The

TWO-POINT-SIX

WORKSHOP MANUAL

NOTE

Refer to the end of the appropriate Section for the latest instructions when carrying out work on the vehicle.

Additional copies of this publication (Part No. AKD741) can only be obtained from a Riley Distributor.

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THE RILEY TWO-POINT-SIX

INTRODUCTION

This manual has been prepared to provide the service operator with the necessary information for the maintenance and repair of the Riley Two-Point-Six.

The manual serves as a ready reference book for service supervision and also covers items of procedure for the guidance of both the fully qualified and the less-experienced mechanic.

UNIT ARRANGEMENT

The complete vehicle is divided into sections in the manual, and, where possible, each section is divided into two parts.

The sections with a single reference letter contain information and instructions which may be applied to other B.M.C. vehicles fitted with the same unit.

The sections with a double reference letter contain information and instructions which apply to the Riley Two-Point-Six.

NUMBERING OF PAGES AND ILLUSTRATIONS

The pages and illustrations are numbered consecutively within each section and the section title and letter(