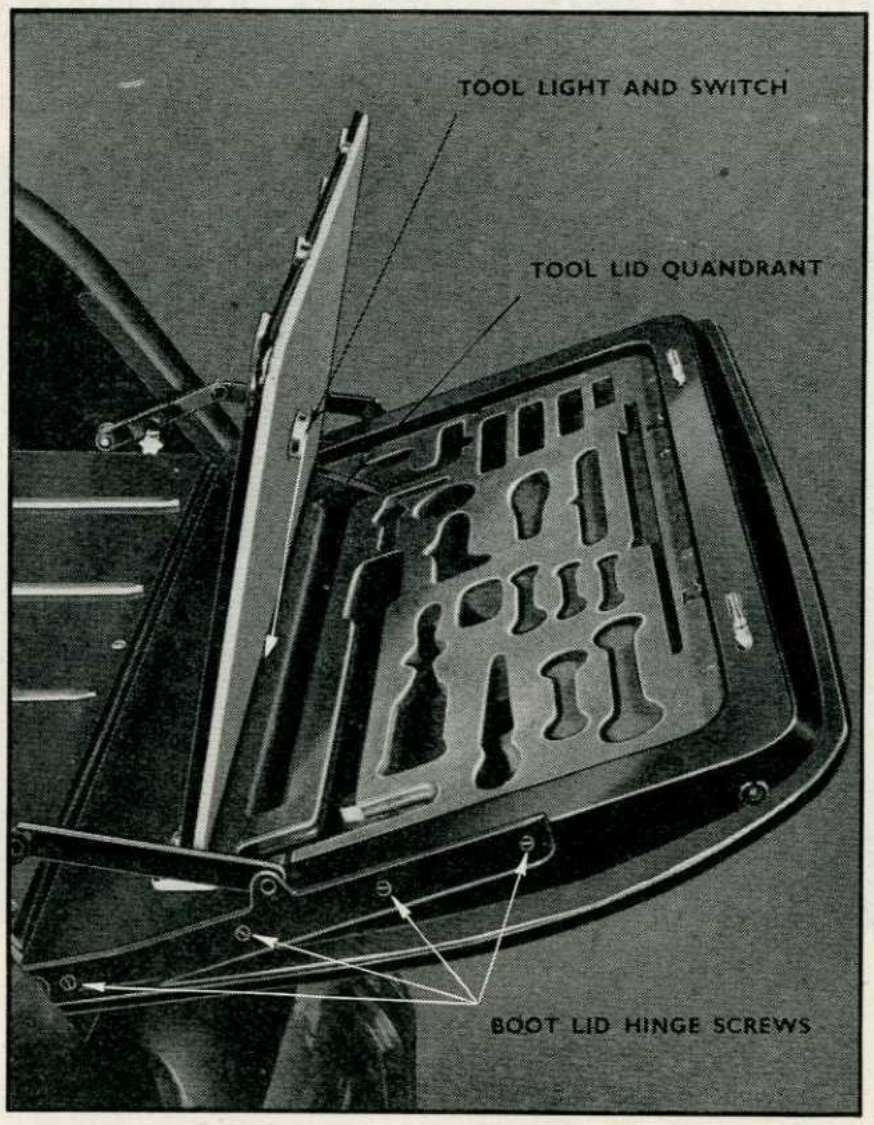


PLATE N.10. BOOT LID ASSEMBLY

BUMPER. FRONT. REMOVE AND REFIT

REMOVE. Remove two self locking nuts and bolts on each side passing through bumper mounting brackets and front end of each chassis frame side member. (Plate N.11.) Lower bumper assembly.

REFIT. Refitting is the reverse of the above procedure.

BUMPER. FRONT. DISMANTLE AND REASSEMBLE

DISMANTLE. The bumper can be dismantled without necessarily removing from the chassis provided the valance is first withdrawn. In practice it will be found to be quicker in all cases where parts of the assembly are to be dismantled to first remove the bumper assembly as described in the previous paragraph.

Remove two nuts securing starting handle guide bracket to bumper top support rail. (Plate N.11.) Remove one nut from either end securing valance to bumper frame. Disengage valance and draw clear. Remove five bolts on either side securing respective top and bottom bars and overriders to bumper frame. Remove top and bottom bars with overriders. Remove two nuts securing each overrider to top and bottom bars. Remove overriders.

REASSEMBLE. Reassembly is the reverse of the above procedure.

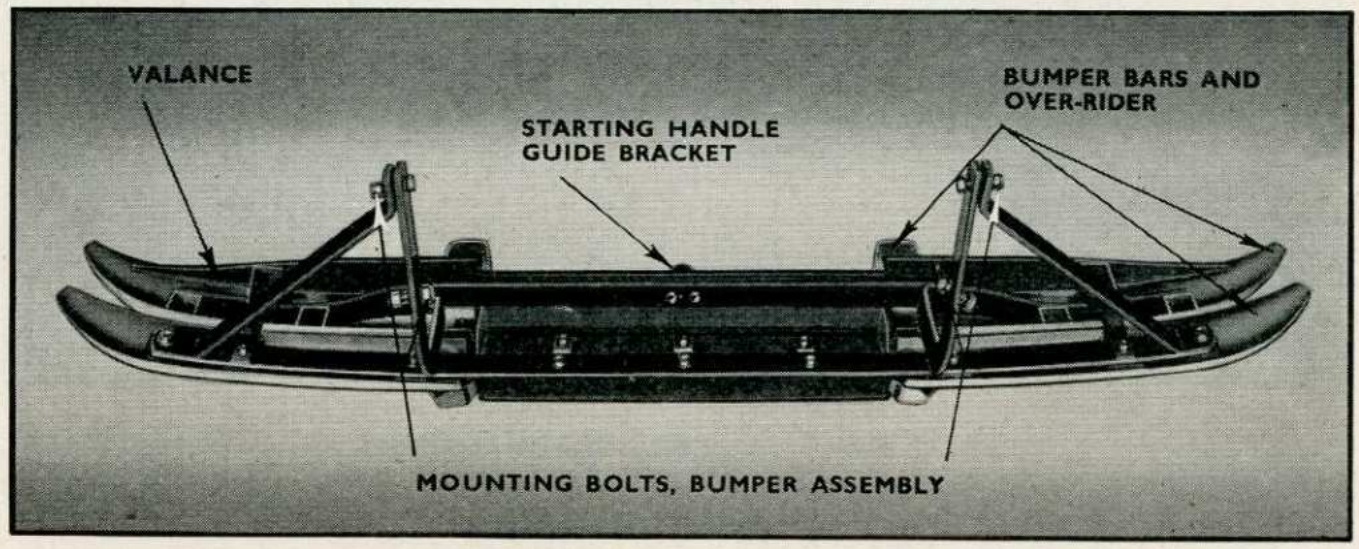


PLATE N.11. FRONT BUMPER ASSEMBLY

BUMPER VALANCE. FRONT. REMOVE AND REFIT

REMOVE. Remove two nuts securing starting handle guide bracket to bumper top support rail. Remove one bolt securing valance to each end of bumper frame. (Plate N.11). Move valance towards radiator to clear top bar and lift upwards.

REFIT. Refitting is the reverse of the above procedure.

BUMPER. REAR. REMOVE AND REFIT

REMOVE. Remove two self locking nuts and bolts through each pair of bumper mounting brackets and rear end of each chassis frame side member. Support bumper, pull rubber cover from rear of tail light body and disconnect cables.

Withdraw bumper from rear of car ensuring that paintwork at bracket apertures in tail panel is not damaged. Observe that offside (right hand) front mounting bolt also supports exhaust tail pipe bracket.

REFIT. Refitting is the reverse of the above procedure. Ensure offside (right hand) front mounting bolt engages exhaust tail pipe bracket.

BUMPER. REAR. DISMANTLE AND REASSEMBLE

DISMANTLE. The bumper can be dismantled without necessarily removing from the chassis provided the valance is first withdrawn. In practice it will be found to be quicker in all cases where parts of the assembly are to be dismantled to first remove the bumper assembly as described in the previous paragraph.

Remove one nut beneath centre of valance and one nut at each end of the valance. Remove valance.

Remove two nuts per side securing overriders to bumper frame and remove overriders. Remove four nuts on each side securing top and bottom bars to bumper frame and remove bars. Remove two nuts securing centre bar to bumper frame. Remove centre bar. Remove three nuts per side securing each light box to bumper frame and remove light boxes.

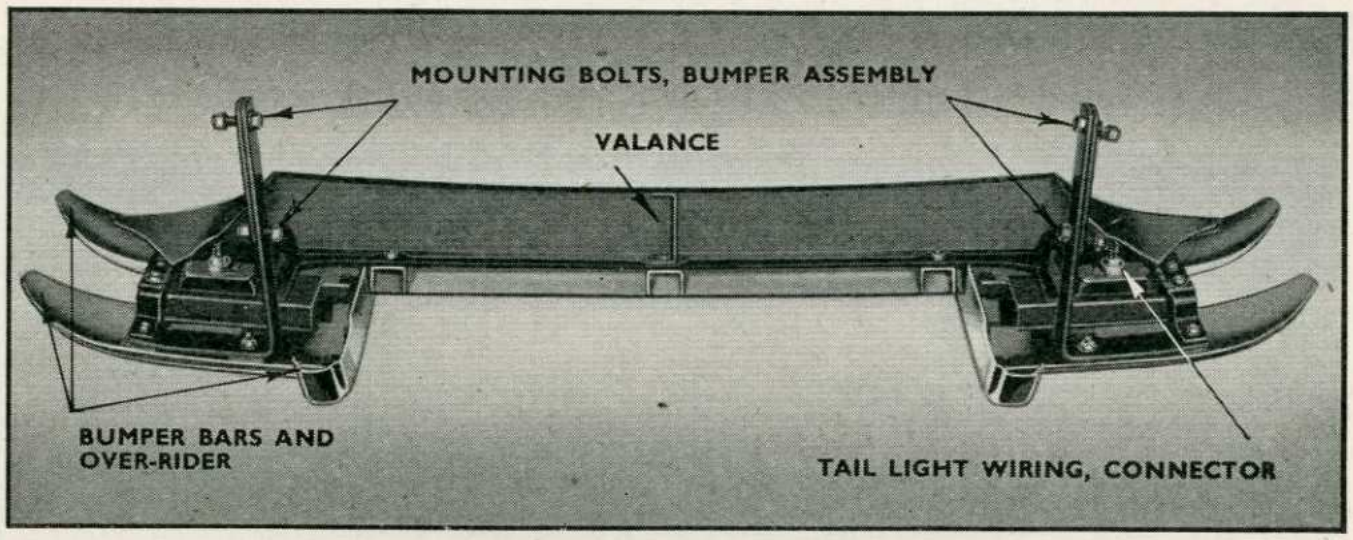


PLATE N.12. REAR BUMPER ASSEMBLY

REASSEMBLE. Reassembly is the reverse of the above procedure.

BUMPER VALANCE. REAR. REMOVE AND REFIT

REMOVE. Remove one nut accessible from beneath the centre of the bumper top rail. Remove two nuts, one at each end of the bumper. Move valance towards body to clear top bar and lift upwards.

REFIT. Refitting is the reverse of the above procedure.

CAPPING. POLISHED WOOD. CENTRE PILLAR. UPPER REMOVE AND REFIT

REMOVE. Remove cantrail draught seal rubber at the top corner of each door aperture next to the centre pillar. (Solutioned in position.) Remove two screws, one on each side of centre pillar, securing centre pillar cantrail upper capping. These screws pass through the cantrail flange and the front and rear door cantrail cappings. (Plate N.13.) Remove capping, exercising care not to damage the polished surface.

REFIT. Refitting is the reverse of the above procedure.

CAPPING. POLISHED WOOD. CENTRE PILLAR. LOWER REMOVE AND REFIT

REMOVE. Remove centre pillar upper capping as described in the previous paragraph. Remove three chrome plate screws securing centre pillar trim pad. (Plate N.13.) Remove trim pad. Remove screws from top and bottom fixing plates on centre pillar lower capping. Withdraw capping.

REFIT. Refitting is the reverse of the above procedure. Care should be taken in removing and refitting cappings in order that the joint faces are not chipped or damaged.

CAPPING. POLISHED WOOD. FRONT DOOR CANTRAIL REMOVE AND REFIT

REMOVE. Remove centre pillar upper capping as described on page N.14. Withdraw sorbo rubber at top of door aperture and remove six screws passing through cantrail flange into capping. (Plate N.13.) Remove capping.

REFIT. Refitting is the reverse of the above procedure. Care should be taken in removing and refitting cappings in order that the joint faces are not chipped.

CAPPING. POLISHED WOOD. REAR DOOR CANTRAIL
REMOVE AND REFIT

REMOVE. Remove centre pillar upper capping as described on page N.14. Withdraw sorbo rubber at top of door aperture and remove six screws passing through cantrail flange into capping. (Plate N.13.) Withdraw capping.

REFIT. Refitting is the reverse of the above procedure. Care should be taken in removing and refitting cappings in order that the joint faces are not chipped or damaged.

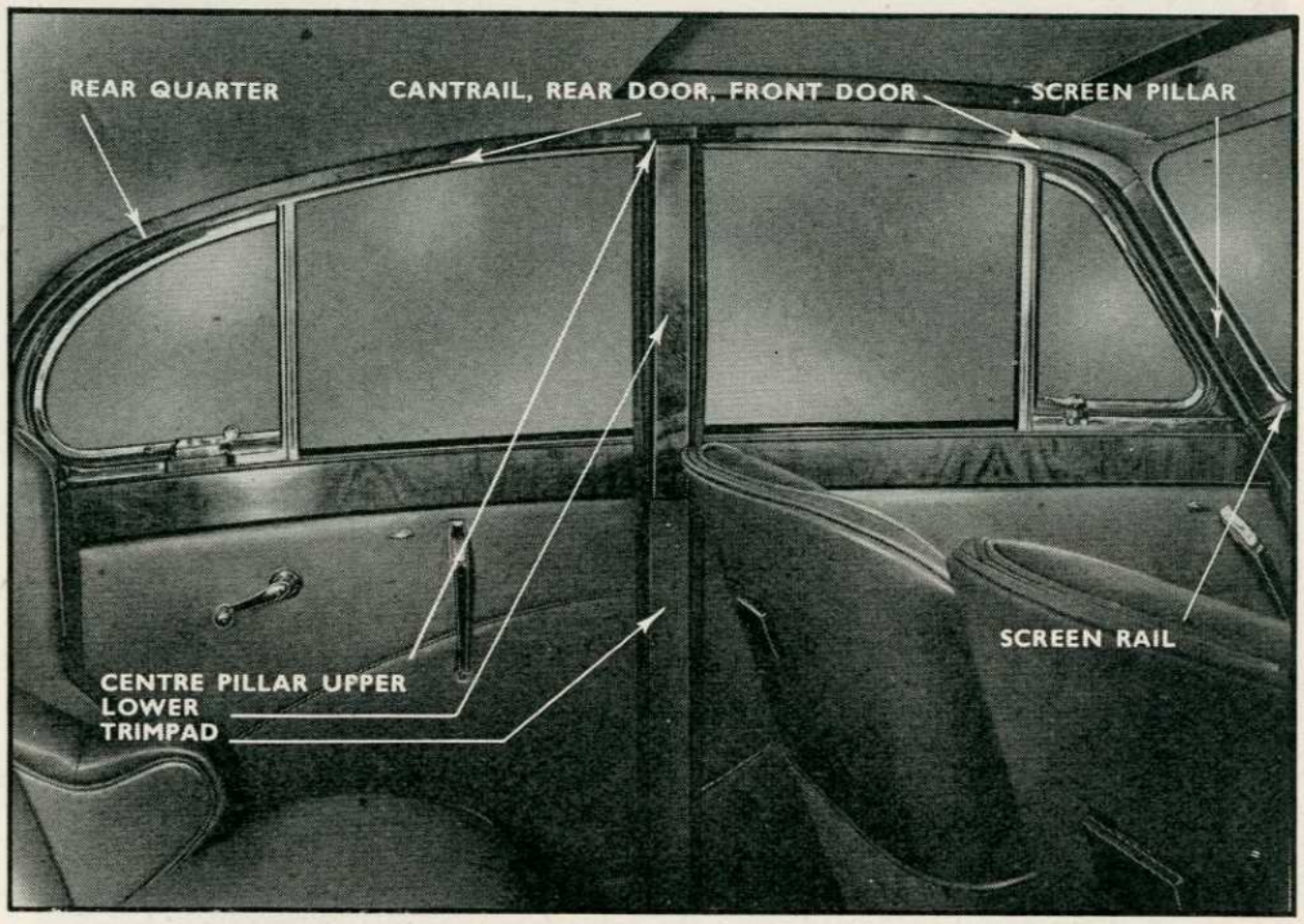


PLATE N.13. POLISHED WOOD CAPPINGS. SALOON

CAPPING. POLISHED WOOD. REAR QUARTER. SALOON
REMOVE AND REFIT

REMOVE. Withdraw draught seal rubber at top rear of door aperture. (Solutioned in position.) Remove four screws passing through cantrail flange into capping. (Plate N.13.) Remove capping.

REFIT. Refitting is the reverse of the above procedure. Care should be taken in removing and refitting cappings in order that the joint faces are not chipped or damaged.

CAPPING. POLISHED WOOD. REAR QUARTER. DROP HEAD COUPE
REMOVE AND REFIT

REMOVE. Remove four screws with cup washers securing top capping and draw off capping. Remove two screws now disclosed and lift quarter facia capping upwards and off.

REFIT. Refitting is the reverse of the above procedure.

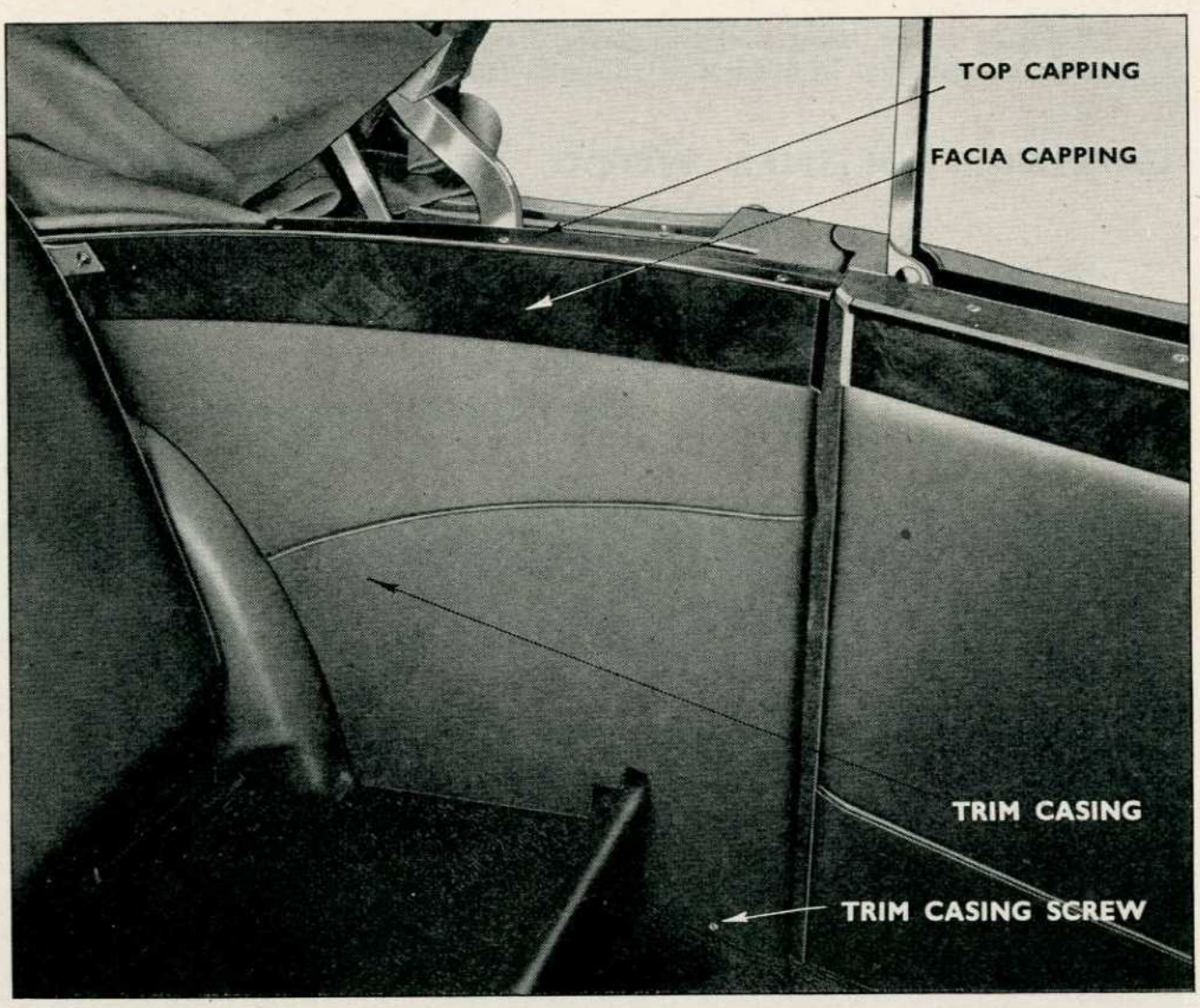


PLATE N.14. FOLISHED WOOD CAPPING QUARTER. DROP HEAD COUPE

CAPPING. POLISHED WOOD. SCREEN PILLAR

REMOVE. Withdraw draught seal rubber from screen pillar. (Solutioned in position.) Remove three screws securing screen pillar capping. (Plate N.13.) Withdraw capping.

REFIT. Refitting is the reverse of the above procedure. Care should be taken in removing and refitting cappings in order that the joint faces are not chipped or damaged.

CAPPING. POLISHED WOOD. SCREEN RAIL
REMOVE AND REFIT

REMOVE. Remove screen pillar cappings as described in the previous paragraph. Withdraw two screws securing driving mirror to screen capping and remove mirror. Remove two nuts (accessible through apertures above glove box facias). Pull out screen rail capping assembly.

REFIT. Refitting is the reverse of the above procedure. Care should be taken in removing and refitting cappings in order that the joint faces are not chipped or damaged.

CARPETS. REMOVE AND REFIT

REMOVE. Remove front seats and slides as described in paragraphs " Seat. Front. Remove and Refit," page N.33 and " Seat Slides. Remove and Refit," page N.33. Lift two press studs at front edge and three press studs at rear edge of both front carpets. Remove front carpets. Withdraw rear carpet edges from chromium plated rocker channels. Remove carpet. Release locknut and unscrew gear lever knob. Turn gearbox dipstick cover, fixing pegs through 180° and lift off cover. Pull rubber cover from headlamp foot dipswitch. Remove brake and clutch pedal lever pinch bolts (engine side of scuttle). With-

draw pedals from levers into car. Lift four fasteners at top edge of toe board carpet and remove carpet. Lift gearbox cowl carpet over gear lever and remove carpet. Note that carpets and underfelts, excepting toeboard carpet and underfelt, are solutioned in position during original assembly.

REFIT. Refitting is the reverse of the above procedure. When refitting the rear carpet use a screw-driver to press the carpet edges into the rocker sill channels. Should it be desired to remove the chromium sill channels, withdraw the fixing screws situated along the inner flange of the channels.

CHROME MOULD. BONNET. REMOVE AND REFIT

REMOVE. Release bonnet side catch by pushing forward the control lever under the facia. Open bonnet top panel and remove nuts securing chrome mould to bonnet top panel. Withdraw chrome mould complete with screws outward.

REFIT. Slide screws into position to engage with holes in bonnet top panel, insert screws and refit nuts.

CHROME MOULD. CENTRE PILLAR. REMOVE AND REFIT.

REMOVE. Open front or rear door. Remove nut and washer securing chrome mould to outer centre pillar. Withdraw chrome mould from the exterior of the car.

REFIT. Refitting is the reverse of the above procedure.

CHROME MOULD. DOOR. SALOON. REMOVE AND REFIT

REMOVE. (Refer to Plate N.17 and N.18.) Remove two screws securing N.D.V. (no Draught Ventilator) window fasteners to capping block. Remove nut from pins engaging in slide on N.D.V. window frame. Lift off fastener. Remove two screws holding block to capping and remove block. Remove four screws and cup washers securing top capping and remove capping. Remove three screws securing facia capping blocks now disclosed (one screw into door inner panel angle plate and two screws into door glass frame). Pull off facia capping upwards and outwards to disengage fixing clips at rear. Remove interior door handle fixing screw, situated at bottom of handle, and slide handle sideways from top clip. Remove interior door handle top clip fixing screw now disclosed and pull off clip. Remove self tapping screw securing interior door handle button to lock lever and remove button. Remove locking catch lever locating screw and pull off lever (not fitted to driver's door). Press in window winder handle escutcheon, eject pin and draw off winder handle and escutcheon The door trim casing is secured by spring clips (twenty in front doors and sixteen in rear doors). Insert a screw driver blade between the trim casing and door shell and lever off the trim casing. Wind window to fully closed position. Remove screw at door panel flange. Using a tubular spanner inserted through the apertures in the door inner panel, remove four nuts and distance washers securing exterior handle and chrome mould. Withdraw handle and chrome mould from the exterior of the car.

REFIT. Refitting is the reverse of the above procedure.

CHROME MOULD. DOOR. DROP HEAD COUPE. REMOVE AND REFIT

REMOVE. (Refer to Plate N.21.) Remove two screws securing N.D.V. (No Draught Ventilator) window fastener to capping block and remove window fastener. Remove two screws holding block to capping now disclosed and remove block. Remove four screws and cup washers securing top capping and lift out capping. Remove draught velvet which is tacked in position. Remove three screws securing facia capping brackets to door frame and lift capping upwards and off. Press in escutcheons on winder handle and door interior handle, eject pins and remove handles. Remove tacks securing upholstery at top of casing. Draw back upholstery and remove drive screws retaining plywood casing to door shell. Tap door casing upwards to release eight slotted clips in the casing from the eight screws in the door frame. Withdraw casing from door. (Refer to Plate N.22.) Remove eight nuts securing chrome mould to door shell. Remove set screw situated at inner end of door handle spindle. Withdraw chrome bead complete with door exterior handle.

REFIT. Refitting is the reverse of the above procedure.

CHROME MOULD. SCUTTLE. (DRIVER'S SIDE). REMOVE

REMOVE CENTRE FACIA. Remove drive screws securing dash casing and withdraw casing. Remove six control knobs, all being retained by a spring loaded pin registering in a hole in the knob. Press in the pins and withdraw knobs. Remove centre fixing screw from lamp switch control and remove control. Remove cigar lighter and ignition key. Remove two screws, one from either side, securing lower edge of facia to support brackets. Remove two chrome plated screws each passing through a top corner of the facia panel. Remove centre facia.

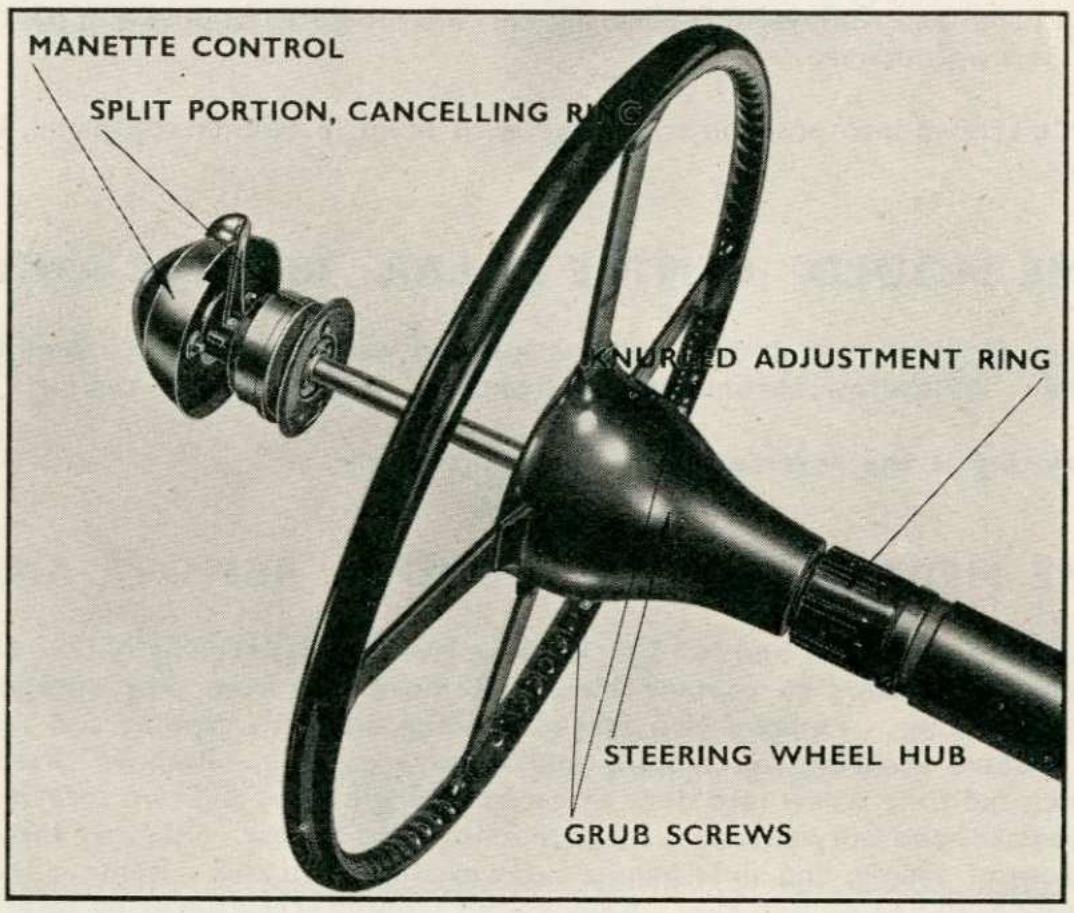


PLATE N.15. MANETTE CONTROL. REMOVAL

REMOVE STEERING WHEEL AND MANETTE CONTROL. Disconnect battery positive lead. Set road wheels in straight ahead position, that is, parallel to the centre line of the car. Disconnect manette control wiring from sockets in junction box on wing valance (3 wires) and from connector to horn relay (1 wire). Release two countersunk grub screws in steering wheel hub and withdraw manette control complete with column wiring harness. Rotate steering wheel adjustment knurled ring until it is free. Remove circlip at top of splined portion of inner column. Draw off steering wheel.

REMOVE DRIVER'S GLOVE BOX FACIA. Remove two screws now disclosed securing edge of driver's glove box to instrument carrier and three screws passing through support rail into bottom edge of glove box facia. Remove two screws at either end of support rail and withdraw rail to effect clearance for removal of glove box facia. Tilt facia, away from operator at the top edge and towards operator at the bottom edge, and remove into car off steering column. Remove dash side casing by withdrawing three screws with cup washers.

REMOVE CHROME MOULD. Remove two nuts and distance washers securing scuttle mould now disclosed. Withdraw driver's side scuttle mould from the exterior of the car.

CHROME MOULD. SCUTTLE. (PASSENGER'S SIDE). REMOVE

REMOVE CENTRE FACIA. Remove centre facias described on page N.30.

REMOVE PASSENGER'S GLOVE BOX FACIA. Remove screw securing both top and bottom brackets of glove box to edge of instrument panel. Remove three screws securing glove box to rear of instrument carrier support rail. Withdraw glove box. Remove three chrome plated screws securing dash side casing. Withdraw side casing towards instrument panel.

REMOVE CHROME MOULD. Remove two nuts and distance washers securing scuttle mould now disclosed. Withdraw driver's side scuttle mould from the exterior of the car.

CHROME MOULD. SCUTTLE. REFIT

REFIT. Refitting is the reverse of the above procedure but the following instructions should be observed when refitting the steering wheel and manette control. Set the road wheels in the straight ahead position Fit steering wheel on splines of inner column and secure with circlip. Pass the column wiring harness down the centre of the inner column. Centralise the trafficator hand control and ensure that the split portion of the cancelling ring is facing the top centre of the steering wheel. (Plate I.2, Section I). Enter the manette control into the hub of the wheel, exercising care not to damage the key and keyway of the stator tubes when they engage.
When the manette control is in position locate with the two grub screws. Check that the trafficators cancel evenly on either side of the straight ahead position. Tighten knurled adjustment ring at base of steering wheel hub.

CHROME MOULD. QUARTER. SALOON. REMOVE AND REFIT

REMOVE. Remove twelve countersunk screws and cup washers securing boot main floor board. Remove nut from nearside (left hand) quadrant hinge stud. Remove knurled locking nut from support stud and pull off hinge arm. Remove hinge stud and support stud. Withdraw floor board through clearance now provided. Remove eleven drive screws securing nearside (left hand) side casing and withdraw casing. Replace hinge stud and support stud. Fit hinge arm and nut to support boot lid while offside (right hand) casing is removed. Remove nut from offside (right hand) quadrant hinge stud. Remove knurled locking nut from support stud. Pull off hinge arm. Remove hinge stud and support stud and eleven drive screws securing offside (right hand) side casing and withdraw casing. Remove eight drive screws securing rear casing and withdraw casing. Remove eight screws, two in each side support rail and four in centre support rail, securing squab to panel. Lift out rear seat cushions and press rear squab assembly into interior of car and remove through door. Remove two bolts in wheel arch panel passing through panel into quarter arm rest assembly. Withdraw arm rest into car. Remove the interior light plastic cover from the securing-clips. Remove two outer screws and withdraw lamp into car and disconnect wiring connections. Remove rear cantrail and shut pillar draught sorbo (solutioned in position). Remove four screws passing through cantrail flange and securing quarter capping. Withdraw capping. Remove two screws in bottom of rear quarter flange (at top of head rest). Remove two drive screws in wheel arch rocker and trim tacks at front top end of quarter trim casing. Withdraw head rest and quarter trim casing assembly. Remove nuts now accessible securing quarter chrome mould. Remove chrome mould from exterior of car.

REFIT. Refitting is the reverse of the above procedure.

CHROME MOULD. QUARTER. DROP HEAD COUPE. REMOVE AND REFIT

REMOVE. Remove four screws with cup washers securing top capping and draw off capping. Remove two screws now disclosed and lift quarter facia capping upwards and off. (Plate N.14.) Remove row of tacks at the top of casing upholstery and withdraw upholstery. Release upholstery where solutioned to head lining. Remove screws securing plywood casing to rear quarter Remove one chrome plated screw securing base of quarter trim panel. Release spring clips along leading edge of casing and withdraw casing. Remove four nuts securing chrome mould to quarter. Withdraw chrome mould from exterior of car.

REFIT. Refitting is the reverse of the above procedure.

COWL. GEARBOX. REMOVE AND REFIT

REMOVE. Lift two press studs at front edge and three press studs at rear edge of both front carpets. Remove carpets. Release clamp bolts (engine side of scuttle) and withdraw brake and clutch pedals and stems out of respective levers. Lift four fasteners at top edge of toe board carpet and remove carpet. Release locknut and unscrew gear lever knob. Turn gearbox dipstick cover fixing pegs through 180° and prise off cover. Full rubber cover from head-lamp foot dipswitch. Remove two setscrews securing dipswitch to cowl brackets. Disconnect wiring and remove switch. (Right hand drive cars only.) Remove four screws along each side flange of gearbox cowl. Remove five screws securing cowl to scuttle. Remove gearbox cowl upwards and over gear lever.

REFIT. Refitting is the reverse of the above procedure.

DASH CASING. REMOVE AND REFIT

REMOVE. Remove eight screws and cup washers securing dash casing to bottom edge of facia. Lower casing and withdraw into car.

REFIT. Refitting is the reverse of the above procedure.

DASH SIDE CASING. REMOVE AND REFIT

REMOVE. The glove box facia support rail passes an aperture in the top of the dash side casing. Cut the aperture into a slot, remove three screws and cup washers and withdraw side casing.

REFIT. Refitting is the reverse of the above procedure.

DOOR. SALOON. REMOVE AND REFIT

REMOVE. Open door to fullest extent. Remove hinge screw from check strap rod and draw rod clear of door. Remove grease nipple at each hinge. Support door and remove four screws from both top and bottom hinges. (Plate N.16.) Draw off door.

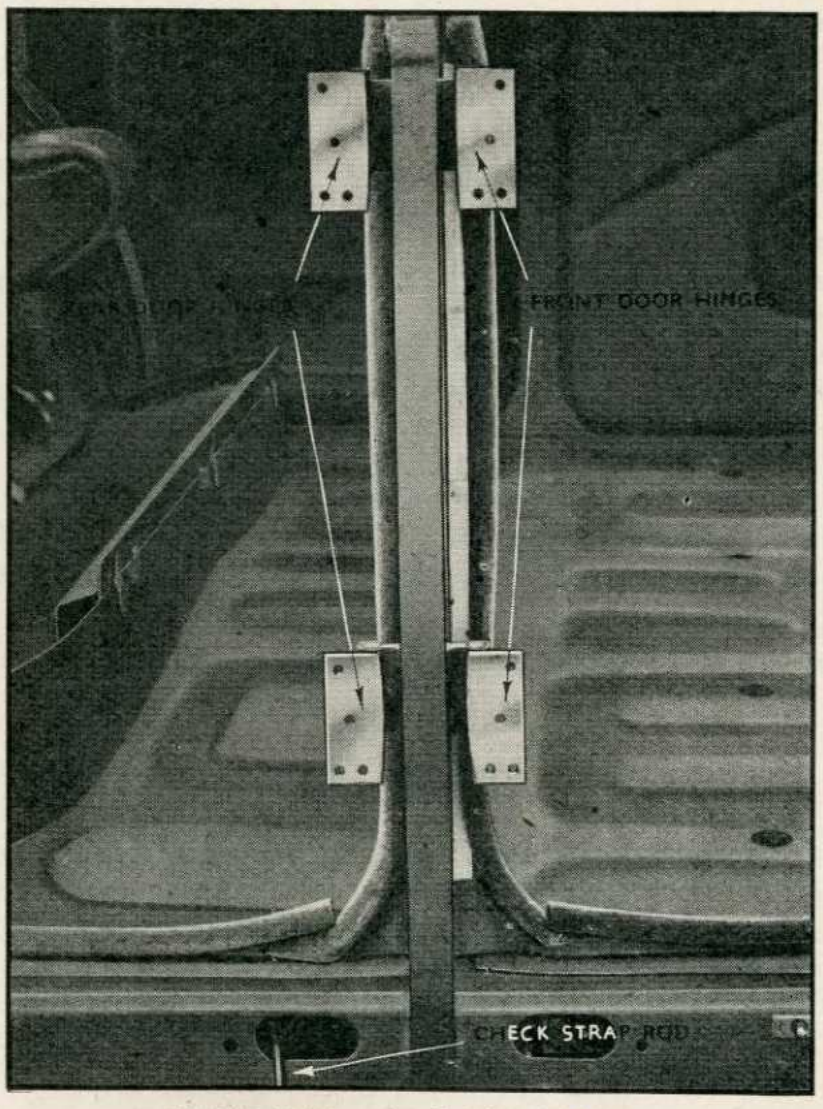


PLATE N.16. DOOR HINGES

REFIT. Refitting is the reverse of the above procedure. See page N.23 for instructions regarding door adjustments.

DOOR. SALOON. DISMANTLE AND REASSEMBLE

DISMANTLE. (Refer to Plate N.17.) Remove two screws securing N.D.V. (No Draught Ventilator) window fastener to capping block. (Plate N.17.) Remove nut from pin engaging in slide on N.D.V. window frame and lift off fastener. Remove two screws holding block to capping and remove block. (Early type N.D.V. windows only. See page N.26.) Remove four screws and cup washers securing top capping and remove capping. Remove three screws securing facia capping blocks now disclosed (one screw into door inner panel angle plate and two screws into door glass frame). Pull off facia capping upwards to disengage fixing clips at rear. Remove interior door handle fixing screw situated at bottom of handle, and slide handle sideways from top clip. Remove interior door handle top clip fixing screw and pull off clip. Remove screw securing interior door handle button to lock lever. Remove button. Remove locking catch lever locating screw and pull off lever (not fitted to door locked with key). Press in window winder handle escutcheon. Remove pin and draw off winder handle and escutcheon. The door trim casing is secured by spring clips (twenty in front doors, sixteen in rear doors). Lever off door trim casing by inserting a screwdriver blade between the trim casing and door shell to spring the clips, one by one, out of engagement with the door shell. (Continued on page N.22.)

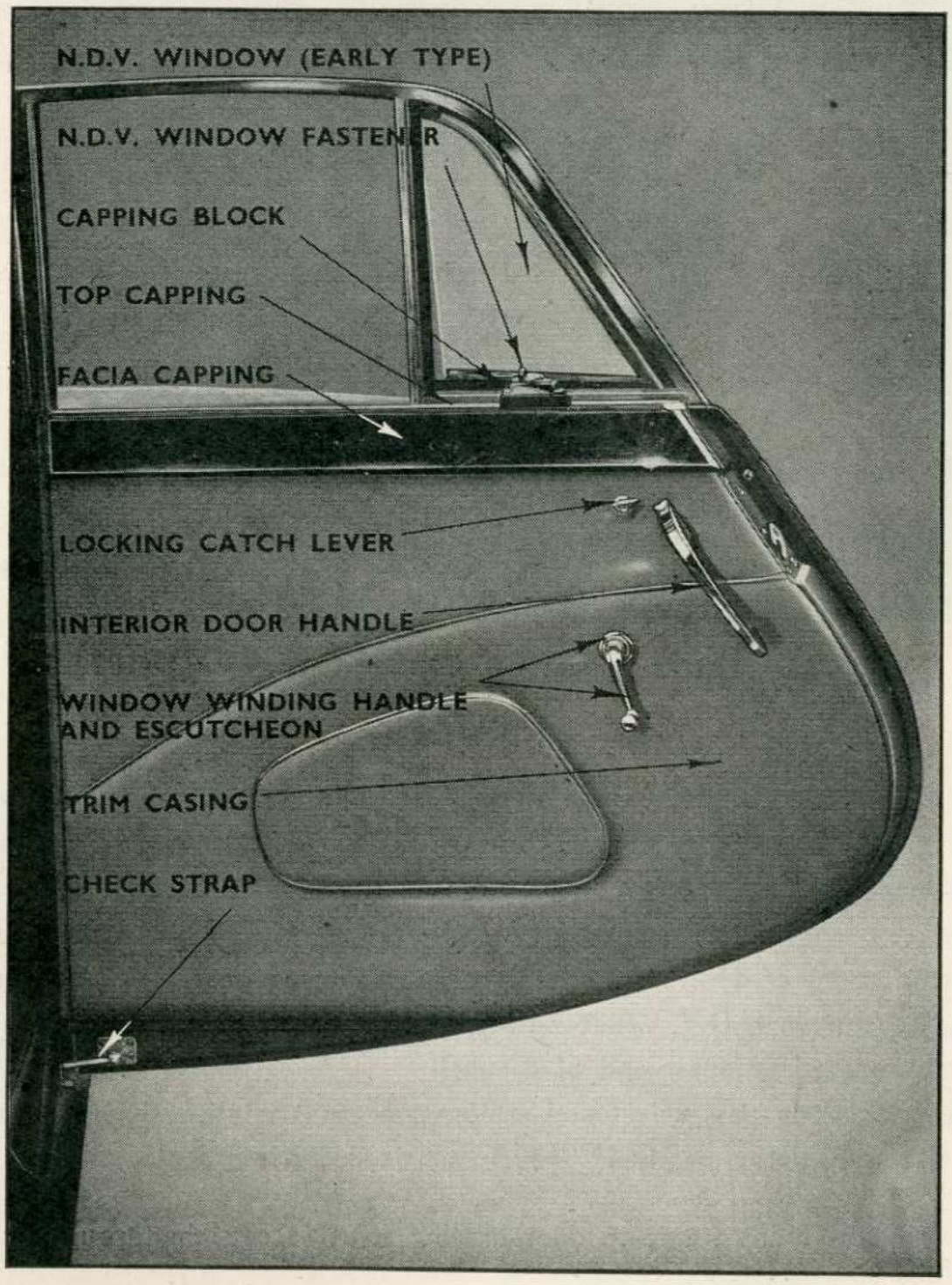


PLATE N.17. DOOR. SALOON. ASSEMBLED

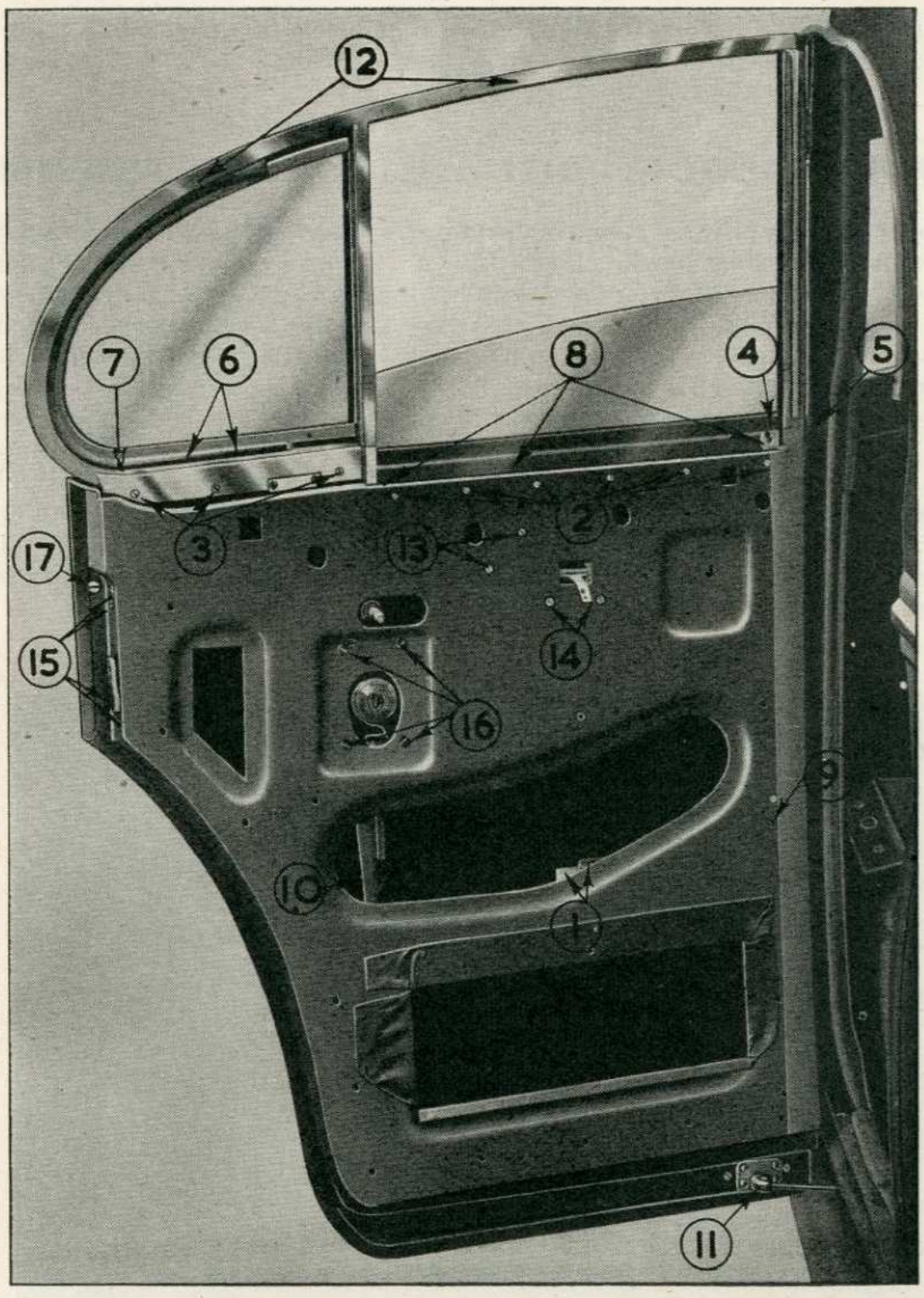


PLATE N.18. DOOR. SALOON. DISMANTLED

(Refer to Plate N.18).

1. Remove bolt and nut securing window winder stop rubber and block. Lower window to lowest extent.
2. Remove six drive screws along top of door shell inner panel and below main glass aperture.
3. Remove three drive screws in ventilation frame bottom flange.
4. Remove one screw in the main glass frame corner bracket (at centre pillar end of bottom frame).
5. Peel back rexine strip at top of door hinge face. Remove one screw now disclosed at top of door hinge face.
6. Lift rubber sealing strip from N.D.V. window bottom channel. Remove Bostic.
7. Remove screw now exposed at outer end of channel.
8. Remove screws securing door glass velvet and remove velvet. (Solutioned in position.)
9. Remove one nut and bolt approximately 12" (30.5 cm.) from bottom of door and 1" (2.5 cm.) from inner edge.
10. Remove one nut and bolt fixing frame to door bracing strut (accessible through upper aperture in door inner panel).
11. Remove screw securing check straps to door bracket.

12. Open door to fullest extent and the chrome door frame and N.D.V. window assembly can now be withdrawn upwards leaving the glass in position. Wind door glass to fully closed position. (Release winder arm from door glass bottom channel.) Withdraw door glass upwards.
13. Remove two screws, one on either side of locking catch spindle (not fitted to driver's door).
14. Remove two screws retaining lock mechanism passing through door shell inner panel. Disengage and remove remote control and locking catch.
15. Remove four screws retaining lock mechanism passing through rim of door shell and withdraw lock downwards.
16. Remove four screws securing window winder mechanism. Withdraw winder through upper aperture in door shell inner panel.
17. Remove screw at door panel flange and four nuts and washers securing exterior handle and chrome mould (nuts accessible through holes in inner panel). Withdraw handle and chrome mould.

REFIT. Refitting is the reverse of the above procedure.

DOOR. SALOON. ADJUST

GENERAL. Each door is mounted on two hinges and provision is made for the insertion of shims between each individual hinge and the door frame. Provision is also made for the insertion of shims between the door striking plates and their mounting points. The striking plates are, to a limited extent, adjustable on their mounting points both vertically and laterally. Finally the chrome plated door frames may be adjusted, to a limited extent, in the door shell.

ADJUST. By adding or subtracting an equal number of shims between the shell of an individual door and its two hinges the door will be moved bodily forward or rearward. Adding or subtracting shims at one or other hinge will tilt the door in the door aperture. Normally any correction which may be required can be obtained by removing or adding shims between the hinges and the door frame as outlined above.

When a door has been correctly adjusted on its hinges the engagement of the lock on the striking plate should be checked. Shims may be added or substracted between the striking plate and its mounting point to bring the striking plate nearer to, or further away from, the lock. With the striking plate securing screws just holding it is possible to tap the striking plate into a new position, to a limited extent, both in the vertical and lateral plane.

If, with the door shell and door lock in correct adjustment, the door chrome frame does not fit the aperture correctly, the frame may be set by either bending inwards to give more intimate contact between frame and door aperture sorbo sealing rubber or by partly stripping the door, loosening the chrome frame securing screws and repositioning the frame in relationship to the door shell. It must be realised that these adjustments are limited by the fact that excessive bending or setting of the chrome frame may cause jamming of the window glass in its slides.

DOOR. SALOON. STRIKING PLATE. REMOVE AND REFIT

REMOVE. Open the door affected and remove two screws securing the striking plate to the door pillar. The striking plate can now be withdrawn.

REFIT. Refitting is the reverse of the above procedure.

DOOR. DROP HEAD COUPE. REMOVE AND REFIT

REMOVE. Open door to fullest extent. Remove hinge screws from check strap rod and draw rod clear of door. Remove grease nipples from each hinge. Support door and remove three screws securing each of the three hinges to the door pillar. (Plate N.21.) Remove door.

REFIT. Refitting is the reverse of the above procedure. See page N.25 for instructions regarding door adjustments.

DOOR. DROP HEAD COUPE. DISMANTLE AND REASSEMBLE

DISMANTLE. (Refer to Plate N.21.) Remove two screws securing N.D.V. (No Draught Ventilator) window fastener to capping block and remove window fastener. Remove two screws holding block to capping now disclosed and remove block. Remove four screws and cup washers securing top capping and lift out capping. Remove draught velvet which is tacked in position. Remove three screws securing facia capping brackets to door frame and lift capping upwards and off. Press in escutcheons on window winder handle and door interior handle, eject pins and remove handles. Remove tacks securing upholstery at top of casing. Draw back upholstery and remove drive screws retaining plywood casing to door shell. Tap door casing upwards to release eight slotted clips in the casing from the eight screws in the door frame. Withdraw casing from door.

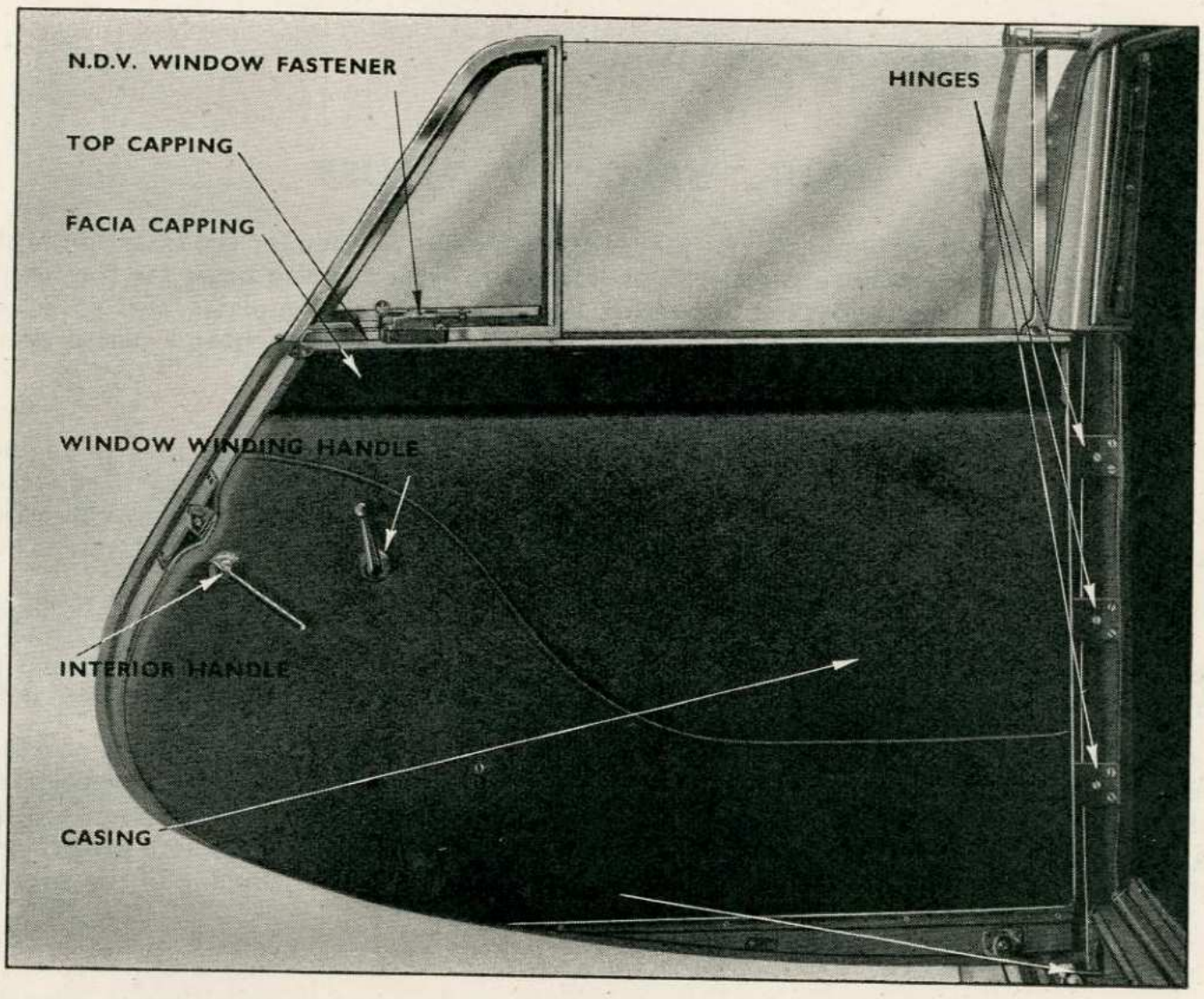


PLATE N.21. DOOR. DROP HEAD COUPE. ASSEMBLED

(Refer to Plate N.22.) Remove eight nuts securing chrome mould to door shell. Remove setscrew situated at inner end of door handle spindle. Withdraw chrome bead complete with door exterior handle. Remove screw retaining window frame fibre stop and wind window upwards until operating arm is disengaged from glass support channel. Withdraw door glass out of frame. Remove seven screws and withdraw window winding mechanism. Remove three screws passing through base of N.D.V. window into door shell. Remove felt from the glass channels. Withdraw three screws from each glass channel and two screws from the small bracket at the top rear corner of the door shell. Withdraw chrome door frame and N.D.V. window assembly complete. Remove four screws securing door lock chrome cover plate. Remove seven screws retaining lock mechanism to door frame and withdraw lock.

REFIT. Refitting is the reverse of the above procedure.

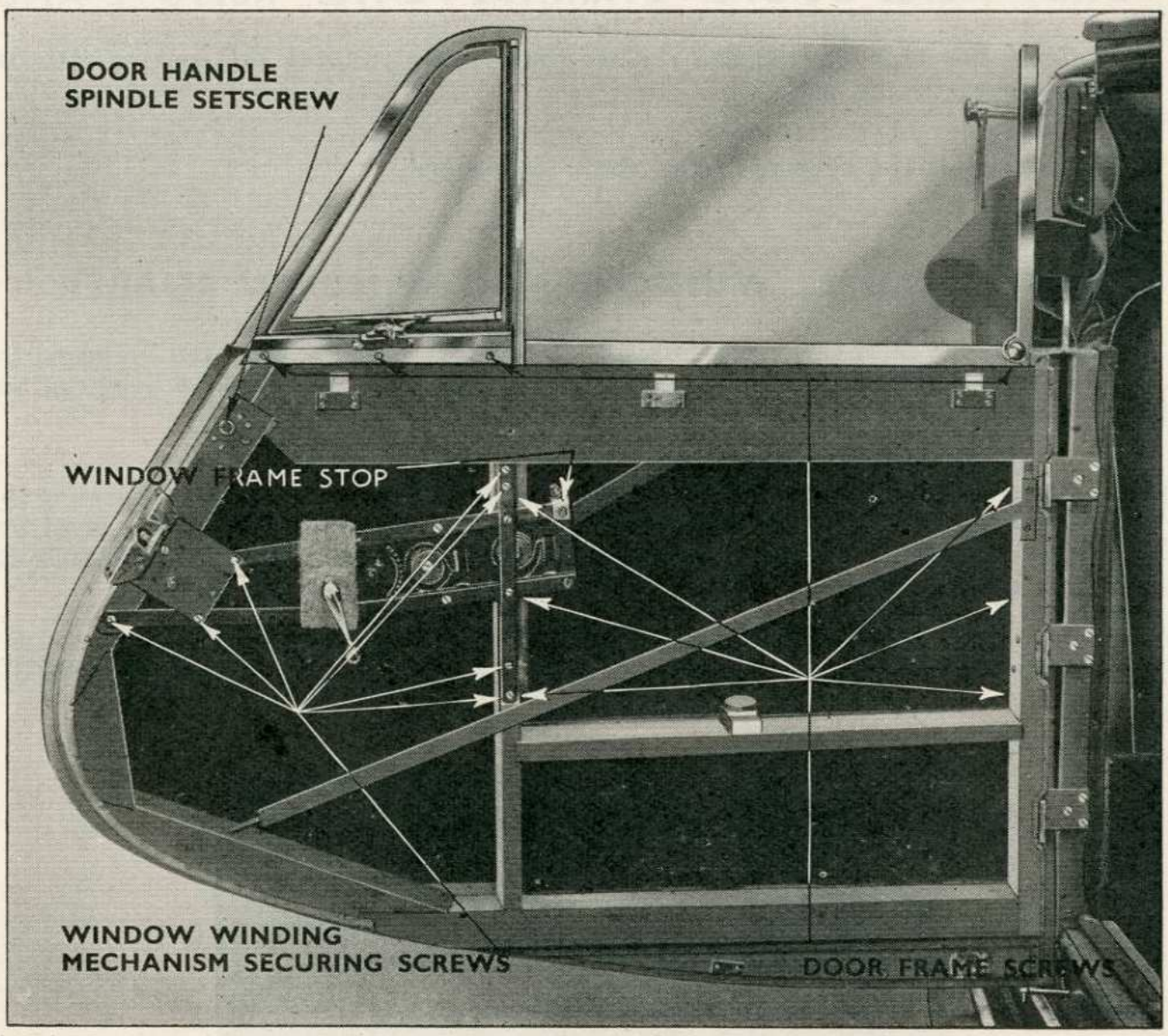


PLATE N.22. DOOR. DROP HEAD COUPE. DISMANTLED

DOOR. DROP HEAD COUPE. ADJUST

GENERAL. Each door is mounted on three hinges and adjustments may be carried out by opening or closing the hinges, or alternatively, by repositioning the door striking plates on their mounting points. There should be approximately 3/32″ (2.4 mm.) equal clearance between the outside edges of the door shell and the door aperture. The leading edge of the door shell should be slightly recessed behind the screen pillar. Door shell and door apertures are correctly jigged in production and little difficulty should be experienced in carrying out adjustments if the following points are observed.

ADJUST. The leading edge of the door shell can be adjusted to a position slightly recessed behind the screen pillar by slackening the four dovetail mounting screws and tapping the dovetail to the position which retains the door at the required adjustment.

Door hinges are adjustable to a limited extent both in the supporting pillar and in the door frame. Slacken the mounting screws and tap the hinge in the required direction. This will give adjustment bodily of the horizontal top and bottom edge. To obtain adjustment of the vertical edges, that is, to move the door forward or backward in the frame it is necessary to open or close the hinges.

The hinge may be opened *in situ* by endeavouring to close the door with a suitable piece of hard wood inserted in the "vee" of the hinge. To close the hinge it is necessary to remove the door and the hinges, place the hinge over a solid block and close with a hammer.

After adjustments have been effected a final check should be made on the clearance with the door closed by inserting a piece of celluloid from inside the car between the door shell and door aperture. Clearance should be present around the whole door aperture.

DOOR. DROP HEAD COUPE. STRIKING PLATE. REMOVE AND REFIT

REMOVE. Open the door affected and remove four screws securing the striking plate to door pillar. Remove striking plate.

REFIT. Refitting is the reverse of the above procedure.

DOOR. N.D.V. WINDOW AND WINDOW RUBBER

REMOVE. Two types of N.D.V. (No Draught Ventilator) window are used. The early type can be opened only to a limited extent to act as extractors and the later type can be fully opened to induce a forced draught into the car.

Early Type. It is necessary to first release the lower pivot of the window hinge by releasing the two screws. These will be found to be positioned either (a) on either side of the pivot underneath the sealing rubber and passing vertically downwards, or (b) behind the door facia capping passing through the lip of the chrome frame horizontally outwards.

In the case of (a) it is only necessary to remove the rubbers to loosen the screws but in the case of (b) it is necessary to remove both the cappings on the door as described on page N.21.

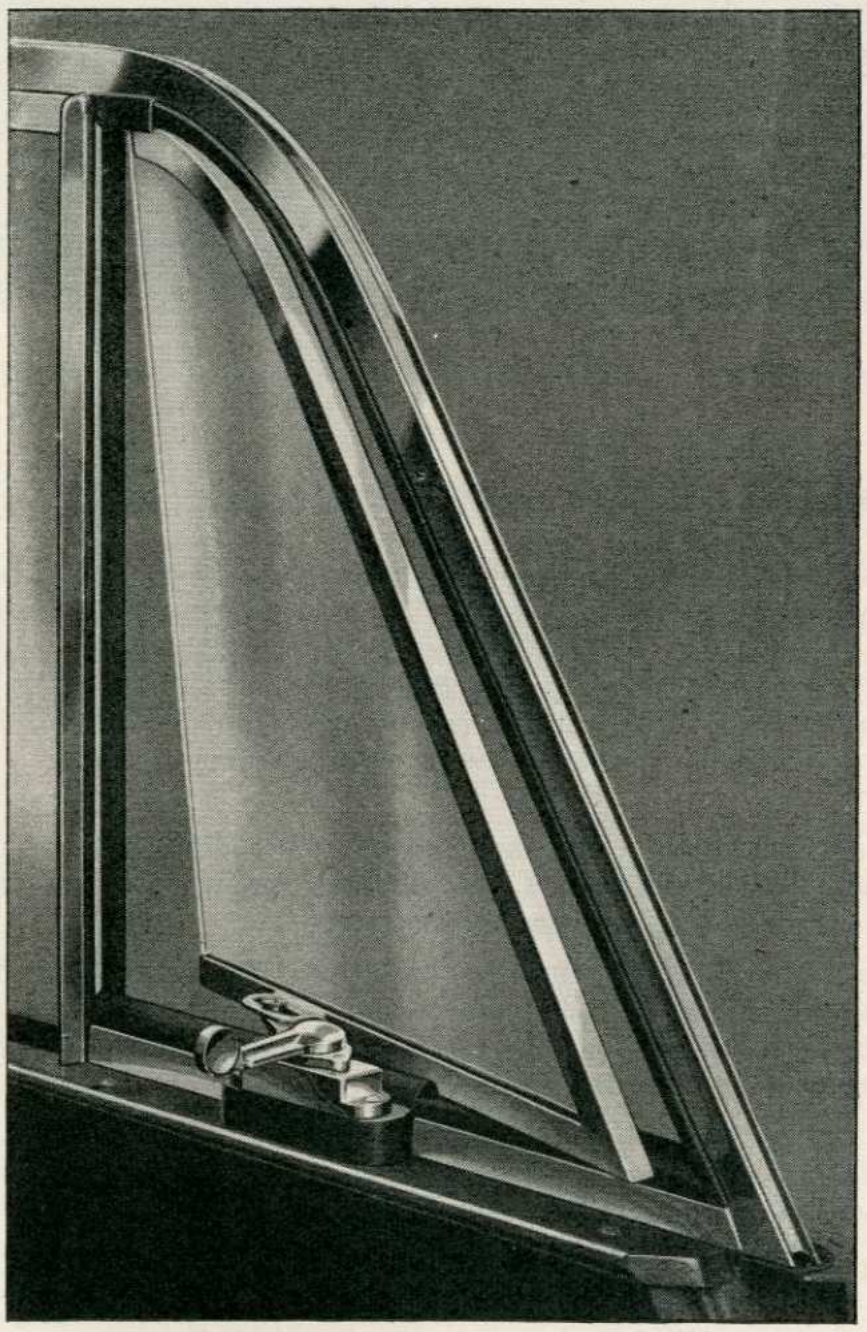


PLATE N.19. N.D.V. WINDOW (Early type)

Slacken the two screws which will allow the window to drop downwards to an extent which permits the top pivot to be disengaged. Tilt the window outside the chrome frame and lift off upwards.

Later Type. Remove the small chromium plated screw securing the window to the top pivot point. Release the window from the pivot and lift off upwards.

The N.D.V. rubbers are solutioned and pressed into position in the channel of the chrome frame.

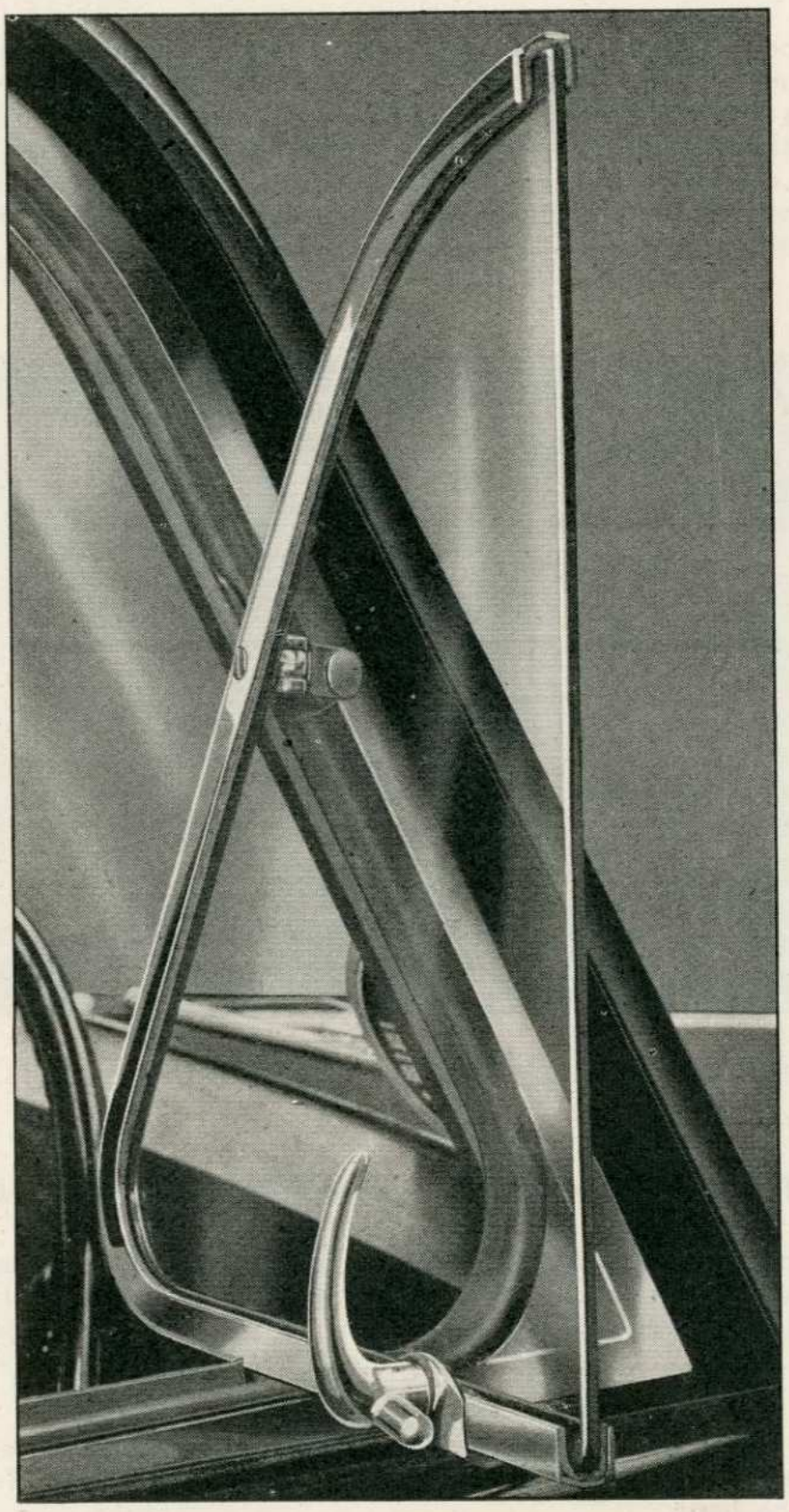


PLATE N.20. N.D.V. WINDOW (Later type)

REFIT. Refitting is the reverse of the above procedure.

DRIP BEAD. REMOVE AND REFIT

REMOVE. Remove twenty-two screws (pop rivets, later cars) securing each drip bead to underside of respective cantrail.
Withdraw drip bead downwards using care not to cause strain or damage at the centre pillar surround.

REFIT. Refitting is the reverse of the above procedure.

DROP HEAD COUPE. RAISING THE HOOD

Remove envelope, erect hood to upright position and raise quadrant arms into locked position. Release straps and stow on press studs under hood. Draw off cantrail protector sleeves and swing arms forward. Engage canopy rail catches with slots at top of screen frame and secure by rotating chrome plated thumb-screws clockwise until they are tight. Swing the cantrails outwards until they lock into the dovetails on the screen frame. (Check that the cantrails are firmly engaged by tapping inwards with the palm of the hand.) Stow the hood envelope and cantrail protector sleeves. On no account must the cantrails be locked into the dovetails until the canopy rail has been secured in position at the top of the screen frame.

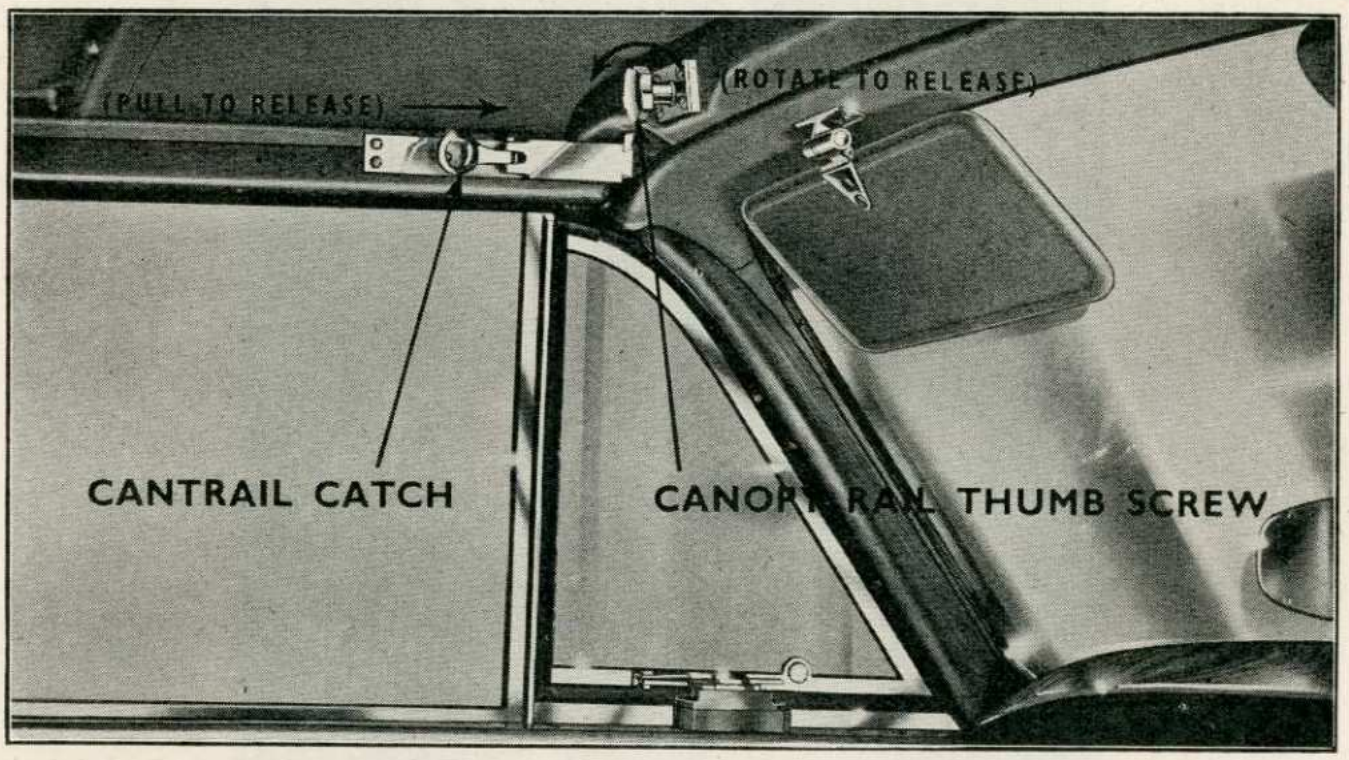


PLATE N.23 CANTRAIL AND CANOPY RAIL CATCHES

DROP HEAD COUPE. LOWERING THE HOOD

RELEASE CANTRAILS. Release one side rail (cantrail) catch by drawing the chrome plated ring towards the centre of the car. Whilst the catch is open strike the cantrail smartly inwards with the palm of the hand which will free it from the dovetail on the windscreen frame. Repeat this operation for the other cantrail.

RELEASE CANOPY RAIL. Unscrew anti-clockwise the two chrome plated thumb-screws securing the canopy rail until the canopy rail can be withdrawn from the windscreen frame. Temporarily place the canopy rail on the hood.

STOW CANTRAILS. Draw the two fabric protector sleeves on to the cantrails and secure with the press fasteners, positioning the sleeves so that the press studs are to the rear. Swing the two cantrails inwards until they are in line with the curved hood stick lying above.

STOW CANOPY RAIL. Rotate the chrome plated thumb-screws clockwise as far as they will go to retract the fixing hooks and thus prevent damage to the head lining when rolled. Roll the canopy rail inwards, that is, with the head lining to the inside, as tightly as possible and place on top of the curved hood stick securing in this position with the two straps. The hood is now in the coupe-de-ville position.

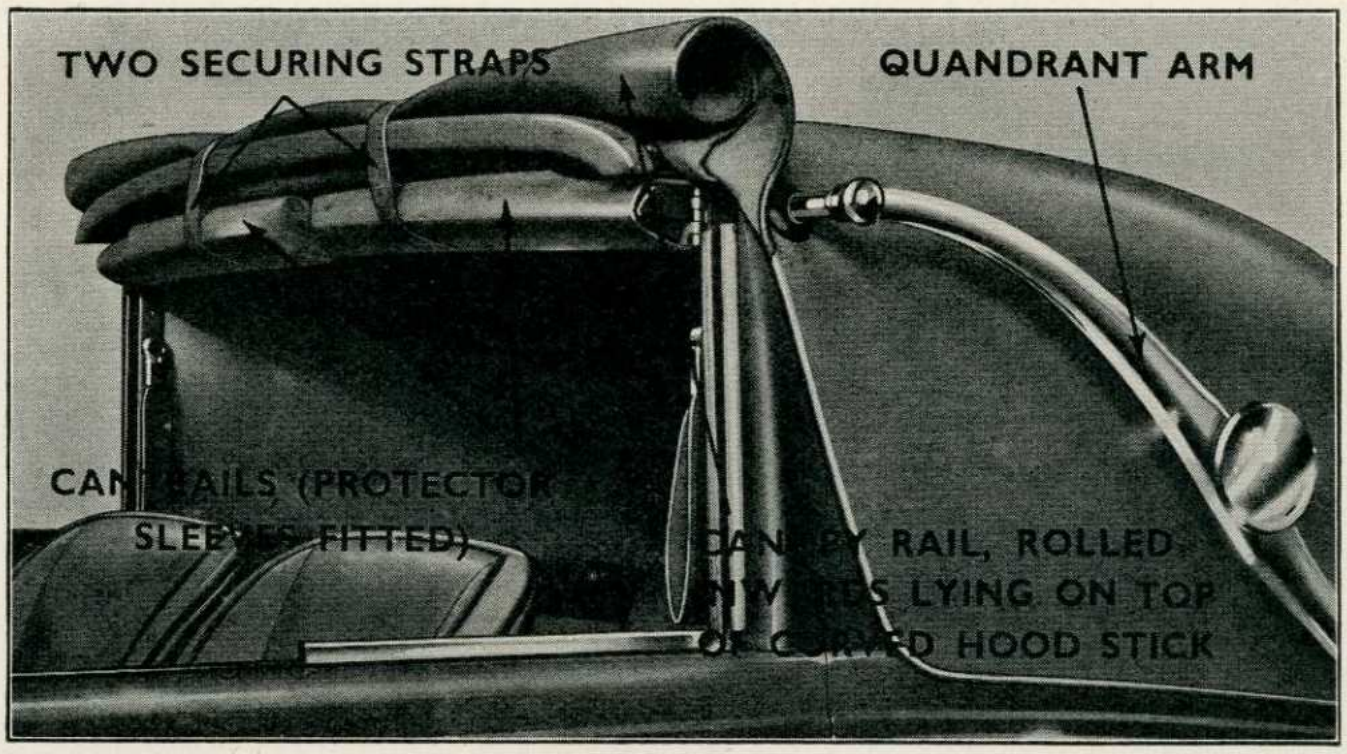


PLATE N.24. COUPE-DE-VILLE POSITION

STOW HOOD. Break the hinged joints of the quadrant arms by pressing downwards at the hinge with the hand. Lower the hood into the well behind the rear seat squab ensuring that no material is trapped. Fit the hood envelope.

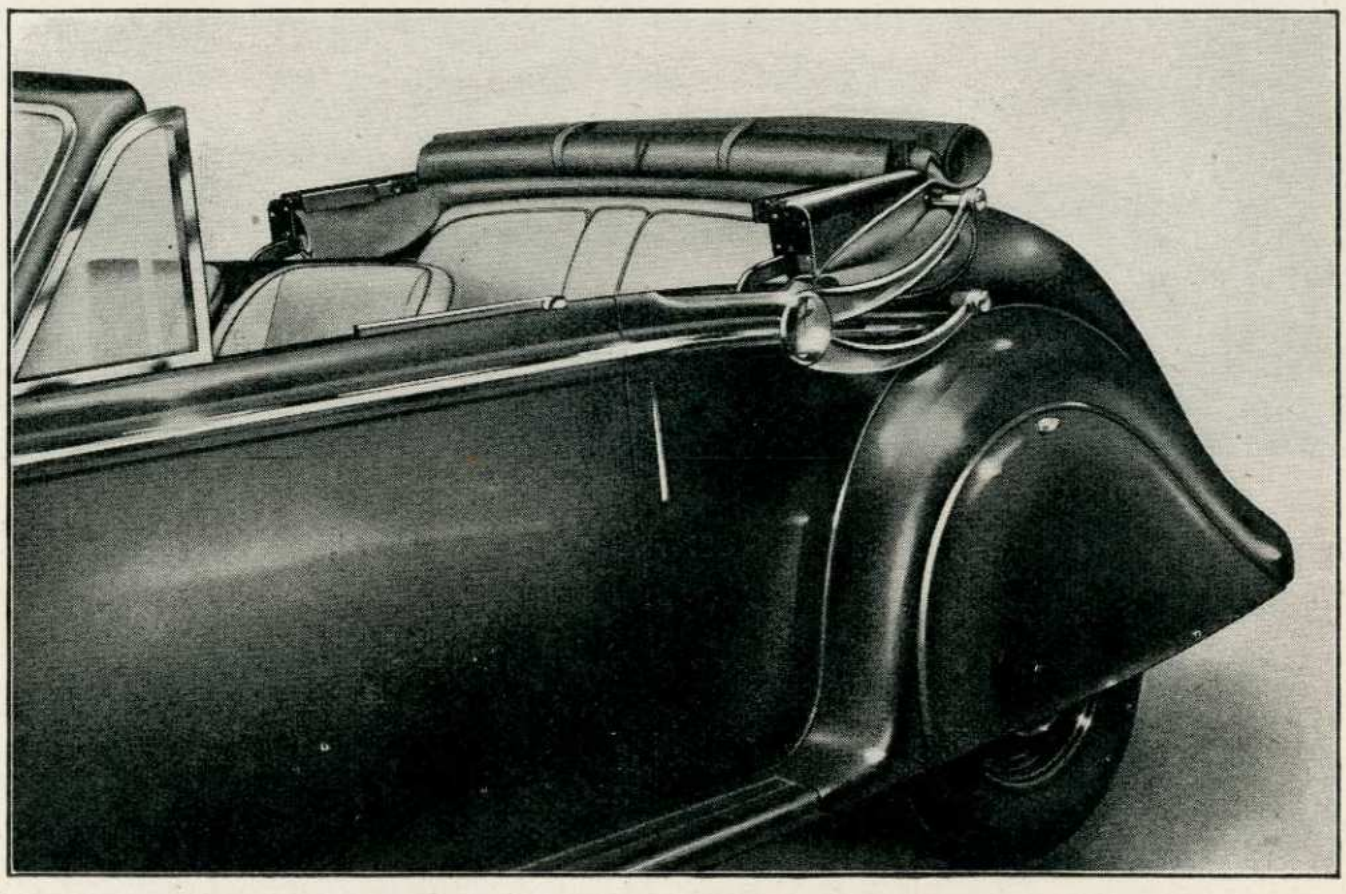


PLATE N.25. HOOD STOWED (ENVELOPE NOT FITTED)

FACIA. CENTRE. REMOVE AND REFIT

REMOVE. Remove drive screws securing dash casing and withdraw casing. Remove six control knobs all being retained by a spring loaded pin registering in a hole in the knob. Press in the pins and withdraw knobs. Remove centre fixing screw from lamp switch control and remove control. Remove cigar lighter and ignition key. Remove two screws, one from either side securing lower edge of facia to support brackets. Remove two chrome plated screws, each passing through a top corner of the facia panel. Remove centre facia.

REFIT. Refitting is the reverse of the above procedure.

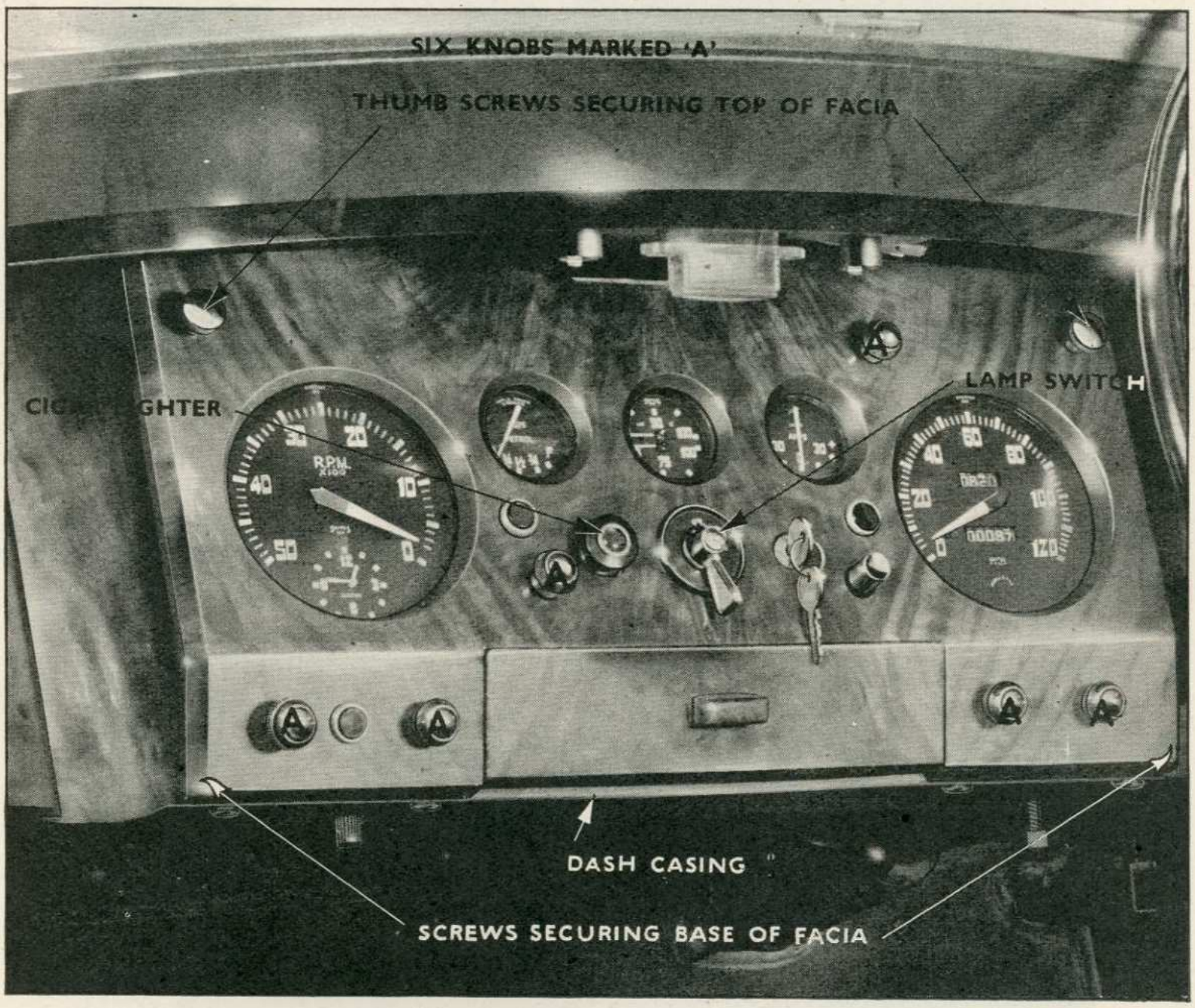


PLATE N.26. CENTRE FACIA. REMOVAL

FACIA. GLOVE BOX. (DRIVER'S SIDE). REMOVE

REMOVE STEERING WHEEL AND MANETTE CONTROL. Disconnect battery positive lead. Set road wheels in straight ahead position, that is, parallel to the centre line of the car. Disconnect manette control wiring from sockets in junction box on wing valance (3 wires) and front connector to horn relay (1 wire). Release two countersunk grub screws in steering wheel hub and withdraw manette control complete with column wiring harness. Rotate steering wheel adjustment knurled ring until it is free. Remove circlip at top of splined portion of inner column. Draw off steering wheel.

REMOVE CENTRE FACIA. Remove drive screws securing dash casing and withdraw casing. Remove six control knobs all being retained by a spring loaded pin registering in a hole in the knob. Press in the pins and withdraw knobs. Remove centre fixing screw from lamp switch control and remove control. Remove cigar lighter and ignition key. Remove two screws, one from either side securing lower edge of facia to support brackets. Remove two chrome plated screws, each passing through a top corner of the facia panel. Remove centre facia. (Plate N.26.)

REMOVE DRIVER'S GLOVE BOX FACIA. Remove two screws now disclosed securing edge of driver's glove box facia to instrument carrier and three screws passing through support rail into bottom edge of glove box facia. Remove two screws at either end of support rail and withdraw rail to effect clearance for removal of driver's glove box facia. (Plate N.27.) Tilt facia, away from operator at the top edge and towards operator at the bottom edge, and remove into car off steering column.

FACIA. GLOVE BOX. (DRIVER'S SIDE.) REFIT

GENERAL. Refitting is the reverse of the above procedure, but special attention should, however, be given to the following points.

REFIT STEERING WHEEL AND MANETTE CONTROL. Set the road wheels in the straight ahead position. Fit steering wheel on splines of inner column and secure with circlip, Pass the column wiring harness down the centre of the inner column. Centralise the trafficator hand control and ensure that the split portion of the cancelling ring is facing the top centre of the steering wheel. (Plate I.2, Section I.) Enter the manette control into the hub of the wheel exercising care not to damage the key and keyway of the stator tubes when they engage. When the manette control is in position locate with the two grub screws. Check that the trafficators cancel evenly on either side of the straight ahead position. Tighten knurled adjustment ring at base of steering wheel hub.

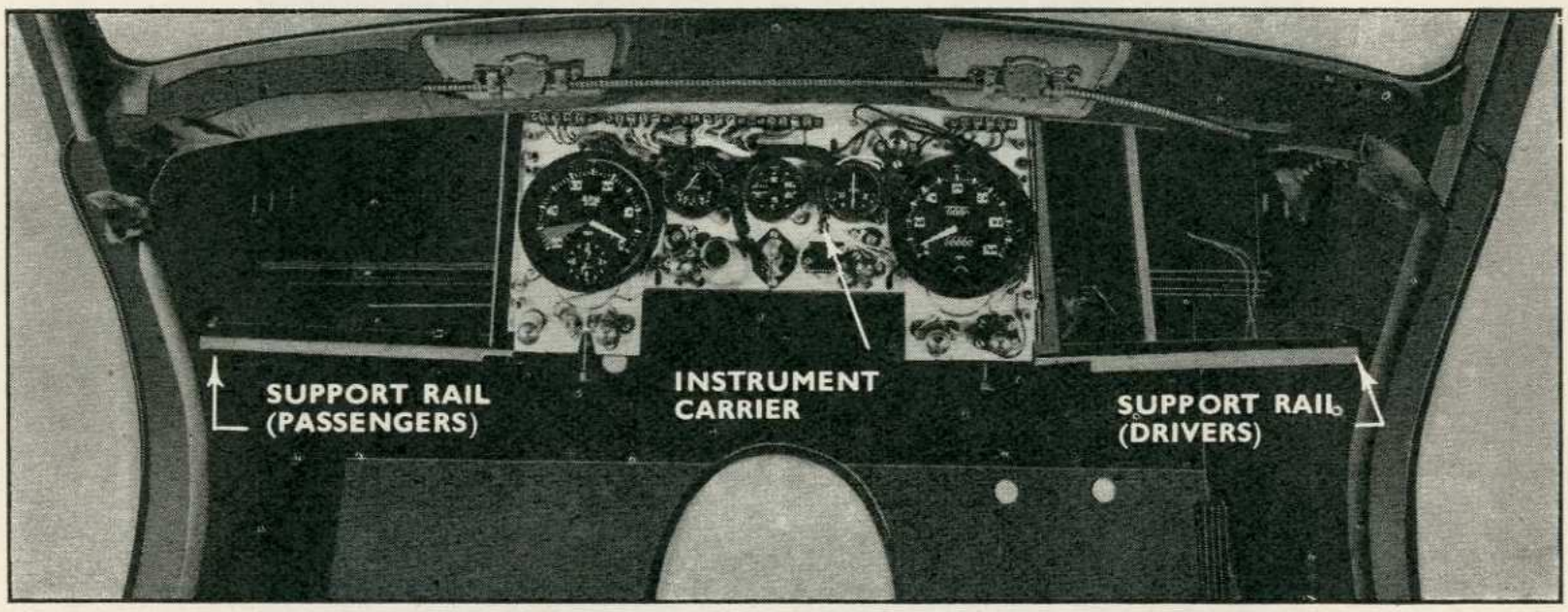


PLATE N.27. GLOVE BOX FACIA. MOUNTING

FACIA. GLOVE BOX. PASSENGER'S SIDE. REMOVE AND REFIT

REMOVE. Remove the centre facia as described on page N.30. Remove two screws now disclosed securing edge of passenger's glove box facia to instrument carrier and three screws passing through support rail into bottom edge of glove box facia. (Plate N.27.) Withdraw passenger's glove box facia.

REFIT. Refitting is the reverse of the above procedure.

PETROL FILLER. REMOVE AND REFIT

REMOVE. Remove twelve countersunk screws and cup washers securing boot main floor board. Remove nut from nearside (left hand) quadrant hinge stud. Remove knurled locking nut from support stud and pull off hinge arm. Remove hinge stud and support stud. Remove eleven drive screws securing nearside (left hand) side casing and withdraw casing. Remove lower hose clip from petrol filler hose and release hose. Open petrol filler cover with key provided and withdraw four screws securing the filler cap neck to the body shell. Withdraw petrol filler through filler aperture. (Plate N.28.)

REFIT. Refitting is the reverse of the above procedure.

PETROL FILLER COVER. REMOVE AND REFIT

REMOVE. Open petrol filler cover with key provided and remove four screws securing cover to hinge arm. Remove cover. The lock catch is secured to the cover by four screws. (Plate N.28.)

REFIT. Refitting is the reverse of the above procedure.

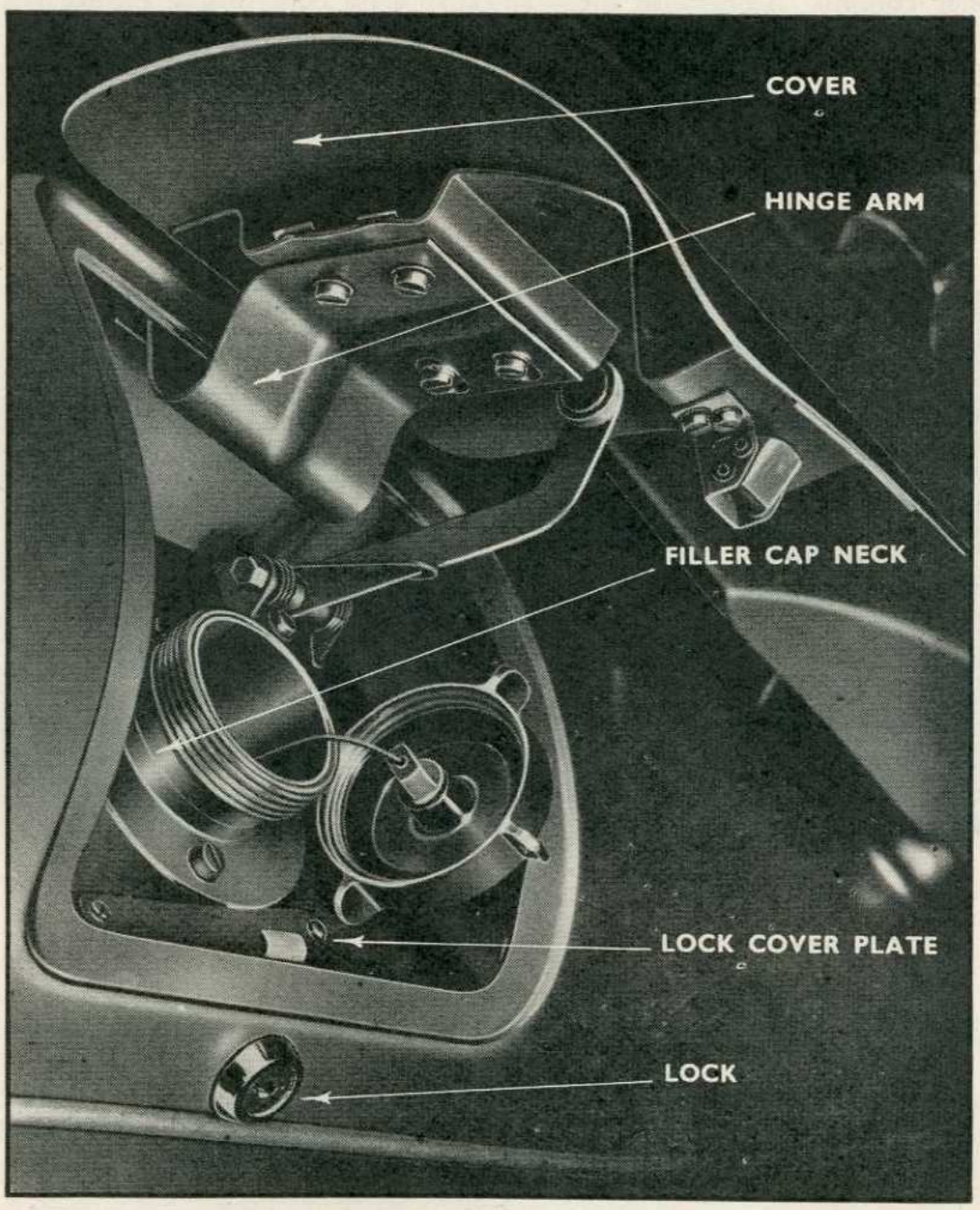


PLATE N.28. PETROL FILLER

PETROL FILLER LOCK. REMOVE AND REFIT

REMOVE. Open petrol filler cover with the key provided. Remove four screws and withdraw plate covering lock aperture. (Plate N.28.) Disengage and remove spring clip surrounding inner portion of lock barrel. Draw lock outwards towards exterior of car. (If difficulty is experienced in removing the spring clip, lever lock outwards towards exterior of car, but observe that removal in this manner will break the spring clip.)

REFIT Refitting is the reverse of the above procedure. If the spring clip has become damaged during removal fit a new clip to the lock barrel and press the lock assembly into position until the spring engages.

RADIATOR SHELL. REMOVE AND REFIT

REMOVE. Remove bonnet top panels. Remove two nuts securing base of radiator shell to front wing valance, observing distance rubbers fitted between shell and valance. Remove two bolts per side securing shell upper casing to bonnet side stays. Remove two bolts per side securing shell lower casing to wings. Remove two bolts per side securing the flange of the radiator shell to the radiator block. Release bonnet tapes. Remove filler cap and withdraw radiator shell upwards and off exercising care not to damage the chromium plate.

REFIT. Refitting is the reverse of the above procedure.

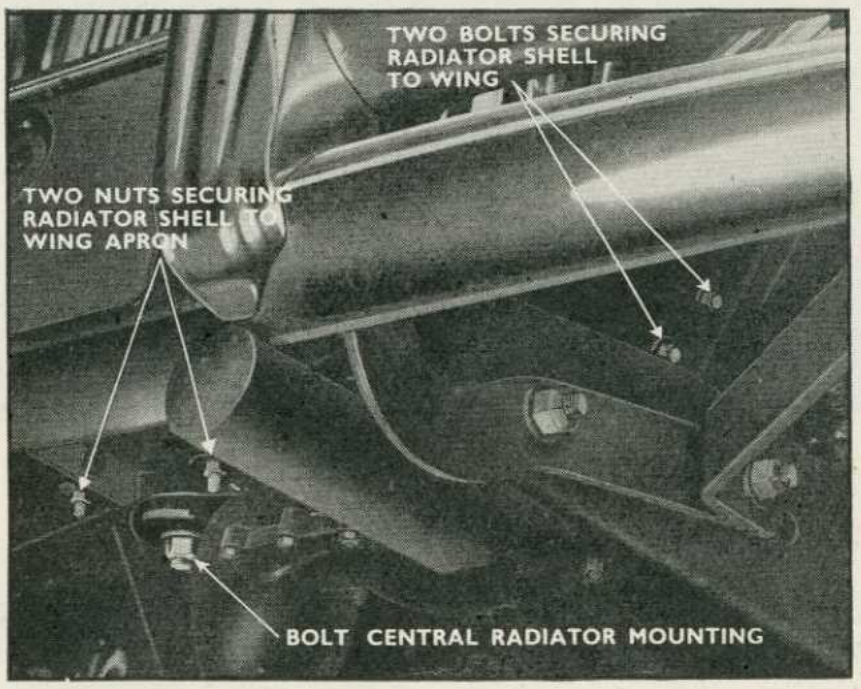


PLATE N.29. RADIATOR SHELL. REMOVAL

SEAT. FRONT. REMOVE AND REFIT

REMOVE. Raise seats to highest point on vertical adjustment. Remove three chromium plated cap nuts on outer bottom seat frame and three hexagon nuts on inner bottom seat frame. Lift seat assembly off slides ensuring that the threads on the studs are not damaged.

REFIT. Refitting is the reverse of the above procedure.

SEAT SLIDES. REMOVE AND REFIT

REMOVE. Remove seats as described in the previous paragraph. Remove centre fixing screw from each slide. Remove one screw at each end of slide, moving runner to gain access to screws. Remove slides. (Note that packing pieces are used under outer slides only.)

REFIT. Refitting is the reverse of the above procedure.

SLIDING ROOF. REMOVE AND REFIT

REMOVE. Place sliding roof in open position. Remove four screws in the two outside aperture cappings. (Plate N.30.) Remove cappings by sliding downwards, exercising care not to damage joints. Close and lock roof. Remove screw in each chromium plated guide bracket, now disclosed, and press brackets outwards towards car exterior thus freeing them from the slide rails. Unlock locking handle. Raise roof panel at leading edge by pushing roof upwards from car interior. The sliding roof and trim panel assembly can now be lifted forward from runners.

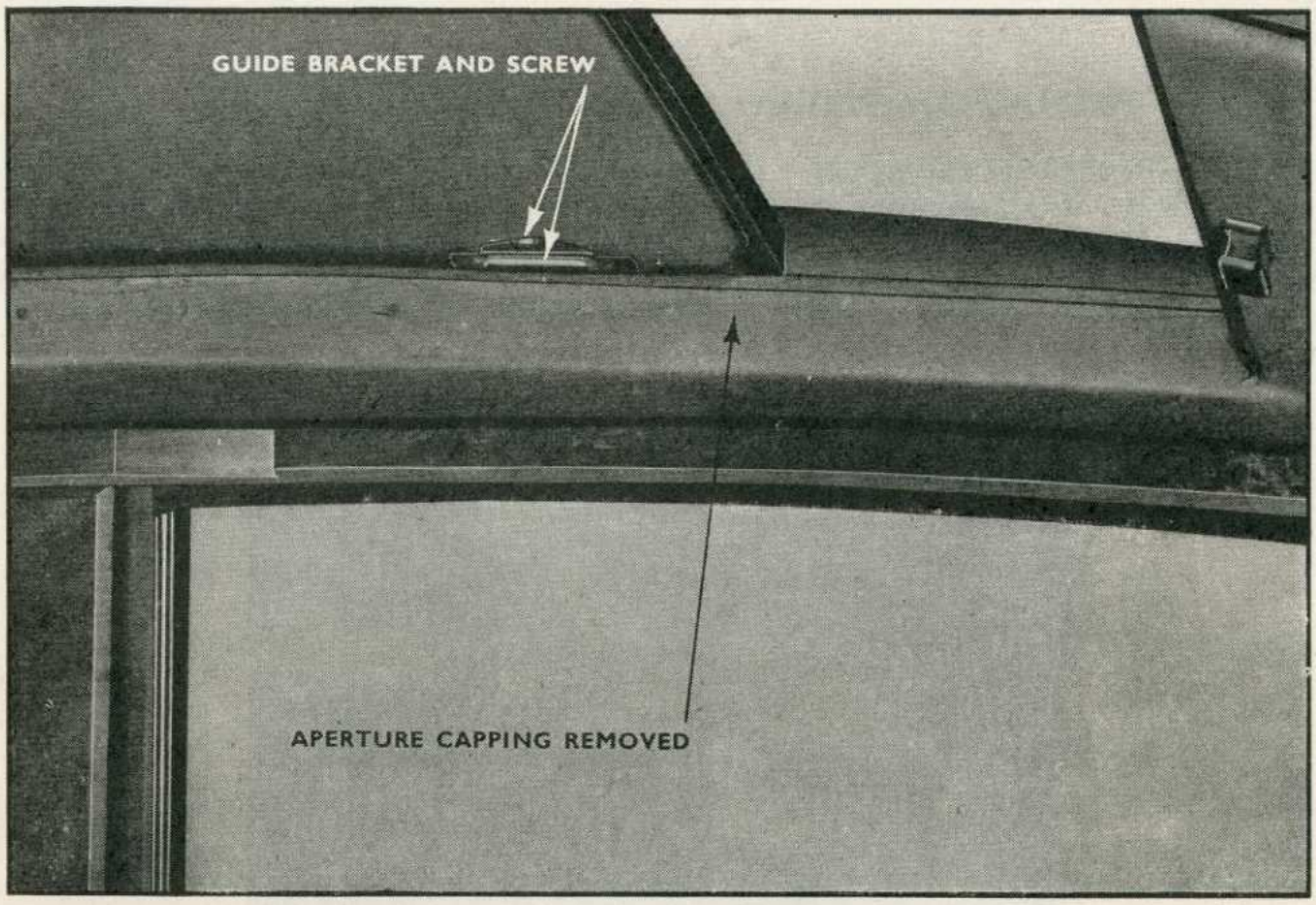


PLATE N.30. SLIDING ROOF. REMOVAL

REFIT. Refitting is the reverse of the above procedure. Ensure that guide brackets are pulled fully inwards when refitting so that fixing screws are properly located.

SLIDING ROOF DRAIN TUBES. SERVICE

GENERAL. Water is carried away from the sliding roof aperture by rubber tubes attached to four suitable conduits, one situated in each corner of the roof aperture. The front tubes pass down inside the screen pillars and discharge at the base of the pillars under the front wings. The rear tubes pass along the cantrails, over the back of the wheel arches and discharge at a point above the rear spring shackles.

SERVICE. From time to time it is advisable to clear out the drain tubes, using compressed air. The front tubes can be cleared with the sliding roof open, but it is necessary to remove the slide as described on page N.34 to gain access to the rear tubes.

SPARE WHEEL COVER. REMOVE AND REFIT

REMOVE. Open spare wheel cover using budget lock key provided in tool kit. Disconnect number plate and reverse light wiring at connectors. Support cover and remove four screws from each hinge. (Plate N.31.) Draw off spare wheel cover.

REFIT. Refitting is the reverse of the above procedure.

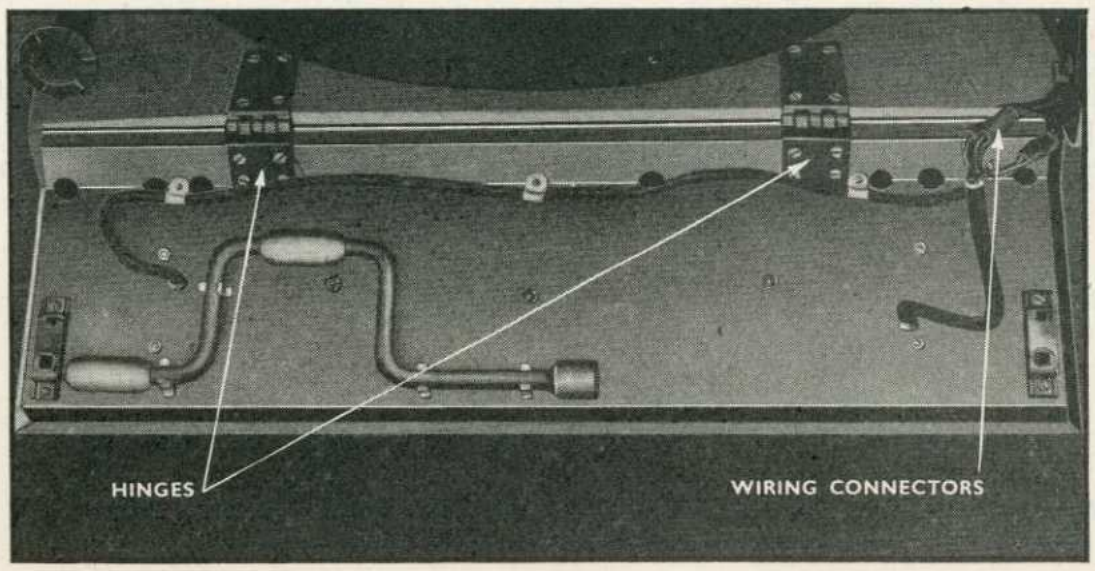


PLATE N.31. SPARE WHEEL COVER. REMOVAL

SPARE WHEEL TRAY. REMOVE AND REFIT

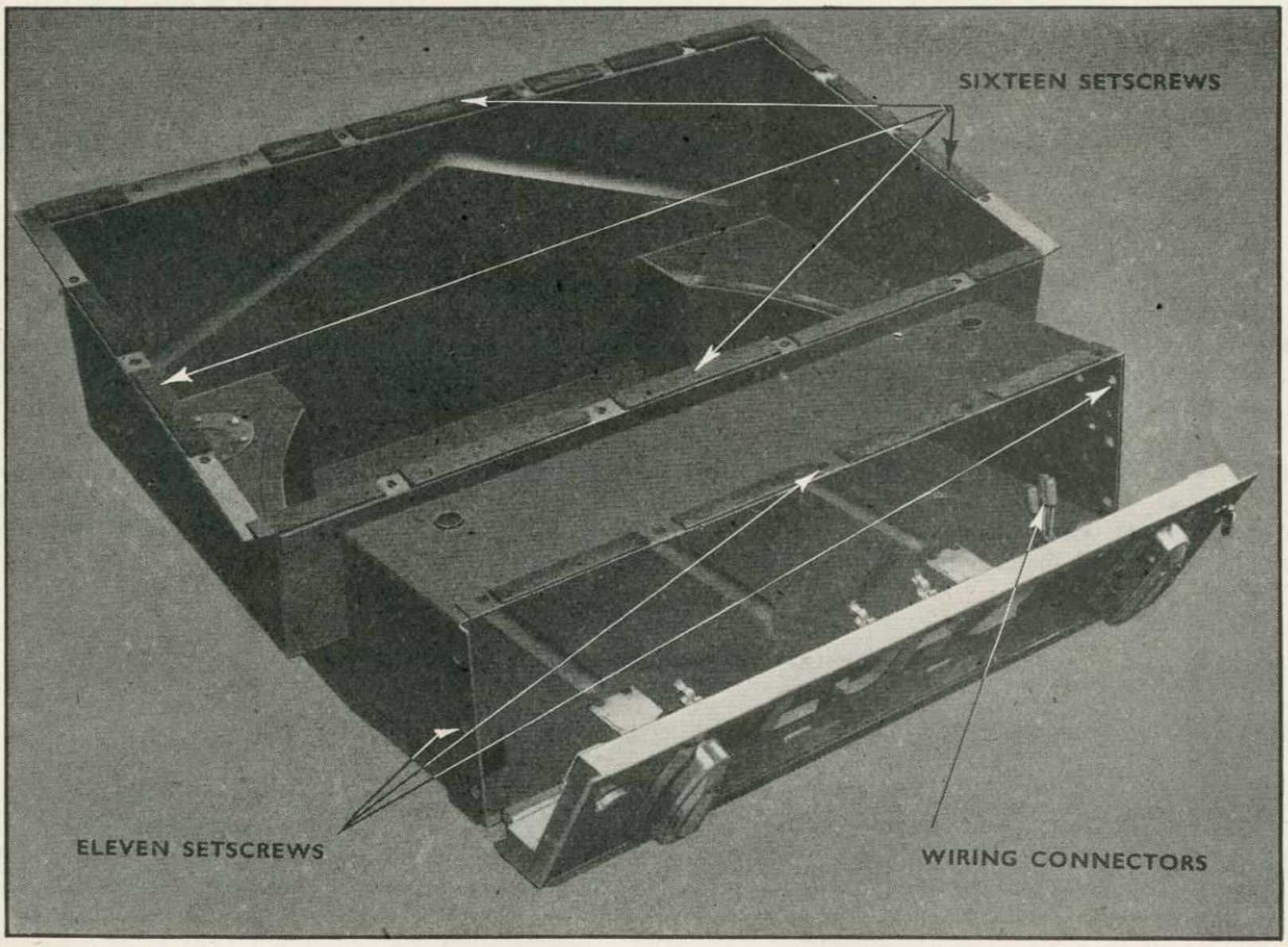


PLATE N.32. SPARE WHEEL TRAY

REMOVE. Open spare wheel cover using budget lock key provided in tool kit. Remove spare wheel, jack and wheel brace. Disconnect number plate and reverse light wiring at connectors. Release wiring from clips and draw through grommet in side of spare wheel tray. Remove eleven setscrews retaining side and top of spare wheel tray to tail panel. Drain petrol tank by removing drain bung. Disconnect petrol outlet pipe from tank and draw through grommet in side of spare wheel tray. Remove twelve countersunk screws and cup washers securing boot main floor board. Remove nut from nearside (left hand) quadrant hinge stud, remove knurled locking nut from support stud and pull off hinge arm. Remove hinge stud and support stud. Raise nearside (left hand) edge of floor board and remove floor board. Support spare wheel tray. Remove sixteen set screws securing petrol tank and spare wheel tray to body side and cross members. Lower tray and withdraw to rear.

REFIT. Refitting is the reverse of the above procedure.

SUN VISORS. REMOVE AND REFIT

REMOVE. Remove screws securing the two hinge rod brackets and draw visor downwards.

REFIT. Refitting is the reverse of the above procedure.

Adjust the tension of the screws so that the visors can be moved easily to any desired position and will be retained in that position without dropping.

SQUAB. REAR. REMOVE AND REFIT

REMOVE. Remove boot floor boards and side casings as described on page N.10. Remove rear seat cushion. Remove eight screws securing squab to panel (two in each side support rail and four in centre support rail). Press rear squab assembly forwards from boot interior.

REFIT. Refitting is the reverse of the above procedure. Ensure that boot side casing strip rubbers are in position before replacing casings.

WINDOW. REAR VIEW. REMOVE AND REFIT

REMOVE. Remove sixteen chromium plated screws, accessible from inside the car, securing the window frame to the body shell. Support window from inside car. Press frame and glass assembly, from the outside, into car.

REFIT. Offer up the rear view window into aperture from car interior and refit sixteen chromium plated securing screws. It may be necessary to refill the clearance between the window frame and aperture with suitable sealing compound. Pressing in "Glasticon" or a similar compound with a piece of pointed wood will make a satisfactory seal.

WINDOW. REAR VIEW. REGLAZE

REMOVE. Remove rear view window as described in the previous paragraph.

REGLAZE. Split frame by withdrawing four countersunk screws from each side. Remove glass and thoroughly clean frame channel of old glazing rubber. Cut off sufficient glazing rubber for one half of frame. Warm replacement glazing rubber and lightly moisten on both sides with thin oil. Apply the rubber to the new glass and firmly draw on one half of the frame. Repeat for other half of frame and replace countersunk screws. Trim off excess rubber.

REFIT. Refit window as described above.

WINDSCREEN. REMOVE AND REFIT

GENERAL. The windscreen is of the fixed type, being located and bolted directly into the screen aperture. The screen is held in position by eight nuts, one on the top edge, two on each side and three on the bottom edge.

REMOVE. Remove sorbo rubber draught strip held by Bostik at rear edge of nearside (left hand) and offside (right hand) screen pillar. Remove three screws securing each screen pillar capping Pull cappings towards car interior, exercising care not to damage joints. Remove two screws securing driving mirror to screen capping. Remove mirror. Remove two nuts, accessible through apertures in dash inner panel above glove box facias securing screen capping. (Plate N.33.) Pull out screen capping assembly. Prise down plate, covered with headlining material, situated above screen centre and between sun visor centre brackets and remove nut now disclosed. Lift edges of headlining material at screen pillar and bottom rail. Remove two nuts on each screen pillar flange and three nuts on bottom screen rail flange. (Plate N.33.) Support windscreen assembly and press outwards.

REFIT. Refitting is the reverse of the above procedure.

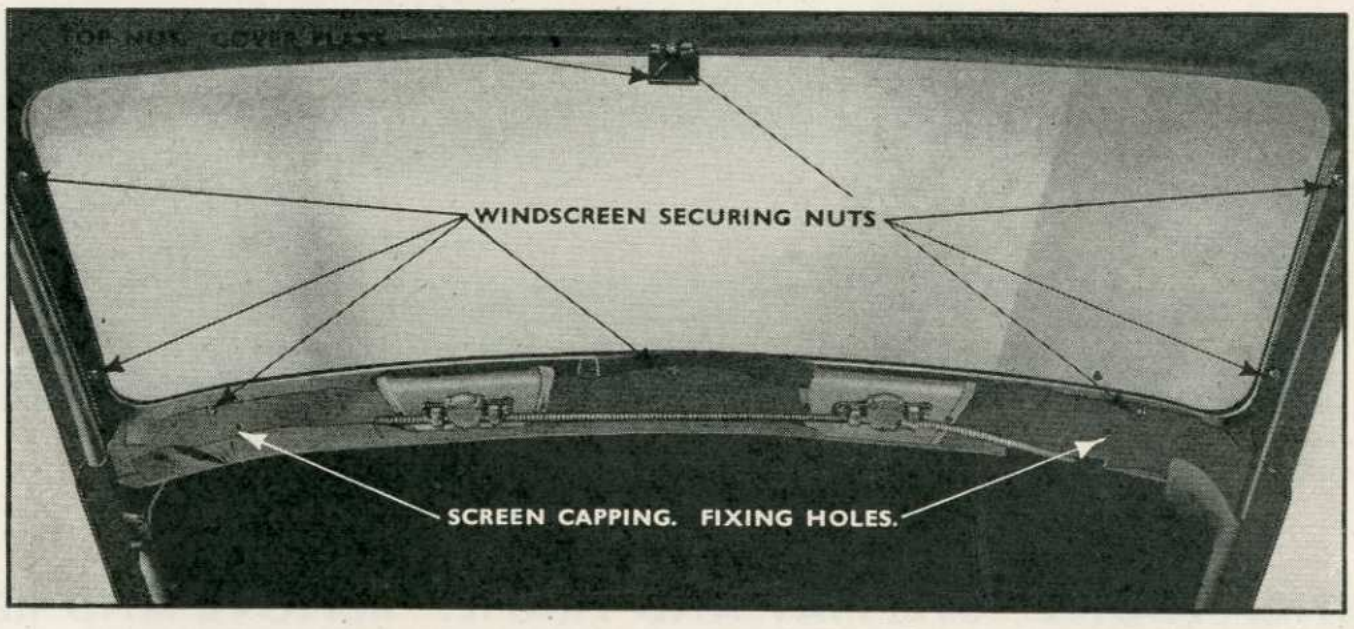


PLATE N.33. WINDSCREEN. REMOVAL

WINDSCREEN. REGLAZE

REMOVE. Remove windscreen as described in previous paragraph.

REGLAZE. Remove the windscreen surround rubber, which is a press fit in the channel running round the outer edge of the screen frame, by pulling out the surround rubber, starting at the joint at the centre point of the base of the screen. Split windscreen frame by withdrawing four countersunk screws at each side of frame. Remove glass and thoroughly clean frame channel of old glazing rubber. Cut off sufficient glazing rubber for one half of frame. Warm replacement glazing rubber and lightly moisten on both sides with thin oil. Apply the rubber to the new glass and firmly draw on one half of the frame. Repeat for other half of frame and replace countersunk screws. Trim off excess rubber.

REFIT. When refitting the windscreen surround rubber, start at the centre point of the base of the screen and work round to the start point. It is an advantage to lightly moisten the lip of the rubber with thin oil to facilitate entry into the channel Seal the rubber joint with a spot of Bostik sealing compound. Refitting the windscreen assembly is as described above.

WINDSCREEN. SURROUND RUBBER. REMOVE AND REFIT

REMOVE AND REFIT. Removal and refitting is described above—" Windscreen. Reglaze."

WING. FRONT. REMOVE AND REFIT

REMOVE. Remove headlamps, and fog lamps as described in Section P. Remove bonnet and side panels as described on page N.9. Remove radiator shell as described on page N.33. Remove two nuts and bolts beneath front apron, securing wing motif and withdraw motif.
Remove front wheel adjacent to wing affected. Remove one nut and bolt at each end of wing outer valance tie rod. Remove centre bolt fixing lower inner valance. Remove tie rod. Remove five bolts and plate washers securing lower inner valance to top inner valance. Remove one bolt securing lower inner valance to chassis frame bracket. Remove one bolt securing lower inner valance to shock absorber top mounting plate. Remove lower valance. Remove four bolts passing through base of headlamp nacelle and front wing stay bracket. Remove stay bracket fibre packing. Disconnect side lamp wiring connections at connector block situated on top inner wing valance. Pull cable through grommet in wing valance. Remove two screws and nuts fixing connector block and horn relay box to top inner wing valance. (Fitted to steering unit side only.) Remove ten bolts and plate washers securing wing to dash and body rockers. Remove two nuts and bolts securing step board to rear wing. Lift off wing assembly.

REFIT. Refitting is the reverse of the above procedure.

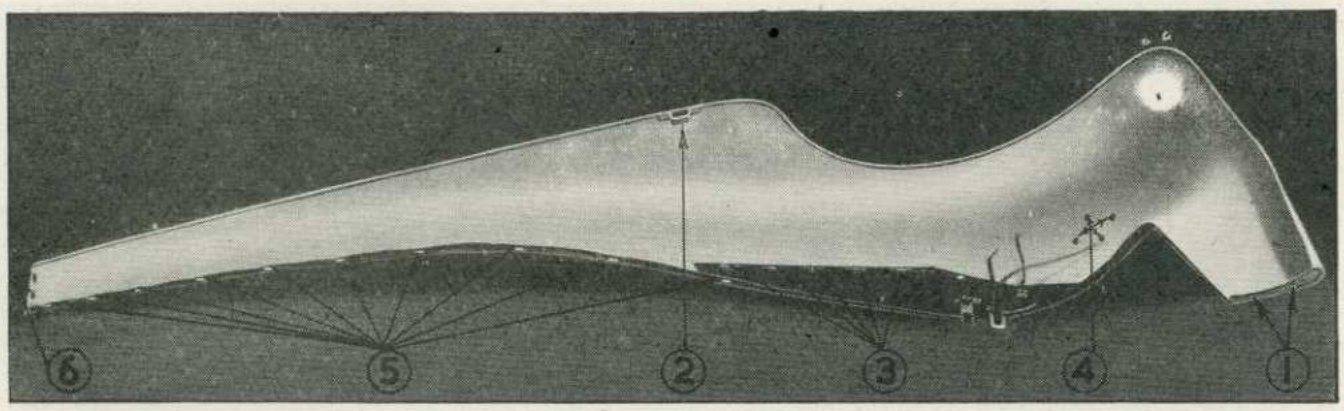


PLATE N.34. FRONT WING MOUNTING POINTS

WING. FRONT. STEPMAT AND FRAME. REMOVE AND REFIT

REMOVE. Remove stepmat centre bead by unscrewing seven nuts beneath stepboard. Carefully prise rubber mat out at front end and slide mat forward. The outer frame is secured to the stepboard by approximately twenty pop rivets which may be drilled out or cut with a flat cold chisel inserted between stepmat frame and stepboard, exercising care to avoid damaging paintwork.

REFIT. Refitting is the reverse of the above procedure, using replacement rivets, or alternatively countersunk head screws and nuts.

WING. REAR. REMOVE AND REFIT

REMOVE. Remove the rear wing valance by inserting the key in the chrome plated budget lock and rotate a quarter of a turn.

Draw the top of the valance outwards, slide to the rear approximately 1″ (25 mm.), lift the front hinge pin out of and under the hinge bracket and draw the valance forward and off. Remove nave plate and road wheel. Remove two nuts and bolts securing rear wing to front wing stepboard. Remove two nuts and bolts securing step mat to rear wing. Remove two screws passing through wing rear flange and tail quarter panel. Remove seven bolts and plate washers securing wing to wheel arch. (Plate N.6.) Remove drive screws (where fitted) securing wing to wheel arch. Remove rear wing.

REFIT. Refitting is the reverse of the above procedure. It will be found an advantage in refitting the wing to first fit the two top centre bolts and to fit remaining bolts in rotation, working downwards to ends of wing.

WING VALANCE. REAR. REMOVE AND REFIT

REMOVE. Remove the rear wing valance by inserting the key in the chrome plated budget lock and rotate a quarter of a turn. Draw the top of the valance outwards, slide to the rear approximately 1″ (25 mm.), lift the front hinge pin out of and under the hinge bracket and draw the valance forward and off.

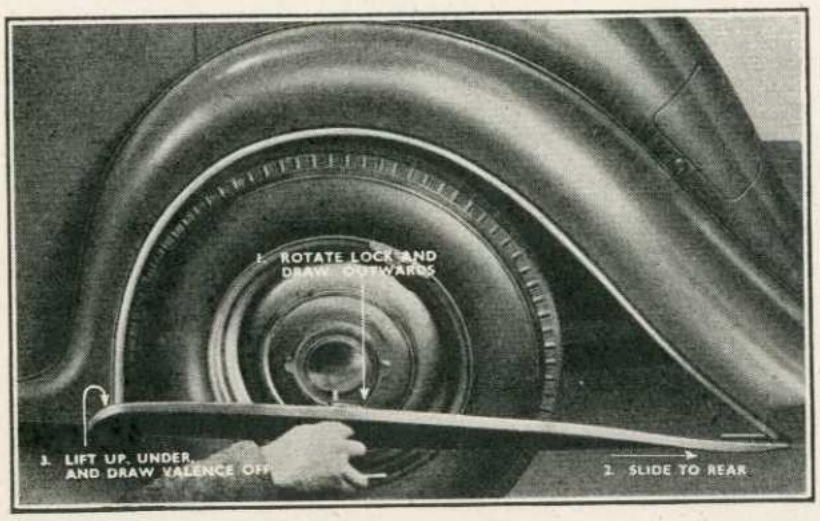


PLATE N.35. REAR WING VALANCE. REMOVAL

Remove Watermark
Wondershare PDFelement

AIR CONDITIONING EQUIPMENT

MARK V

2½ and 3½ LITRE

CHASSIS NUMBERS

(Stamped at the front of the chassis left-hand side member)

EARLY TYPE EQUIPMENT

Saloon

2½ Litre	3½ Litre
Right-Hand Drive 520001—520781	Right-Hand Drive 620001—622839
Left-Hand Drive 527001—527134	Left-Hand Drive 627001—627810

Coupé

Right-Hand Drive 540001 Only	Right-Hand Drive 640001—640011
Left-Hand Drive Not Fitted	Left-Hand Drive 647001—647011

LATER TYPE EQUIPMENT

Saloon

Right-Hand Drive 520782 Onwards	Right-Hand Drive 622840 Onwards
Left-Hand Drive 527135 Onwards	Left-Hand Drive 627811 Onwards

Coupé

Right-Hand Drive 540002 Onwards	Right-Hand Drive 640012 Onwards
Left-Hand Drive 547001 Onwards	Left-Hand Drive 647012 Onwards

The instructions in this section are presented under the following main headings which appear as sub-titles on the pages concerned and in the order shown :—

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Description and Maintenance - - - - Page O. 4
Servicing. (Early Type.) - - - - - Page O. 8
Servicing. (Later Type.) - - - - - Page O.10

For recognition features of the two types of equipment refer to Page O.4.

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Controls		O. 6
Operating Instructions		O. 7
Maintenance		O. 7
Air Duct. (Early Type)	Remove and Refit	O. 8
Motor and Fan Unit. (Early Type)	Remove and Refit	O. 8
Heater Element Housing. (Early Type)	Remove and Refit	O. 8
Water Tap. (Early Type)	Remove and Refit	O. 8
Water Tap Control Rod. (Early Type)	Remove and Refit	O. 8
Motor Switch and Warning Light. (Early Type)	Remove and Refit	O. 9
Windscreen Demisting and Defrosting Vents. (Early Type)	Remove and Refit	O. 9
Motor	To Test	O. 9
Air Conditioner Unit. (Later Type)	Remove and Refit	O.10
Water Tap. (Later Type)	Remove and Refit	O.10
Water Tap Control Rod. (Later Type)	Remove and Refit	O.10
Motor Switch and Warning Light. (Later Type)	Remove and Refit	O.11
Windscreen Demisting and Defrosting Vents. (Later Type)	Remove and Refit	O.11
Motor	To Test	O.11

INDEX TO PLATES

Plate No.	Plate.	Page.
O.1	Air Conditioning Unit. Early Cars	O. 4
O.2	Air Conditioning Unit. Later Cars	O. 5
O.3	Air Conditioning Controls	O. 6
O.4	Mounting Bolts. (Later Type Unit)	O.10

GENERAL. The chassis numbers to which the early and later types of air conditioning equipment are fitted are shown on the first page of this section. The description of the two types of equipment which follows indicates the differences and the points of recognition.

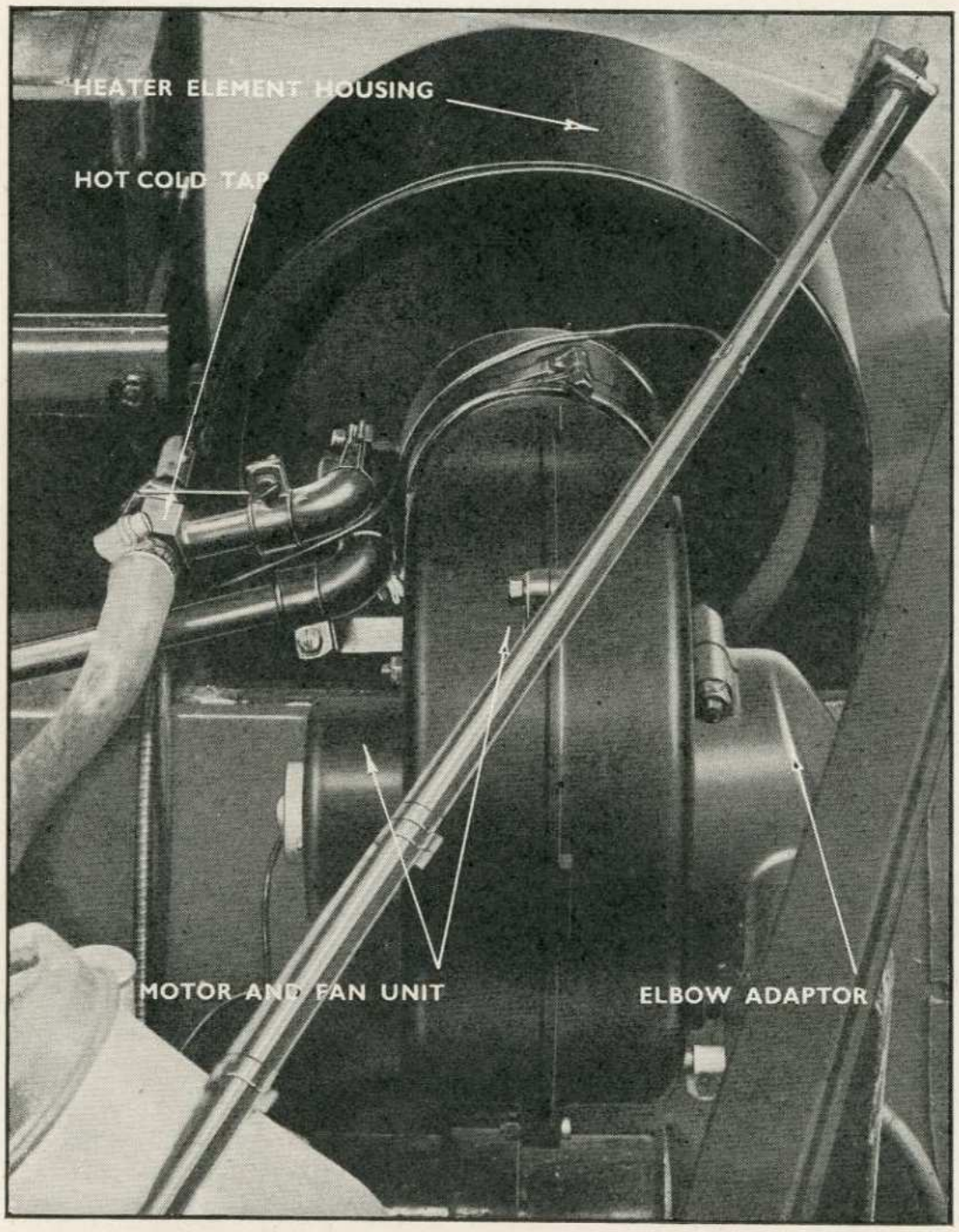


PLATE O.1

AIR CONDITIONING UNIT. EARLY CARS

DESCRIPTION. (Early Type.) A small electric motor, powered by the battery, is situated on the left hand side of the scuttle under the bonnet. Air is carried from an orifice in the left hand side of the radiator block by a duct to a housing on the scuttle which contains the fan, operated by the electric motor, and a heating element through which engine cooling water may be circulated. Situated in the inlet pipe to the heating element is an on/off tap controlled by the driver. When the tap is opened engine cooling water is circulated through the heating element by the engine water pump. When the tap is closed no circulation through the heating element takes place. An on/off switch for the electric motor is also controlled by the driver and when the

fan is running, air is delivered through an aperture in the scuttle to a gallery under the facia. Suitable pipes deliver air from the rear face of the heating element housing to vents at the base of the screen to provide demisting and defrosting of the screen. Doors are fitted on either end of the gallery to control the flow of air into the car body. Water circulation through the heating element is obtained by suitable pipes connected to the engine water cooling system. The inlet pipe to the heating element is connected to the rear end of the engine water uptake manifold and it is in this pipe that the hot/cold tap is situated. The outlet from the heating element is taken to the inlet elbow on the water pump at the front of the engine.

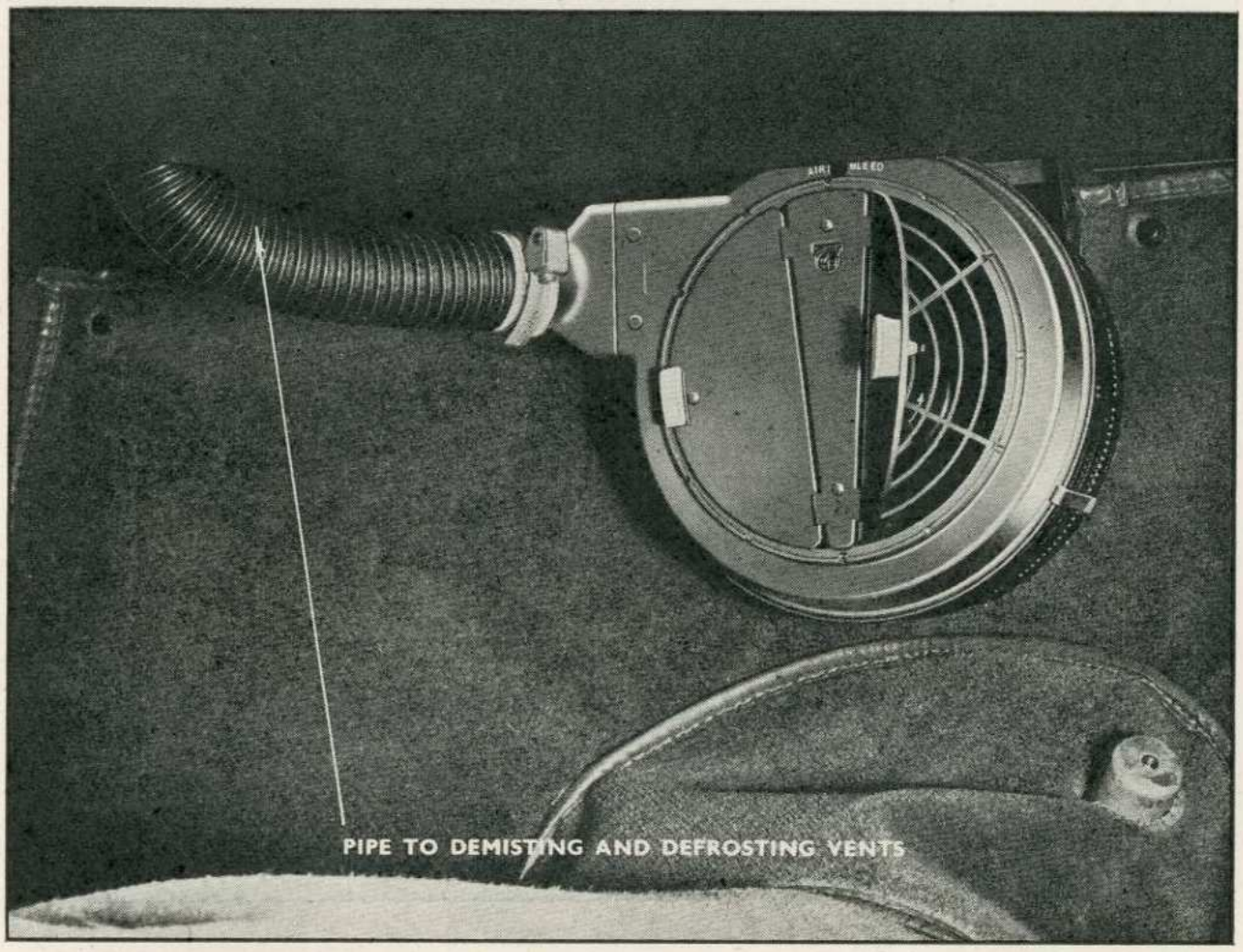


PLATE O.2

AIR CONDITIONING UNIT. LATER CARS

(Later Type.) The air conditioning unit, consisting of heating element, fan and electric motor, is mounted inside the car on the scuttle under the facia immediately above the gearbox cowl. Engine cooling water may be circulated through the heating element by the water pump and an on/off tap, which is controlled by the driver, is provided in the inlet pipe. When the tap is opened the water circulates and the element is heated. When the tap is closed no circulation takes place. An on/off switch for the motor, which combines a rheostat to vary the motor speed, is also provided and is controlled by the driver. Suitable pipes deliver air from the top of the fan casing to vents at the base of the screen to provide demisting and defrosting of the screen. Situated on the face of the air conditioning unit are two doors which may be used to control the flow of air, delivered by the fan, into the body of the car. Water circulation through the heating element is obtained by suitable pipes connected to the engine water cooling system. The inlet pipe to the heating element is connected to the rear end of the engine water uptake manifold and it is in this pipe that the hot/cold tap is situated. The outlet from the heating element is taken to the inlet elbow on the water pump at the front of the engine.

CONTROLS. These are situated at the lower left hand corner of the facia board and consist of the hot/cold control knob on the extreme left and motor on/off switch (with rheostat on later type) to the right of the hot/cold tap. (Plate O.3.) Situated between these two controls is a warning light which indicates when the fan is in operation.

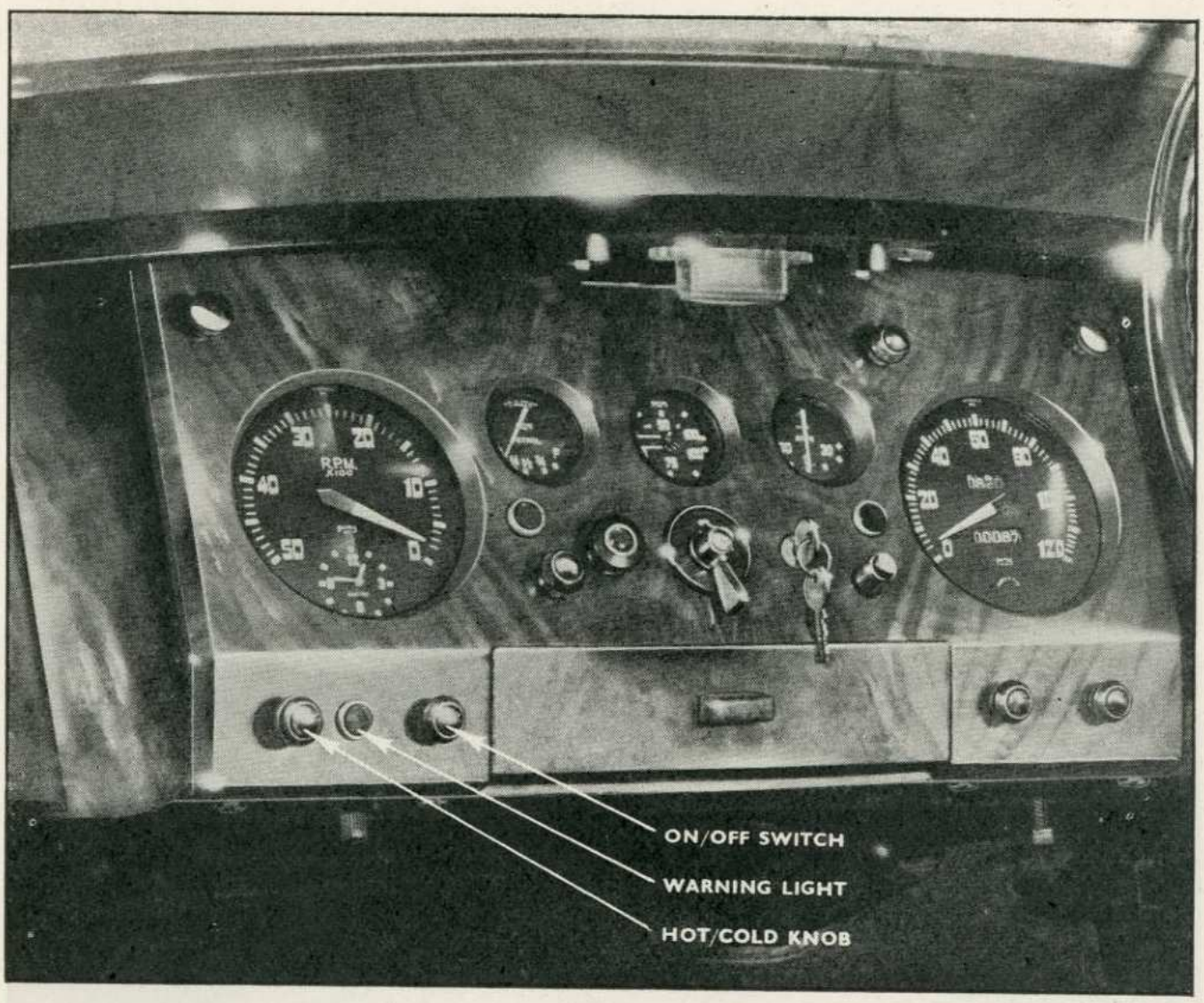


PLATE O.3. AIR CONDITIONING CONTROLS

The hot/cold tap is set to hot when rotated fully anti-clockwise, that is, in the direction of the arrow on the knob. Rotation fully clockwise sets the tap to cold. On early cars the motor switch knob is of the push/pull type and is pulled out for on and pushed in for off. On later cars the motor switch knob is off when rotated fully anti-clockwise. Rotation clockwise switches on the motor at its maximum speed. Further rotation brings the resistance of the rheostat into operation and the motor speed progressively falls until the knob reaches the end of its travel. Observe that in both cases the motor switch is wired through the ignition switch and will be automatically switched off with the ignition.

The warning light glows and records " FAN " when the motor is running. On later types with rheostat control the light progressively dims as the resistance is brought into operation and the motor speed falls.

DO NOT USE FORCE WHEN TURNING CONTROLS.

OPERATING INSTRUCTIONS.

Unit Not In Use.
(Air conditioning, demisting or defrosting not required).

(*a*) Set motor to off.
(*b*) Close gallery or air conditioner doors.

Unit In Use. Cold Air.
(Demisting only.)

(*a*) Set motor to on.
(*b*) Turn " hot/cold " tap to cold.
(*c*) Close gallery or air conditioner doors.

(Cold (recirculated on later types) air conditioning and demisting.)

(*a*) Set motor to on.
(*b*) Turn " hot/cold " tap to cold.
(*c*) Open gallery or air conditioner doors.

Unit In Use. Warm Air.
(Demisting and defrosting only.)

(*a*) Set motor to on.
(*b*) Turn " hot/cold " tap to hot.
(*c*) Close gallery or air conditioner doors.

(Warm (recirculated on later types) air conditioning, demisting and defrosting).

(*a*) Set motor to on.
(*b*) Turn " hot/cold " tap to hot.
(*c*) Open gallery or air conditioner doors.

On later type use the rheostat switch to control the speed of the fan.

MAINTENANCE. During winter months, to protect the heating element from frost damage, it is strongly recommended that an approved anti-freeze solution should be added to the cooling water in the proportions laid down by the manufacturers. If an anti-freeze solution is not used it is essential to adhere closely to the following instructions, otherwise it is likely that severe and expensive damage will be caused to the engine and also to the heating element of the air conditioner. Drain the radiator whilst the car is standing on level ground by opening the drain taps situated at the base of the radiator block and the engine by opening the tap at the right hand rear of the cylinder block. It is recommended that a wire be inserted in the two drain taps to ensure that these are clear and the engine then run at 1,000 r.p.m. for thirty seconds to dry out remaining water pockets. Observe that it is essential to open both drain taps to completely drain the cooling system. See Section D " Cooling System " for full details in regard to the use of anti-freeze, or alternatively, draining the cooling system.

With continuous service dust may collect on the heating element thus impairing its efficiency. To maintain the full efficiency it is necessary to periodically clean the element but it is not possible to state an exact period since conditions of service will vary considerably. Remove the air conditioner unit as described on page O.8 early types and page O.10 later types, and blow off all dust using a fine jet from an air line.

AIR DUCT. REMOVE AND REFIT

REMOVE. Open left hand bonnet side panel by pushing forward control situated under left hand side of facia. Remove three countersunk screws from top face of bonnet left hand side panel and lift out side panel. Slide rubber sleeves off adaptors on radiator block and air conditioner motor and lift out heater air duct.

REFIT. Refitting is the reverse of the above procedure.

MOTOR AND FAN UNIT. REMOVE AND REFIT

REMOVE. Remove air duct as described in the previous paragraph. Remove hose clip and release hose connecting fan housing to heating element housing. Release clamp bolt and remove air duct elbow adaptor from left hand side of unit. Remove mounting bracket screw from inner bracket and remove motor earth wire. Disconnect motor electrical feed wire at connector. Remove two bolts with plain washers securing unit to outside bracket on dash and withdraw unit. Observe two rubber grommets fitted on each bolt. Withdraw motor and fan unit.

REFIT. Refitting is the reverse of the above procedure. Ensure that the rubber grommets are in position on the mounting bolts and that the hose connecting the unit to heating element housing is correctly positioned and not allowing air leaks.

HEATER ELEMENT HOUSING. REMOVE AND REFIT

REMOVE. Drain cooling system by opening tap at base of radiator block. Conserve water if anti-freeze is in use. Release hose clip and disconnect delivery hose from " hot/cold " tap. Release hose clip and disenagage outlet pipe from heating element housing. Withdraw split pin from coupling on " hot/cold " tap control rod and disengage coupling from "T" pin on rod.
Remove six screws with plain washers securing housing to scuttle. Remove dash casing. Release flexible feed pipe for windscreen demisting and defrosting vents from rear of heating element housing. Remove housing observing packing between housing and scuttle.

REFIT. Refitting is the reverse of the above procedure.

WATER TAP. REMOVE AND REFIT

REMOVE. Withdraw split pin from coupling on " hot/cold " tap control rod and disengage coupling from "T" pin on rod. Release hose clip and disengage water delivery hose from " hot/cold " tap. Release hose clip and disengage water outlet pipe from tap to heating element housing. Unscrew hexagon nut securing tap to bracket on heating element housing and remove tap.

REFIT. Refitting is the reverse of the above procedure.

WATER TAP CONTROL ROD. REMOVE AND REFIT

DISCONNECT ROD FROM TAP Withdraw split pin from coupling on " hot/cold " tap control rod and disengage coupling from "T" pin on rod.

REMOVE CENTRE FACIA. Remove drive screws securing dash casing and withdraw casing. Remove six control knobs all being retained by a spring loaded pin registering in a hole in the knob. Press in the pin and withdraw knobs. Remove centre fixing screw from lamp switch control and remove control. Remove cigar lighter and ignition key. Remove two screws, one from either side securing lower edge of facia to support brackets. Remove two chrome plated thumb screws each passing through top corner of the facia panel. Remove centre facia.

REMOVE CONTROL ROD. Unscrew hexagon nut from control rod which is situated at rear of instrument carrier. Withdraw control rod into car interior.

MOTOR SWITCH AND WARNING LIGHT. REMOVE AND REFIT

REMOVE CENTRE FACIA. Remove centre facia as described in the previous paragraph.

REMOVE SWITCH AND WARNING LIGHT. Disconnect wiring connections and remove one screw securing both the switch and the warning light respectively. Remove switch and warning light.

WINDSCREEN DEMISTING AND DEFROSTING VENTS. REMOVE AND REFIT

REMOVE. Withdraw sorbo rubber from each screen pillar (solutioned in position). Remove three screws securing each screen pillar capping. Withdraw cappings. Withdraw two screws securing driving mirror to screen capping and remove mirror. Remove two nuts accessible through apertures above glove box facias. Pull out screen rail capping assembly. Remove screen wiper arms and blades complete by releasing chrome nut on spindle. Remove two nuts from each windscreen spindle drive assembly and draw both assemblies, complete with drive cable, out of vents. Remove two self tapping screws securing each vent and withdraw vents.

MOTOR. TO TEST

TESTING. Connect leads to a 13 volt supply. The motor should run at 2,600 r.p.m. and absorb a current of 2.6 amps. Motor speeds are best checked by stroboscopic means as the application of some forms of tachometer to the shaft will increase the load, thus reducing the speed of the motor. If the performance is up to the figures given, the motor car be assumed to be satisfactory. If it falls considerably below this standard, the indication is that the motor is faulty and it should be replaced.

AIR CONDITIONER UNIT. REMOVE AND REFIT

REMOVE. Drain cooling system by opening tap at base of radiator block. Conserve water if anti-freeze is in use. Remove toe board carpets. Release motor earth wire from bolt on scuttle. Disconnect motor feed wire at connector. Remove hose clip securing delivery pipe for windscreen demisting and de-frosting vents at air conditioner unit. Disconnect inlet and outlet water pipes accessible from engine side of scuttle. Remove five nuts, three at the bottom of the unit and two at the top, securing the mounting plate to scuttle and accessible from inside the car. Remove three nuts securing air conditioner unit and mounting plate to scuttle accessible from engine side of scuttle. Withdraw unit into interior of car.

REFIT. Refitting is the reverse of the above procedure.

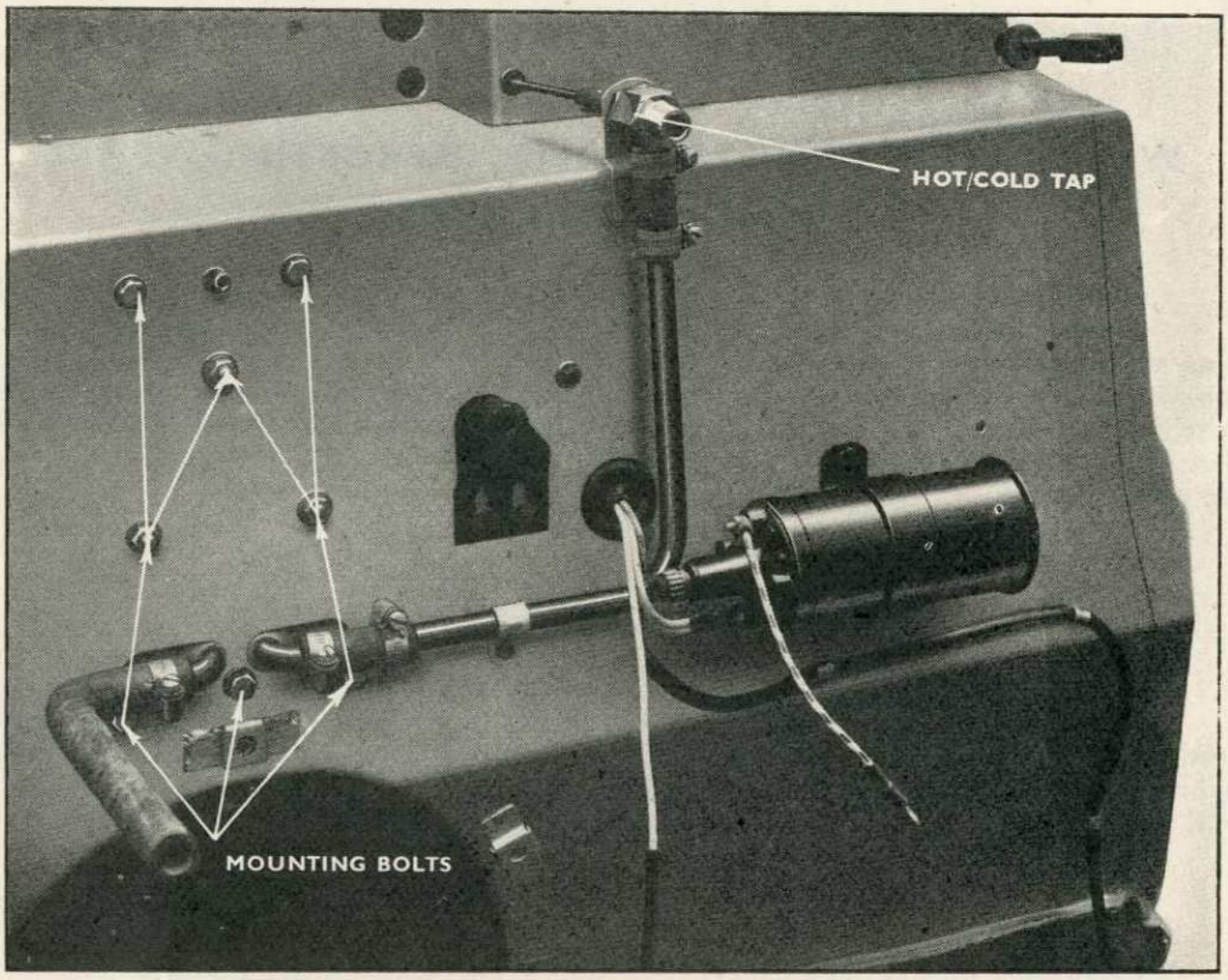


PLATE O.4. MOUNTING BOLTS (LATER TYPE UNIT)

WATER TAP. REMOVE AND REFIT

REMOVE. Withdraw split pin from coupling on "hot/cold" tap control rod and disengage coupling from "T" pin on rod. Release hose clip and disengage water delivery hose from "hot/cold" tap. Release hose clip and disengage water outlet pipe from tap to air conditioning unit. Unscrew hexagon nut securing tap to bracket on scuttle and remove tap.

WATER TAP CONTROL ROD. REMOVE AND REFIT

REMOVE AND REFIT. Removal and refitting of the water tap control rod is as described on page O.8.

MOTOR SWITCH AND WARNING LIGHT. REMOVE AND REFIT

REMOVE CENTRE FACIA. Remove drive screws securing dash casing and withdraw casing. Remove six control knobs all being retained by a spring loaded pin registering in a hole in the knob. Press in the pins and withdraw knobs. Remove centre fixing screw from lamp switch control and remove control. Remove cigar lighter and ignition key. Remove two screws, one from either side securing lower edge of facia to support brackets. Remove two chrome plated thumb-screws each passing through top corner of the facia panel. Remove centre facia.

REMOVE SWITCH AND WARNING LIGHT. Disconnect wiring connections to motor rheostat switch and warning light. Remove hexagon nut with spring washer situated on the outside face of the instrument carrier and withdraw rheostat switch from the rear of the instrument carrier. Remove one screw securing warning light to instrument carrier and withdraw warning light.

REFIT. Refitting is the reverse of the above procedure.

WINDSCREEN DEMISTING AND DEFROSTING VENTS REMOVE AND REFIT

REMOVE AND REFIT. Removal and refitting of the vents is as described on page O.9.

MOTOR. TO TEST

TESTING. Testing is as described on page O.9.

Remove Watermark
Wondershare PDFelement

ELECTRICAL

MARK V

2½ and 3½ LITRE

CHASSIS NUMBERS

(Stamped at the front of the chassis left-hand side member and on a plate attached to the scuttle under the right-hand bonnet top panel.)

2½ Litre		3½ Litre
	Saloon	
520001 Right-Hand Drive		620001 Right-Hand Drive
527001 Left-Hand Drive		627001 Left-Hand Drive
	Coupé	
540001 Right-Hand Drive		640001 Right-Hand Drive
547001 Left-Hand Drive		647001 Left-Hand Drive

The instructions in this section are presented under the following main headings which appear as sub-titles on the pages concerned and in the order shown :—

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Battery	Maintenance, Removal and Refitting	P. 6
Charging and Inspection Lamp Socket	Description	P. 8
Coil Ignition	Maintenance, Removal and Refitting	P. 8
Connector Block	Description	P. 8
Control Box	Description	P. 8
Distributor	Maintenance, Removal and Refitting	P. 8
Dynamo	Remove and Refit	P. 9
Dynamo	Servicing	P.10
Electric Clock	Remove and Refit	P.11
Electric Clock	Adjust	P.11
Fog Lamp	Remove and Refit	P.12
Fog Lamp Bulb	Remove and Refit	P.12
Fuse Box and Fuses	Description	P.13
Headlamp and Headlamp Bulb	Remove and Refit	P.14
Headlamp	Track	P.15
Headlamp Dipswitch	Remove and Refit	P.15
Horn	Remove and Refit	P.15
Horn	Adjust	P.16
Horn Relay Box	Description	P.16
Instrument Panel	Remove and Refit	P.16
Instrument Panel Components (Switches, Warning Lights, etc.)	Remove and Refit	P.16
Interior Light	Remove and Refit	P.17
Manette Control	Remove and Refit	P.18
Map Light	Remove and Refit	P.18
Map Light Door Switch	Remove and Refit	P.18
Number Plate/Reverse Lamp	Remove and Refit	P.19
Number Plate/Reverse Lamp Bulb	Remove and Refit	P.19
Reverse Lamp Switch	Remove and Refit	P.19
Side Lamp	Description	P.20
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Starter Motor	Remove and Refit	P.20
Starter Motor	Service	P.20
Starter Motor Solenoid	Remove and Refit	P.21
Stop Lamp Switch	Remove and Refit	P.21
Tail/Stop Lamp	Remove and Refit	P.21
Tail/Stop Lamp Bulb	Remove and Refit	P.21
Tool Tray Light	Remove and Refit	P.21
Tool Tray Light Bulb	Remove and Refit	P.22
Tool Tray Light Switch	Remove and Refit	P.22
Trafficator. Saloon	Remove and Refit	P.22
Trafficator. Drop Head Coupé	Remove and Refit	P.22
Trafficator Bulb	Remove and Refit	P.22
Windscreen Wiper Drive Assembly	Remove and Refit	P.23
Windscreen Wiper Motor	Remove and Refit	P.23
Windscreen Wiper Motor	Service	P.24
Wiring Diagrams		P.26

The following electrical equipment is dealt with fully in Section C, "Carburettors and Fuel System," and is not, therefore, repeated in this section :—

Petrol Gauge.
Petrol Pump.
Petrol Tank Element.
Self-Starting Carburettor Solenoid.
Self-Starting Carburettor Thermostatic Switch.

INDEX TO PLATES

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P.16	Windscreen Wiper Motor. Exploded View	P.25

ELECTRICAL DATA

	2½ Litre.	3½ Litre.
Battery Make and Type	Lucas 12V. GTW 11A.	Lucas 12V. GTW 11A.
Capacity. Amp. Hour. 10-hour Rate ...	64	64
Terminal Grounded	Positive	Positive
Dynamo Make and Type	Lucas C.45 PV/S	Lucas C.45 PV/S
Cut-out Relay Volts to Close	12·7/13·3	12·7/13·3
Cut-out Relay Amps. to Open	3·5/5·0	3·5/5·0
Regulator Type	Lucas RF 95/2	Lucas RF 95/2
Max. Charging Rate, Amps.	20	20
Max. Charging Rate, Volts	13·5	13·5
Starter Motor, Make and Type	Lucas M.418.G	Lucas M.45.G
Drive	"S" Type	"S" Type
Locktest Amp. Draw	450	450
Locktest Volts	7·2	8·0
Locktest Torque, lbs./ft.	17 (2·4 mkg.)	22·5 (3·1 mkg.)
Distributor Model	DVX H6A	DVX H6A
Distributor Type	GC.40	GC.42
Breaker Gap, Ins.	·012 (·31 mm.)	·012 (·31 mm.)
Degrees Advance—Automatic	13/15	13/15
At Distributor, r.p.m.	2200	1900
Max. Vacuum Advance Distributor, Degrees	7/9	11/13
Crankshaft, Degrees	14/18	22/26
Cam Dwell Angle, Degrees	38	38
Breaker Spring Tension, Ozs.	20/24 (·58 kg./·68 kg.)	20/24 (·58 kg./·68 kg.)
Coil Make and Type	Lucas B.12	Lucas B.12
Amp. Draw Engine, Stopped	2·88	2·88
Amp. Draw Engine, Running	1·5	1·5
Sparking Plug	Champion N.8	Champion L.10
Plug Gap, Ins.	·025 (·64 mm.)	·025 (·64 mm.)

BULB DATA

Lamp.		Lucas Bulb No.	Volts.	Watts.	Application.
Head.	Left-Hand	302	12	48/48	Home.
	Right-Hand	185	12	48	Home.
		303	12	48/48	Left-Hand Drive. Export.
		302	12	48/48	Right-Hand Drive. Export.
		Sealed	Beam	Units	U.S.A. and Canada.
Fog		192	12	48	
Side		207	12	6	
		189	12	6/24	U.S.A.
Number Plate		989	12	6	
Reverse		199	12	24	
Rear and Brake		189	12	6/24	
		189	12	6/24	U.S.A.
		199	12	24	U.S.A.
Panel Lights		*	12	6	
Trafficators, Tool Container, Interior, Map Light		256	12	3	
Trafficator, Ignition, Air Conditioner, Head Lamp and Petrol Level Warning Lights		987	12	2.2	

* Supplied by Smith's Motor Accessories Limited.

On later cars the side lamp bulbs No. 189 and the tail lamp bulbs No. 189 are replaced by bulb No. 353.

AMMETER. REMOVE AND REFIT

REMOVE. Disconnect battery positive lead. Remove drive screws securing dash casing and withdraw casing. Remove six control knobs all being retained by a spring loaded pin registering in a hole in the knob. (On later cars the air conditioner "hot/cold" tap knob is secured by a grub screw). Press in the pins and withdraw knobs. Remove centre fixing screw from lamp switch control and remove control. Remove cigar lighter and ignition key. Remove two screws, one from either side securing lower edge of facia to support brackets. Remove two chrome plated thumb-screws each passing through a top corner of the facia panel. Remove centre facia. (Plate P.1.) Remove two screws securing ammeter to instrument carrier, withdraw ammeter into car and disconnect wiring (Plate P.10.) Remove ammeter.

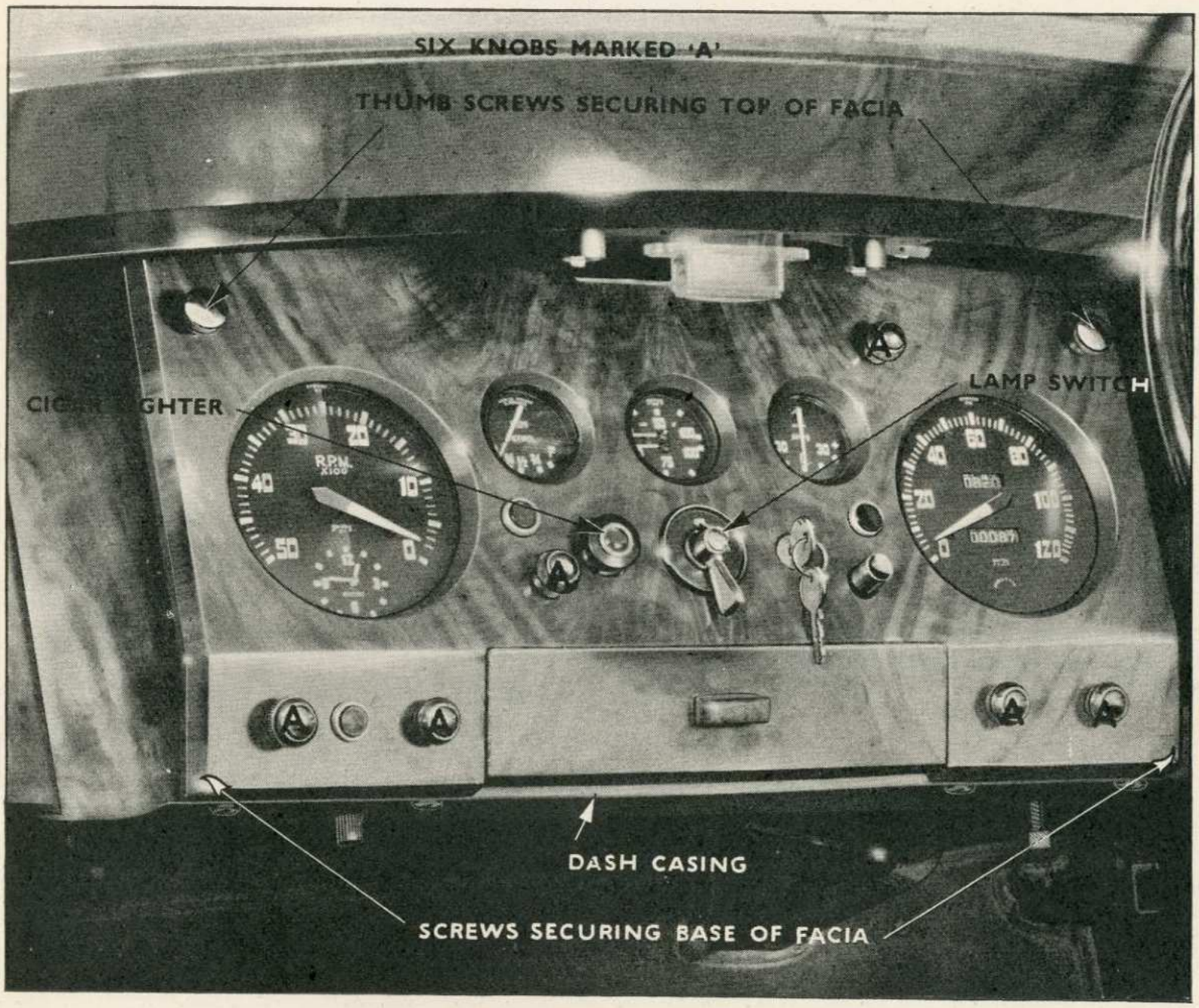


PLATE P.1. CENTRE FACIA. REMOVAL

BATTERY. MAINTENANCE, REMOVAL AND REFITTING

MAIN-TENANCE. Every 1,000 miles (1,500 kilometres) or monthly, examine the electrolyte level in the battery cells and top up, if necessary, using distilled water until the separators are just covered. Never use tap water, the impurities in which will be harmful to the battery. Do not use a naked light to examine the condition of the cells. Clean the battery casing and ensure that all connections are clean and tight. If the terminals are corroded, scrape them clean and smear with petroleum jelly. Occasionally

check the condition of the battery by taking hydrometer readings of the specific gravity of the electrolyte in each of the cells. Specific gravity readings and their indications are as follows :—

1.280—1.300	-	-	Battery fully charged.
About 1.210	-	-	Battery about half discharged.
Below 1.150	-	-	Battery fully discharged.

The readings of all cells should be approximately the same. If one cell gives a reading very different from the rest it may be that acid has been spilled or has leaked from this particular cell or there may be a short circuit between the plates. In this case the battery should be examined by a Lucas Service Agent or Depot.
Never leave the battery in a discharged condition for any length of time. Have it fully charged and every fortnight give it a short refreshing charge.

REMOVAL. Release bonnet catches by pushing forward controls under either side of the facia. With both bonnet top panels open remove two screws from centre hinge front "T" piece. Raise front of bonnet and remove forward. Remove screws securing both positive and negative lead terminals to battery posts. Remove terminals. Remove battery fixing bolts and lift out battery. (Plate P.2.) Observe rubber pad between battery and scuttle.

REFITTING. Refitting is the reverse of the above procedure.

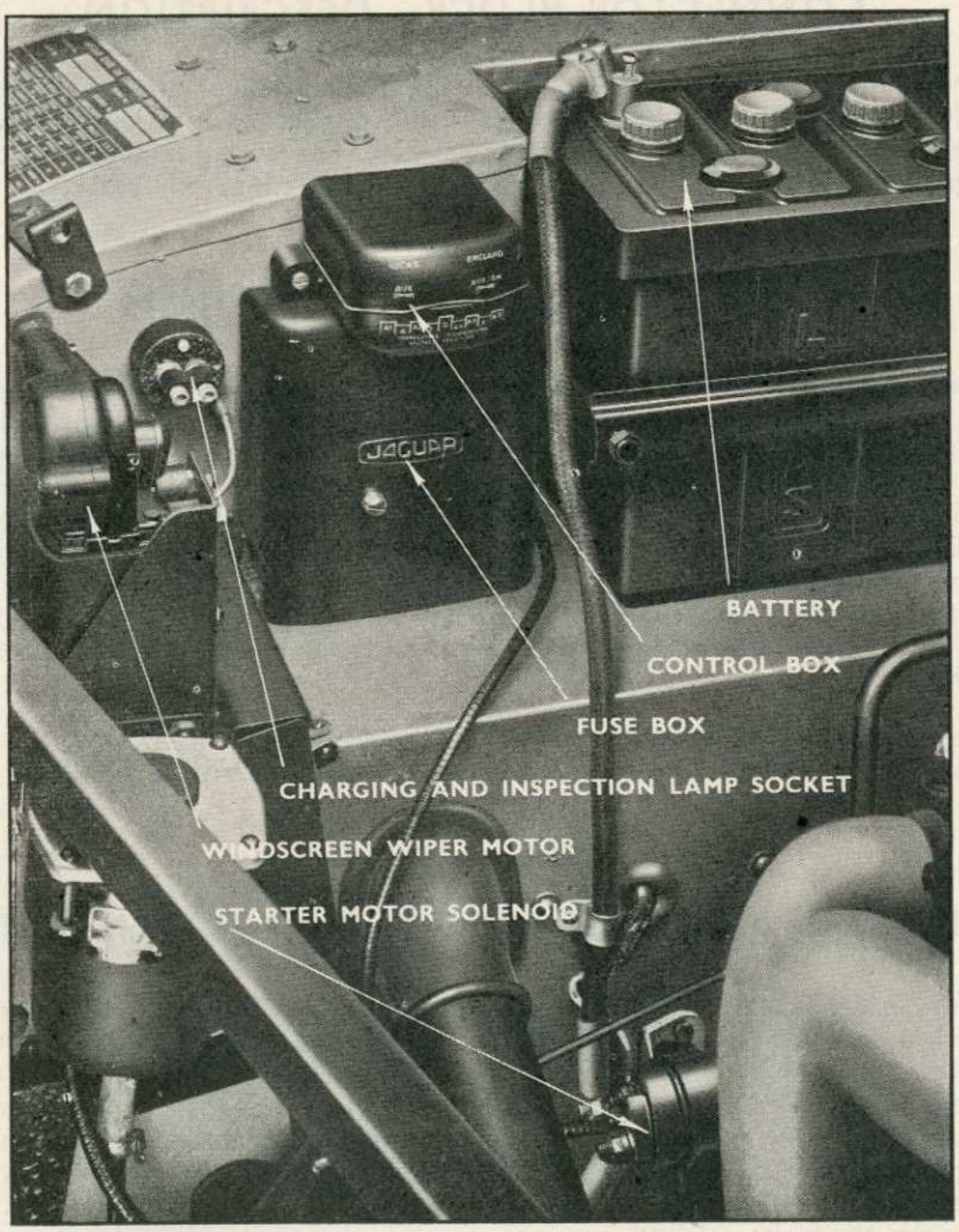


PLATE P.2. BATTERY, CONTROL BOX, FUSE BOX, CHARGING SOCKET, WINDSCREEN WIPER MOTOR AND STARTER SOLENOID

CHARGING AND INSPECTION LAMP SOCKET. DESCRIPTION

DESCRIPTION. Situated under the scuttle under the left hand bonnet panel adjacent to the windscreen wiper motor will be found a two pin socket which may be used to trickle charge the battery or to illuminate an inspection lamp. (Plate P.2.) Reference to the wiring diagrams contained at the end of this section will indicate the wiring connections to this socket.

COIL IGNITION. MAINTENANCE, REMOVAL AND REFITTING

MAIN-TENANCE. The coil requires no attention beyond keeping its exterior clean, particularly between the terminals, and occasionally checking that the terminal connections and mountings are quite right.

REMOVAL. Disconnect both L.T. (Low Tension) connections to coil by removing screws. Disconnect H.T. (High Tension) lead by unscrewing knurled ring. Withdraw mounting bolts and remove coil.

CONNECTOR BLOCK. DESCRIPTION

DESCRIPTION. The connector block is fitted on the wing inner balance adjacent to the steering box. It thus follows that with right hand drive cars the connector is on the right hand wing inner valance and on left hand drive cars on the left hand wing inner valance. The wiring connections to the connector block are made by jack plugs on the wiring and companion sockets in the connector block.

CONTROL BOX. DESCRIPTION

DESCRIPTION. The control box is fitted on the scuttle under the right hand bonnet panel immediately adjacent to the battery (Plate P.2) and houses the cut out voltage regulator and two fuses, "Aux Ign" (auxiliaries through ignition switch) and "Aux" (auxiliaries through ammeter). Fuse holders are marked to show the circuits which the two fuses protect and two spare fuses are provided. When replacing a fuse it is important to use the correct replacement, that is, 35 amps. The fusing value is marked on a coloured paper slip inside the tube. A blown fuse will be indicated by the failure of all the units protected by it and is confirmed by examination of the fuse. If a fuse has blown the broken ends of the wire will be visible inside the glass tube. Before replacing a blown fuse, inspect the wiring of the units that have failed for evidence of a short circuit or other fault which may have caused the fuse to blow and remedy the cause of the trouble. See page P.13 for details of the various circuits served by each fuse.

Cut outs and regulator units are carefully and accurately set before leaving the Works and it is not recommended that endeavours be made to carry out adjustments. Where difficulties are experienced it is advisable to fit a replacement unit.

DISTRIBUTOR. MAINTENANCE, REMOVAL AND REFITTING

MAIN-TENANCE. Every 2,500 (4,000 kilometres) remove cover and rotor arm. Clean rotor arm and segments with a petrol moistened cloth and ensure that the carbon brush moves freely in its holder. Wipe out interior of the cover with a soft dry cloth, paying particular attention to the spaces between the terminals. Check free operation of centrifugal advance mechanism and lubricate movement with thin oil. Place a spot of thin oil on top of the distributor spindle. Clean and adjust contact breaker points to .012" (.31 mm.). Place a smear of light grease on the cam and a spot of oil on the contact breaker rocker arm pivot. (Plate P.3.) Refit head and check tightness of all H.T. and L.T. connections on distributor. Check over insulation, wires and cables for faults. Check that the distributor dowel bolt and base plate set screw are tight since looseness will allow the distributor to rise and fall thus affecting ignition timing. Check correct operation of vacuum advance mechanism with engine running.

REMOVAL. Open left hand bonnet top panel by pushing forward control under left hand side of facia. Remove three screws from top face of side panel and lift out side panel. (Slide rubber sleeves off adaptors at radiator block and air conditioner motor and lift out heater air duct. Fitted only to early cars). Disengage sparking plug high tension lead carriers from engine rear plate Disconnect high tension leads from sparking plugs. Remove dowel bolt located under distributor in tappet cover plate boss. Release base plate set screw and withdraw distributor. Removal of the distributor in this manner will not upset ignition timing since the driving dog is offset and the support clamp at the base of the distributor has not been disturbed.

REFITTING. Refitting is the reverse of the above procedure.

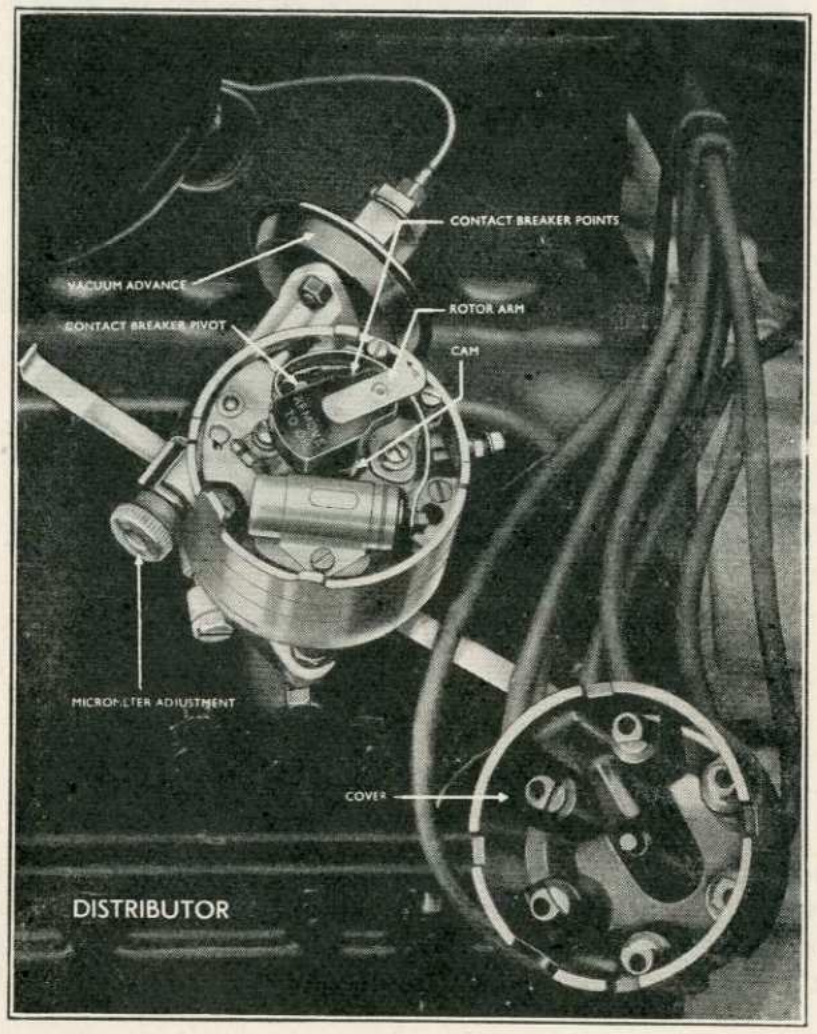


PLATE P.3. DISTRIBUTOR

DYNAMO. REMOVE AND REFIT

REMOVE. Open bonnet left hand top panel by pushing forward control situated under left hand side of facia. Remove three screws from top face of side panel and lift out side panel. (Slide rubber sleeves off adaptors on radiator block and air conditioner motor and lift out heater air duct. (Early cars only.) Disconnect battery positive lead. Remove dynamo connections noting that "Yellow" wire is connected to terminal "D" and "Yellow with Green" wire to terminal "F". Remove adjusting bolt situated at the top of dynamo and swing dynamo towards engine to free fan belt. Disengage fan belt from dynamo pully, remove two securing bolts situated under dynamo and lift out dynamo. (Plate P.4.)

REFIT. Refitting is the reverse of the above procedure, but it is important to ensure that due to the construction of the belt this is not stretched over the pulleys other than by hand. If a tool is used to lever the belt on or off rupture will occur. When adjusting the fan belt after refitting, lever the dynamo until tension is just obtained. Tighten all bolts. (Plate P.4.) Undue tension will create heavy wear of belt, pulleys and dynamo bearings.

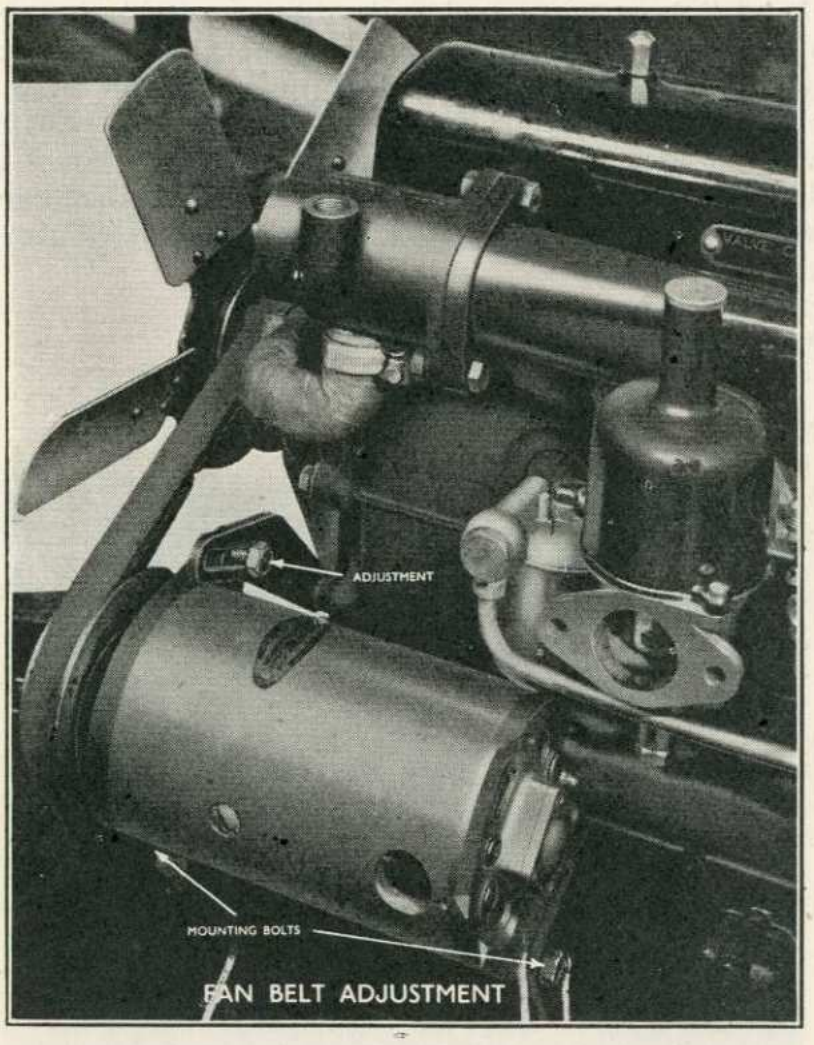


PLATE P.4. DYNAMO MOUNTINGS

DYNAMO. SERVICING

MAIN-TENANCE. The dynamo bearings are supplied with lubricant during manufacture sufficient to last, under normal conditions, until the engine is taken out for a major overhaul. When this occurs it is strongly recommended that the dynamo be submitted to a Lucas Service Depot for cleaning, adjustment and replenishment of bearing lubricant, or alternatively, that a replacement dynamo be obtained from the Factory.

Every 10,000 miles (16,000 kilometres) or annually, remove the cover band to inspect the brushes and commutator. Check that the brushes move freely in their holders by holding back the brush springs and pulling gently on the flexible connectors.

If a brush is inclined to stick remove it from its holder and clean its sides with a petrol moistened cloth. Be careful to replace brushes in their original position in order to retain the " bedding." Brushes which have worn so that they will not bear correctly on the commutator must be replaced and properly bedded in. The commutator should be clean, free from oil or dirt and should have a polished appearance. If it is dirty, clean it by pressing a fine dry duster against it while the engine is slowly turned over by hand. If the commutator is very dirty, moisten the cloth with petrol. Inspect the driving belt for wear and ensure that it is correctly adjusted. A loose or worn belt may prevent the dynamo giving its full output. Refer to the previous paragraphs on instructions in regard to adjusting the driving belt.

DISMANTLE. Remove the dynamo as described on page P.9. Remove hexagon nut with spring washer retaining drive pulley to armature shaft. (Plate P.5.) Draw off pulley from key on shaft. Remove brush gear inspection cover and partially withdraw brushes from holders. Remove nut and washer from terminal "F" (small terminal). Remove the two bolts with spring washers passing through the dynamo and securing front end cover to rear end cover. Withdraw front end cover complete with armature. Withdraw rear end cover. Observe that extractor slots are cut in the dynamo body to facilitate removal of covers.

REASSEMBLE. Reassembly is the reverse of the forgoing procedure. Refit the dynamo as described on page P.9.

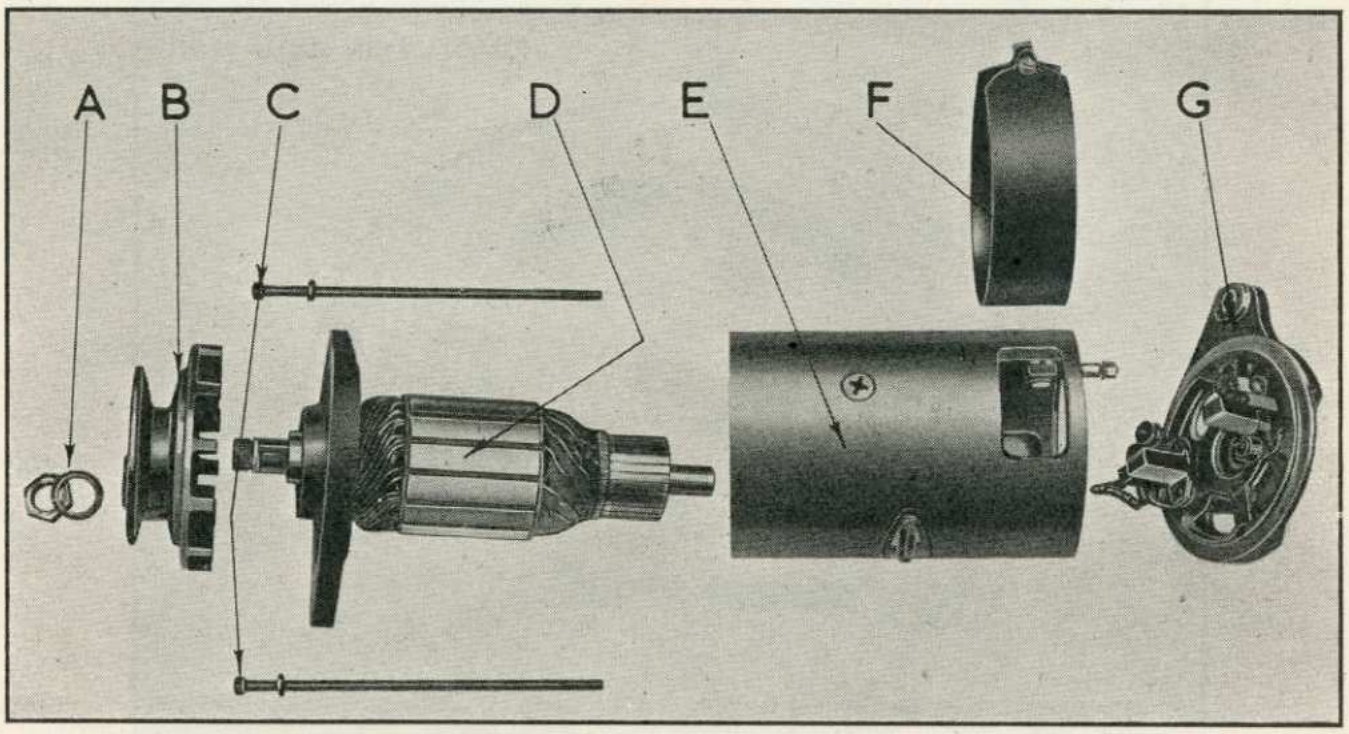


PLATE P.5. DYNAMO. DISMANTLED

A. Hexagon Nut and Washer.
B. Drive Pulley
C. Securing Bolts.
D. Armature and Front End Cover.
E. Dynamo Body.
F. Inspection Cover.
G. Rear End Cover.

ELECTRIC CLOCK. REMOVE AND REFIT

GENERAL. The electric time clock is built in to the revolution counter instrument and must be removed with the revolution counter.

REMOVE. Remove drive screws securing dash casing and withdraw casing. Remove six control knobs all being retained by a spring loaded pin registering in a hole in the knob. Press in the pins and withdraw knobs. Remove centre fixing screw from lamp switch control and remove control. Remove cigar lighter and ignition key. Remove two screws, one from either side securing lower edge of facia to support brackets. Remove two chrome plated thumb-screws each passing through top corner of the facia panel. Remove centre facia. (Plate P.1.) Disconnect feed wire to the electric clock by removing screw. Disconnect two earth wires from back of instrument case. Disconnect revolution counter drive cable by rotating knurled ring. Remove three screws securing instrument to instrument carrier and withdraw revolution counter. (Plate P.10.)

REFIT. Refitting is the reverse of the above procedure.

ELECTRIC CLOCK. ADJUST

ADJUST. Remove drive screws securing dash casing and withdraw casing. Situated on the back of the time clock will be found a small screw surrounded by a calibrated ring. (Plate P.6.) Rotation of the screw in an anti-clockwise direction advances the clock speed and, conversely, rotation in a clockwise direction retards the clock speed.

REFIT. Refit the dash casing after adjustments have been effected.

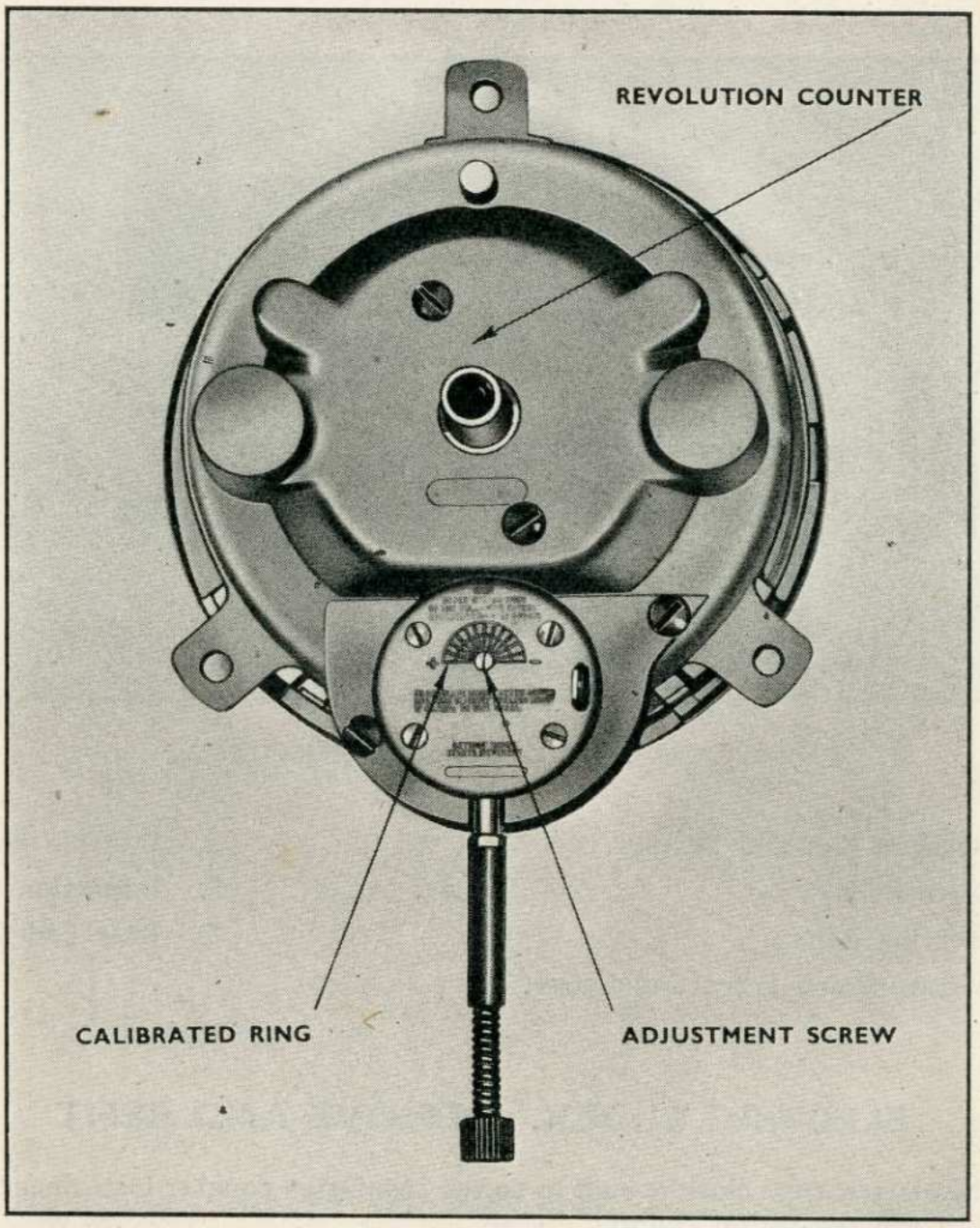


PLATE P.6. ADJUSTMENT. ELECTRIC CLOCK

FOG LAMP. REMOVE AND REFIT

REMOVE. Release screw securing rim at base and remove rim. Remove reflector unit complete with bulb. Disconnect wiring at rear of lamp shell and draw wiring through lamp stem. (Plate P.8.) Remove barrel nut situated under wing, securing lamp stem to wing. Remove lamp and support block.

REFIT. Refitting is the reverse of the above procedure ensuring that the support block is fitted in its original position to enable the fog lamp to be correctly tracked.

FOG LAMP BULB. REMOVE AND REFIT

REMOVE. Release screw securing rim at base and remove rim. Remove reflector unit complete with bulb. Extract circlip and remove bulb. (Plate P.8.)

REFIT. Refitting is the reverse of the above procedure. Observe that the bulb is pre-focussed and can only be fitted in one position relative to the fog lamp reflector unit.

FUSE BOX AND FUSES. DESCRIPTION

DESCRIPTION. The fuse box and voltage regulator are situated on the scuttle on the right hand side immediately beside the battery. (Plate P.7.) Should any component in the electrical system fail to function it is possible that the fuse protecting that component has blown. Should a replacement fuse of the correct capacity also blow this indicates a fault in the circuit serving the affected component and a careful examination should, therefore, be carried out to ascertain the fault. Replacement of fuses is carried out either at the control box or at the fuse box, both being situated under the right hand bonnet panel. The circuits service by the various fuses are as follows:—(Plate P.7.)

Voltage Regulator. "Aux. Ign." (Accessories fuse via ignition switch.)
Trafficators; petrol gauge; petrol warning light; windscreen wipers; brake lights; air conditioner motor.

"Aux." (Accessories fuse via motor.) Interior lights; map light.

Fuse Box. Fuse 1. Side; tail; number plate; reverse and tool tray lights.
Fuse 2. Head lamp and head lamp warning lights.
Fuse 3. Fog lights.
Fuse 4. Cigar lighter and horns.

All six fuses are 35 amp. capacity.

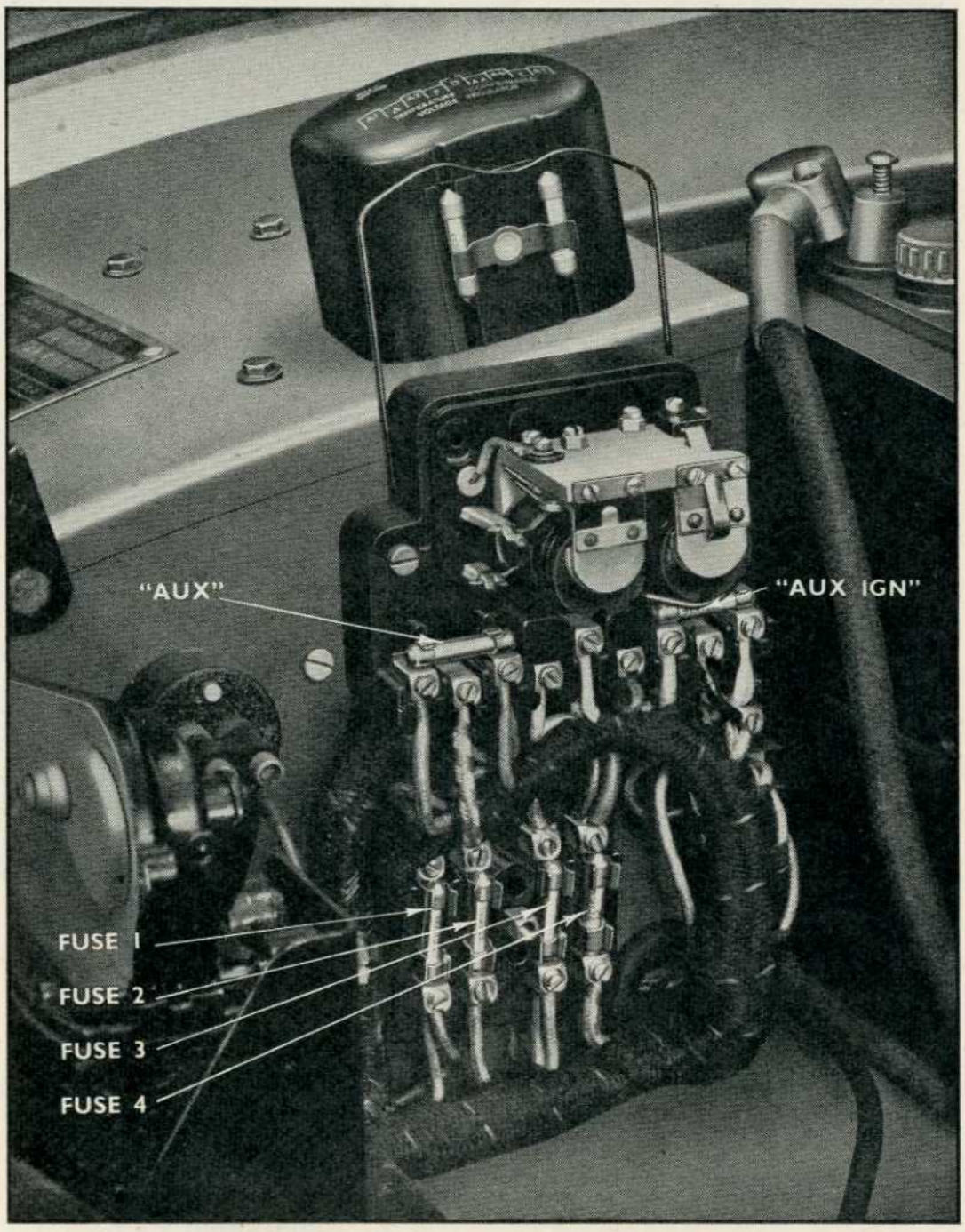


PLATE P.7. FUSE BOX AND FUSES

HEAD LAMP AND HEAD LAMP BULB. REMOVE AND REFIT

REMOVE. Release screw at base of lamp rim and remove rim by drawing forward at base and lifting off upwards. Release four screws, now disclosed, passing through elongated holes in reflector assembly into lamp shell. Rotate reflector assembly anti-clockwise until screw heads line up with cutaways in elongated holes. Draw out reflector and release the two spring clips securing bulb holder. Remove bulb holder complete with bulb and wiring. Press in and rotate the knurled ring at rear of bulb holder and withdraw bulb with bulb carrier. (Plate P.8.)

REFIT. Refitting is the reverse of the above procedure, but care should be exercised not to disturb the three screws governing the track of the head lamp reflector. See following paragraph.

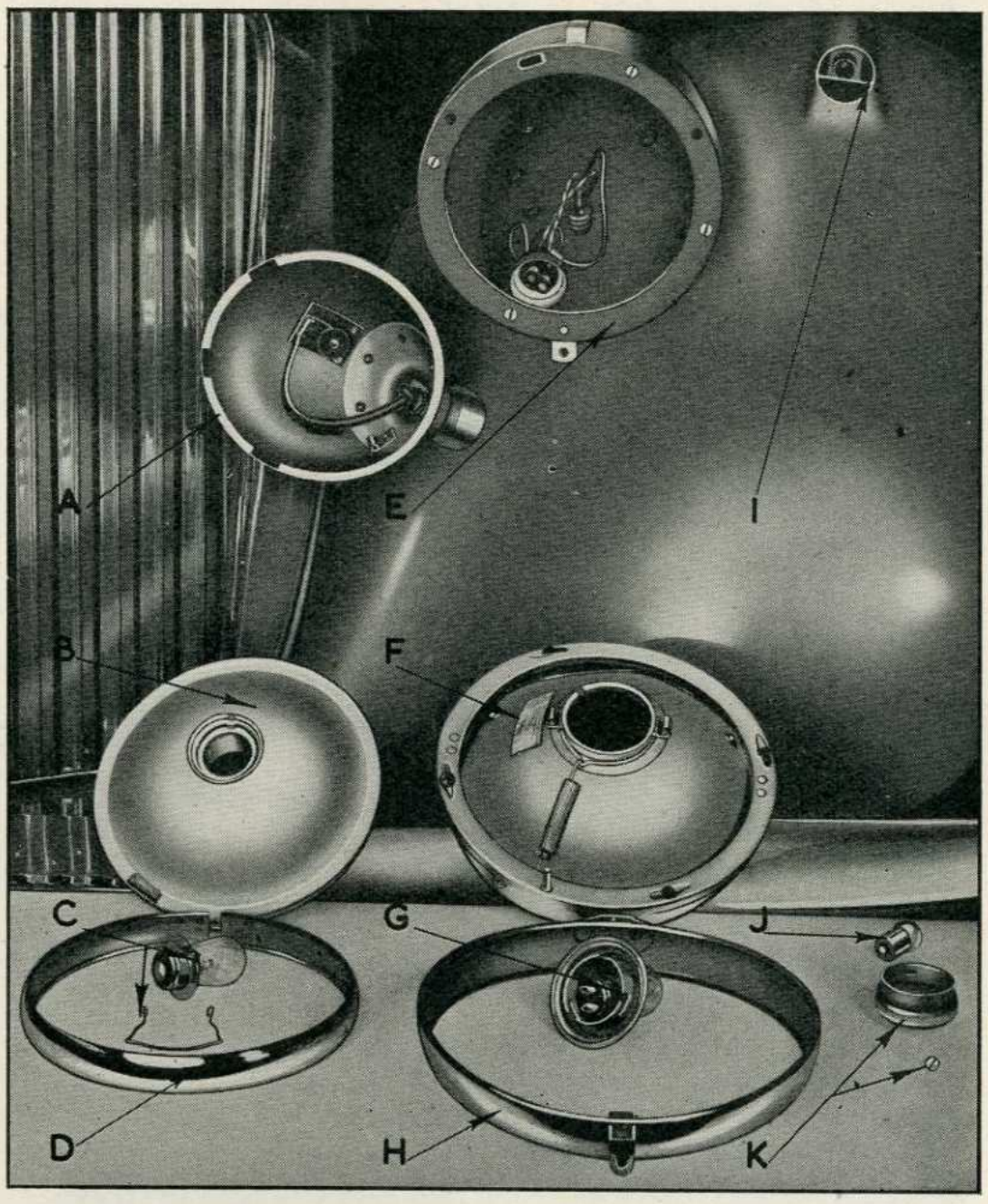


PLATE P.8. HEADLAMP, FOG LAMP AND SIDE LAMP. REMOVAL

A. Fog Lamp Shell.
B. Fog Lamp Reflector Assembly.
C. Fog Lamp Bulb and Circlip.
D. Fog Lamp Rim.
E. Headlamp Shell.
F. Headlamp Reflector Assembly.
G. Headlight Bulb and Bulb Carrier.
H. Headlamp Rim.
I. Side Lamp Shell.
J. Side Lamp Bulb.
K. Side Lamp Rim and Glass with fixing screw.

HEAD LAMP. TRACK

Release screw at base of lamp rim and remove rim by drawing forward at base and lifting off upwards. Situated one at either side of the reflector rim are two hexagon headed screws which control the lateral tracking of the light beam. Release both screws and move the reflector unit into the required position. Relock screws.
Situated at the top of the reflector rim is a single spring loaded screw which controls vertical adjustment. Screw in (clockwise) to raise the beam and screw out (anti-clockwise) to lower the beam. When adjustments are complete refit lamp rim.

HEAD LAMP DIPSWITCH. REMOVE AND REFIT

REMOVE. Pull rubber cover off dipswitch. Release toe board carpets and lift over switch to gain access to mounting screws. Remove two setscrews with spring washers securing switch to bracket. Disconnect electric connections and remove switch.

REFIT. Refitting is the reverse of the above procedure.

HORN. REMOVE AND REFIT

REMOVE. Remove two self locking nuts and setscrews securing horn to chassis side member under front wing apron. Draw horn clear, remove screw in cover and remove cover. Disconnect wiring connections and remove horn. On a few early cars the offside (right hand) horn will be found to be fitted to a bracket attached to the upper wishbone lever mounting bracket bolts. Removal is as described above.

REFIT. Refitting is the reverse of the above procedure.

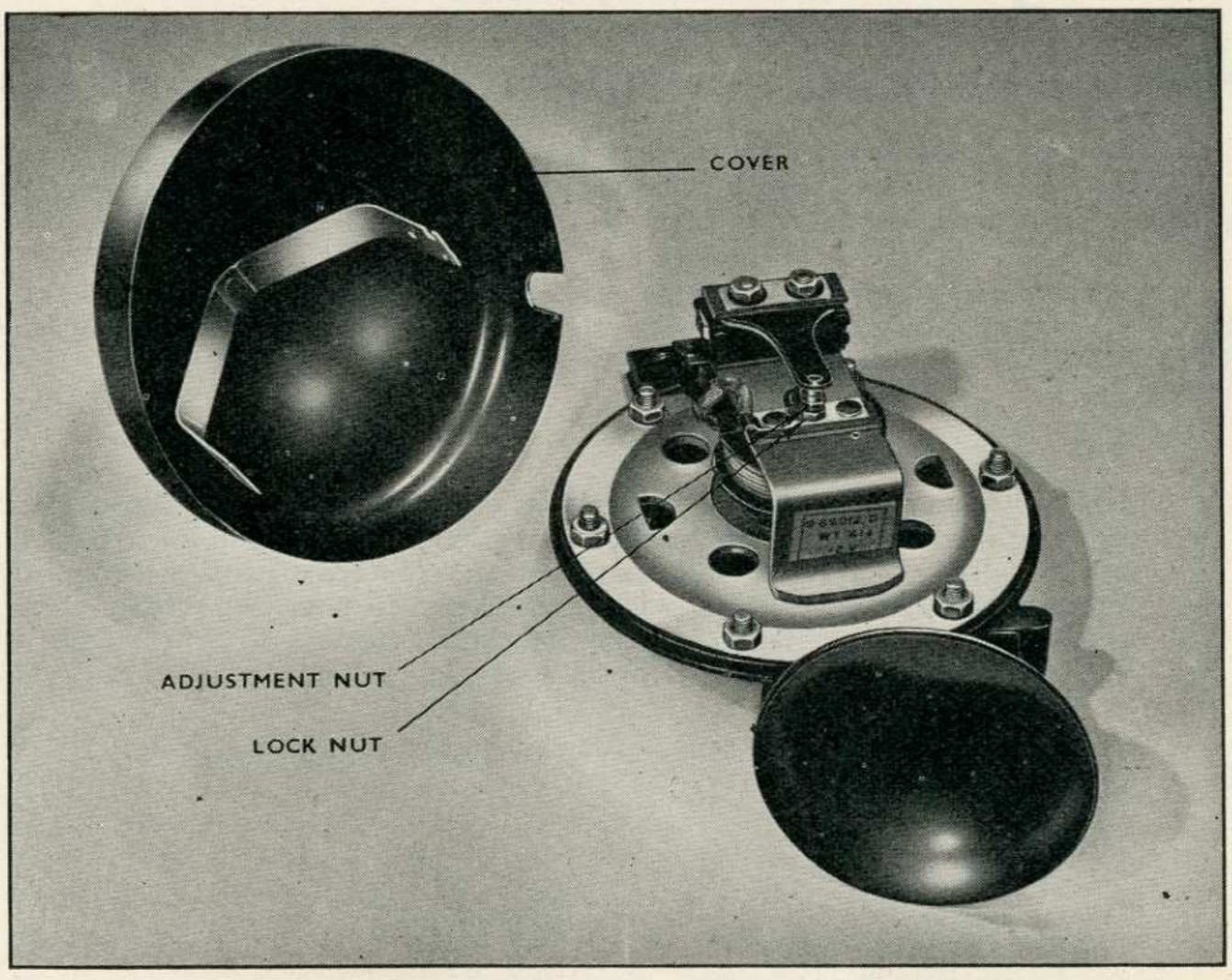


PLATE P.9. HORN

HORNS. ADJUST

REMOVE. Remove horns as described in the previous paragraph.

ADJUST. Adjustment does not alter the pitch of the note, but merely takes up wear of moving parts. Slacken the lock nut on the fixed contact and rotate the adjusting nut until the contacts are just separated (indicated by the horn failing to sound). Turn the adjusting nut half a turn in the opposite direction and secure in this position by tightening the lock nut. (Plate P.9.) If the note is still unsatisfactory, do not dismantle the horn but return it to a Lucas Service Depot or Service Agent for examination.

HORN RELAY BOX. DESCRIPTION

DESCRIPTION. The horn relay box is situated on the wing valance immediately beside the steering box, that is, it is on the right hand wing valance on right hand drive cars and on the left hand wing valance on left hand drive cars. Connections to the horn relay box will be clear from the wiring diagrams, page P.26.

INSTRUMENT PANEL. REMOVE AND REFIT

REMOVE. Remove drive screws securing dash casing and withdraw casing. Remove six control knobs all being retained by a spring loaded pin registering in a hole in the knob. Press in the pins and withdraw knobs. Remove centre fixing screw from lamp switch control and remove control. Remove cigar lighter and ignition key. Remove two screws, one from either side securing lower edge of facia to support brackets. Remove two chrome plated thumb-screws each passing through top corner of the facia panel. Remove centre facia. (Plate P.1.) Disconnect pipe from rear of oil pressure gauge by unscrewing union. Remove four screws retaining instrument carrier and withdraw into car. Access can now be obtained to the components behind the instrument carrier. To completely remove instrument carrier, disconnect wiring connections and withdraw into car.

REFIT. Refitting is the reverse of the above procedure.

INSTRUMENT PANEL COMPONENTS. REMOVE AND REFIT

GENERAL. Removal of the centre facia panel as described in the following paragraph gives access to all instrument panel components for removal purposes. Observe that head lamp and petrol level warning lights are removed without disturbing the centre facia.

REMOVE HEADLAMP AND PETROL LEVEL WARNING LIGHT. Remove dash casing and withdraw either headlamp warning light bulb carrier or petrol level warning light bulb carrier from the rear face of the speedometer or petrol gauge respectively. The bulbs are a screw fit in the respective holders.

REMOVE CENTRE FACIA. Remove drive screws securing dash casing and withdraw casing. Remove six control knobs all being retained by a spring loaded pin registering in a hole in the knob. Press in the pins and withdraw knobs. Remove centre fixing screw from lamp switch control and remove control. Remove cigar lighter and ignition key. Remove two screws, one from either side securing lower edge of facia to support brackets. Remove two chrome plated thumb-screws each passing through top corner of the facia panel. Remove centre facia. (Plate P.1.)

REMOVE SWITCHES. The following switches are removed in the manner described opposite.

Interior and Map Light Switch.
Instrument Panel Light Switch.
Windscreen Wiper Switch.
Starter Switch.
Fog Lamp Switch.
Air Conditioner Motor Switch. (Early Cars.)
Ignition Switch.

Remove wiring connections and remove wiring. Remove one (or two) screws securing switch to instrument carrier and withdraw switch.

Lamp Switch. Remove two screws retaining switch to instrument carrier. Withdraw switch, release wiring connections and remove switch.

REMOVAL OF WARNING LAMPS. The following warning lamps are removed in the manner described below.

Ignition Warning Light.
Trafficator Warning Light.
Air Conditioner Warning Light.

Remove the bulbs by unscrewing from the respective holders. Remove holders by withdrawing screws securing them to the instrument carrier, withdraw holders and disconnect wiring. Remove holders.

REMOVE CIGAR LIGHTER. Remove the small bakelite knurled knob at the back of the cigar lighter and withdraw bridge piece. Release feed wire and disconnect earth wire. Withdraw cigar lighter.

REFIT. Refitting is the reverse of the above procedure.

REMOVE AIR CONDITIONER CONTROL ROD. Unscrew hexagon nut at rear of instrument carrier and withdraw rod through instrument carrier into car.

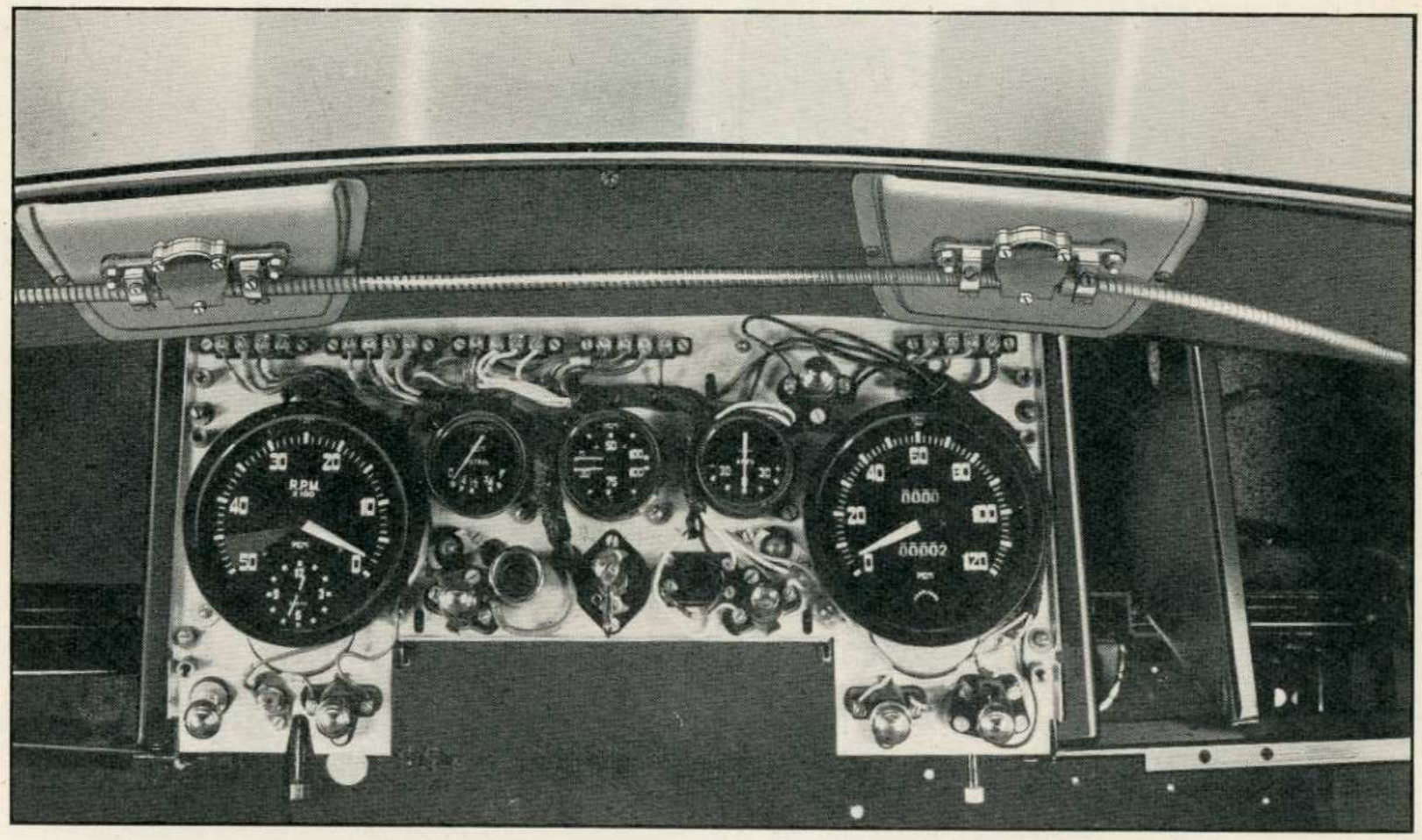


PLATE P.10. INSTRUMENT PANEL COMPONENTS

INTERIOR LIGHT. REMOVE AND REFIT

REMOVE. Remove light cover from securing clips. Remove the two outer screws, withdraw lamp into car and disconnect wiring connections. Remove lamp.

REFIT. Refitting is the reverse of the above procedure.

MANETTE CONTROL. REMOVE AND REFIT

REMOVE. Disconnect battery positive lead. Set road wheels in straight ahead position, that is, parallel to the centre line of the car. Disconnect manette control wiring from sockets in junction box on wing valance (3 wires) and from connector to horn relay (1 wire).
Release two countersunk grub screws in steering wheel hub and withdraw manette control complete with column wiring harness into car. (Plate P.11.)

REFIT. Set the road wheels in the straight ahead position. Pass the column wiring harness down the centre of the inner column. Centralise the trafficator hand control and ensure that the split portion of the cancelling ring is facing the top centre of the steering wheel. (Plate P.11.) Enter the manette control into the hub of the wheel using care not to damage the key and keyway of the stator tubes when they engage. When the manette control is in position locate with the two grub screws. Check that the trafficators cancel evenly on either side of the straight ahead position.

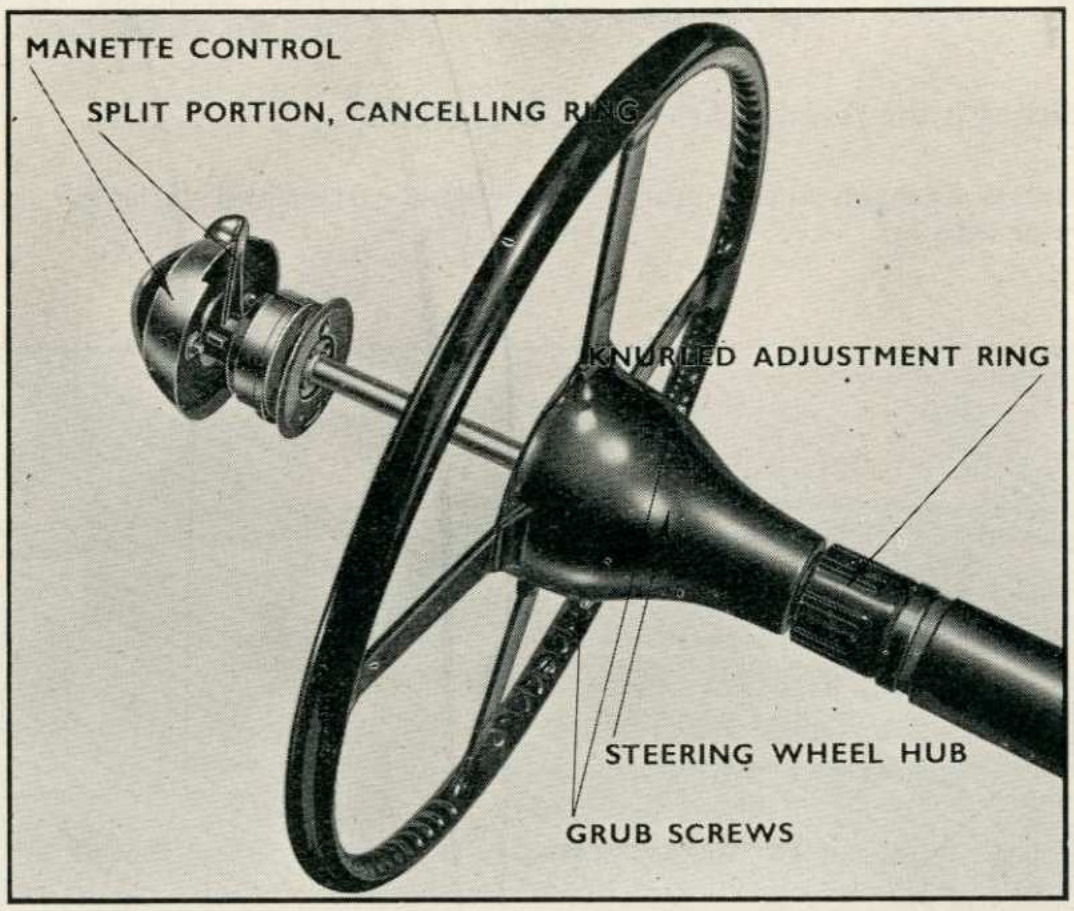


PLATE P.11. MANETTE CONTROL

MAP LIGHT. REMOVE AND REFIT

REMOVE. Withdraw map light cover from securing clips. Remove two self tapping screws, withdraw lamp into car and disconnect wiring connections. Remove lamp.

REFIT. Refitting is the reverse of the above procedure.

MAP LIGHT DOOR SWITCH. REMOVE AND REFIT

REMOVE. Remove two setscrews securing switch to body rocker, withdraw switch and disconnect wiring. Remove switch.

REFIT. Refitting is the reverse of the above procedure.

NUMBER PLATE/REVERSE LAMP. REMOVE AND REFIT

REMOVE. Remove two chromium plated screws securing lamp cover to lamp and with draw cover. Disconnect wiring connections. Open spare wheel cover using key provided in the tool kit. Remove two nuts on the back face of the spare wheel cover. Remove lamp. (Plate P.12.)

REFIT. Refitting is the reverse of the above procedure.

NUMBER PLATE/REVERSE LAMP BULB. REMOVE AND REFIT

REMOVE. Remove two screws retaining lamp cover to lamp and withdraw cover. The bulbs are secured to the lamp by a bayonet fixing and are pressed in and rotated for removal.

REFIT. Refitting is the reverse of the above procedure.

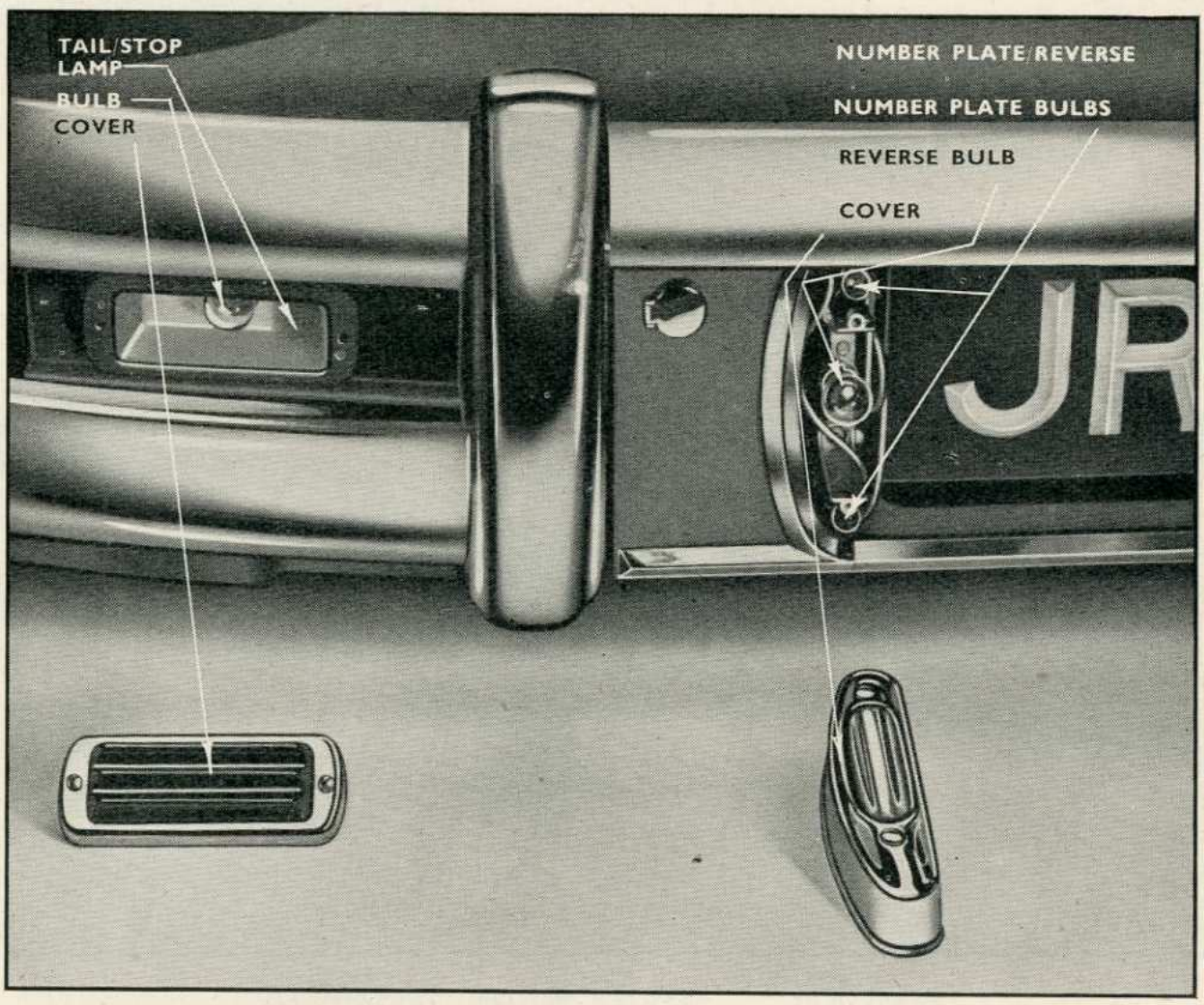


PLATE P.12. NUMBER PLATE/REVERSE LAMP AND STOP/TAIL LAMP. REMOVAL

REVERSE LAMP SWITCH. REMOVE AND REFIT

REMOVE. Remove two press studs at front edge and three press studs at rear edge of both front carpets. Remove carpets. Remove clamp bolts (engine side of scuttle) and withdraw brake and clutch pedals and stems out of respective levers. Lift four fasteners at top edge of toe board carpet and remove carpet. Release lock nut and unscrew gear lever knob. Pull rubber cover from head lamp, foot switch. Remove two setscrews securing dipswitch to cowl brackets. Disconnect wiring and remove switch. (Right hand drive cars only.) Remove four screws along each side flange of gearbox cowl. Remove five screws securing cowl to scuttle. Remove gearbox cowl upwards and over gear lever. Disconnect wiring connections to switch. Unscrew switch from gearbox cover.

REFIT. Refitting is the reverse of the above procedure.

SIDE LAMP. DESCRIPTION

DESCRIPTION. The side lamp body, including the bulb holder, is integral with the front wing and is attached to the wing by soldering. It will not normally be found necessary to service the side lamp but to remove the side lamp it is necessary to remove the solder and rivets which secure the lamp to the wing.

SIDE LAMP BULB. REMOVE AND REFIT

REMOVE. Remove small screw at top of side lamp shell. Pull out top edge of side lamp rim and glass and lift off upwards. The bulb is secured in its holder with a bayonet fixing. Press in and rotate bulb to withdraw. (Plate P.8.)

STARTER MOTOR. REMOVE AND REFIT

REMOVE. Remove exhaust down pipes by disconnecting at both manifold flanges and at flange to intermediate pipe. Disconnect wiring connections to starter motor. Remove three nuts and bolts with spring washers securing starter in position and remove starter motor.

REFIT. Refitting is the reverse of the above procedure.

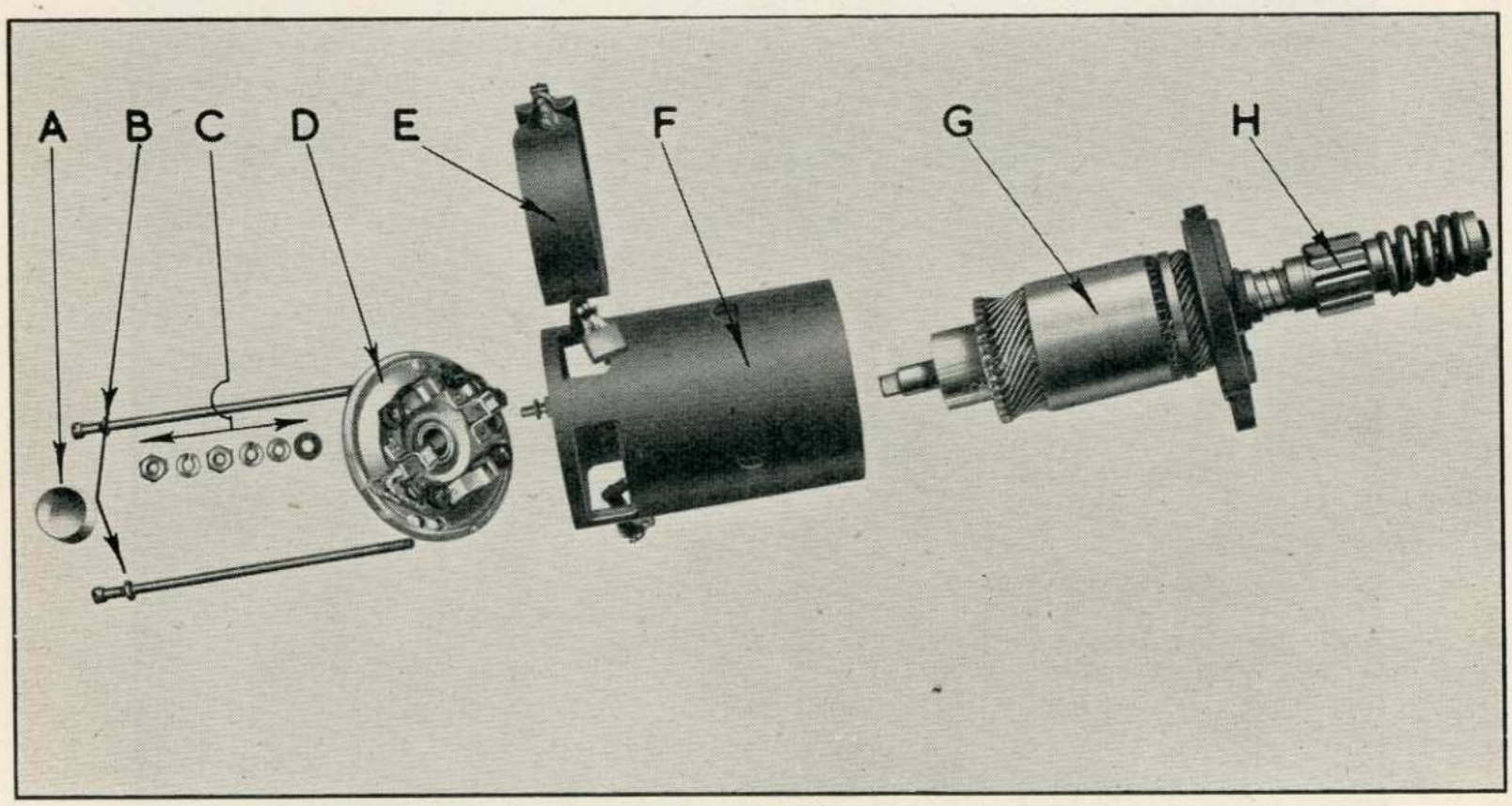


PLATE P.13. STARTER MOTOR. DISMANTLED

A. Dust Cover.
B. Securing Bolts.
C. Field Terminal Post Washers.
D. Front End Cover.
E. Inspection Cover.
F. Starter Body.
G. Armature and Rear End Cover.
H. Drive Gear.

STARTER MOTOR. SERVICE

MAINTENANCE. Starter motor bearings are supplied with lubricant during manufacture sufficient to last under normal conditions until the engine is taken out for a major overhaul. When this occurs it is strongly recommended that the starter motor be submitted to a Lucas Service Depot for cleaning, adjustment and replenishment of bearing lubricant, or alternatively, that a replacement starter motor is obtained from the Factory.

Every 10,000 miles (16,000 kilometres) or annually, remove the cover band to inspect the brushes and commutator. Check that the brushes move freely in their holders by holding back the brush springs and pulling gently on the flexible connectors. If a brush is inclined to stick remove it from its holder and clean its sides with a petrol moistened cloth. Be careful to replace brushes in their original position in order to retain the "bedding." Brushes which have worn so that they will not bear correctly on the commutator must be replaced and properly bedded in. The commutator should be clean, free from oil or dirt and should have a polished appearance. If it is dirty clean it with a fine dry cloth and if very dirty with a cloth moistened in petrol.

DISMANTLE. Remove the starter as described on page P.20. Pull off front bearing dust cover. Remove nuts and washers from field terminal post observing disposition of washers to facilitate correct assembly. (Plate P.13.) Remove brush gear inspection cover and withdraw brushes from holders. Remove two bolts with spring washers securing the front end cover to the rear end cover and withdraw front end cover complete with two brushes attached. Withdraw rear end cover complete with armature and starter pinion.

Remove split pin from collar on end of drive shaft and unscrew collar. Remove compression spring followed by the collar, drive pinion, collar, restraining spring and sleeve.

REASSEMBLE. Reassembly is the reverse of the above procedure. Ensure that the fibre bush is in position in the hole in the front end cover engaging with the field terminal post and that fibre and metal washers are fitted in correct relationship. (Plate P.13.) Refit the starter as described on page P.20.

STARTER MOTOR SOLENOID. REMOVE AND REFIT

REMOVE. Disconnect wiring connections to solenoid. (Plate P.2.) Remove two nuts and setscrews with shakeproof washers securing solenoid to scuttle. Remove solenoid.

REFIT. Refitting is the reverse of the above procedure.

STOP LAMP SWITCH. REMOVE AND REFIT

REMOVE. Disconnect wiring connections to switch. Remove operating spring. Remove two nuts and setscrews with shakeproof washers and withdraw switch. On left hand drive models the switch is screwed on to the end of the master cylinder. Disconnect wiring connections and unscrew switch. Care is necessary not to operate the brake pedal or leave the switch removed for more than a short space of time or it will be necessary to bleed the brakes as described in Section L. "Brakes."

REFIT. Refitting is the reverse of the above procedure.

TAIL/STOP LAMP. REMOVE AND REFIT

REMOVE. Remove two screws securing chromium plated rim to lamp. Withdraw cover. Remove two screws situated in the rubber sealing grommet and withdraw lamp to rear. Slide rubber grommet off lamp connections at rear of lamp. Disconnect wiring and remove lamp. (Plate P.12.)

REFIT. Refitting is the reverse of the above procedure.

TAIL/STOP LAMP BULB. REMOVE AND REFIT

REMOVE. Remove two screws securing chromium plated rim to lamp. Withdraw cover. The bulb is secured in its holder with a bayonet fixing. Press in and rotate bulb to withdraw. (Plate P.12.)

REFIT. Refitting is the reverse of the above procedure.

TOOL TRAY LIGHT. REMOVE AND REFIT

GENERAL. The tool compartment is illuminated when the lid is open and the side lights switched on. The control switch is situated beneath the centre lower edge of the tool lid.

REMOVE. Remove two screws and withdraw chromium plated rim and plastic cover. Remove two screws now disclosed securing light to tool lid, withdraw light and disconnect wiring. Remove light.

REFIT. Refitting is the reverse of the above procedure.

TOOL TRAY LIGHT BULB. REMOVE AND REFIT

REMOVE. Remove two screws and withdraw chromium plated rim and plastic cover. Withdraw light bulb from clips now disclosed.

REFIT. Refitting is the reverse of the above procedure.

TOOL TRAY LIGHT SWITCH. REMOVE AND REFIT

REMOVE. Open tool lid and remove all tools. Withdraw fourteen screws securing tool container to boot lid and lift out container assembly. Remove two screws securing switch and withdraw switch to rear and under the boot lid flange, disconnect wiring and remove switch.

REFIT. Refitting is the reverse of the above procedure.

TRAFFICATOR. SALOON. REMOVE AND REFIT

REMOVE. Remove cantrail draught rubber at either side of centre pillar (solutioned in position). Remove one screw from either side of centre pillar securing top capping. These screws pass through the cantrail flange and the front and rear door cantrail cappings into the centre pillar top capping. Remove centre pillar top capping exercising care to prevent damage to the polished surface. Remove three screws securing centre pillar trim pad and withdraw trim pad. Remove one screw from the top and one screw from the bottom fixing plate on the centre pillar capping, now disclosed, and withdraw capping. Remove top and bottom screws securing trafficator assembly to centre pillar and withdraw trafficator into car. Disconnect wiring connections and remove trafficator.

REFIT. Refitting is the reverse of the above procedure.

TRAFFICATOR. DROP HEAD COUPE. REMOVE AND REFIT

REMOVE. Remove four screws with cup washers securing quarter top capping and draw off capping. Remove two screws now disclosed and lift quarter capping upwards and off. Remove row of tacks at the top of casing upholstery and withdraw upholstery. Release upholstery where solutioned to head lining. Remove screws securing plywood casing to rear quarter. Remove one chromium plated screw securing base of quarter trim panel. Release spring clips along leading edge of casing and withdraw casing. Remove top and bottom screws securing trafficator assembly to body shell and withdraw trafficator into car. Disconnect wiring connections and remove trafficator.

REFIT. Refitting is the reverse of the above procedure.

TRAFFICATOR BULB. REMOVE AND REFIT

REMOVE. Switch on the ignition and raise trafficator arm by operating the control at the top of the steering wheel hub. Retain the arm in the up position and switch off the ignition. Remove the small screw in the outer end of the arm and withdraw the chromium plated cover plate. Slide the bulb out of the arm. If the bulb is serviceable but does not light when the trafficator is in the raised position this may be due to a faulty bulb contact. Lightly rubbing the bulb contact surface with a piece of fine glass paper will, in these circumstances, rectify matters.

REFIT. Refitting is the reverse of the above procedure, but ensure that the foot of the cover plate engages with the slides on the inside of the spindle bearing.

WINDSCREEN WIPER DRIVE ASSEMBLY. REMOVE AND REFIT

REMOVE. Withdraw door seal rubber from both screen pillars (solutioned in position). Remove three screws now disclosed securing each screen pillar capping. Withdraw cappings. Withdraw two screws securing driving mirror to screen capping and remove mirror. Remove two nuts accessible through apertures above glove box facias. Pull out screen rail capping assembly. Remove screen wiper arms and blades complete by releasing chrome nuts on spindles. Open offside (right hand) bonnet top panel. Remove three hexagon headed screws retaining windscreen wiper drive gear cover plate and remove plate. Withdraw split pin from operating link and remove operating link. Release cable from windscreen wiper drive gear housing and disengage grommet in scuttle. Remove two nuts and shakeproof washers securing each windscreen wiper spindle drive assembly to windscreen aperture. Withdraw windscreen wiper drive assemblies into car and release cable clamp screw retaining right hand outer cable. (Plate P.14.) Release three screws retaining right hand drive assembly cover plate. Draw both drive assemblies off drive cable. Withdraw drive cable through scuttle into engine compartment.

REFIT. Refitting is the reverse of the above procedure.

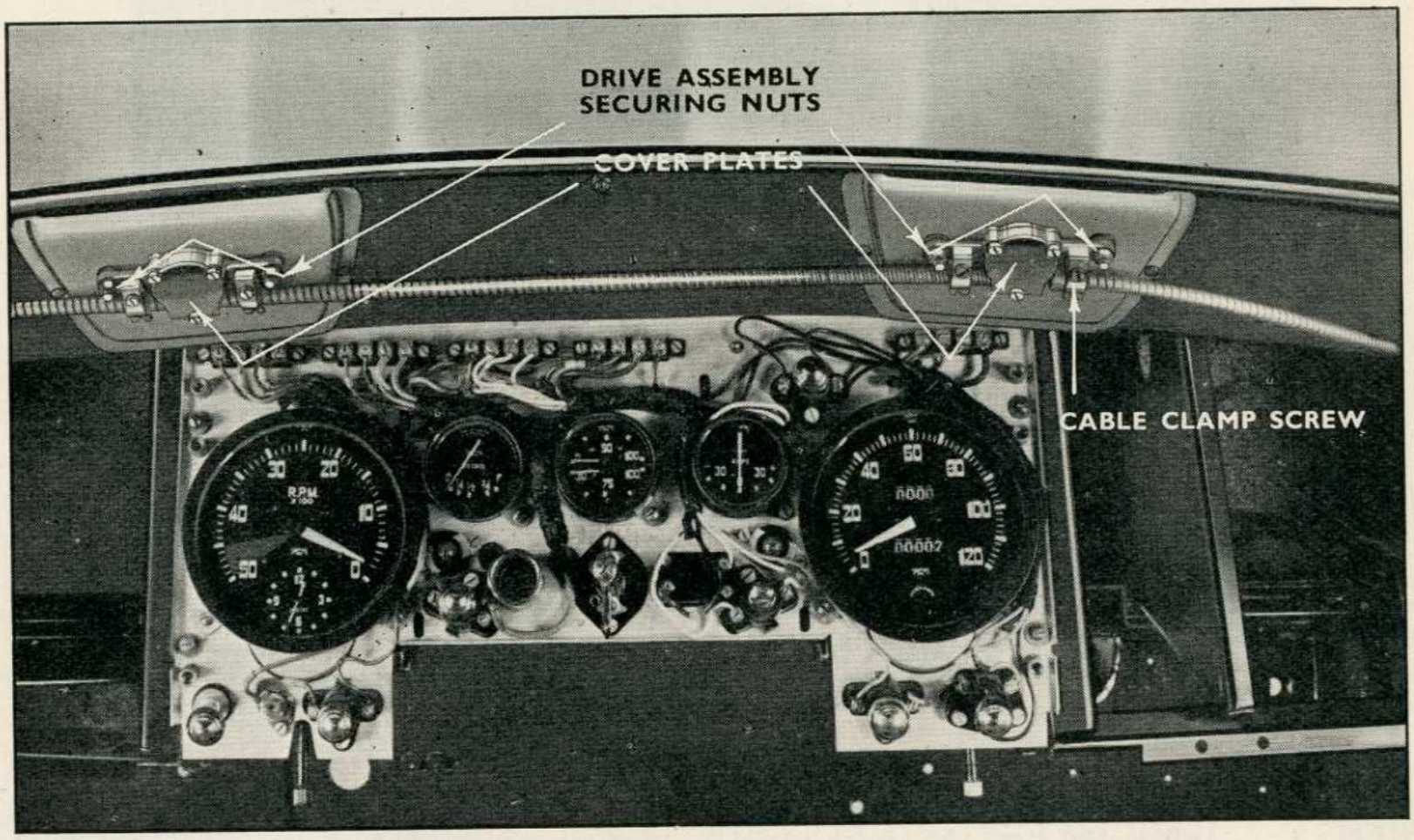


PLATE P.14. WINDSCREEN WIPER DRIVE ASSEMBLY

WINDSCREEN WIPER MOTOR. REMOVE AND REFIT

REMOVE. Open offside (right hand) bonnet top panel. Remove three hexagon headed screws retaining windscreen wiper drive gear cover plate and remove plate. Withdraw split pin from operating link and remove operating link. Release cable from windscreen wiper drive gear housing. Remove three nuts with spring washers securing motor to mounting bracket. Withdraw motor and disconnect wiring at connectors. Remove motor.

REFIT. Refitting is the reverse of the above procedure.

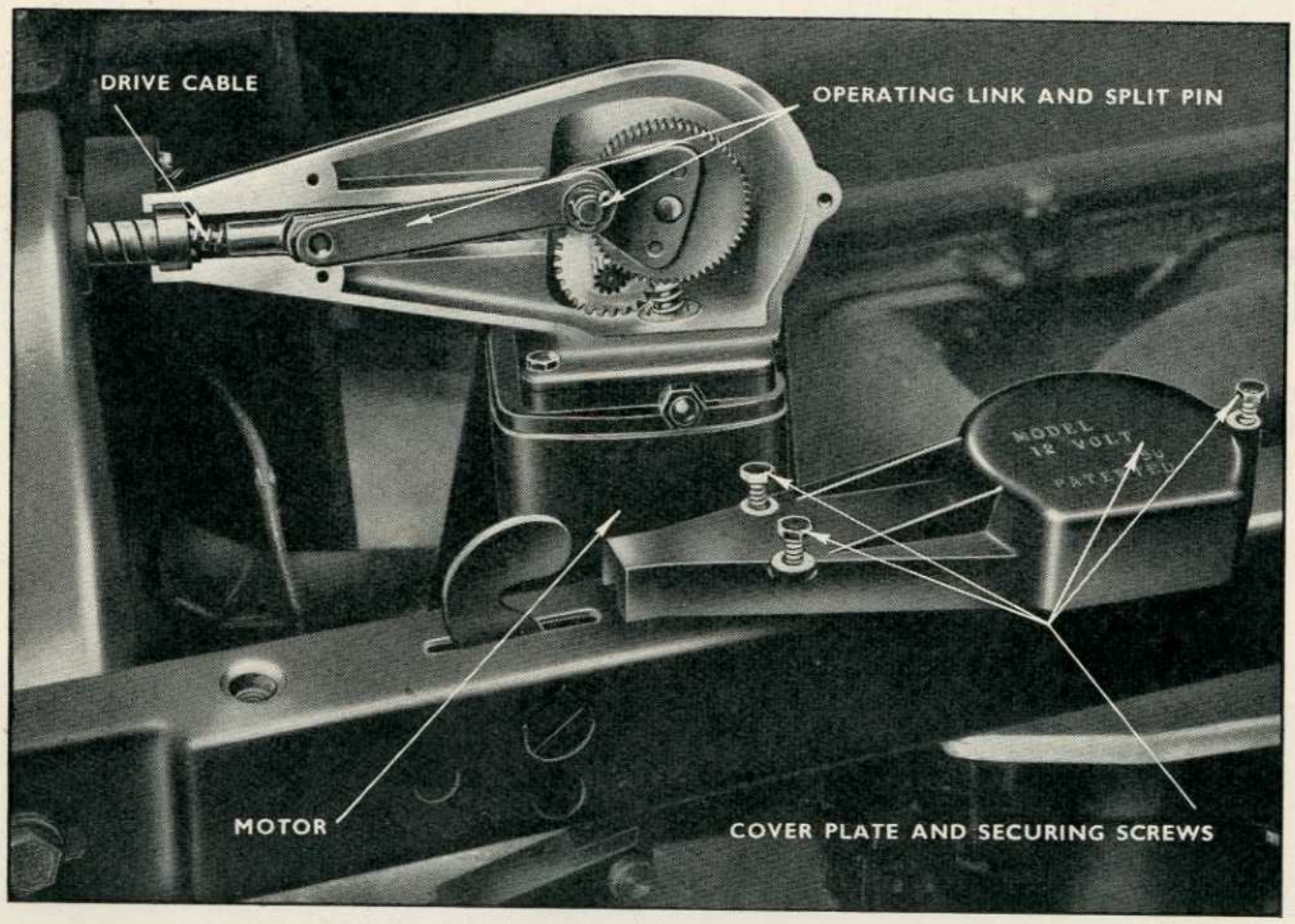


PLATE P.15. WINDSCREEN WIPER MOTOR

WINDSCREEN WIPER MOTOR. TO SERVICE

GENERAL. If the wiper fails to operate, or operates unsatisfactorily, proceed as follows:—
Ascertain if the battery is supplying current to the wiper by switching on and noting if the ammeter responds. If no current is being supplied, examine the fuse protecting the wiper. If it has blown, inspect the wiring for evidence of chafed leads or short circuits. If, on replacing the fuse, it blows again, momentarily connect the motor directly to the battery and see if the wiper then operates satisfactorily. If this is the case, the cause of the fuse blowing may be in one of the other auxiliary circuits protected by it, and must be traced.

LOOSE OR BROKEN CONNECTIONS. Examine the connections from the supply terminal to the motor, from the motor to the switch, and from the switch to earth. Replace any leads which are badly worn or chafed. If necessary, fit protective tubing over the leads in the position where the original leads became chafed.

COMMUTATOR DIRTY. Remove the screws securing the commutator end cover, and lift off the cover. Clean the commutator with a cloth moistened with petrol, and carefully remove any carbon dust from between the commutator segments.

BRUSH LEVERS STIFF OR BRUSHES NOT BEARING ON COMMUTATOR. Check that the brushes bear freely on the commutator. If they are loose, and do not make contact, a replacement tension spring is necessary. The brush levers must be free on their pivots. If they are stiff, they should be freed by working them backwards and forwards by hand and by applying a trace of thin machine oil. Packing shims are fitted beneath the legs of the brush lever to ensure that the brushes are central, and that there is no possibility of the brush boxes fouling the commutator.

ARMATURE BEARING BINDING. This may be due to lack of lubrication. A lubricator is provided on the motor adjacent to the gearbox through which a small quantity of good grade thin machine oil may be applied. Ascertain that a blow on the motor end bracket has not thrown the bearings out of line. A screw and lock nut are provided in the commutator end cover to take up the end thrust of the armature. The screw has a special hard alloy tip and under normal conditions will not require adjustment.

MOTOR OPERATES BUT DOES NOT TRANSMIT MOTION TO SPINDLES. Remove the cover of the gearbox. A push-pull motion should be transmitted to the inner cable of the flexible rack. If the crosshead moves sluggishly between the guides, lightly smear a small amount of medium grade engine oil in the groove formed in the die-cast housing. When overhauling, the gears must be lubricated by lightly packing the gearbox with a grease of the zinc oxide type.

To detach the cable rack from the motor and gearbox, proceed as follows:—

Remove gearbox cover. Remove split pin and washer from crank pin and final gearwheel. Lift off the connecting link. Draw outer casing, inner cable and cross head from the gearbox. Replace the cover to prevent the ingress of dirt.

ARMATURE DAMAGED. If, following the above examination, the wiper still does not operate or its performance is unsatisfactory, the fault may be due to the armature. Check by substitution and, if necessary, fit a replacement armature.

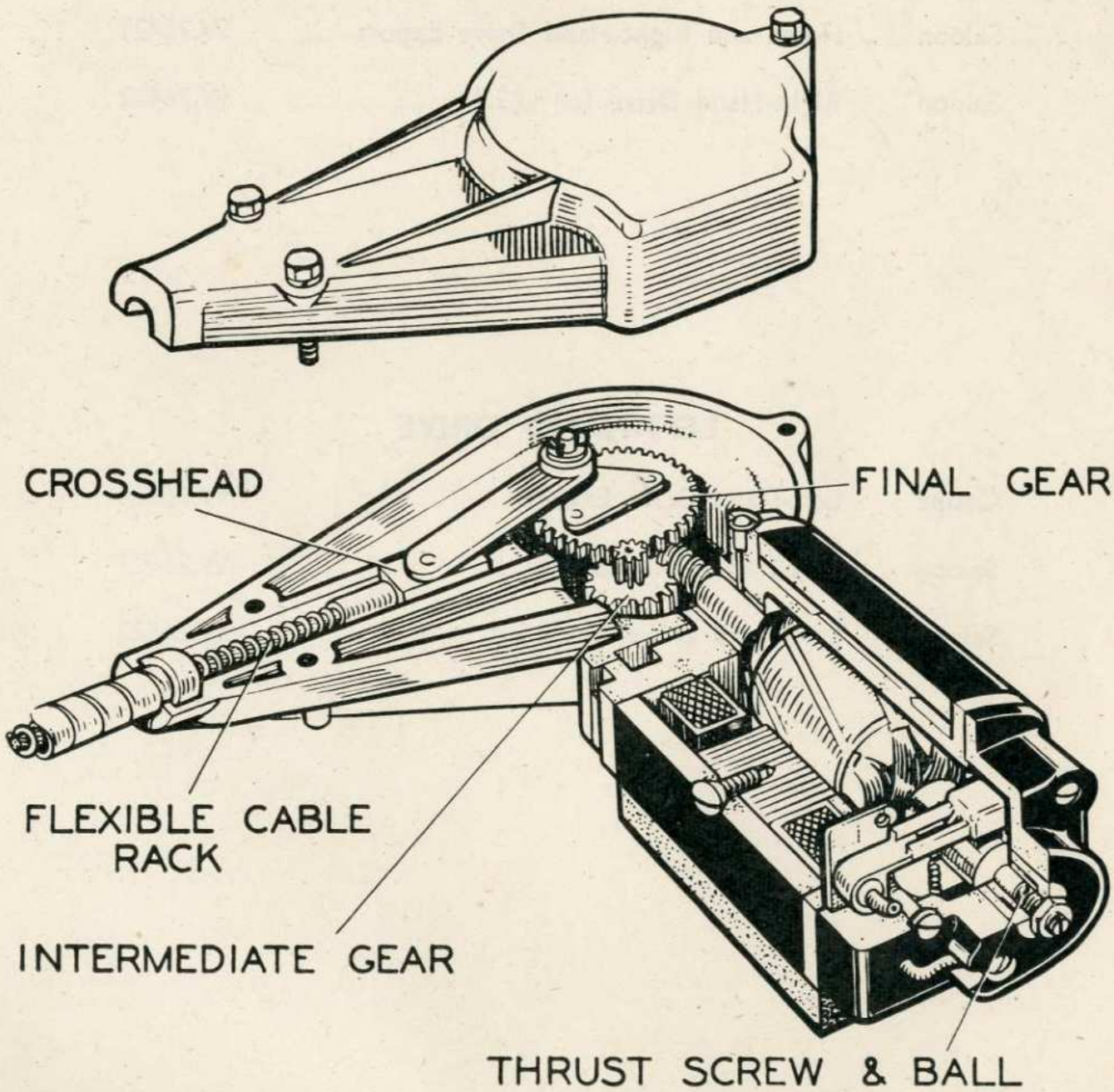


PLATE P.16. WINDSCREEN WIPER MOTOR (Exploded view)

INDEX TO WIRING DIAGRAMS

$2\frac{1}{2}$ and $3\frac{1}{2}$ MARK V MODELS

RIGHT-HAND DRIVE

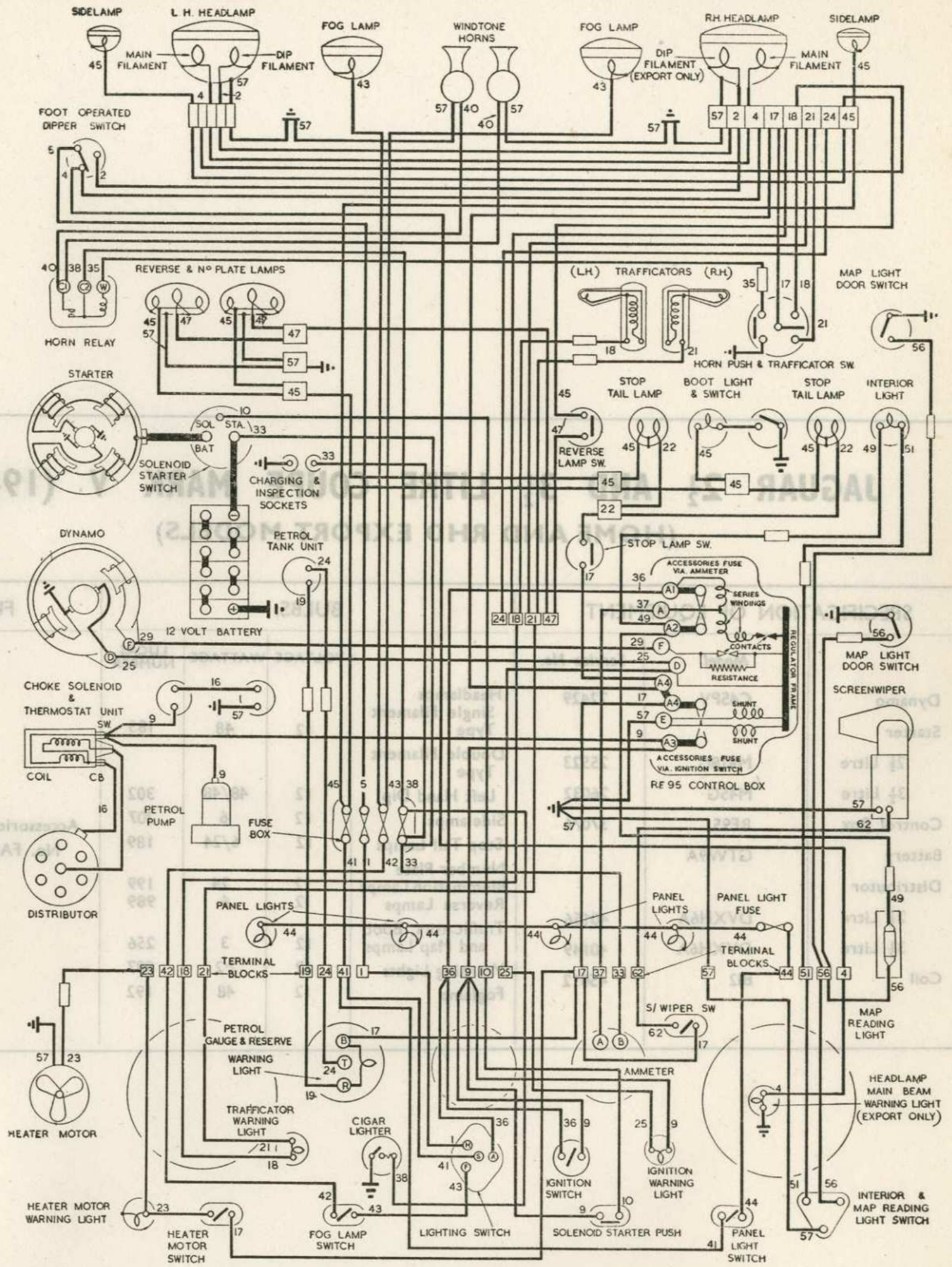
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Saloon	Home and Right-Hand Drive Export ...	W.76421
Saloon	Right-Hand Drive for U.S.A.	W.76422

LEFT-HAND DRIVE

Coupé	Left-Hand Drive Export	W.76520
Saloon	Left-Hand Drive Export	W.76521
Saloon	Left-Hand Drive for U.S.A.	W.76522

LUCAS
ELECTRICAL EQUIPMENT

JAGUAR 2½ AND 3½ LITRE
COUPE MARK V 1949
(HOME & RHD EXPORT MODELS)



KEY TO CABLE COLOURS

1 BLUE	14 WHITE with PURPLE	27 YELLOW with BLUE	40 BROWN with BLACK	53 PURPLE with WHITE
2 BLUE with RED	15 WHITE with BROWN	28 YELLOW with WHITE	41 RED	54 PURPLE with GREEN
3 BLUE with YELLOW	16 WHITE with BLACK	29 YELLOW with GREEN	42 RED with YELLOW	55 PURPLE with BROWN
4 BLUE with WHITE	17 GREEN	30 YELLOW with PURPLE	43 RED with BLUE	56 PURPLE with BLACK
5 BLUE with GREEN	18 GREEN with RED	31 YELLOW with BROWN	44 RED with WHITE	57 BLACK
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8 BLUE with BLACK	21 GREEN with WHITE	34 BROWN with RED	47 RED with BROWN	60 BLACK with BLUE
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11 WHITE with YELLOW	24 GREEN with BLACK	37 BROWN with WHITE	50 PURPLE with RED	63 BLACK with PURPLE
12 WHITE with BLUE	25 YELLOW	38 BROWN with GREEN	51 PURPLE with YELLOW	64 BLACK with BROWN
13 WHITE with GREEN	26 YELLOW with RED	39 BROWN with PURPLE	52 PURPLE with BLUE	

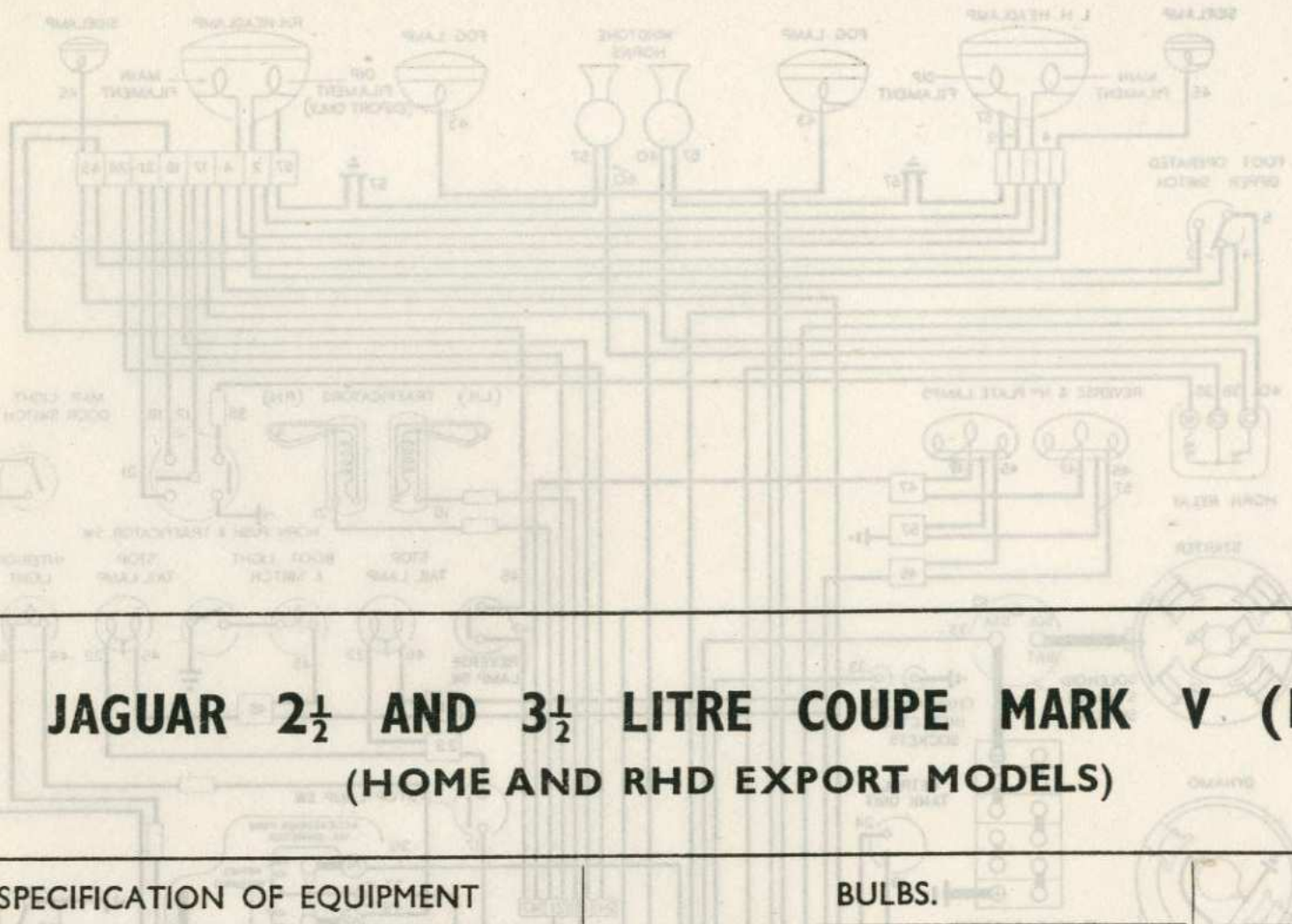
WIRING DIAGRAM
No. W76420
12 VOLT

ISSUED:
APRIL 1949

F/89/L

NUMBERS INDICATE CABLE IDENTIFICATION COLOURS, SEE KEY ABOVE.

FOR SPECIFICATION OF EQUIPMENT SEE OVERLEAF.



JAGUAR 2½ AND 3½ LITRE COUPE MARK V (1949)

(HOME AND RHD EXPORT MODELS)

SPECIFICATION OF EQUIPMENT

	Model	Service No.
Dynamo	C45PV	22429
Starter		
2½ Litre	M418G	25523
3½ Litre	M45G	26032
Control Box	RF95	37076
Battery	GTW9A	
Distributor		
2½ Litre	DVXH6A	40156
3½ Litre	DVXH6A	40149
Coil	BI2	45012

BULBS.

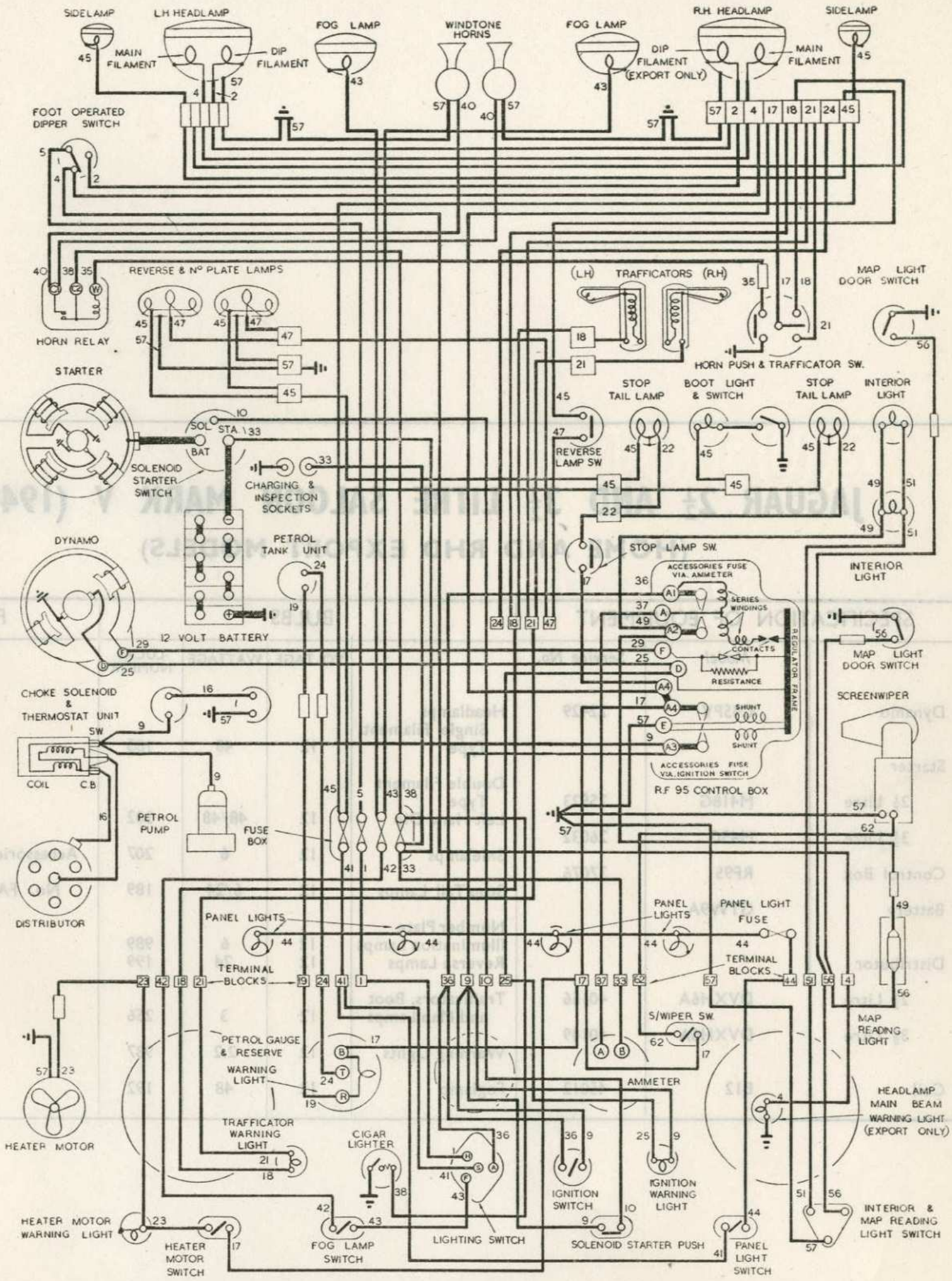
	VOLTAGE	WATTAGE	LUCAS NUMBER
Headlamps Single Filament Type	12	48	185
Double Filament Type			
Left Hand Dip	12	48/48	302
Sidelamps	12	6	207
Stop Tail Lamps	12	6/24	189
Number Plate Illumination Lamps	12	24	199
Reverse Lamps	12	6	989
Trafficators, Boot and Map Lamps	12	3	256
Warning Lights	12	2·2	987
Foglamp	12	48	192

FUSES

Accessories:—
No. FA35 35 amperes

LUCAS
ELECTRICAL EQUIPMENT

JAGUAR 2½ AND 3½ LITRE
SALOON MARK V 1949
(HOME & RHD EXPORT MODELS)



KEY TO CABLE COLOURS

1 BLUE	14 WHITE with PURPLE	27 YELLOW with BLUE	40 BROWN with BLACK	53 PURPLE with WHITE
2 BLUE with RED	15 WHITE with BROWN	28 YELLOW with WHITE	41 RED	54 PURPLE with GREEN
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12 WHITE with BLUE	25 YELLOW	38 BROWN with GREEN	51 PURPLE with YELLOW	64 BLACK with BROWN
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WIRING DIAGRAM
No. W76421
12 VOLT

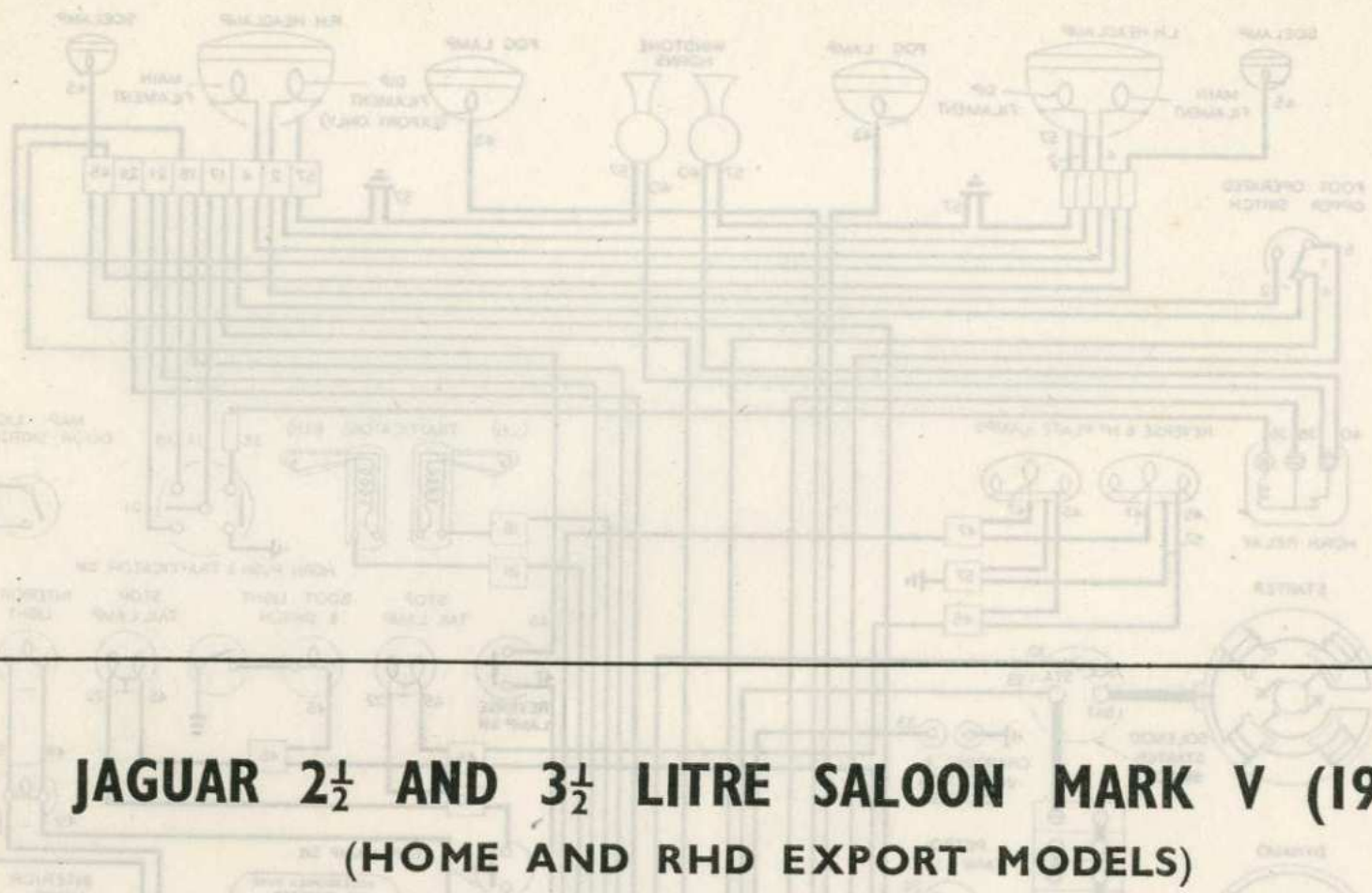
ISSUED:
APRIL 1949

F/109/L

NUMBERS INDICATE CABLE IDENTIFICATION COLOURS, SEE KEY ABOVE.

FOR SPECIFICATION OF EQUIPMENT SEE OVERLEAF.

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Wondershare PDFelement



JAGUAR 2½ AND 3½ LITRE SALOON MARK V (1949)

(HOME AND RHD EXPORT MODELS)

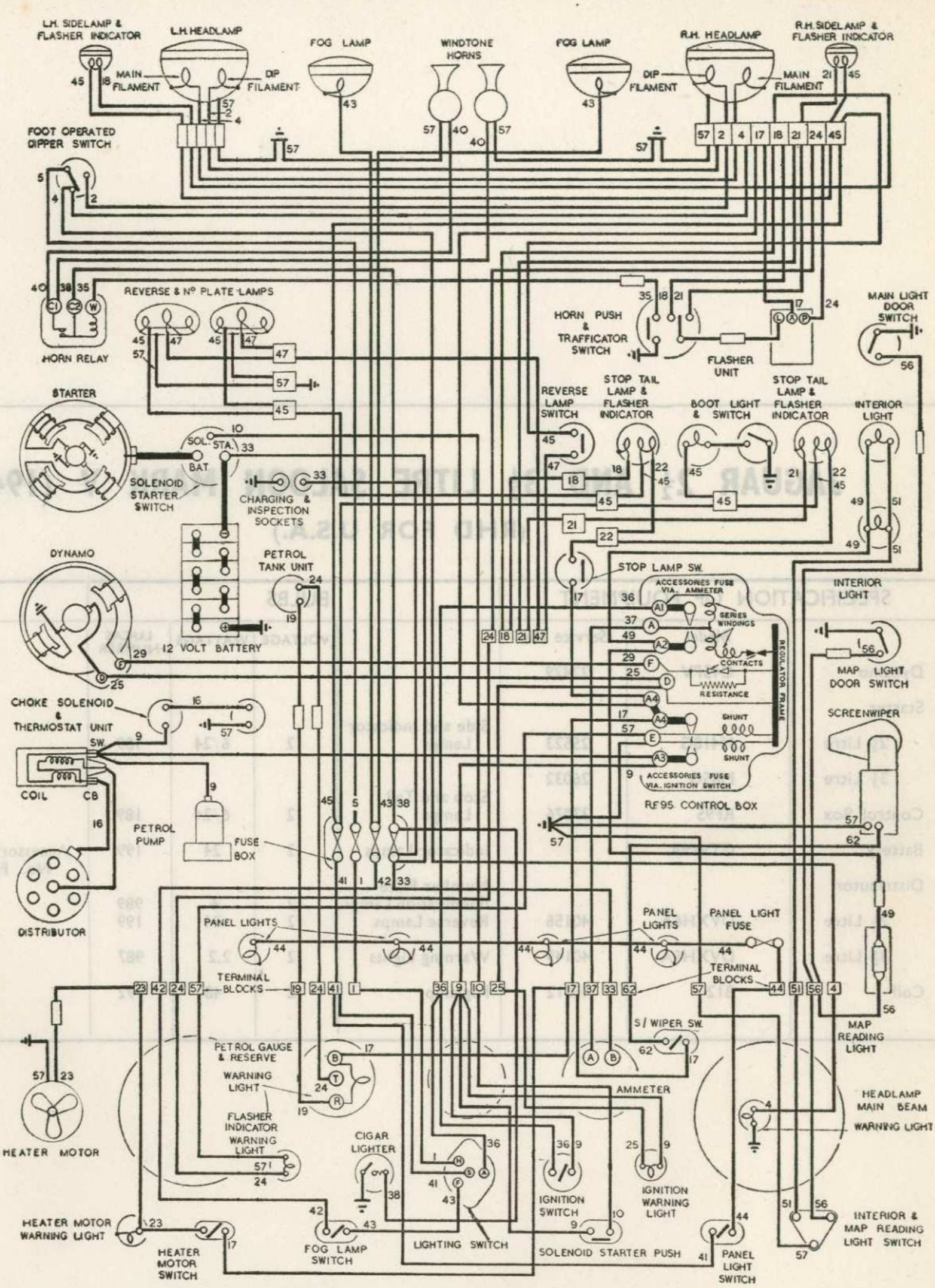
SPECIFICATION OF EQUIPMENT		
	Model	*Service No.*
Dynamo	C45PV	22429
Starter		
2½ Litre	M418G	25523
3½ Litre	M45G	26032
Control Box	RF95	37076
Battery	GTW9A	
Distributor		
2½ Litre	DVXH6A	40156
3½ Litre	DVXH6A	40149
Coil	B12	45012

BULBS			
	VOLTAGE	WATTAGE	LUCAS NUMBER
Headlamps Single Filament Type	12	48	185
Double Filament Type Left Hand Dip	12	48/48	302
Sidelamps	12	6	207
Stop Tail Lamps	12	6/24	189
Number Plate Illumination Lamps	12	6	989
Reverse Lamps	12	24	199
Trafficators, Boot and Map Lamps	12	3	256
Warning Lights	12	2.2	987
Foglamp	12	48	192

FUSES
Accessories :—
No. FA35 35 amperes

LUCAS
ELECTRICAL EQUIPMENT

JAGUAR 2½ AND 3½ LITRE
SALOON MARK V 1949
(RHD FOR U.S.A.)



KEY TO CABLE COLOURS

1 BLUE
2 BLUE with RED
3 BLUE with YELLOW
4 BLUE with WHITE
5 BLUE with GREEN
6 BLUE with PURPLE
7 BLUE with BROWN
8 BLUE with BLACK
9 WHITE
10 WHITE with RED
11 WHITE with YELLOW
12 WHITE with BLUE
13 WHITE with GREEN
14 WHITE with PURPLE
15 WHITE with BROWN
16 WHITE with BLACK
17 GREEN
18 GREEN with RED
19 GREEN with YELLOW
20 GREEN with BLUE
21 GREEN with WHITE
22 GREEN with PURPLE
23 GREEN with BROWN
24 GREEN with BLACK
25 YELLOW
26 YELLOW with RED
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28 YELLOW with WHITE
29 YELLOW with GREEN
30 YELLOW with PURPLE
31 YELLOW with BROWN
32 YELLOW with BLACK
33 BROWN
34 BROWN with RED
35 BROWN with YELLOW
36 BROWN with BLUE
37 BROWN with WHITE
38 BROWN with GREEN
39 BROWN with PURPLE
40 BROWN with BLACK
41 RED
42 RED with YELLOW
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48 RED with BLACK
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56 PURPLE with BLACK
57 BLACK
58 BLACK with RED
59 BLACK with YELLOW
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64 BLACK with BROWN

WIRING DIAGRAM
No. W76422
12 VOLT

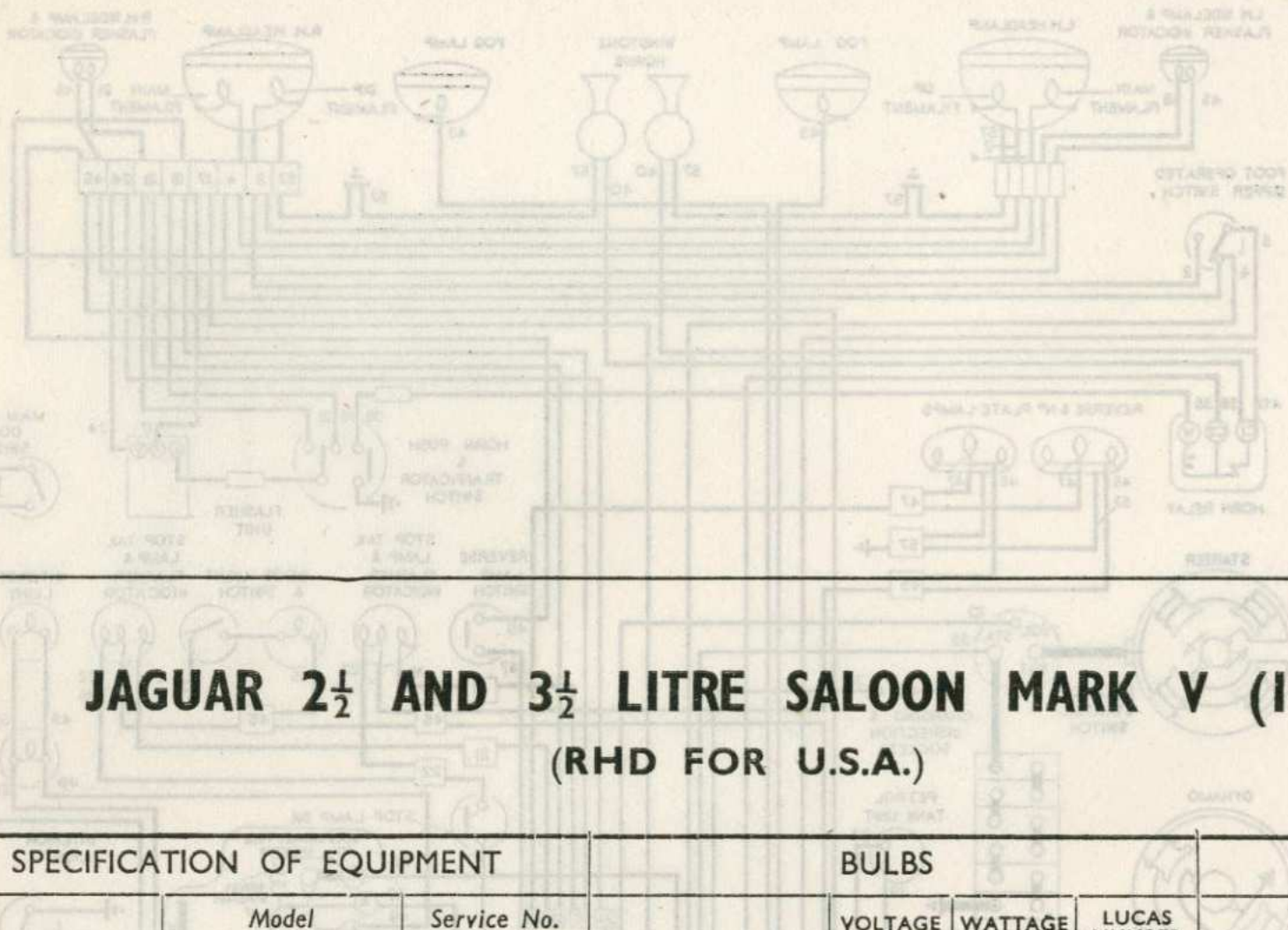
ISSUED:
APRIL 1949

F/119/L

NUMBERS INDICATE CABLE IDENTIFICATION COLOURS, SEE KEY ABOVE.

FOR SPECIFICATION OF EQUIPMENT SEE OVERLEAF.

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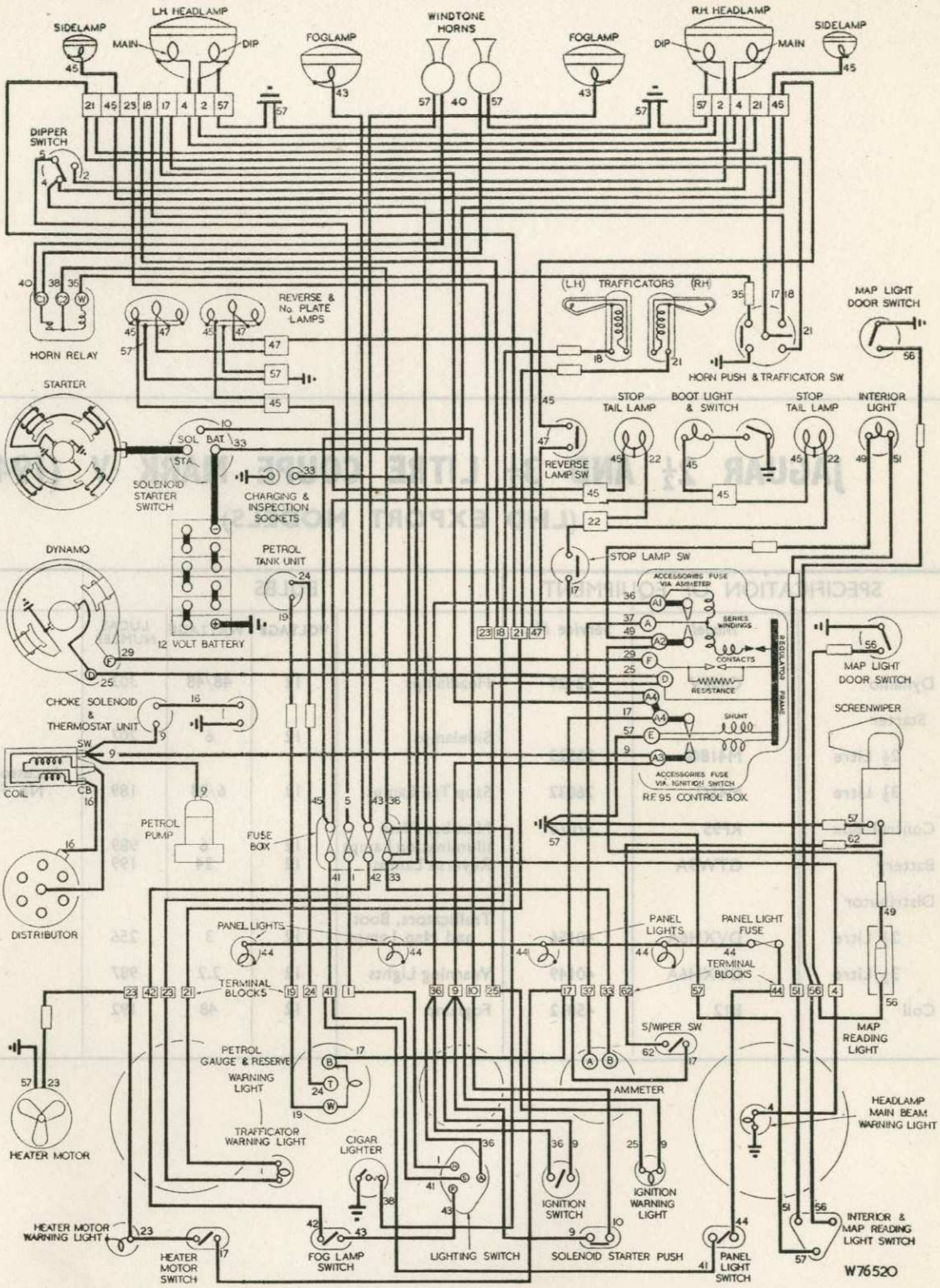
JAGUAR 2½ AND 3½ LITRE SALOON MARK V (1949)

(RHD FOR U.S.A.)

SPECIFICATION OF EQUIPMENT			BULBS				FUSES
	Model	*Service No.*		VOLTAGE	WATTAGE	LUCAS NUMBER	
Dynamo	C45PV	22429					
Starter			Side and Indicator Lamps	12	6/24	189	
2½ Litre	M418G	25523					
3½ Litre	M45G	26032	Stop and Tail Lamps	12	6/24	189	
Control Box	RF95	37076					
Battery	GTW9A		Indicator Lamps	12	24	199	Accessories :— No. FA35 35 amperes
Distributor			Number Plate Illumination Lamps	12	6	989	
2½ Litre	DVXH6A	40156	Reverse Lamps	12	24	199	
3½ Litre	DVXH6A	40149	Warning Lights	12	2.2	987	
Coil	B12	45012	Foglamp	12	48	192	

LUCAS
ELECTRICAL EQUIPMENT

JAGUAR 2½ AND 3½ LITRE
COUPE MARK V 1949
(LHD EXPORT MODELS)



KEY TO CABLE COLOURS

1 BLUE	14 WHITE with PURPLE	27 YELLOW with BLUE	40 BROWN with BLACK	53 PURPLE with WHITE
2 BLUE with RED	15 WHITE with BROWN	28 YELLOW with WHITE	41 RED	54 PURPLE with GREEN
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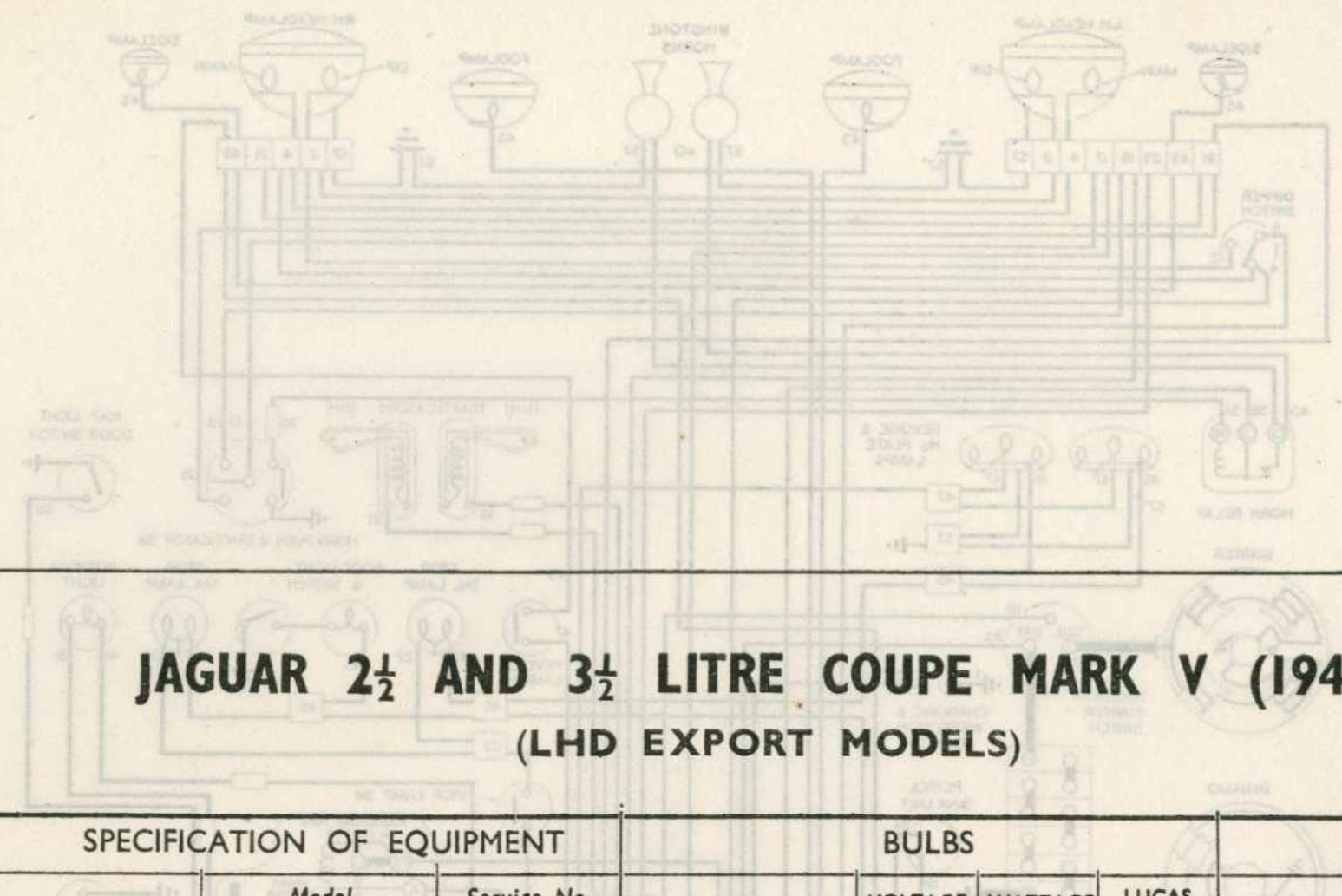
WIRING DIAGRAM
No. W76520
12 VOLT

ISSUED:
NOVEMBER 1949
F/1191L

NUMBERS INDICATE CABLE IDENTIFICATION COLOURS, SEE KEY ABOVE.

FOR SPECIFICATION OF EQUIPMENT SEE OVERLEAF.

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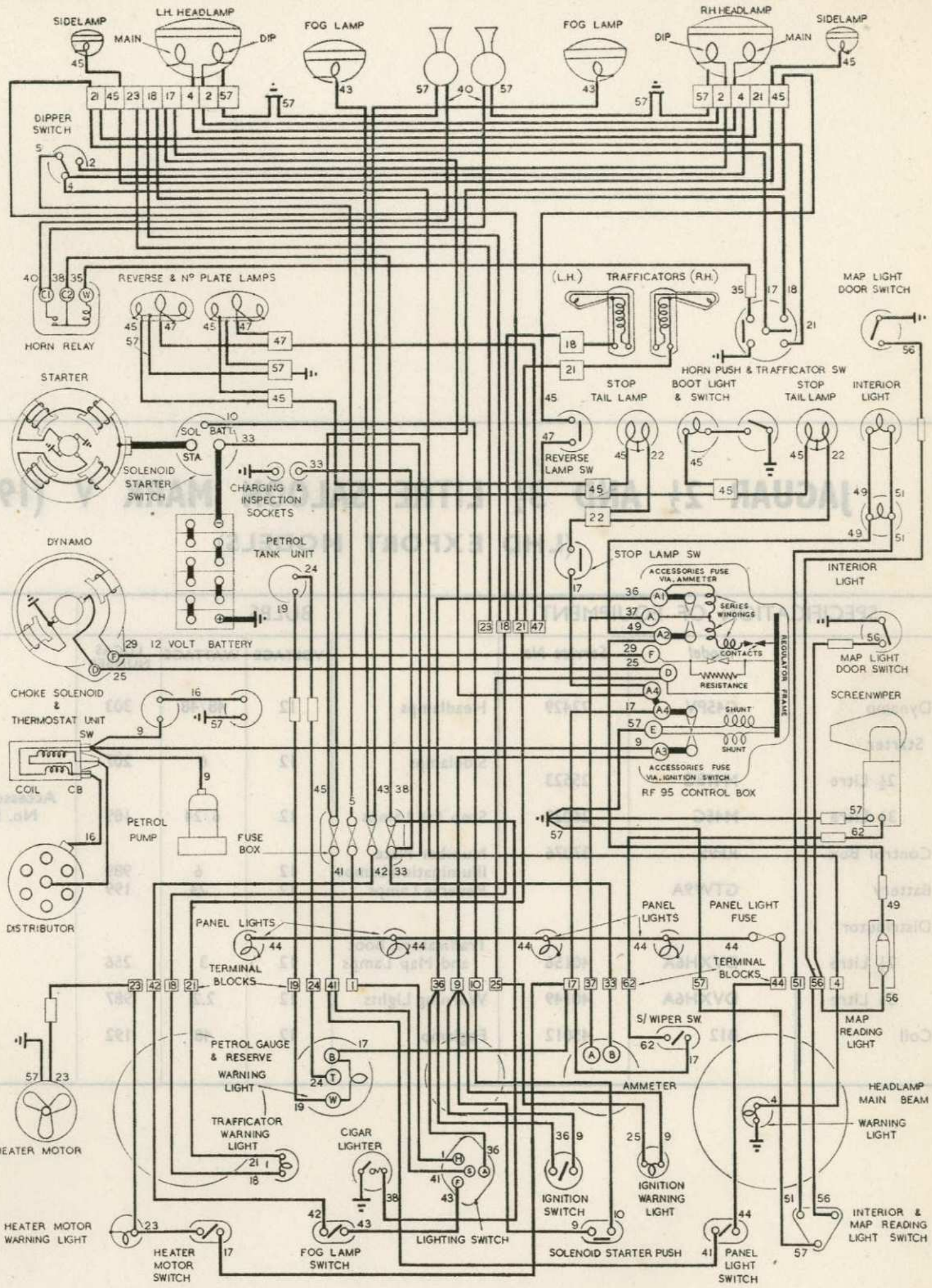
JAGUAR 2½ AND 3½ LITRE COUPE MARK V (1949)

(LHD EXPORT MODELS)

SPECIFICATION OF EQUIPMENT			BULBS				FUSES
	Model	*Service No.*		VOLTAGE	WATTAGE	LUCAS NUMBER	
Dynamo	C45PV	22429	Headlamps	12	48/48	303	
Starter							
2½ Litre	M418G	25523	Sidelamps	12	6	207	
3½ Litre	M45G	26032	Stop Tail Lamps	12	6/24	189	Accessories :— No. FA35 35 amperes
Control Box	RF95	37076	Number Plate Illumination Lamps	12	6	989	
Battery	GTW9A		Reverse Lamps	12	24	199	
Distributor							
2½ Litre	DVXH6A	40156	Trafficators, Boot and Map Lamps	12	3	256	
3½ Litre	DVXH6A	40149	Warning Lights	12	2.2	987	
Coil	B12	45012	Foglamp	12	48	192	

LUCAS
ELECTRICAL EQUIPMENT

JAGUAR 2½ AND 3½ LITRE
SALOON MARK V 1949
(LHD EXPORT MODELS)



KEY TO CABLE COLOURS

1 BLUE	14 WHITE with PURPLE	27 YELLOW with BLUE	40 BROWN with BLACK	53 PURPLE with WHITE
2 BLUE with RED	15 WHITE with BROWN	28 YELLOW with WHITE	41 RED	54 PURPLE with GREEN
3 BLUE with YELLOW	16 WHITE with BLACK	29 YELLOW with GREEN	42 RED with YELLOW	55 PURPLE with BROWN
4 BLUE with WHITE	17 GREEN	30 YELLOW with PURPLE	43 RED with BLUE	56 PURPLE with BLACK
5 BLUE with GREEN	18 GREEN with RED	31 YELLOW with BROWN	44 RED with WHITE	57 BLACK
6 BLUE with PURPLE	19 GREEN with YELLOW	32 YELLOW with BLACK	45 RED with GREEN	58 BLACK with RED
7 BLUE with BROWN	20 GREEN with BLUE	33 BROWN	46 RED with PURPLE	59 BLACK with YELLOW
8 BLUE with BLACK	21 GREEN with WHITE	34 BROWN with RED	47 RED with BROWN	60 BLACK with BLUE
9 WHITE	22 GREEN with PURPLE	35 BROWN with YELLOW	48 RED with BLACK	61 BLACK with WHITE
10 WHITE with RED	23 GREEN with BROWN	36 BROWN with BLUE	49 PURPLE	62 BLACK with GREEN
11 WHITE with YELLOW	24 GREEN with BLACK	37 BROWN with WHITE	50 PURPLE with RED	63 BLACK with PURPLE
12 WHITE with BLUE	25 YELLOW	38 BROWN with GREEN	51 PURPLE with YELLOW	64 BLACK with BROWN
13 WHITE with GREEN	26 YELLOW with RED	39 BROWN with PURPLE	52 PURPLE with BLUE	

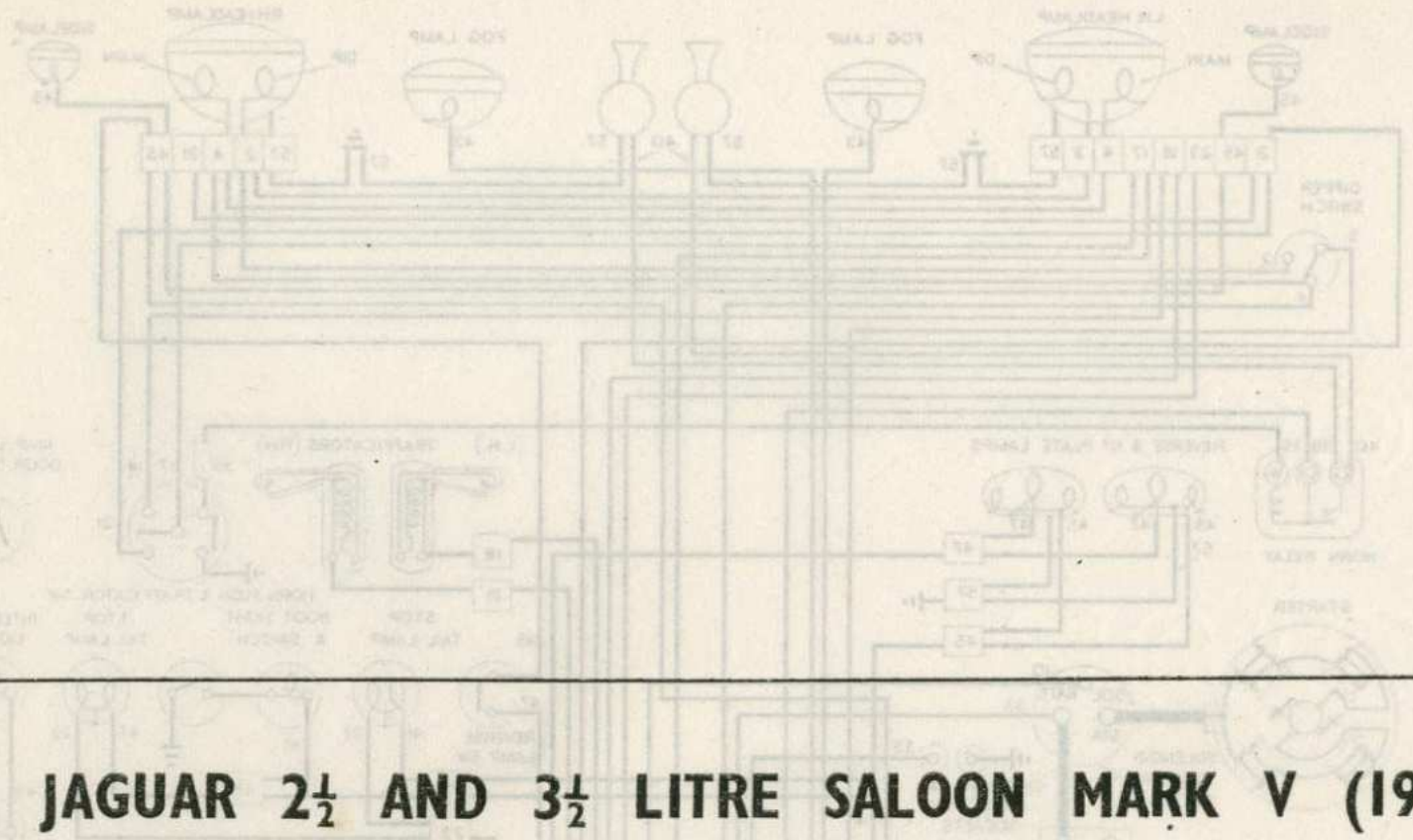
WIRING DIAGRAM
No. W76521
12 VOLT

ISSUED:
DECEMBER 1949
F/119/L

NUMBERS INDICATE CABLE IDENTIFICATION COLOURS, SEE KEY ABOVE.

FOR SPECIFICATION OF EQUIPMENT SEE OVERLEAF.

Remove Watermark
Wondershare PDFelement



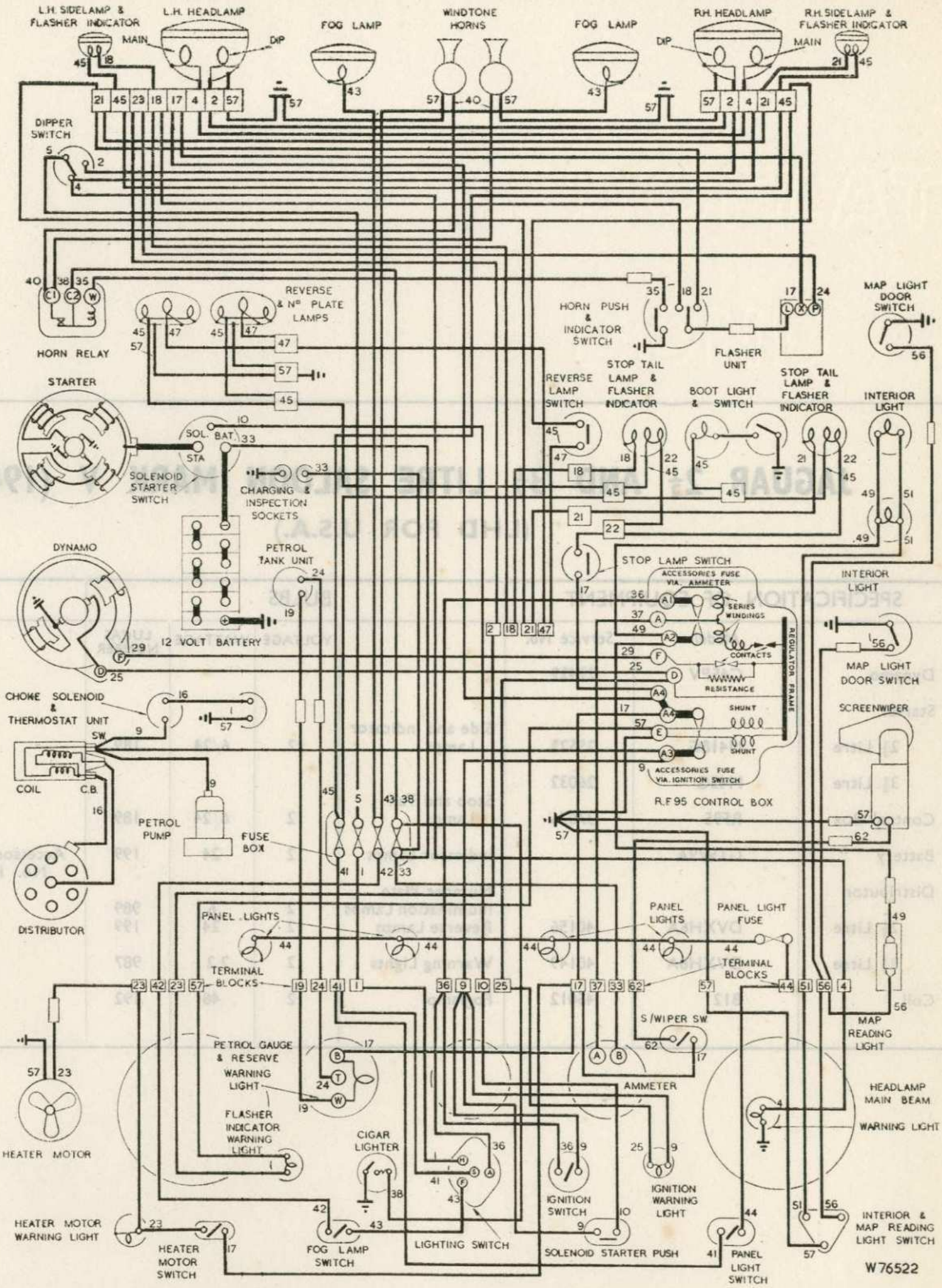
JAGUAR 2½ AND 3½ LITRE SALOON MARK V (1949)

(LHD EXPORT MODELS)

SPECIFICATION OF EQUIPMENT			BULBS				FUSES
	Model	*Service No.*		VOLTAGE	WATTAGE	LUCAS NUMBER	
Dynamo	C45PV	22429	Headlamps	12	48/48	303	
Starter			Sidelamps	12	6	207	
2½ Litre	M418G	25523					Accessories :—
3½ Litre	M45G	26032	Stop Tail Lamps	12	6/24	189	No. FA35 35 amperes
Control Box	RF95	37076	Number Plate Illumination Lamps	12	6	989	
Battery	GTW9A		Reverse Lamps	12	24	199	
Distributor							
2½ Litre	DVXH6A	40156	Trafficators, Boot and Map Lamps	12	3	256	
3½ Litre	DVXH6A	40149	Warning Lights	12	2.2	987	
Coil	B12	45012	Foglamp	12	48	192	

LUCAS
ELECTRICAL EQUIPMENT

JAGUAR 2½ AND 3½ LITRE
SALOON MARK V 1949
(LHD FOR U.S.A.)



KEY TO CABLE COLOURS

1 BLUE	14 WHITE with PURPLE	27 YELLOW with BLUE	40 BROWN with BLACK	53 PURPLE with WHITE
2 BLUE with RED	15 WHITE with BROWN	28 YELLOW with WHITE	41 RED	54 PURPLE with GREEN
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13 WHITE with GREEN	26 YELLOW with RED	39 BROWN with PURPLE	52 PURPLE with BLUE	

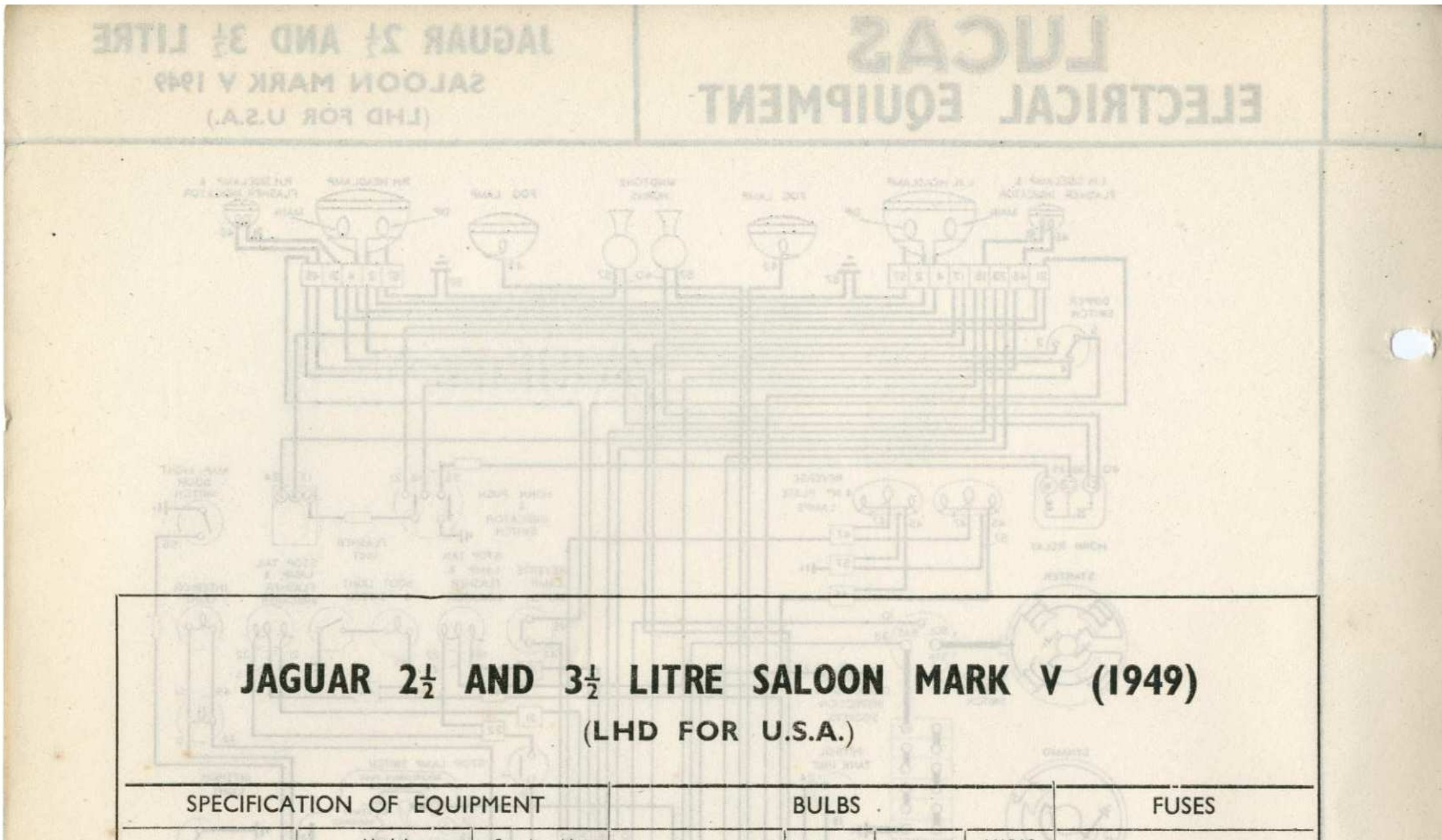
WIRING DIAGRAM
No. W76522
12 VOLT

ISSUED:
DECEMBER 1949
F/119/L

NUMBERS INDICATE CABLE IDENTIFICATION COLOURS, SEE KEY ABOVE.

FOR SPECIFICATION OF EQUIPMENT SEE OVERLEAF.

Remove Watermark
Wondershare PDFelement



JAGUAR 2½ AND 3½ LITRE SALOON MARK V (1949)

(LHD FOR U.S.A.)

SPECIFICATION OF EQUIPMENT			BULBS				FUSES
	Model	*Service No.*		VOLTAGE	WATTAGE	LUCAS NUMBER	
Dynamo	C45PV	22429					
Starter							
2½ Litre	M418G	25523	Side and Indicator Lamps	12	6/24	189	
3½ Litre	M45G	26032					
Control Box	RF95	37076	Stop and Tail Lamps	12	6/24	189	
Battery	GTW9A		Indicator Lamps	12	24	199	Accessories :— No. FA35 35 amperes
Distributor			Number Plate Illumination Lamps	12	6	989	
2½ Litre	DVXH6A	40156	Reverse Lamps	12	24	199	
3½ Litre	DVXH6A	40149	Warning Lights	12	2.2	987	
Coil	B12	45012	Foglamp	12	48	192	

Remove Watermark Wondershare PDFelement

ACCESSORY MANUFACTURERS OVERSEAS SERVICE AGENTS

JAGUAR

2½ and 3½ LITRE

MARK V

INDEX

Manufacturer	Page
DUNLOP RUBBER COMPANY LIMITED - - - - - (Road wheels, tyres and tubes.)	Q. 2
JOSEPH LUCAS LIMITED AND GIRLING LIMITED - - - (Lucas : Electrical Equipment.) (Girling : Rear Shock Absorbers and Brakes.)	Q.10
SMITHS MOTOR ACCESSORIES LIMITED - - - - - (Instruments and Panel Lighting.)	Q.14
NEWTON AND BENNETT LIMITED - - - - - - (Front Shock Absorbers.)	Q.16
RADIOMOBILE LIMITED - - - - - - - - - (Radiomobile Car Radio.)	Q.17
CHAMPION SPARKING PLUG COMPANY LIMITED - - - (Sparking Plugs.)	Q.21

DUNLOP RUBBER COMPANY LIMITED

OVERSEAS DEPARTMENT

ST. JAMES'S HOUSE, ST. JAMES'S STREET

LONDON, S.W.1

Cables: Dunlop, London

EUROPE

A

ALBANIA

AUSTRIA

AZORES D. J. Leacock & Co. Ltda.,
P.O. Box 78, Ponta Delgada.
(Leacock Ponta Delgada)

B

BELGIUM Dunlop Rubber Co. (Continental) Ltd.,
13/14 Rue de France, Brussels.
(Pneumatic 21.00.10)

BULGARIA

C

CANARY ISLES Juan Dominguez Guedes,
Bravo Murillo, 28.
Las Palmas de Gran Canaria.
(Dogue 5737)
Hamilton & Co., Santa Cruz, Teneriffe.
(Hamilton)

CYPRUS B. C. Petrides & Co.,
P.O. Box 91, 4 Kyrenia St., Nicosia.
(Petrides Nicosia 214)

CZECHO-SLOVAKIA Jas. Narodni Podnik,
Generalni Zastaupeni Dunlop,
Hastalska–9, Praha 1.
(Pneulop, Praha)

D

DENMARK Dunlop Rubber Co., A/S,
Vennemindevej 30, Copenhagen, Ø.
(Dunlop Central 11,633)

F

FAROE ISLANDS Th. P. Christiansen, Thorshavn.
(Atlantic)

FINLAND Oy. Gronblom A.B.,
P.O. Box 370, Helsingfors, C.
(Gronblom 25861)

FRANCE Ste. Anon. des Pneumatiques Dunlop,

Head Office : 64 Rue de Lisbonne, Paris.
(Pneumatic Carnot 52-70)

Tyre Factory : Montlucon, Rue de Pasquis.
(Dunlop 186 & 399)

Wheel Works : Rue Edouard-Vaillant, Le Bourget.
(Dunlop Avi.01-19 01-61 Nor 86-77)

Depots—

AMIENS : 59 Rue de la Republique.
(Dunlop 63-34)

FRANCE (continued)

BAYONNE : 10 et 12 Rue Jacques-Laffitte.
(Dunlop 523-93)

BORDEAUX : 218 à 222 cours de la Somme.
(Dunlop 924-58)

CAEN : 61 Avenue Guynemer.
(Dunlop 49-24)

CLERMONT-FERRAND : 8 Rue Latour-Fondue.
(Dunlop 22-83)

DIJON : 19 Rue Thurot.
(Dunlop 17-47)

GRENOBLE : 10 Av. Alsace-Lorraine.
(Dunlop 40-46)

LE MANS : 106 Rue de Chanzy.
(Dunlop 16-75)

LILLE : 110 Avenue de la Republique,
La Madeleine.
(Dunlop 501-26/7)

LIMOGES : 13 bis, bd Gambetta, Boite Postale 39.
(Dunlop 36-28, 36-27)

LYON : 23 Rue Marc-Bloch.
(Dunlop Parmentier 49-91)

MARSEILLE : 300/2 Av. due Prado.
(Dunlop Dragon 50-04)

MONTLUCON : 41 Boulevard, Carnot.
(Dunlop 1-66, 9-66)

MONTPELLIER : 40 Av. du Pont-Juvénal.
(Dunlop 97-80)

NANCY : 152-154 Rue Jeanne-d'Arc.
(Dunlop 70-65, 70-66)

NANTES : 6 Quai Baco.
(Dunlop 122-15)

NICE : 74 Rue du Maréchal-Joffre.
(Dunlop 822-01, 822-03)

ORLEANS : 23 Rue Patay.
(Dunlop 31-37)

PARIS ET REGION PARISIENNE : 49 Rue de Villiers,
Neuilly-s/Seine.
(Dunlop, Maillot 94-02 & Maillot 73-00)

PAU : 16 Rue d'Etigny.
(Dunlop 32-61)

REIMS : 53 Rue des Moissons.
(Dunlop 59-78)

RENNES : 27 à 31 Rue Poullain-Duparc.
(Dunlop 36-58)

ROUEN : 5 Place du General-de-Gaulle.
(Dundop 372-64)

SAINT-ETIENNE : 77 Rue Bergson.
(Dunlop 39-74)

STRASBOURG : 5 Rue Thiergarten.
(Dunlop 214-87)

TOULOUSE : 1 Rue Saint-Bernard.
(Dunlop 201-14)

TOURS : 25 Rue Michel-Colombe.
(Dunlop 35-45)

G

GERMANY

Deutsche Dunlop Gummi Cie A.G.,
Hanau (Main).

Deutsche Dunlop Gummi Co A.G.,
Stockachstr 4-8, Stuttgart.
(41413)

Alte Jakobstr. 148,
Berlin SW.68 (American Sector).
(668 609)

Grosse Johannisstr. 204/208, Bremen.
(53 117)

Steelerstr. 151/53, Essen.
(28 303)

Mainzer Landstr. 87/89,
Frankfurt/Main.
(78 784)

Wilhelmstr. 24, Freiburg.
(2 133)

Bonnerstr. 515, Koln-Bayenthal.
(52 621)

Johanniswall – 2, Hamburg 1.
(330742-3)

Hildesheimerstr. 200, Hanover.
(24 746)

Paul Hese Str. 21, Munchen 2 BS.
(73 357)

Marienstr. 5, Nurnburg.
(26 800)

Depots—

Edenkobenstr. 30,
Mannheim-Kafertal-Sud.
(51 094)

Sandershauerstr. 59, Kassel-Battenhausen.

Russian Zone :

Krampferring 27, Erfurt.
(23 961)

Breiter Weg 252, Magdeburg.

GIBRALTAR

A. M. Capurro & Sons Ltd.,
(Central Garage),
20 Line Wall Road, Gibraltar.
(Capurro 488)

GREECE

Motor, Giant & M/Cycle Tyres :—
Georges Ioannou,
3rd September Street, No. 40, Athens.
(Rubber 55-879)

Cycle Tyres :—
C. Simeonoglou & H. Lykiardopoulos,
Solomou Str. 54, Athens.
(Simjac 593-711)

H

HOLLAND

N. V. Nederlandsche Dunlop Rubber en Banden Maatschappij,
Weesperzijde, 144/147, Amsterdam.
(Inflater 51178)

HUNGARY

I

ICELAND

Motor, Giant, M/Cycle & Aero :—
Fridrik Bertelsen & Co. Ltd.,
P.O. Box 852, Hafnarhvoll, Reykjavik.
(Fridrik 6620)

Cycle Tyres :—
Falkinn Ltd., Langaveg 24, Reykjavik.
(Falkinn 2670 and 3670)

ITALY

M

MADEIRA

Leacock & Co. Ltd., Funchal.
(Leacock)

MALTA

Gius Anastasi,
The John Bull Ironmongery Stores,
27/35 Opposite St. John's Co-Cathedral,
Valetta.
(Ironmongery Malta C.4122)

N

NORWAY

A.S. Auto-Materiell,
Munkedamsveien 5B, Oslo.
(Autotrio 42-69-44 Switchboard)

P

POLAND

PORTUGAL

William Graham Jr. & Co.,
7 Rua dos Fanqueiros, Lisbon.
(Grahams 20066, 20067)
6 Rua dos Clerigos, Oporto.
(Grahams 880,881)

R

RHODES

ROUMANIA

S

SPAIN

SWEDEN

Dunlop Rubber Co., A.B.,
Stockholmsvagen 16, Norrkoping.
(Dunlop 29215)

SWITZERLAND

Societe Anonyme des Pneumatiques Dunlop,
40-42 Rue de Berne, Geneva.
(Dunlop Geneva 2.16.45, 2.68.07)

Dunlop Pneumatik Co., A.G.,
Postfach Zurich 35, Zurich 6.
(Dunlop Zurich 26.97.33, 26.97.34, 26.97.35)

T

TENERIFFE

See under Canary Isles.

TURKEY

G. & A. Baker Ltd.,
Prevuayans Han, Tahtakale, Istanbul.
(Baker 24330)

Y

YUGOSLAVIA

ASIA

A

ADEN
E. C. Patell, Camp Aden,
Arabian Trading Co. Ltd., Aden.
(Chawky)

B

BURMA
Burmese Agencies Ltd.,
245/249 Sule Pagoda Road,
Corner of Bogyoke Street,
P.O. Box No. 176, Rangoon.
(Dunlops Rangoon)

C

CEYLON
Dunlop Rubber Co. Ltd.,
20 Darley Road, Post Box No. 223,
Colombo.
(Dunlops 2313/4)

CHINA
Dunlop Rubber Co. (China) Ltd.,
Marina House, 2nd Floor,
P.O. Box 478, Queens Road, Hongkong.
(Pneumatic 31107)
P.O. Box 593,
117 Hongkong Road, Shanghai.
(Pneumatic 13411-3)
Correspondence to Shanghai via Hongkong address above.

I

INDIA
Dunlop Rubber Co. (India) Ltd.,

Head Office :
"Dunlop House," 57b Free School Street,
Post Box No. 391, Calcutta.
(Covers South 364)

Factory :
P.O. Sahaganj, District Hooghly, Bengal.
(Dunlopwork Bhatpara 3)

Depots—
"Dunlop House," Hughes Road,
Post Box No. 4023, Bombay.
(Dunlops 46078)
"Dunlop House," 57b, Free School Street,
Post Box No. 256, Calcutta.
(Dunloptyre South 364)
Mori Gate, Post Box No. 64, Delhi.
(Dunlops 5108-5109)
"Dunlop House," 3/29 Mount Road,
Post Box No. 332, Madras.
(Dunlops 84041)

Sub-Depots—
No. 3 Hospital Road,
P.O.Box No. 86, Bangalore.
(Dunlops 7)
Blue Building, Canning Street,
P.O. Box 121, Lucknow.
(Dunlops)
246 Naicker New Street, Madura.
Kamptee Road, P.O.Box 60, Nagpur.
(Dunlops)
Dev Raj Mal Raj Buildings,
Fenton Gunj Road, Jullundur City.

INDO-CHINA
Compagnie de Commerce et de Navigation d'Extreme-Orient,
Boulevard Charner, Saigon.

INDONESIA
Dunlop Rubber Co. (Indonesia) Ltd.,
Tanah Abang Barat 22,
P.O. Kotak Pos No. 69, Djakarta-Pusat.
(Dunloptyre Batavia. Tel. Weltevreden 5208)

IRAN
Irano-Garb, Teheran.

IRAQ
H. S. Abed & Co. Ltd.,
Al Rashid Street, Baghdad.
(Joyce)

J

JAPAN

M

MALAYA
The Dunlop Rubber Co. (Malaya) Ltd.,
142 Robinson Road, P.O. Box 1135,
Singapore.
(Dunlop Tyre 5034)
11 China Street, Ghaut, Penang.
(Dunlop Tyre 1151)
42 Ampang Road, P.O. Box 1052,
Kuala Lumpur.
(Dunloptyre Kualalumpur)

P

PAKISTAN
The Pakistan Tyre & Rubber Co. Ltd.,
Head Office : Nadir House, P.O. Box 142),
McLeod Road, Karachi.
(Dunlops)
Depot— 36 Mall, P.O. Box No. 96, Lahore.
(Dunlops Lahore)
Sub-Depot— Basanta Kumar Das Road,
P.O. Box No. 65, Dacca.
(Dunlops Dacca)

PALESTINE
Consolidated Near East Co. Ltd.,
P.O. Box 60, Allenby Square, Haifa.
(Coneareast 2299)

PERSIAN GULF
Y. A. Fakhroo, Bahrein, Persian Gulf.
(Fakhroo)
Ahmad Mohamad Alghanim,
Kuwait, Persian Gulf.
(Arabi)
W. J. Towell & Co., Muscat, Oman.
(Towell)

PHILIPPINE ISLANDS
Cycle Tyres :
Warner Barnes & Co. Ltd.,
Soriano Building, Manila.

S

SAUDI ARABIA
Mohamed Fazil Abdulla Arab,
Jeddah (Hedjaz), Saudi Arabia.
(Arab d'Jeddah)

SIAM
Anglo-Thai Corporation Ltd.,
P.O.Box 328, Bangkok.

SYRIA
Henry Heald & Co.,
P.O. Box 64, Beirut (Lebanon).
(Healdco 62-75)

AFRICA

A

ALGERIA
Soc. Anon. des Pneumatiques Dunlop, 23 ter Boulevard Carnot, Algiers (Dunlop 306-70 306-71)
3 Av. de Roumanie, Constantine. (Dunlop 35-84)
2 Rue du Lieutenant Sylvestre, Oran. (Dunlop 253-10)

ANGOLA
Angola Coaling Co., Luanda. (Vapor)
Manica Trading Co., P.O. Box 118, Lobito. (Marrojar)

ASCENSION ISLAND

C

CAMEROONS (French)
Compagnie Francaise de L'Afrique Occidentale, Douala.
Société Commerciale de l'Ouest Africain, Douala.
Compagnie Exploitation Commerciale Africaine, Douala.

CAPE VERDE ISLANDS
Wilson, Sons & Co., St. Vincent, Cape Verde Is.

CONGO (Belgian)
La Sima, Société Congolaise d'Importation D'Automobiles, Boite Postale 671, Elizabethville. (Sima)
Nieuwe Afrikaansche Handels Vennootschap S.A., Leopoldville.
Compagnie du Kivu, Usumbura. (Kivu)

D

DAHOMEY
Compagnie Française de l'Afrique Occidentale, Cotonou.
Société Commerciale de l'Ouest Africain, Cotonou.

E

EGYPT
Tractor & Engineering Co. S.A.E., P.O. Box 366, 15 Sharia Emad El-Dine, Cairo. (Crocodile 46339, 56619)
(Branches at: Alexandria, Assiut, Mansourah, Minia, Tanta, Port Said, Port Tewfik.)

EQUATORIAL AFRICA (French)
Société Afrique et Congo Brazzaville, Barnier, Brazzaville.
Compagnie d'Exploitation Commerciale Africaine, Libreville.
Compagnie Française de l'Afrique Occidentale, Libreville. (Also at Pointe-Noire and Portgentil.)
Société Commerciale de l'Ouest Africain, Fort Lamy.

ERITREA
The Arabian Trading Co. Ltd., Via Bianchini 47, Asmara. (Arabian)

ETHIOPIA
The Arabian Trading Co. Ltd., 155 Cunningham Street, Addis Abbaba. (Arabian)

F

FERNANDO PO

G

GAMBIA
United Africa Co., Bathurst. (Unafrico)

GOLD COAST
United Africa Co., P.O. Box 306, Accra. (Unafrico)
Bartholomew & Co. Ltd., Accra. (Bartholomew)

GUINEA (French)
Compagnie Française de l'Afrique Occidentale, Conákry.
Société Commerciale de l'Ouest Africain, Conákry.
Compagnie du Niger Français, Conákry.

GUINEA (Portuguese)

GUINEA (Spanish)

I

IVORY COAST
Compagnie Française de l'Afrique Occidentale, Abidjan. (Also at Bobo Dioulassa & Gd. Bassam.)
Société l'Africaine Française, Abidjan.
Compagnie Française de la Côte d'Ivoire, Abidjan. (Also at Bobo Dioulassa & Gd. Bassam.)
Compagnie d'Exploitations Commerciales Africaines, Abidjan.
Société d'Exportation Coloniale, Abidjan.
Société Commerciale de l'Ouest Africain, Abidjan. (Also at Bobo Dioulasso, Tabou and Gd. Bassam.)

K

KENYA
African Mercantile Co. Ltd., P.O. Box 230, Nairobi. (Navigation)
African Mercantile Co. Ltd., P.O. Box 110, Mombasa. (Navigation)

L

LIBERIA
The Cavalla River Co. Ltd., Monrovia. (Unafrico)
Oost Afrikaansche Cie., Monrovia.

LIBYA
Cyrenaica

Tripolitania

M

MADAGASCAR
Société Madagascar-Automobile, Tananarive.

MAURITIUS
Electric & Motor Car Co. Ltd., Port Louis. (Electro)

MOROCCO
Soc. Anon. des Pneumatiques Dunlop, 64 Rue Savorgnan de Brazza, Casablanca. (Dunlop A.49-91)

MOZAMBIQUE (N. of Zambesi R.)
Joao Ferreira dos Santos, Mozambique. (Santos Jorreirantos)
Zambesia Comercial Lda., Quelimane, Mozambique. (Zamalda)

MOZAMBIQUE (S. of Zambesi R.)
Companhia Comercial (Pty.) Ltd., P.O. Box 433, Lourenco Marques. (Comercial 386)
Emporium Grandes Armazens da Beira, P.O. Box 200, Beira. (Emporium 37 & 234)

N

NIGERIA
United Africa Co. Ltd., P.O. Box 550, Lagos. (Unafrico)
Joe Allen & Co., Lagos. (Allymotter Lagos)

NYASALAND
African Lakes Corporation Ltd., Mandala, Blantyre. (Nyasa Blantyre)

R

REUNION ISLANDS
Mm. Foucque & Cie, Saint-Denis.

RHODESIA (Northern)
Border Motor Co., P.O. Box 182, Ndola. (Bormotor 352)
Duly & Co., P.O. Box 90, Ndola. (Duly 390)

RHODESIA (Southern)
Dunlop South Africa Ltd., Eleventh Avenue, P.O. Box 771, Bulawayo. (Tyres 3544 & 2361)
Also at :
Cnr. Kingsway and Union Avenue, P.O. Box 1217, Salisbury. (Tyres 4849)

S

SENEGAL
La Manutention Africaine, Dakar.
Compagnie Française de l'Afrique Occidentale, Dakar. (Also at Kaolack and Ziquinchor.)
Nouvelle Société Commerciale Africaine, Dakar. (Also at Kaolack, Ziquinchoir and Foundiougne.)
Société Commerciale de L'Ouest Africain, Dakar. (Also at Kaolack.)

SOUTH WEST AFRICA
S. Cohen (Pty.) Ltd., P.O. Box 215, Windhoek. (Cohen 218, 211 & 696)

SEYCHELLES
Temooljee & Co., Mahe.

SIERRA LEONE
United Africa Co. Ltd., Freetown. (Unafrico)
Staveley & Co. Ltd., Freetown.

SOMALIA
Ernst Goldschmidt, Mogadishu, Somalia. (Ergo, Phone 17)

SOMALILAND (British)
Karsondas Pitamber, Berbera.

SOMALILAND (French)
Milas, Djibouti.

ST. HELENA

SUDAN (Anglo-Egyptian)
Sudan Mercantile Co. (Motors) Ltd., P.O. Box 97, Khartoum. (Sudanile)
Also at :
Port Sudan, Wad Medani.

SUDAN (French)
Compagnie Française de l'Afrique Occidentale, Bamako.
Compagnie du Niger Français, Bamako.
Société Commerciale de l'Ouest Africain, Bamako.
Société Commerciale du Soudan Français, Bamako.
Manutention Africaine, Bamako.

T

TANGANYIKA
African Mercantile Co. Ltd., P.O. Box 119, Dar-es-Salaam. (Navigation)
Also :
P.O. Box 24, Tanga. (Navigation)
P.O. Box 8, Bukoba. (Navigation)

TOGOLAND (French)
Compagnie Française de l'Afrique Occidentale, Lome.
Société Commerciale de l'Ouest Africain, Lome.
United Africa Co. Ltd., Lome.

TUNISIA
Soc. Anon. des Pneumatiques Dunlop, 67 Rue de Besançon, Tunis. (Dunlop 19-47)

U

UGANDA
The Uganda Co. Ltd., P.O. Box 1, Kampala. (Ugacol)
The Uganda Co. Ltd., Jinja. (Ugacol)
The Uganda Co. Ltd., Mbale. (Uganda Co.)

UNION OF SOUTH AFRICA
Head Office and Factory :
Dunlop South Africa Ltd., Sydney Road, P.O. Box 925, Durban. (Dunlop 57131-7, 58435)
Depots :
P.O. Box 941, Cnr. Albert Street and Commercial Road, Durban. (Tyres 25582-4)
59 Church Street, Bloemfontein. (Tyres 1664 & 1667)
P.O. Box 477, 50 Strand Street, Cape Town. (Dunlop 25544/6)
P.O. Box 648, 8-10 Albert Street, East London. (Tyres 2101)
P.O. Box 6370 Dunlop House, Cnr. Loveday and Frederick Streets, Johannesburg. (Tyres 33-4321/7)
P.O. Box 802, 12 Parkin Street, North End, Port Elizabeth. (Tyres 87641/3)
P.O. Box 919, 5 Ockerse Street, Pretoria. (Tyres 31486 & 33341)

W

WEST AFRICA (French Niger)
Société Commerciale de l'Ouest Africain, Zinder.
Compagnie du Niger Français, Zinder. (Also at Niamey.)

Z

ZANZIBAR
African Mercantile Co. Ltd., P.O. Box 1, Zanzibar. (Navigation)

AMERICA

A

ANTIGUA
Geo. W. Bennett-Bryson & Co. Ltd., St. Johns.
(Bennett Antigua)

ARGENTINA
Dunlop Pneumatic Tyre Co. (S.A.) Ltd.
Head Office : Avenida Ingeniero Huergo 1433, Buenos Aires.
(Dunlop)
Depots : Avenida Velez Sarsfield 141, Cordoba.
Salta 1882, Rosario.
1° de mayor 3502, Santa Fé.
Calle Cordoba 360, Mendoza.
Crisostomo Alvarez 458/60, Tucuman.
General Pinto No. 890, Tandil, Provincia de Buenos Aires.
Avenida Colon 179, Bahia Blanca.
Depositaires : Casa Corga, Entre Rios 872, Concordia.

ARUBA
Arubia General Supplies, San Nicolas.
A. Max Arends, P.O. Box 142, Nassaustraat 380, Aruba, N.W.1.

B

BAHAMAS
L. C. Brice, Central Gas Station, P.O. Box 12, Nassau.
(Brice Nassau)

BARBADOS
Dowding Estates and Trading Co. Ltd., Bay Street, Bridgetown.
(Detco Barbados)

BERMUDA
Hand Arnold Ltd., Hamilton.
(Mater Hamilton)

BOLIVIA
Compania Importadora Boliviana S.A., Avenida Mariscal Santa Cruz, (Edificio Medina), Casilla Correo 954, La Paz.
(Cibo La Paz)

BRAZIL
Dunlop Pneumatic Tyre Co. (S.A.) Ltd.
Head Office : Rua Dona Veridiana 172, Caixa Postal 162B, Sao Paulo.
(Dunlop)
Branches : Avenida Rodriques Alves No. 179, Caixa Postal 1788, Rio de Janeiro.
Rua da Concordia No. 220, Recife, Pernambuco.
(Dunlop Recife)
Rua 7 de Setembro 754, Caixa Postal 1000, Porto Alegre.
Rua Portugal 14, Caixa Postal 519, Bahia.

C

CANADA
Dunlop Tire & Rubber Goods Co. Ltd.,
Head Office : Queen Street East, Toronto, Ont.
(Pneumatic Gladstone 2431)
Branches : 522 11th Ave., West, Calgary, Alta.
(M.9541)
1619 William Street, Montreal 3, Quebec.
(Fitzroy 9654)
74 Union Street, St. John, N.B.
(2559)
1290 Homer Street, Vancouver, B.C.
(0251)
376 Donald Street, Winnipeg, Man.
(27-861)
1434 Broad Street, Regina, Sas.
(1342)

CHILE
Agencias Graham S.A.C., Morande 330, Casilla 88D, Santiago.
(Graham Santiago Chile)
Gibbs & Co., Agustinas 1350, Casilla 67-D, Santiago.
(Antipodean Santiago Chile)

COLOMBIA
G. N. Hutchinson, Paseo Bolivar 43-38, Apartado Aereo 182, Barranquilla.
(Hutchie Barranquilla)
Aparicio y Silva, Carrera 8, 16-12, Apartado Nacional 906, Bogota.
(Aparsilva Bogota)
V. Burrowes y Cia. Ltda., Apartado Aereo 228, Carrera 1a No. 14-70, Cali.
(Burrowes Cali)
Casa Colombia, Carrera Bolivar 45-57, Apartado Aereo 648, Medellin.
(Casacol Medellin)

COSTA RICA
C. M. Palma & Co., Apartado 403, San Jose.
(Palmanos San Jose Costa Rica)

CUBA
Renovadora Cubana de Gomas, S.A., Infanta 603, Havana.
(Renovadora Havana)

CURACAO
Rodolfo Pardo, Madurostratt No. 7, P.O. Box 163, Curacao.
(Ropar Curacao)
Henri J. de Jongh, P.O. Box 46, Willemstad, Curacao, N.W.1.

D

DOMINICA
C. G. Phillip, Market Square, Roseau.
(Phillip, Dominica)

DOMINICAN REPUBLIC
General Sales Company C. por A., Apartado 746, Ciudad Trujillo.
(Gensaco Ciudad Trujillo Dominican Republic)

E

ECUADOR
Sociedad Comercial Anglo Ecuatoriana, Ltda., Malecon 809-810, Casilla 410, Guayaquil.
(Scael Guayaquil Ecuador)

EL SALVADOR
Cia Tecnico-Industrial, Soler-Serra Hnos., 1a Calle Poniente No. 6, Apartado 214, San Salvador, C.A.
(Solerserra San Salvador)
Casa Saprissa S.A., Calle Ruben Dario 58, San Salvador.

F

FALKLAND ISLANDS
Estate Louis Williams, Port Stanley.
(Williams Port Stanley)

G

GRENADA
Thomson Hankey & Co., St. George's.

GUADELOUPE
Souquet-Basiege, Pointe-á-Pitre.

GUATEMALA
George J. Plihal Cia., Guatemalteca Incatecu S.A., Guatemala City.

GUIANA (British) — The Central Garage, 7 and 8 High Street, P.O. Box 87, Georgetown. (Fretus Demarara)

GUIANA (Dutch) — Heirs of W. M. F. Bourne, P.O. Box 220, Waterkant 22-22A, Suriname. (Bourne Paramaribo)

GUIANA (French) — Siguier, Cayenne.

H

HAITI — Brandt Brothers, Port-au-Prince. (Branbros Haiti)

HONDURAS (British) — G. N. F. Nord, P.O. Box 188, Belize.

HONDURAS REPUBLIC — Honduras Importers Association, S.A. Apartado Postal 82, Tegucigalpa.

J

JAMAICA — T. Geddes Grant Ltd., 139 Harbour Street, Kingston. (Britgoods Kingston (Jca.)

M

MAGALLANES — Stambuk y Fernandez Ltda., Casilla 283, Punta Arenas, Chile. (Stamindez Punta Arenas)

MARTINIQUE — Andre H. Despointes, Fort-de-France.

MEXICO — Watson, Phillips y Cia Sucs S.A., 3a Dinamarca No. 55, Apartado Postal No. 67, Mexico, D.F.

MONTSERRAT — R. E. D. Osborne, Tar River Estate, Montserrat. (Reos Montserrat)

N

NEWFOUNDLAND — Corner Brook Foundry & Machine Co. Ltd., Corner Brook. (266)

NICARAGUA — H. F. Cross & Co., Managua. (Cross Managua)

P

PANAMA — Agencias W. H. Doel, Central Avenue, P.O. Box 322, Panama City, Panama, R.P.

PARAGUAY — Frutos & Arietti, Pte. Eligio Ayala y Caballero, Asuncion. (Frutosar Asuncion)

PERU — Neumaticos Dunlop S.A., Avenida Paraguay 486, Plaza Bolognesi, Casilla 1352, Lima. (Dunlop-Lima)

S

ST. KITTS — S. L. Horsford & Co. Ltd., Basseterre.

ST. LUCIA — Minvielle & Chastanet Ltd., Castries, St. Lucia, B.W.I. (Chastanet St. Lucia B.W.I.)

ST. VINCENT — Corea & Co. Ltd., St. Vincent, B.W.I. (George)

T

TRINIDAD — Neal & Massy Engineering Co. Ltd., 63 Edward Street, Port-of-Spain. (Nealco Port of Spain)
Principal Cycle Dealer: H. M. Hernandez Ltd., Henry Street, Port-of-Spain. (Cycle Port of Spain)

U

URUGUAY — Dunlop Rubber Co. (Uruguay) Ltd., Uruguay 774, Montevideo. (Dunlop)

U.S.A. — Dunlop Tire & Rubber Corporation, (Dunlop-Buffalo)

Factory and Head Office: River Road & Sheridan Drive, Buffalo 7, N.Y. (Riverside 6220)

Branches:
507 Peachtree Street, N.E., Atlanta 3, Ga.
698 Beacon Street, Boston 15, Mass. (Copley 0210)
431/7 E Illinois Street, Chicago 11, Ill. (Whitehall 7881)
2106 Euclid Avenue, Cleveland 15, Ohio. (Prospect 3322)
1801 Griffen Street, Box 5175, Dallas 2, Texas. (Riverside 75166)
1620-1622 Grand Avenue, Kansas City 8, Mo. (Harrison 2144)
3744 Fruitland Avenue, Maywood, Los Angeles, Calif. (Angeles 15118)
385 Gerard Avenue, Bronx Central Post Office, New York 51, N.Y. (Mott Haven 9-2033)
22nd Street and Sedgley Avenue, Philadelphia 32, Pa. (Radcliff 1666)
1155 Mission Street, San Francisco 3, Calif. (Sutter 4224)
500 Fifth Avenue, New York 18, N.Y. (Pennsylvania 6-2682)

Warehouses:
908 Main Street, Jacksonville 2, Fla.
289 Monroe Avenue, Memphis 3, Tenn.
6204 Shakespeare Ave. Extension, Pittsburgh 6, Pa.
2214 Whitesboro Street, Utica 4, N.Y.
144 Monroe Avenue, Rochester 7, N.Y.
430 East Wells Street, Milwaukee 2, Wis.
1933 Washington Avenue, St. Louis 3, Mo.
3930 Woodward Avenue, Detroit 1, Mich.
1651 West Broad St., W.E. P.O. Box 5192, Richmond 20, Va.
1101, West Baltimore Street, Baltimore 23, Md.

V

VENEZUELA — Juan S. Mendoza, y Cia, Pte. de Hierro, Apartado de Correos 446, Caracas. (Jusimen Caracas)

AUSTRALASIA

A

AUSTRALIA

Dunlop Rubber Australia Ltd.,

Head Office : 108 Flinders Street, Melbourne, Victoria. (Pneumatic 10740-51)

Factories :
- Normanby Road, Montague, Melbourne, Victoria. (Pneumatic Mx. 3291)
- Carey Street, Drummoyne, New South Wales. (Rubber Works Drummoyne)
- Trennery Crescent, Abbotsford, Victoria. (JA.1114)

Branches :
- 108 Flinders Street, Melbourne, Victoria. (Pneumatic 10740)
- 27 Wentworth Avenue, Sydney, New South Wales. (Pneumatic M.4409)
- Centenary Place, Brisbane, Queensland. (Pneumatic B.1641)
- 153 Flinders Street, Adelaide, South Australia. (Pneumatic Central 8050)
- 424 Murray Street, Perth, Western Australia. (Pneumatic B.8181)
- 35 Argyle Street, Hobart, Tasmania. (Pneumatic 6581)
- 18 Patterson Street, Launceston, Tasmania. (Pneumatic 1650)

N

NEW CALEDONIA

Agence Alma-Pentecost, Noumea.

Société Automobile des Messageries Neo-Caledoniennes, Noumea.

NEW ZEALAND

Head Office : Dunlop New Zealand Ltd., 35 Marion Street, Wellington, C.2. (Dunlop Wellington 54-370)

Factories :
- Upper Hutt, P.O. Box 55, Nr. Wellington. (Dunlop Upper Hutt 375)
- P.O. Box 1222, Woolston, Christchurch. (Dunlopwork Christchurch)

Branches :

North Isle
- Halsey Street, P.O. Box 1802, Auckland. (19-844/5 40-325)
- Unity Building, Hood Street, P.O. Box 521, Hamilton. (4051)
- Warren Street, P. O. Box 535, Hastings. (3615)
- State Fire Building, Egmont Street, P.O. Box 39, New Plymouth. (2117)
- Stewart Building, 127 Rangetikei Street, P.O. Box 526, Palmerston North. (5517)
- 7 Trafalgar Place, P.O. Box 61, Wanganui. (Pneumatic 2133)
- 38 Taranici Street, P.O. Box 100, Wellington. (Pneumatic 55-040)

South Isle
- 126 Oxford Terrace, P.O. Box 171, Christchurch. (30-798 & 41-865)
- Moritzsons Building, Cnr. Jetty Street and Bond Street, P.O. Box 875, Dunedin. (11-811)
- N.Z. Express Co. Building, Barnard Street, Timaru. (2096)

S

SOUTH PACIFIC
- Burns, Philp (South Sea) Co. Ltd., Suva, Fiji Isles.
- Burns, Philp (South Sea) Co. Ltd., Apia, Samoa.
- Burns, Philp (South Sea) Co. Ltd., Lautoka, Fiji Islands.
- Burns, Philp (South Sea) Co. Ltd., Ba, Fiji Islands.
- Burns, Philp (South Sea) Co. Ltd., Levuka, Fiji Islands.
- Burns, Philp (South Sea) Co. Ltd., Lagasa, Fiji Islands.
- Burns, Philp (New Hebrides) Co. Ltd., Vila, New Hebrides.
- Burns, Philp (South Sea) Co. Ltd., Nukulofa, Tonga Islands.
- Burns, Philp (South Sea) Co. Ltd., Vavau, Tonga Islands.
- A. B. Donald Ltd., Rarotonga, Cook Islands.

LUCAS CENTRAL EXPORT DIVISION

46 PARK STREET, LONDON, W.1

Cables : Lucasland, Audley, London

A

ADEN Mitchell Cotts & Co. Ltd. (M.E.), Aden and Yemen. (Lucas, Girling)

ALGERIA Soumeillant & Cie., 30 Boulevard Carnot, Algiers. (Lucas)
Andre Debes et Ci., 3 Rue Denfert, Rocheneau, Algiers.

ANGOLA Under negotiation.

ANGUILLA J. N. Goddard & Sons Ltd., P.O. Box 77, Barbados, British West Indies. (Lucas, C.A.V., Girling)

ANTIGUA J. N. Goddard & Sons Ltd., P.O. Box 77, Barbados, British West Indies. (Lucas, C.A.V., Girling)

ARGENTINE Goffre Carbone Y Cia., S.A.C., Calle Viamonte 1549, Buenos Aires. (Lucas, C.A.V., Girling)

AUSTRALIA Joseph Lucas (Aust.) Pty. Ltd.,

Main Factory Branch : 81-85 Bouverie Street, Melbourne, N.3. (Lucas, C.A.V., Girling)

Main Factory Sub-Branch : Joseph Lucas (Aust.) Pty. Ltd., Box No. P1217, Perth, Western Australia. (Lucas, C.A.V., Girling)

Main State Agents : Bennett & Wood Pty. Ltd., Cnr. of Pitt and Bathurst Streets, Sydney, New South Wales. (Lucas, C.A.V.)

Starting Lighting Ignition Pty. Ltd., 68/78 Sturt Street, S.C.4, Melbourne, Victoria. (Lucas, C.A.V.)

Hannan Bros. Pty. Ltd., 58/62 Flinders Street, Adelaide, South Australia. (Lucas, C.A.V).

Elphinstones Pty. Ltd., 327/335 Ann Street, Brisbane, Queensland. (Lucas, C.A.V.)

W. A. Richards, 56 Collins Street, Hobart, Tasmania. (Lucas, C.A.V.)

Bells Auto Electric Service, 166 Brisbane Street, Launceston, Tasmania. (Lucas, C.A.V.)

AUSTRIA Adolf Riedl & Alfred Brandt, Turkenstrasse 25, Vienna IX/66. (Lucas, C.A.V., Girling)

AZORES Under consideration.

B

BAHAMAS Bay Street Garage, P.O. Box 878, Nassau. (Lucas, Girling)

BARBADOS J. N. Goddard & Sons Ltd., P.O. Box 77, Barbados, British West Indies. (Lucas, C.A.V., Girling)

BARBUDA J. N. Goddard & Sons Ltd., P.O. Box 77, Barbados, British West Indies. (Lucas, C.A.V., Girling)

BELGIAN CONGO Duncan Smith (Africa) Ltd., Leopoldville, Belgian Congo. (Lucas, C.A.V., Girling)

BELGIUM and LUXEMBOURG Daniel Doyen Societe Anonyme, 31-32 Boulevard du Midi, Brussels. (Lucas, C.A.V.)
Bureau Technique International S.P.R.L., 34 Rue de l'Association, Brussels. (Girling)

BERMUDA The Bermuda Motor & Cycles Accessories Co. Ltd., The Lucas House, Hamilton. (Lucas, C.A.V., Girling)

BOLIVIA Under negotiation.

BORNEO NORTH See Malaya.

BRAZIL G. Borghoff & Cia., Rua Riachuelo 243, Rio de Janeiro. And at Av. General Olimpio da Silveira 63, Sao Paulo. (Lucas, C.A.V., Girling)

BRITISH COLUMBIA Boultbee Ltd., 1025 Howe Street, Vancouver, B.C., Canada. (Lucas, C.A.V., Girling)

BRITISH GUIANA Booker, Bros., McConnell & Co. Ltd., Georgetown. (Lucas, C.A.V., Girling)

BRITISH HONDURAS British Honduras Distributors, P.O. Box 240, Belize. (Lucas, C.A.V., Girling)

BULGARIA Under consideration.

BURMA The East Asiatic Co. Ltd., 577 Merchant Street, Rangoon. (C.A.V.)

C

CANADA (See also British Columbia) Joseph Lucas (Canada) Ltd., 7035 Grand Avenue, Montreal. (Lucas, C.A.V., Girling)
And
Joseph Lucas (Canada) Ltd., 2299 Dundas Street West, Toronto 3. (Lucas, C.A.V., Girling)

CANARY ISLANDS Autocesorios Harry Walker, S.A.E., Bravo-Murillo, 36, Las Palmas-de Gran Canaria. (Lucas, C.A.V., Girling)

CEYLON Walker Sons & Co. Ltd., P.O. Box 166, Colombo. (Lucas, C.A.V., Girling)

CHILE Flinn, Blandford & Co. Ltd., Casilla 1837, Santiago de Chile. (Lucas, C.A.V., Girling)

CHINA Dodwell & Co. Ltd., Praya Central, Hong Kong. (Lucas)

COLOMBIA Under negotiation.

COOK ISLANDS Under negotiation.

COSTA RICA Under negotiation.

CUBA Alvarez Mena Corporation, Prado y San Lazaro, Havana. (Lucas, C.A.V., Girling)

CURACAO Unique Machine Coy., P.O. Box 58, Willemstad, Curacao. (Lucas, C.A.V., Girling)

CYPRUS — Nicos D. Solomonides & Co., P.O. Box 210, Limassol. (Lucas, C.A.V., Girling)

CZECHO-SLOVAKIA — Autoavia (Z. Rejman & Co.), Rimska 26, Prague XII. (Lucas, C.A.V., Girling)

D

DAHOMEY — John Walkden & Co. Ltd., Cotonou. (Lucas)

DENMARK — Axel Ketner, Norrevold 9, Copenhagen K. (Lucas, C.A.V., Girling)

DOMINICA — J. N. Goddard & Sons Ltd., P.O. Box 77, Barbados, British West Indies. (Lucas, C.A.V., Girling)

DOMINICAN REPUBLIC — Under consideration.

DUTCH GUIANA — Under consideration.

E

ECUADOR — Arosemena Hermanos, Calle Pedro Carbo 406/416 Guayaquil (Lucas, Girling)

EGYPT — Soliman Osman, Brougham & Co., 75-77a Malika Nazli Avenue, Cairo. (Lucas, Girling)

Edgard Eid, 12 Rue El, Malika Farida, Cairo. (C.A.V.)

EIRE — Joseph Lucas Ltd., Portland Street North, North Circular Road, Dublin. (Lucas, C.A.V.)

ERITREA — Gellatly, Hankey & Co. (Sudan) Ltd., Asmara. (Lucas, C.A.V., Girling)

ETHIOPIA — Sabean Utility Corporation Ltd., 76 Churchill Road, Addis Ababa. (Lucas, C.A.V., Girling)

F

FALKLAND ISLANDS — **Under consideration.**

FAROE ISLANDS — Under consideration.

FIJI ISLANDS — Under consideration.

FINLAND — O. Y. Alftan Ab., Fabiansgatan 14, Helsingfors. (Lucas, C.A.V., Girling)

FRANCE and MONACO — M.E.V.A., 79 Avenue de la Grande Armee, Paris, 16. (Lucas, C.A.V., Girling)

FRENCH CAMEROONS — R. & W. King Ltd., Duala. (Lucas)

FRENCH MOROCCO — Standard Auto-Accessories, (A. Kaufmann), 87 Boulevard Pasteur, (Route de Rabat), Casablanca. (C.A.V.)

G

GAMBIA — The United Africa Co. Ltd., Bathurst. (Lucas, C.A.V., Girling)

GERMANY — Under consideration.

GIBRALTAR — C. Cabedo & Co., 19-21 Cannon Lane, Gibraltar. (Lucas, C.A.V., Girling)

GOLD COAST — The United Africa Co. Ltd., P.O. Box 306, Motor Department, Accra. (Lucas, C.A.V., Girling)

GREECE — J. Th. Galanos & Co., 28th October Street, 59, Athens. (Lucas, C.A.V., Girling)

GRENADA — J. N. Goddard & Sons Ltd., P.O. Box 77, Barbados, British West Indies. (Lucas, C.A.V., Girling)

GUATEMALA — Keilhauer, Pagram & Co. Ltd., 20 Calle Oriente No. 22, Guatemala, C.A. (Lucas, C.A.V., Girling)

H

HAITI — Under consideration.

HOLLAND — See Netherlands.

HONDURAS REPUBLIC — Under consideration.

HONG KONG — Dodwell & Co. Ltd., Praya Central, Hong Kong. (Lucas)

Gilman & Co. Ltd., 4a Des Voeux Road, Hong Kong. (C.A.V.)

HUNGARY — A. Kluger-VI, Jokai Utca 3, Budapest. (C.A.V.)

I

ICELAND — Fridrik Bertelsen & Co. Ltd., Hafnarhvoll, Reykjavik. (Lucas, C.A.V., Girling)

INDIA — Lucas Indian Service Ltd.,

Main Factory Branch : 15 New Queen's Road, Bombay. (Lucas, C.A.V., Girling)

Main Factory Sub-Branch : 46 Wellesley Street, Calcutta. (Lucas, C.A.V., Girling)

Main Factory Sub-Branch : No. 1 Pattullas Road, Mount Road, Madras. (Lucas, C.A.V., Girling)

INDO CHINA — Under consideration.

IRAN — The Lynch Co. Ltd., 118 Avenue Hafiz, Teheran. (Lucas, C.A.V., Girling)

IRAQ — Stephen Lynch & Co. Ltd., Beit Lynch, Baghdad. (Lucas, C.A.V., Girling)

IRELAND N. — Joseph Lucas Ltd., 51/55 Upper Library Street, Belfast. (Lucas, C.A.V.)

ITALY — Under consideration.

J

JAMAICA — The Electrical Supply & Service Co. Ltd., 12-16 Hanover Street, Kingston. (Lucas, C.A.V., Girling)

JAPAN — Under consideration.

JAVA — See Netherlands East Indies.

K

KENYA — Kettles-Roy & Tysons (Mombasa) Ltd., Box 100, Nairobi and at Box 208, Mombasa. (Lucas, C.A.V., Girling)

KUWAIT — See Persian Gulf.

L

LEBANON — Automotive & Industrial Equipment Co. Ltd., Rue Al Arz, Beirut. (Lucas, C.A.V., Girling)

LEEWARD ISLANDS — J. N. Goddard & Sons Ltd., P.O. Box 77, Barbados, British West Indies. (Lucas, C.A.V., Girling)

LIBERIA Under consideration.

LIBYA Under consideration.

LUXEMBOURG (as BELGIUM) Daniel Doyen Societe Anonyme, 31-32 Boulevard du Midi, Brussels. (Lucas, C.A.V.)
Bureau Technique International S.P.R.L., 34 Rue de l'Association, Brussels. (Girling)

M

MADAGASCAR Under consideration.

MADEIRA Leacock & Co. Ltd., Funchal. (Lucas, C.A.V.)

MALAYA Far East Motors Ltd., 54 Orchard Road, Singapore. (Lucas, C.A.V., Girling)

MALTA Mizzi Brothers, 283 Kingsway, Valetta. (Lucas, C.A.V., Girling)

MAURITIUS Forget & Co., 10-12 Royal Street, Port Louis. (Lucas)

MEXICO Auto-Repuestos de Mexico S.A., Calle Ignacio Ramirez 20, Mexico City, D.F. (Lucas, C.A.V., Girling)

MONACO See France.

MONTSERRAT J. N. Goddard & Sons Ltd., P.O. Box 77, Barbados, British West Indies. (Lucas, C.A.V., Girling)

MOROCCO See French Morocco.

MOZAMBIQUE Agencias Modernas Ltd., Avenida Republica, Lourenco Marques. (Lucas, C.A.V., Girling)

MUSCAT (OMAN) See Oman.

N

NETHERLANDS Transmark N/V, Hooftlaan 57, Bussum, Holland. (Lucas, C.A.V., Girling)

NETHERLANDS EAST INDIES Manufacturers & Traders Incorporated, 58 Djoclaweg, P.O. Box 73, Batavia, Java. (Lucas, C.A.V., Girling)

NEVIS J. N. Goddard & Sons Ltd., P.O. Box 77, Barbados, British West Indies. (Lucas, C.A.V., Girling)

NEWFOUNDLAND Under negotiation.

NEW GUINEA See Papua.

NEW ZEALAND

Main Factory Branch : Joseph Lucas (N.Z.) Ltd., 75-77 Beach Road, Auckland, C.I. (Lucas, C.A.V.)

Main Factory Sub-Branch : Joseph Lucas (N.Z.) Ltd., Unity Buildings, Hood Street, Hamilton. (Lucas, C.A.V., Girling)

Main Agents : L. M. Silver & Co. Ltd., Lucas House, Wakefield Street, Wellington. (Lucas, C.A.V., Girling)
Wooff & Salvesen Ltd., 32-34 Lichfield Street, Christchurch. (Lucas, C.A.V., Girling)
Wooff & Salvesen Ltd., 218 Crawford Street, Dunedin. (Lucas, C.A.V., Girling)

NICARAGUA H. F. Cross & Co., Managua, Nicaragua. (Lucas, C.A.V., Girling)

NIGERIA The United Africa Co. Ltd., P.O. Box 550, Lagos. (Lucas, C.A.V., Girling)

NORWAY Chr. Gran-Henriksen, Radhusgt 14, Oslo. (Lucas, Girling)
A/S Automagnet, Tollbodgatan 28, Oslo. (C.A.V.)

NYASALAND Brown & Clapperton Ltd., P.O. Box 52, Blantyre. (Lucas, C.A.V., Girling)

O

OMAN (MUSCAT) Sub-Agent : Jaffer Haji Bhacker Abdul Latif, Muscat. (Lucas, Girling)

P

PAKISTAN The Lucas Service (Pakistan) Ltd., Kandawalla Building, Mohammad Ali Jinnah Road, Karachi. (Lucas, C.A.V., Girling)

PALESTINE Consolidated Near East Co. Ltd., P.O. Box 60, Haifa. (Lucas, C.A.V., Girling)

PANAMA Under consideration.

PAPUA Under consideration.

PARAGUAY Under negotiation.

PEMBA Kettles-Roy & Tysons (Mombasa) Ltd., Box 171, Dar-es-Salaam, Tanganyika. (Lucas, C.A.V., Girling)

PERSIAN GULF Sub-Agents : Gray Mackenzie & Co. Ltd., Basra and Bahrein. (Lucas, C.A.V., Girling)

PERU "Inca," S.A., Calle Hauscar 1338, Lima. (Lucas, C.A.V., Girling)

PHILLIPINE ISLANDS Under negotiation.

POLAND Under consideration.

PORTUGAL Electro Automobilista, 55 Rua de Gloria 59, Lisbon. (Lucas, C.A.V., Girling)

PORTUGUESE EAST AFRICA See Mozambique.

PUERTO RICO Under consideration.

R

RHODESIA Stansfield Ratcliffe & Co. Ltd., Lucas (S.A.) Service Station, 101 Main Street, Bulawayo. (Lucas, C.A.V., Girling)
Stansfield Ratcliffe & Co. Ltd., Corner of Manica Road, Sindia Street, P.O. Box 1263, Salisbury. (Lucas, C.A.V., Girling)

ROUMANIA Under consideration.

S

SAN SALVADOR Under consideration.

SAUDI ARABIA Mahamed Fazil Abdulla Arab, Jeddah (Hedjaz) (Lucas, C.A.V., Girling)

SIAM (THAILAND) See Thailand.

SIERRA LEONE The United Africa Co. Ltd., Motor Department, Freetown. (Lucas, C.A.V., Girling)

SOMALILAND See Ethiopia.

SPAIN Autocesorios Harry Walker, S.A., Rosellon 192, Barcelona. (Lucas, C.A.V., Girling)

ST. KITTS J. N. Goddard & Sons Ltd., P.O. Box 77, Barbados, British West Indies. (Lucas, C.A.V., Girling)

ST. LUCIA J. N. Goddard & Sons Ltd., P.O. Box 77, Barbados, British West Indies. (Lucas, C.A.V., Girling)

ST. VINCENT J. N. Goddard & Sons Ltd., P.O. Box 77, Barbados, British West Indies. (Lucas, C.A.V., Girling)

SUDAN Gellatly, Hankey & Co. (Sudan) Ltd., P.O. Box 215, Khartoum. (Lucas, C.A.V., Girling)

SUMATRA See Netherlands East Indies.

SWEDEN Amerikanska Gummi Aktiebolaget, Luntmakaregatan 25, Stockholm 3. (Lucas, C.A.V., Girling)

Amerikanska Gummi Aktiebolaget, Lundavagen 54, Malmo. (Lucas, C.A.V., Girling)

SWITZERLAND C. Schaefer, Limmatstrasse 210, Zurich 5. (Lucas, C.A.V.)

V. Merz, Rue des Rois 1, Geneva. (Lucas, C.A.V.)

Walker & Cie., Belpstrasse 24, Bern. (Lucas, C.A.V.)

J. J. Derendinger, G.m.b.H., Stauffacherquai 18/20, Zurich. (Girling)

SYRIA Automotive & Industrial Equipment Co. Inc., Mawlayeh Building, Sultan Street, Damascus. (Lucas, C.A.V., Girling)

T

TANGANYIKA Kettles-Roy & Tysons (Mombasa) Ltd., Box 171, Dar-es-Salaam. (Lucas, C.A.V., Girling)

TANGIER Under negotiation.

THAILAND (SIAM) Oriental Machinery Stores, Bangkok. (Lucas (less batteries), C.A.V., Girling)
Barrow Brown & Co. Ltd., Bangkok. (Lucas (batteries))

TOGOLAND The United Africa Co. Ltd., Lome. (Lucas, C.A.V., Girling)

TRINIDAD Laughlin & de Gannes Ltd., 44 New Street, Port of Spain. (Lucas, C.A.V., Girling)

TRIPOLI (North Africa) Beniamino Haddad, 9 Corso 1, P.O. Box 168, Balbo. (Lucas, C.A.V., Girling)

TUNISIA Etablissements E. Anduze, 46 Rue Massicault, Tunis. (C.A.V.)
Jean Borg, 35 Rue de Marseille & Passage Mado, Tunis. (Lucas)

TURKEY Suat Karaosman ve Dizel Sirketi, Ceylan Han, Taksim No. 25, Istanbul. (Lucas, C.A.V., Girling)

U

UGANDA Kettles-Roy & Tysons (Mombasa) Ltd., Box 28, Kampala. (Lucas, C.A.V., Girling)

UNION OF SOUTH AFRICA

CAPE TOWN Stansfield Ratcliffe & Co. Ltd., 105-107 Strand Street. (Lucas, C.A.V., Girling)

JOHANNESBURG Lucas (S.A.) Service Station, 29/31 Simmonds Street (Extension). (Lucas, C.A.V., Girling)

DURBAN Lucas (S.A.) Service Station, 101/5 Pine Street, P.O. Box 72. (Lucas, C.A.V., Girling)

PORT ELIZABETH Lucas (S.A.) Service Station, 115 Queen Street, P.O. Box 798. (Lucas, C.A.V., Girling)

EAST LONDON Lucas (S.A.) Service Station, 179 Oxford Street, P.O. Box 386. (Lucas, C.A.V., Girling)

KIMBERLEY Lucas (S.A.) Service Station, 95 Du Toitspan Road, P.O. Box 487. (Lucas, C.A.V., Girling)

PRETORIA Lucas (S.A.) Service Station, 452 Church Street, P.O. Box 54. (Lucas, C.A.V., Girling)

BULAWAYO Stansfield Ratcliffe & Co. Ltd., Lucas (S.A.) Service Station, 101 Main Street. (Lucas, C.A.V., Girling)

SALISBURY Stansfield Ratcliffe & Co. Ltd., Corner of Manica Road, Sindia Street, P.O. Box 1263. (Lucas, C.A.V., Girling)

UNITED STATES OF AMERICA Lucas Electrical Services (Inc.), 653 Tenth Avenue (corner of 46th Street), New York 19, N.Y. (Lucas, C.A.V., Girling)

And at

Lucas Electrical Services (Inc.), 8163 Melrose Avenue, Los Angeles. California. (Lucas, C.A.V., Girling)

URUGUAY Automotive Accessories, S.A., Calle Nueva York 1175, Montevideo. (Lucas, C.A.V., Girling)

V

VENEZUELA Under negotiation.

W

WINDWARD ISLANDS See Barbados.

Y

YUGOSLAVIA Under consideration.

Z

ZANZIBAR Kettles-Roy & Tysons (Mombasa) Ltd., Box 171, Dar-es-Salaam, Tanganyika. (Lucas, C.A.V., Girling)

SMITHS MOTOR ACCESSORIES LIMITED

CENTRAL EXPORT DEPARTMENT

CRICKLEWOOD WORKS, LONDON, N.W.2

Cables: Speedofac, Norphone, London

NORTH AMERICA AND BERMUDA

B

BERMUDA — Bermuda Motor & Cycle Accessories Co., The Lucas House, Hamilton, Bermuda.

C

CANADA — Pryal & Nye, 24 Wellesley Street West, Toronto 5, Ontario.
Boultbee Limited, 1025 Howe Street, Vancouver, British Columbia.

U

UNITED STATES OF AMERICA — Nisonger Sales Company, 146 East 74th Street, New York 21, N.Y.

SOUTH AMERICA AND B.W. INDIES

A

ARGENTINE — Goffre Carbone y Cia., Viamonte 1549, Buenos Aires.

B

BRAZIL — Thornycroft Mecanica y Importadora S.A., P.O. Box 2383, Rua Santa Luzia No. 405, Rio de Janeiro.

C

CHILE — Flinn, Blandford & Co. (Imp.) S.A.C., Casilla 1837, Teatinos 901, Santiago de Chile.

G

GUIANA (British) — Bookers Garage, Church Street, Georgetown, Demerara.

U

URUGUAY — Automotive Accessories S.A., Nueva York 1175, Montevideo.

W

WEST INDIES — B.S.A. Agency Ltd., 9 King Street, Kingston, Jamaica.
David Morrin & Son Ltd., 67 Marine Square, Port of Spain, Trinidad.

EUROPE

A

AUSTRIA — Dipl. Ing. H. Roth, Geylinggasse 2-4, Vienna XIII.

B

BELGIUM — De Witteleir & Keppens, 641-645 Chaussee de Waterloo, Brussels.

C

CZECHO-SLOVAKIA — Stepar Hanak & Co., Schirchova 15, Prague VIII.

D

DENMARK — Vilh. Nellemann A/S., Vodroffsvej 55-57, Copenhagen.

E

EIRE — Buckley Accessories Ltd., 191 Pearse Street, Dublin.

F

FINLAND — Osakeyhtio S. & N., Alexandersg. 21a, Helsingfors.

FRANCE — Ets. Ed. Jaeger S.A., 2 Rue Baudin, Levallois Perret, Seine.

G

GIBRALTAR — A. M. Capurro & Sons Ltd., 20 Line Wall Road, Gibraltar.

GREECE — John Vorres & Co., Voulis Street 12, Athens.

H

HOLLAND — Rietbergen-Van Hees N.V., Van der Sluysstraat 90-92, Rotterdam.

I

ICELAND — Fridrik Bertelsen & Co. Ltd., Hafnarhvoll, Reykjavik.

ITALY — Ruggeri & Nizzi, Via Andrea Doria 32, Milan.

N

NORWAY — Norsk Speedometer Service, Toftesgate 56, Oslo.

P

PORTUGAL — Soc. de Lubrificantes Ingleses, Lda., Avenida da Liberdade 35, 1°, Lisbon.

S

SPAIN — Soc. Anonima Olabour, Gerona 55, Barcelona.
Also at Madrid, Bilbao, Cartagena.

SWITZERLAND — Imex S. A., Rue Ph.-Plantamour 8, Geneva.

SWEDEN — A-B. E. Fleron, Malmgatan 4, Malmo.

TURKEY — Suat Karaosman ve Seriki, Ceylan Han, Taksim No. 25, Istanbul.

AFRICA AND THE NEAR EAST

A

AFRICA (NORTH)

EGYPT — Soliman Osman, Brougham & Co., Lucas Service Station, 75-77a Malika Nazli Avenue, Cairo.

AFRICA (SOUTH)

CAPE TOWN — Stansfield Ratcliffe & Co. Ltd., P.O. Box 797, 105-107 Strand Street.

Branches at :

DURBAN — P.O. Box 72, 101/5 Pine Street.

JOHANNESBURG	P.O. Box 3223, 29/31 Simmonds Street Extension.
PRETORIA	P.O. Box 54, 452 Church Street.
EAST LONDON	Lucas (S.A.) Service Station, 179 Oxford Street.
PIETERMARITZ-BURG	Lucas (S.A.) Service Station, 212 Commercial Road.
KIMBERLEY	Lucas (S.A.) Service Station, 95 Dutoitspan Road, P.O. Box 487.
BULAWAYO	P.O. Box 254.
PORT ELIZABETH	Lucas (S.A.) Service Station, 115 Queen Street.
BLOEMFONTEIN	Lucas (S.A.) Sub-Service Station, 48a Henry Street.
SALISBURY	Stansfield Ratcliffe & Co. Ltd., Cnr. of Manica Road and Sinoia Street, P.O. Box 1263.

AFRICA (WEST)

GOLD COAST and NIGERIA	Union Trading Co. Ltd., Accra and Lagos.

C

CYPRUS	Cyprus Trading Corpn. Ltd., P.O. Box 73, Nicosia.

I

IRAQ and PERSIAN GULF	Stephen Lynch & Co. Ltd., Deit Lynch, Baghdad.
IRAN	Sherkat Fanni Automobile Ltd., Bargh Avenue, Teheran.
ISRAEL	Israel Motor Agency Ltd., 12 Allenby Road, P.O. Box 1507, Haifa.

J

JORDAN	Jordan Automobile & General Agencies Ltd., P.O. Box 200, Ammam.

M

MALTA	Mizzi Brothers, 283 Kingsway, Valletta.
MAURITIUS	Robert Le Maire Ltd., Port Louis.

S

SUDAN	Gellatly Hankey & Co. (Sudan) Ltd., P.O. Box 215, Khartoum.
SYRIA	The Automotive & Industrial Equipment Co. (Lebanon) Inc., P.O. Box 47, Beirut.

INDIA AND THE FAR EAST

B

BURMA	Motor House Co. Ltd., Judah Ezekial Street, Rangoon.

C

CEYLON	Walker Sons & Co. Ltd., P.O. Box 166, Colombo.
CHINA	Alex Ross & Co. (China) Ltd., Hong Kong. Auto Palace Co. Ltd., C.56 Mow Ming Road South, Shanghai 18.

I

INDIA

HYDERABAD (DECCAN), CENTRAL PROVINCES and BOMBAY PRESIDENCY	French Motor Car Co. Ltd., Hughes Road, Bombay.
MADRAS PRESIDENCY	P. Orr & Sons Ltd., Mount Road, Madras.
BENGAL, ASSAM, BIHAR and ORISSA	French Motor Car Co. Ltd., 234-3, Lower Circular Road, Calcutta.
NEW DELHI and UNITED PROVINCES	Allied Motors Ltd., Scindia House, Queensway, New Delhi.
EAST PAKISTAN	James Finlay & Co. Ltd., Chittagong.
PAKISTAN WEST AND NORTH, INCLUDING ADJACENT STATES OF HYDERABAD, KAIRPUR, BAHAWALPUR AND KASHMIR	Walter Locke & Co. (1933) Ltd., 69 The Mall, Lahore.

INDONESIA	Manufacturers & Traders Ind., P.O. Box 73, 58 Djocjaneg, Batavia, Java.

M

MALAY STATES, BRITISH NORTH BORNEO, SARAWAK and BRUNEI.	Far East Motors Ltd., 54 Orchard Road, Singapore.

S

SIAM.	Barrow Brown & Co. (1948) Ltd., Barrow Brown Buildings, Asadang Road, Bangkok.

AUSTRALIA AND NEW ZEALAND

A

AUSTRALIA	S. Smith & Sons (Australia) Pty. Ltd., 307 Parramatta Road, Haberfield, N.S.W. Smith, Sons & Rees Pty. Ltd., 30-32, Wentworth Avenue, Sydney, N.S.W. Johns & McHale Pty. Ltd., Cnr. Ann & Wharf Streets, Brisbane, Queensland. Keep Bros. & Wood (Pty.) Ltd., 200 Latrobe Street, Melbourne, Victoria. Lenroc Limited, 211 Pulteney Street, Box 1119K, G.P.O., Adelaide, S. Australia. F. & R. Tough, Alder Street, Perth, W. Australia.

N

NEW ZEALAND	Watson, Steel & Ganley Ltd., 109-113 Hobson Street, Auckland. Teagle, Smith & Sons Ltd., 276-278 Wakefield Street, Wellington. E. Parrott, 43 Litchfield Street, Christchurch. H. E. W. Silver Magneto & Speedometer Co., 70b Dixon Street, Wellington, C.I. Young Bros., Stafford Street, Timaru.

T

TASMANIA	C. H. Heathorn, 53-63 Bathurst Street, Hobart.

NEWTON AND BENNETT LIMITED
VALETTA ROAD, ACTON
LONDON, W.3

A

ARGENTINE Mr. Eric Greene, Junca 14645, Buenos Aires.

AUSTRALIA

Representatives : Kemsley & Co. (Pty.) Limited, 109 Russell Street, Corner Little Collins Street, Melbourne.
Kemsley & Co. (Pty.) Limited, N.Z. Chambers, 105 St. George's Terrace, Perth, Western Australia.
Kemsley & Co. (Pty.) Limited, Warwick Building, Hamilton Street, Sydney.

Distributors : Motor Traders (S.A.) Ltd., 81-89 Flinders Street, Adelaide, South Australia.
Coventry Motor Replacements Pty. Limited, 876-879 Hay Street, Perth, Western Australia.
Shock Absorber Steering Specialists & Co., 100 Riley Street, Sydney, N.S.W.
Annand & Thompson, Breakfast Creek Road, Newstead N. L., Brisbane, Queensland.

B

BELGIUM, LUXEMBOURG and BELGIAN CONGO Etablissements M. Pianetti, 138-138A Rue Jourdan, Brussels, Belgium.

BRAZIL Mr. H. Decoster, Caiza Postal 2488, Rio de Janeiro.

BRITISH WEST INDIES Trinidad Agencies Limited, Port-of-Spain, Trinidad, B.W.I.

C

CANADA Prenco Progress Engineering Corp., 72-74 Stafford Street, Toronto, Ontario.

CZECHO-SLOVAKIA Mr. Joseph H. Chmel, Krakovska 22, Praha 11.

D

DENMARK F. Bulow & Co., Postgire, 610 Polititorvet, Kobenhavn V.

F

FINLAND Sandholm Industrimaskiner, P.O. Box 24, Helsingfors.

FRANCE Applications Nouvelles a l'Industrie & l'Automobile, 26 Boulevard Sebastopol, Paris (IVe).

G

GREECE Mr. G. E. McKenzie, 21 Komninon, Thessaloniki.

H

HOLLAND Deha, Den Haag.

HUNGARY Magyar Abroncs EsKerekgyar R. T., Legardy Faroly Ucca 5, Budapest V.

I

ICELAND Gisli Jonsson & Co. Ltd., 10 Aegisgata, Reykjavik.

ITALY Britalia, Corso Guilo Cesaro 16, Torino.

K

KENYA Hill, Barrett & Co., P.O. Box 53, Kitale, Kenya Colony.

M

MAURITIUS Robert le Maire Ltd., Port Louis.

N

NEAR EAST and MEDITERRANEAN Mr. R. Haynes, 30 Sharia Fouad el Awai, Cairo.

NEW ZEALAND

Representatives : Kemsley & Co. (Pty.) Limited, Colonial Mutual Building, Wellington.

Distributors : Motor Traders (N.Z.) Ltd., P.O. Box 789, Auckland.
J. & A. R. Scott Limited, P.O. Box 209, Dunedin.
Teagle Smith & Sons Limited, P.O. Box 405, Wellington.

NORWAY T. H. Elin Anderson, P.O. Box 987, Oslo.

P

PORTUGAL Auto-Triunfo 56 F. R. Santa Maria, Lisbon.

S

SOUTH AFRICA

Representatives : D. Kemsley & Co. (Pty.) Ltd., 322 Boston House, Strand Street, Cape Town.

Distributors : Atlanta Industries (Pty.) Limited, 3 MacLaren Street (opp. Marshall Square), Johannesburg.
McCarthy Rodway Limited, 17 Smith Street, Durban.
Port Elizabeth Motors, 231 Adderley Street, Port Elizabeth.

SOUTHERN and NORTHERN RHODESIA, PORTUGUESE EAST AFRICA, NYASALAND. Puzey & Payne Limited, P.O. Box 857, Kingsway, Salisbury, S. Rhodesia.

SPAIN Liffraud, Prats S. L., Paseo San Juan, 35, Barcelona.

SWEDEN A. B. Amerikanska, Motor Importen, Stockholm, 7.

SWITZERLAND Heizmann & Regis, Aarau.

T

TANGANYIKA Wigglesworth & Co. (Africa) Limited, P.O. Box 416, Dar es Salaam, and Private Bag, Tanga.

U

UGANDA Motors Limited, Uganda.

RADIOMOBILE LIMITED

CRICKLEWOOD WORKS,

LONDON, N.W.2

EUROPE

A

AUSTRIA

B

BELGIUM S.A. Gramophone N.V.,
Bd. Maurice Lemonnier 171, Brussels.
(Gramophone Brussels)

C

CANARY ISLANDS

CYPRUS D. J. Demades, P.O. Box 104,
Nicosia, Cyprus.
(Didemades Nicosia)

CZECHO-SLOVAKIA

D

DENMARK Vilh. Nellemann A/S,
Vodroffsvej 55-57, Copenhagen.
(Waldeck Copenhagen)

F

FINLAND Oy. Radioteolisuus,
Loon Rotinkatu 20, Helsinki.

FRANCE Les Industries Musicales et Electriques
Pathe Marconi,
251/3 Rue du Faubourg, St. Martin, Paris.
(Gramophone, Paris)

G

GERMANY

GIBRALTAR S. Teuma & Co. Ltd.,
79 Main Street, Gibraltar.

GREECE Lambropoulos Bros. Ltd.,
4 Churchill Street, Athens.

H

HUNGARY

I

ICELAND Fridrik Bertelsen & Co. Ltd.,
Hafnarhvoll, Reykjavik.
(Fridrik Reykjavik)

IRISH REPUBLIC Buckleys Accessories Ltd.,
191 Pearse Street, Dublin.
(Dublin 70881)

ITALY Ruggeri & Nizzi,
Via Andrea Doria 32, Milan.

M

MADEIRA Valentim de Carvalho Lda.,
Rua Nova Almada, 95-97, Lisbon, Portugal.
(Tim Lisbon)

MALTA Mizzi Bros., 283 Kingsway,
Valletta, Malta.
(Framizzi Malta)

N

NETHERLANDS Nira N.V., President Steynstraat, Maasluis.
Service at :
Van Santen, Tiendstraat 53-55,
Einde West Kruis Kade, Rotterdam.

NORWAY Brodrene Johnsen A/S., Postboks 251,
Nedre Slottsgate 11, Oslo.
(Broderjohn Oslo)

P

POLAND

PORTUGAL Valentim de Carvalho Lda.,
Rua Nova de Admada, 95-97, Lisbon.
(Tim Lisbon)

S

SPAIN Soc. Anonima Olabour,
Gerona 55, Barcelona.
(Olabour, Barcelona)

SWEDEN Skandinaviska Grammophon A-b,
Sandhamnsgatan 39, Stockholm.
(Grammophon Stockholm)

SWITZERLAND Imex S.A., Rue Ph. Plantamour 8, Geneva.
(Imex Geneva)

T

TURKEY Suat Karaosman ve Seriki Dizel,
Ceylan Han Taksim No. 25, Istanbul.
(Dizel Istanbul)

Y

YUGOSLAVIA

AFRICA

A

ALGERIA Les Industries Musicales et Electriques
Pathe Marconi,
251/3 Rue du Faubourg, St. Martin, Paris.
(Gramophone Paris)

ANGOLA Valentim de Carvalho Lda.,
R. Nova do Almada, 95-97,
Lisbon, Portugal.
(Tim Lisbon)

AZORES Valentim de Carvalho Lda.,
R. Nova do Almada, 95-97,
Lisbon, Portugal.
(Tim Lisbon)

B

BELGIAN CONGO

E

EGYPT Misr Engineering & Car Co.,
19 Bustan Street, Cairo.

ETHIOPIA Pallonjee Dinshaw & Co.,
Steamer Point, Aden.

F

FRENCH EQUATORIAL AFRICA Les Industries Musicales et Electriques Pathe Marconi,
251/3 Rue du Faubourg, St. Martin, Paris.
(Gramophone Paris)

FRENCH WEST AFRICA Les Industries Musicales et Electriques Pathe Marconi,
251/3 Rue du Faubourg, St. Martin, Paris.
(Gramophone Paris)

G

GOLD COAST

K

KENYA COLONY East Africa Music Store,
Government Road, Nairobi.
(Music Nairobi)

M

MADAGASCAR Les Industries Musicales et Electriques Pathe Marconi,
251/3 Rue du Faubourg, St. Martin, Paris.
(Gramophone Paris)

MAURITIUS S. Manuel, 11 St. George Street,
Port Louis.

MOROCCO (FRENCH) Les Industries Musicales et Electriques Pathe Marconi,
251/3 Rue du Faubourg, St. Martin, Paris.
(Gramophone Paris)

MOROCCO (SPANISH) Centrale Automobile Marocaine S.A.,
Rue du Mexique, Place du France, Tangier.
(Camsa Tangier)

N

NIGERIA

NYASSALAND

P

PORTUGUESE EAST AFRICA Stansfield Ratcliffe & Co. Ltd.,
101/5 Pine Street, Durban.
(Smallarms Durban)

R

REUNION ISLAND

RHODESIA SOUTH Stansfield Ratcliffe & Co. Ltd.,
Cnr. Manica Road and Sinoia Street,
Salisbury, South Rhodesia.
(Smallarms, Salisbury)

RHODESIA NORTH Stansfield Ratcliffe & Co. Ltd.,
101 Main Street, Bulawayo,
South Rhodesia.
(Smallarms, Bulawayo)

S

SOMALILAND Pallonjee Dinshaw & Co.,
Steamer Point, Aden.

SOUTH AFRICA

Head Office : Stansfield Ratcliffe & Co. Ltd.,
105-107 Strand Street, Capetown.
(Smallarms Cape Town)

Branches at : Stansfield Ratcliffe & Co. Ltd.,
48a Henry Street, Bloemfontain.
(Smallarms, Bloemfontain)

Stansfield Ratcliffe & Co. Ltd.,
101/5 Pine Street, Durban.
(Smallarms Durban)

Stansfield Ratcliffe & Co. Ltd.,
179 Oxford Street, East London.
(Smallarms East London)

Stansfield Ratcliffe & Co. Ltd.,
29/31 Simmonds Street Extension,
Johannesburg.
(Rifles Johannesburg)

Stansfield Ratcliffe & Co. Ltd.,
95 Dutoitspan Road, Kimberley.
(Smallarms Kimberley)

Stansfield Ratcliffe & Co. Ltd.,
212 Commercial Road, Pietermaritzburg.

Stansfield Ratcliffe & Co. Ltd.,
115 Queen Street, Port Elizabeth.
(Smallarms Port Elizabeth)

SUDAN

T

TANGANYIKA International Motor Mart Ltd.,
P.O. Box 409, Dar-es-Salaam.
(Garager Dar-es-Salaam)

TANGIER Centrale Automobile Marocaine S.A.,
Rue du Mexique, Place du France, Tangier.
(Camsa Tangier)

TRIPOLITANIA Flli, V. & C. Hannuna,
Casella Postale 221, Tripoli.
(Fratelli Hannuna Tripoli)

TUNISIA Les Industries Musicales et Electriques Pathe Marconi,
251/3 Rue du Faubourg, St. Martin, Paris.
(Gramophone Paris)

U

UGANDA East Africa Music Store,
Government Road, Nairobi, Kenya.
(Music Nairobi)

ASIA

A

ARABIA

ADEN Pallonjee Dinshaw & Co.,
Steamer Point, Aden.

KUWAIT Stephen Lynch & Co.,
Beit Lynch, Baghdad.

SAUDI ARABIA

PERSIAN GULF

BRITISH NORTH BORNEO, SARAWAK and BRUNEI

ACCESSORY MANUFACTURERS

CENTRAL AND SOUTH AMERICA

B

BURMA — M. L. Shaw (Burma) Ltd., 389 Dalhousie Street, Rangoon. (Goldey Rangoon)

C

CEYLON — Cargills Ltd., P.O. Box 23, Colombo.

CHINA

H

HONG KONG

I

INDIA — The Gramophone Co. Ltd., P.O. Box 118, Bombay 1. The Gramophone Co. Ltd., P.O. Box 48, Calcutta. (Jabberment Calcutta)

INDONESIA — Manufacturers & Traders Ltd., 58 Joc Jaweg, P.O. Box 73, Batavia, Java. (Jabberment Singapore)

IRAQ — Stephen Lynch & Co. Ltd., Beit Lynch, Baghdad.

ISRAEL

J

JORDAN

L

LEBANON — S. Audi Freres, 10-14 Avenue des Français, Beyrouth. (Saudi Beyrouth)

M

MALAYA — Far East Motors Ltd., Orchard Road, Singapore.

P

PAKISTAN EAST — James Finlay & Co. Ltd., Chittagong, East Pakistan. (Mercator Chittagong)

PAKISTAN WEST and NORTH INCLUDING ADJACENT STATES OF HYDERABAD, KHAIRPUR, BAHAWALPUR and KASHMIR — Shahnawaz Ltd., P.O. Box 655, 140 Bunder Road, Karachi.

PERSIA — Lynch Bros. Ltd., 95 Cannon Street, E.C.4.

T

THAILAND

A

ARGENTINA — Industrias Electricas Y Musicales Odeon, Av. Corrientes 485, Buenos Aires. (Turntable Baires)

B

BARBADOS — Da Costa & Co. Ltd., Barbados, British West Indies. (Dacosta Barbados)

BERMUDA — Bermuda Motor & Cycle Accessories Co., The Lucas House, Hamilton, Bermuda. (Accessories Bermuda)

BOLIVIA — Industrias Electricas Y Musicales Odeon, Av. Corrientes 485, Buenos Aires. (Turntable Baires)

BRITISH GUIANA — The Modern Radio Co. Ltd., P.O. Box 178, Georgetown, Demerara. (Victrola Georgetown)

BRAZIL — Industrias Electricas E Musicais Fabrica Odeon S.A., Rua Do Lavradio 76, Rio de Janeiro. (Turntable Rio de Janeiro) Also at: Rua Frederico Alvarenga 284, Sao Paulo.

C

CHILE — Servicio Lucas-Blandford Y Cia Ltda., Casilla 9858, Santiago de Chile. (Blandford Santiago)

COLOMBIA — Industrias Electricas Y Musicais Odeon, Av. Corrientes 485, Buenos Aires. (Turntables Baires)

COSTA RICA — Industrias Electricas Y Musicais Odeon, Av. Corrientes 485, Buenos Aires. (Turntable Baires)

CUBA

CURACAO — Industrias Electricas Y Musicais Odeon, Av. Corrientes 485, Buenos Aires. (Turntable Baires)

E

ECUADOR — Industrias Electricas Y Musicais Odeon, Av. Corrientes 485, Buenos Aires. (Turntable Baires)

G

GUATEMALA — Industrias Electricas Y Musicais Odeon, Av. Corrientes 485, Buenos Aires. (Turntable Baires)

H

HONDURAS — Industrias Electricas Y Musicais Odeon, Av. Corrientes 485, Buenos Aires. (Turntable Baires)

J

JAMAICA — Times Stores Ltd., King Street, Kingston.

M

MEXICO — Industrias Electricas Y Musicais Odeon, Av. Corrientes 485, Buenos Aires. (Turntable, Baires)

N

NICARAGUA Industrias Electricas Y Musicais Odeon, Av. Corrientes 485, Buenos Aires. (Turntable Baires)

P

PANAMA Industrias Electricas Y Musicais Odeon, Av. Corrientes 485, Buenos Aires. (Turntable Baires)

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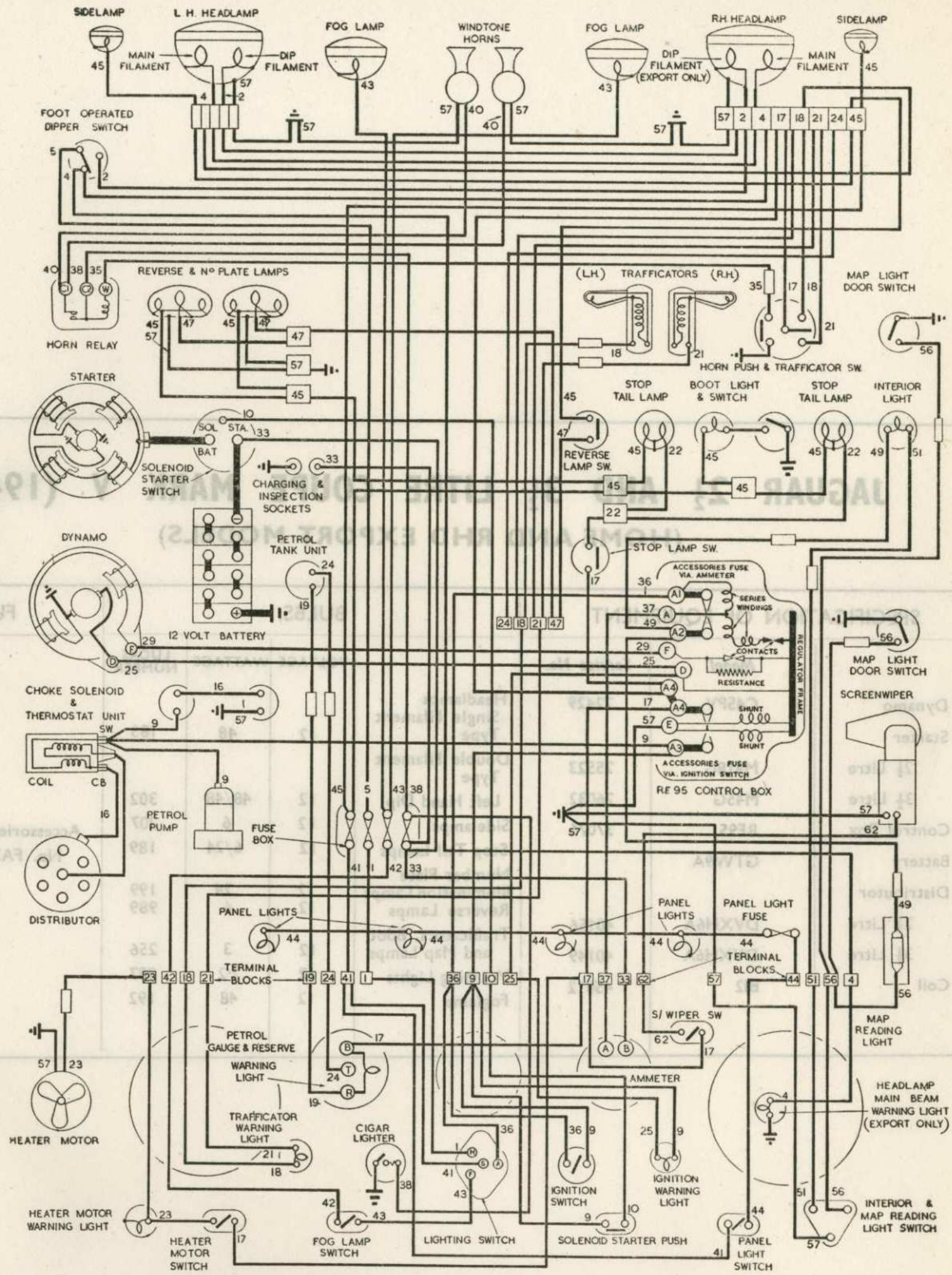
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COUPE MARK V 1949
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2 BLUE with RED	15 WHITE with BROWN	28 YELLOW with WHITE	41 RED	54 PURPLE with GREEN
3 BLUE with YELLOW	16 WHITE with BLACK	29 YELLOW with GREEN	42 RED with YELLOW	55 PURPLE with BROWN
4 BLUE with WHITE	17 GREEN	30 YELLOW with PURPLE	43 RED with BLUE	56 PURPLE with BLACK
5 BLUE with GREEN	18 GREEN with RED	31 YELLOW with BROWN	44 RED with WHITE	57 BLACK
6 BLUE with PURPLE	19 GREEN with YELLOW	32 YELLOW with BLACK	45 RED with GREEN	58 BLACK with RED
7 BLUE with BROWN	20 GREEN with BLUE	33 BROWN	46 RED with PURPLE	59 BLACK with YELLOW
8 BLUE with BLACK	21 GREEN with WHITE	34 BROWN with RED	47 RED with BROWN	60 BLACK with BLUE
9 WHITE	22 GREEN with PURPLE	35 BROWN with YELLOW	48 RED with BLACK	61 BLACK with WHITE
10 WHITE with RED	23 GREEN with BROWN	36 BROWN with BLUE	49 PURPLE	62 BLACK with GREEN
11 WHITE with YELLOW	24 GREEN with BLACK	37 BROWN with WHITE	50 PURPLE with RED	63 BLACK with PURPLE
12 WHITE with BLUE	25 YELLOW	38 BROWN with GREEN	51 PURPLE with YELLOW	64 BLACK with BROWN
13 WHITE with GREEN	26 YELLOW with RED	39 BROWN with PURPLE	52 PURPLE with BLUE	

WIRING DIAGRAM
No. W76420
12 VOLT

ISSUED:
APRIL 1949

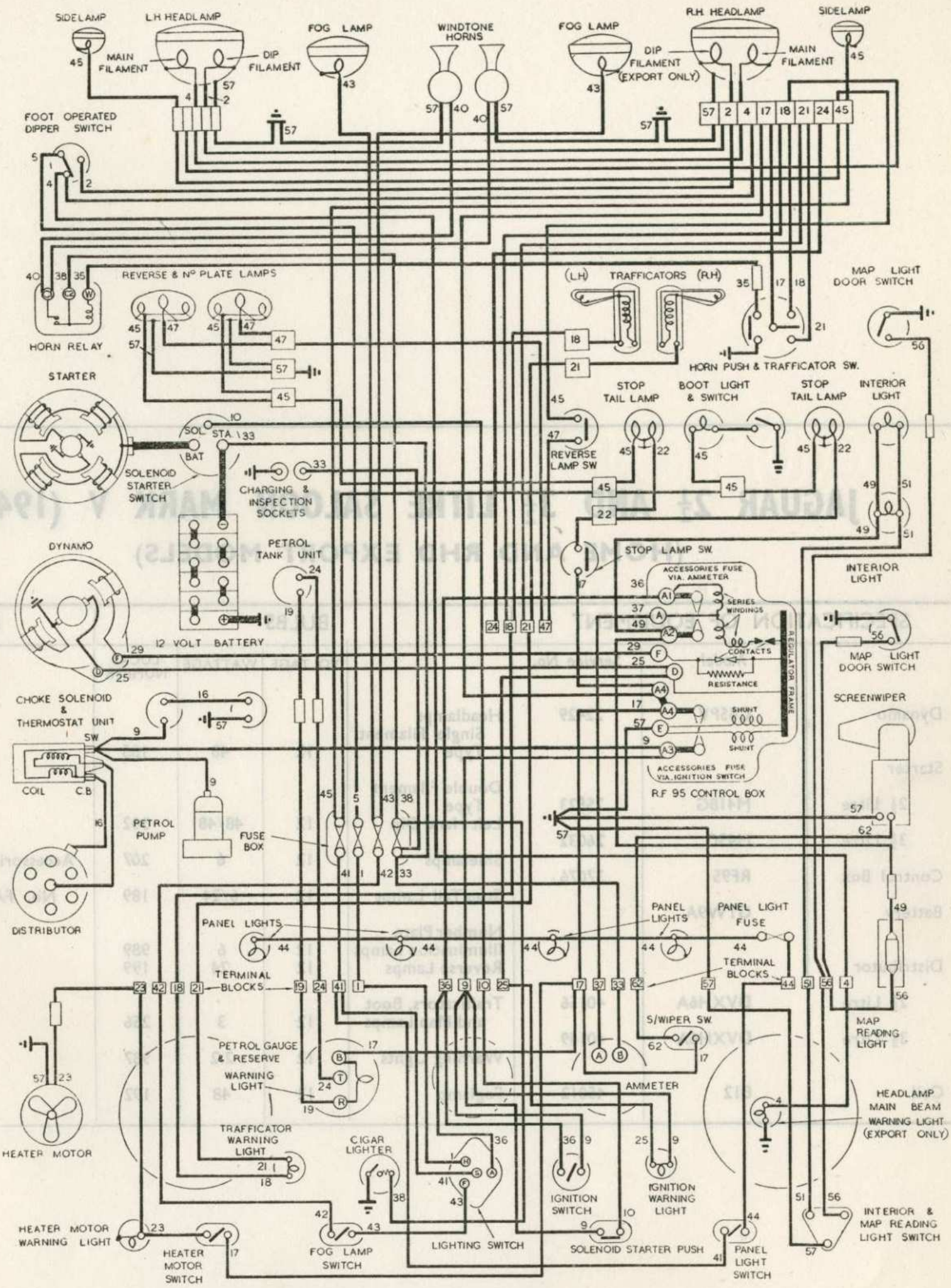
F/89/L

NUMBERS INDICATE CABLE IDENTIFICATION COLOURS, SEE KEY ABOVE.

FOR SPECIFICATION OF EQUIPMENT SEE OVERLEAF.

LUCAS
ELECTRICAL EQUIPMENT

JAGUAR 2½ AND 3½ LITRE
SALOON MARK V 1949
(HOME & RHD EXPORT MODELS)



KEY TO CABLE COLOURS

1 BLUE	14 WHITE with PURPLE	27 YELLOW with BLUE	40 BROWN with BLACK	53 PURPLE with WHITE
2 BLUE with RED	15 WHITE with BROWN	28 YELLOW with WHITE	41 RED	54 PURPLE with GREEN
3 BLUE with YELLOW	16 WHITE with BLACK	29 YELLOW with GREEN	42 RED with YELLOW	55 PURPLE with BROWN
4 BLUE with WHITE	17 GREEN	30 YELLOW with PURPLE	43 RED with BLUE	56 PURPLE with BLACK
5 BLUE with GREEN	18 GREEN with RED	31 YELLOW with BROWN	44 RED with WHITE	57 BLACK
6 BLUE with PURPLE	19 GREEN with YELLOW	32 YELLOW with BLACK	45 RED with GREEN	58 BLACK with RED
7 BLUE with BROWN	20 GREEN with BLUE	33 BROWN	46 RED with PURPLE	59 BLACK with YELLOW
8 BLUE with BLACK	21 GREEN with WHITE	34 BROWN with RED	47 RED with BROWN	60 BLACK with BLUE
9 WHITE	22 GREEN with PURPLE	35 BROWN with YELLOW	48 RED with BLACK	61 BLACK with WHITE
10 WHITE with RED	23 GREEN with BROWN	36 BROWN with BLUE	49 PURPLE	62 BLACK with GREEN
11 WHITE with YELLOW	24 GREEN with BLACK	37 BROWN with WHITE	50 PURPLE with RED	63 BLACK with PURPLE
12 WHITE with BLUE	25 YELLOW	38 BROWN with GREEN	51 PURPLE with YELLOW	64 BLACK with BROWN
13 WHITE with GREEN	26 YELLOW with RED	39 BROWN with PURPLE	52 PURPLE with BLUE	

WIRING DIAGRAM
No. W76421
12 VOLT

ISSUED:
APRIL 1949

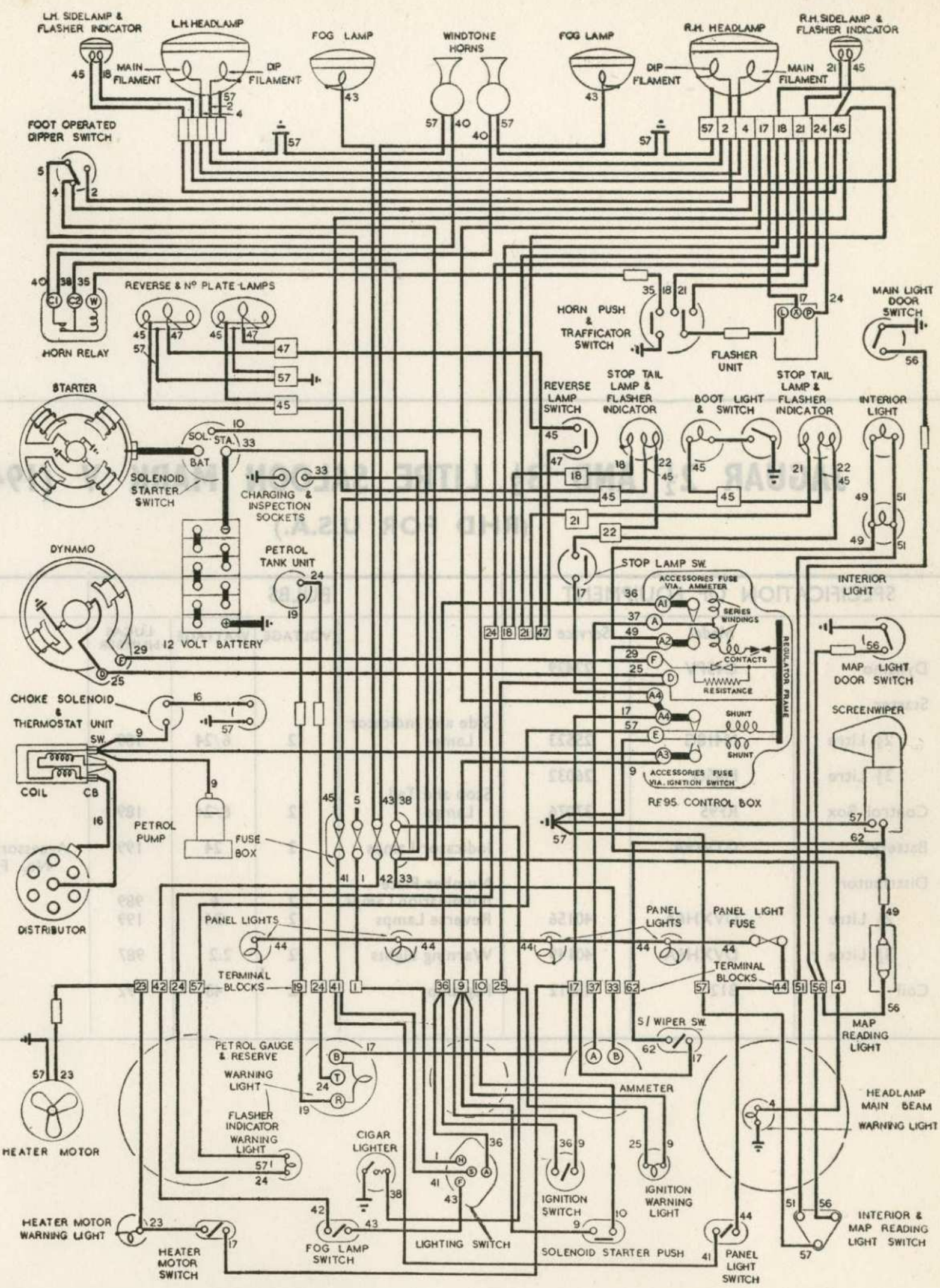
F/109/L

NUMBERS INDICATE CABLE IDENTIFICATION COLOURS, SEE KEY ABOVE.

FOR SPECIFICATION OF EQUIPMENT SEE OVERLEAF.

LUCAS
ELECTRICAL EQUIPMENT

JAGUAR 2½ AND 3½ LITRE
SALOON MARK V 1949
(RHD FOR U.S.A.)



KEY TO CABLE COLOURS

1 BLUE	14 WHITE with PURPLE	27 YELLOW with BLUE	40 BROWN with BLACK	53 PURPLE with WHITE
2 BLUE with RED	15 WHITE with BROWN	28 YELLOW with WHITE	41 RED	54 PURPLE with GREEN
3 BLUE with YELLOW	16 WHITE with BLACK	29 YELLOW with GREEN	42 RED with YELLOW	55 PURPLE with BROWN
4 BLUE with WHITE	17 GREEN	30 YELLOW with PURPLE	43 RED with BLUE	56 PURPLE with BLACK
5 BLUE with GREEN	18 GREEN with RED	31 YELLOW with BROWN	44 RED with WHITE	57 BLACK
6 BLUE with PURPLE	19 GREEN with YELLOW	32 YELLOW with BLACK	45 RED with GREEN	58 BLACK with RED
7 BLUE with BROWN	20 GREEN with BLUE	33 BROWN	46 RED with PURPLE	59 BLACK with YELLOW
8 BLUE with BLACK	21 GREEN with WHITE	34 BROWN with RED	47 RED with BROWN	60 BLACK with BLUE
9 WHITE	22 GREEN with PURPLE	35 BROWN with YELLOW	48 RED with BLACK	61 BLACK with WHITE
10 WHITE with RED	23 GREEN with BROWN	36 BROWN with BLUE	49 PURPLE	62 BLACK with GREEN
11 WHITE with YELLOW	24 GREEN with BLACK	37 BROWN with WHITE	50 PURPLE with RED	63 BLACK with PURPLE
12 WHITE with BLUE	25 YELLOW	38 BROWN with GREEN	51 PURPLE with YELLOW	64 BLACK with BROWN
13 WHITE with GREEN	26 YELLOW with RED	39 BROWN with PURPLE	52 PURPLE with BLUE	

WIRING DIAGRAM
No. W76422
12 VOLT

ISSUED:
APRIL 1949

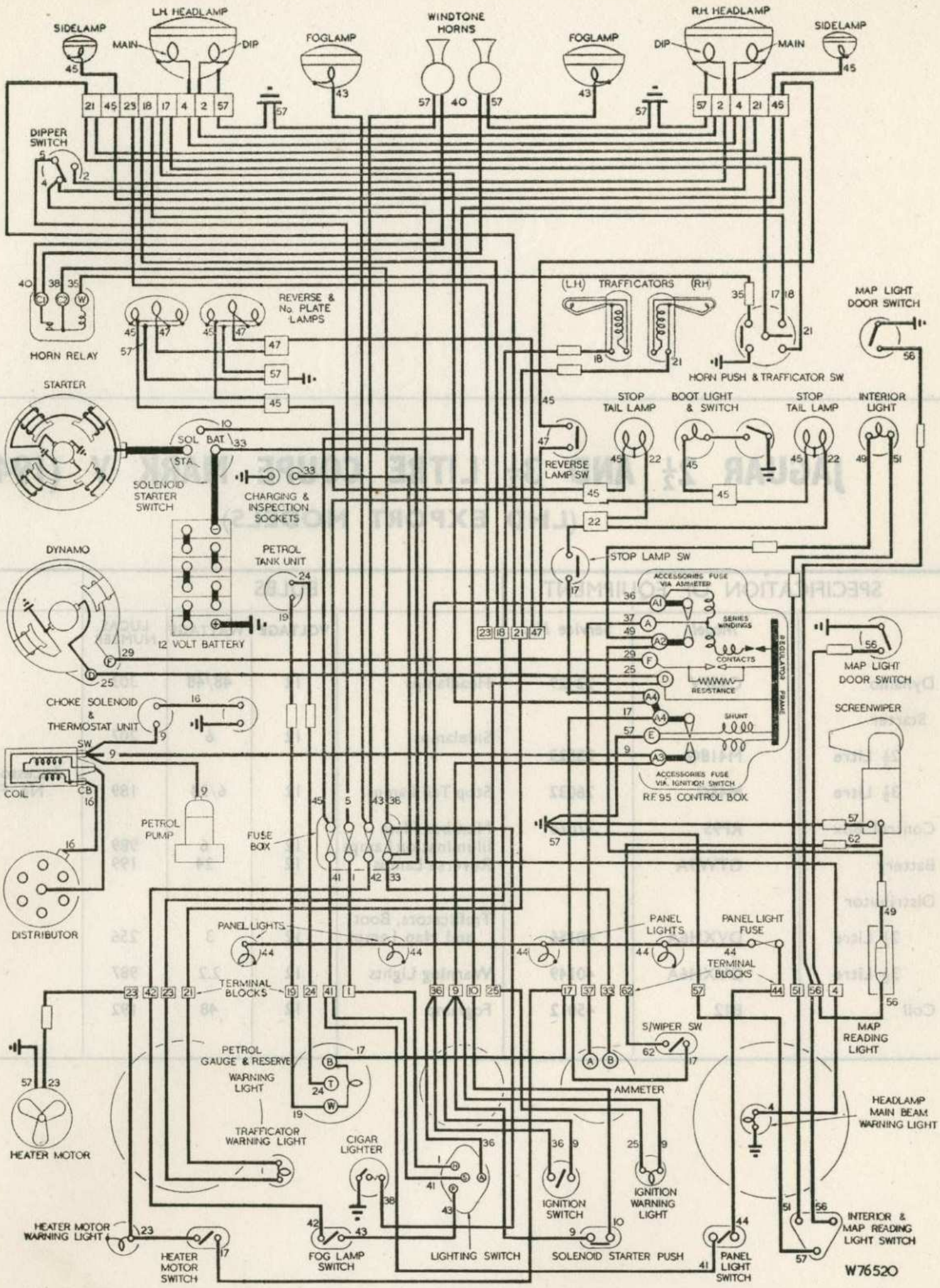
F/119/L

NUMBERS INDICATE CABLE IDENTIFICATION COLOURS, SEE KEY ABOVE.

FOR SPECIFICATION OF EQUIPMENT SEE OVERLEAF.

LUCAS
ELECTRICAL EQUIPMENT

JAGUAR 2½ AND 3½ LITRE
COUPE MARK V 1949
(LHD EXPORT MODELS)



KEY TO CABLE COLOURS

1 BLUE	14 WHITE with PURPLE	27 YELLOW with BLUE	40 BROWN with BLACK	53 PURPLE with WHITE
2 BLUE with RED	15 WHITE with BROWN	28 YELLOW with WHITE	41 RED	54 PURPLE with GREEN
3 BLUE with YELLOW	16 WHITE with BLACK	29 YELLOW with GREEN	42 RED with YELLOW	55 PURPLE with BROWN
4 BLUE with WHITE	17 GREEN	30 YELLOW with PURPLE	43 RED with BLUE	56 PURPLE with BLACK
5 BLUE with GREEN	18 GREEN with RED	31 YELLOW with BROWN	44 RED with WHITE	57 BLACK
6 BLUE with PURPLE	19 GREEN with YELLOW	32 YELLOW with BLACK	45 RED with GREEN	58 BLACK with RED
7 BLUE with BROWN	20 GREEN with BLUE	33 BROWN	46 RED with PURPLE	59 BLACK with YELLOW
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9 WHITE	22 GREEN with PURPLE	35 BROWN with YELLOW	48 RED with BLACK	61 BLACK with WHITE
10 WHITE with RED	23 GREEN with BROWN	36 BROWN with BLUE	49 PURPLE	62 BLACK with GREEN
11 WHITE with YELLOW	24 GREEN with BLACK	37 BROWN with WHITE	50 PURPLE with RED	63 BLACK with PURPLE
12 WHITE with BLUE	25 YELLOW	38 BROWN with GREEN	51 PURPLE with YELLOW	64 BLACK with BROWN
13 WHITE with GREEN	26 YELLOW with RED	39 BROWN with PURPLE	52 PURPLE with BLUE	

WIRING DIAGRAM
No. W76520
12 VOLT

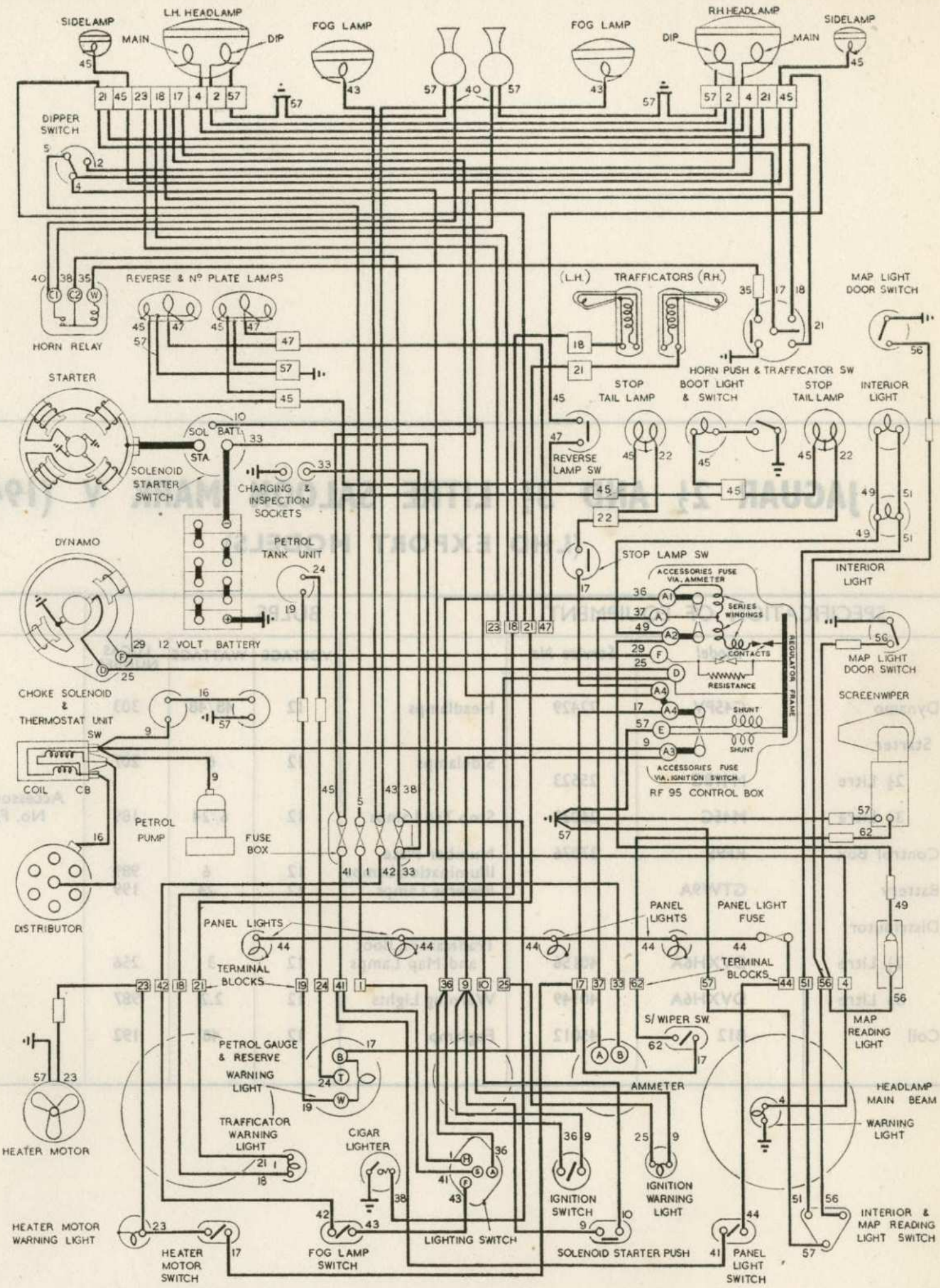
ISSUED:
NOVEMBER 1949
F/1197L

NUMBERS INDICATE CABLE IDENTIFICATION COLOURS, SEE KEY ABOVE.

FOR SPECIFICATION OF EQUIPMENT SEE OVERLEAF.

LUCAS
ELECTRICAL EQUIPMENT

JAGUAR 2½ AND 3½ LITRE
SALOON MARK V 1949
(LHD EXPORT MODELS)



KEY TO CABLE COLOURS

1 BLUE	14 WHITE with PURPLE	27 YELLOW with BLUE	40 BROWN with BLACK	53 PURPLE with WHITE
2 BLUE with RED	15 WHITE with BROWN	28 YELLOW with WHITE	41 RED	54 PURPLE with GREEN
3 BLUE with YELLOW	16 WHITE with BLACK	29 YELLOW with GREEN	42 RED with YELLOW	55 PURPLE with BROWN
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6 BLUE with PURPLE	19 GREEN with YELLOW	32 YELLOW with BLACK	45 RED with GREEN	58 BLACK with RED
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11 WHITE with YELLOW	24 GREEN with BLACK	37 BROWN with WHITE	50 PURPLE with RED	63 BLACK with PURPLE
12 WHITE with BLUE	25 YELLOW	38 BROWN with GREEN	51 PURPLE with YELLOW	64 BLACK with BROWN
13 WHITE with GREEN	26 YELLOW with RED	39 BROWN with PURPLE	52 PURPLE with BLUE	

WIRING DIAGRAM
No. W76521
12 VOLT

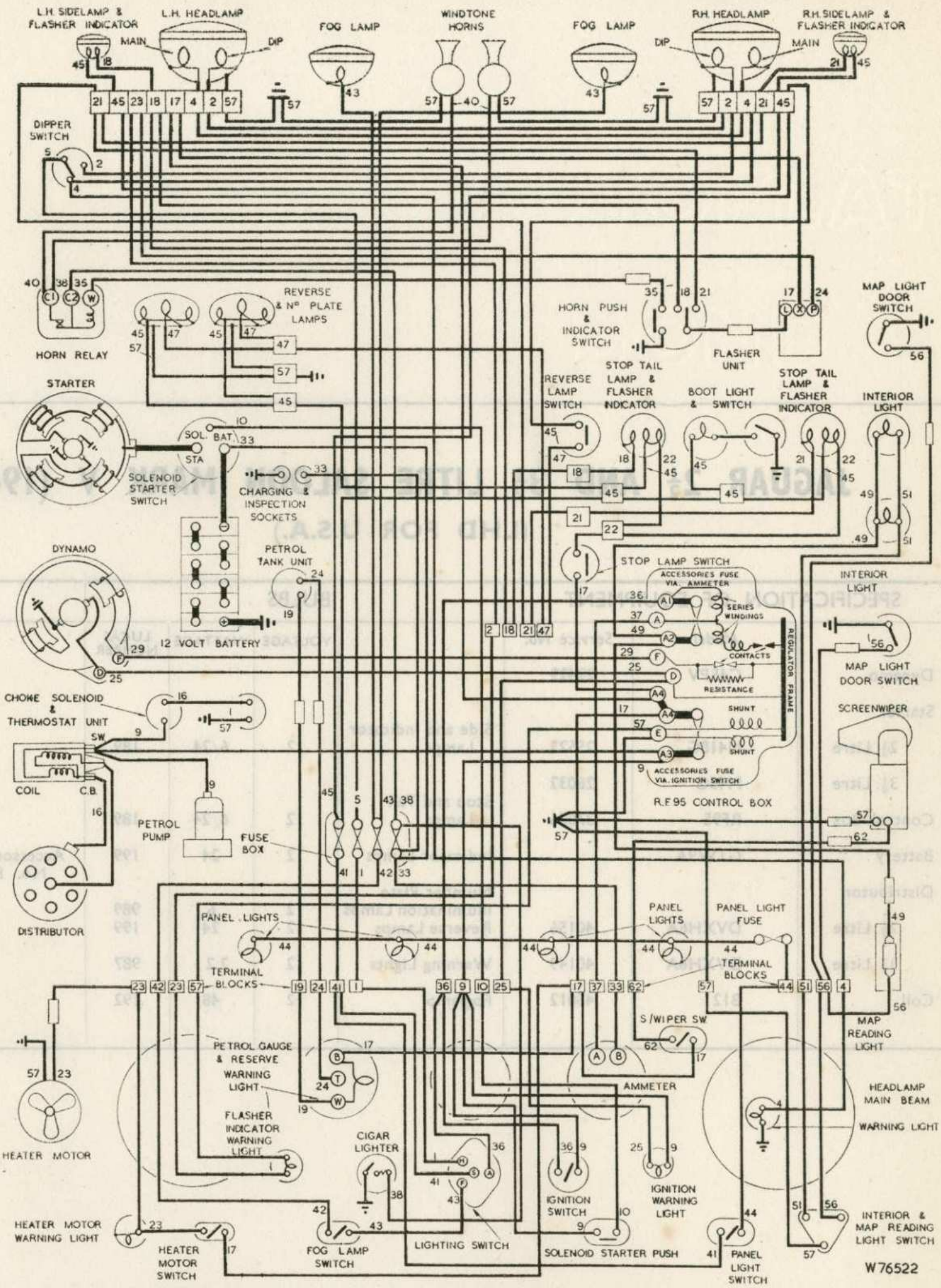
ISSUED:
DECEMBER 1949
F/119/L

NUMBERS INDICATE CABLE IDENTIFICATION COLOURS, SEE KEY ABOVE.

FOR SPECIFICATION OF EQUIPMENT SEE OVERLEAF.

LUCAS
ELECTRICAL EQUIPMENT

JAGUAR 2½ AND 3½ LITRE
SALOON MARK V 1949
(LHD FOR U.S.A.)



KEY TO CABLE COLOURS

1 BLUE	14 WHITE with PURPLE	27 YELLOW with BLUE	40 BROWN with BLACK	53 PURPLE with WHITE
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13 WHITE with GREEN	26 YELLOW with RED	39 BROWN with PURPLE	52 PURPLE with BLUE	

WIRING DIAGRAM
No. W76522
12 VOLT

ISSUED:
DECEMBER 1949
F/119/L

NUMBERS INDICATE CABLE IDENTIFICATION COLOURS, SEE KEY ABOVE.

FOR SPECIFICATION OF EQUIPMENT SEE OVERLEAF.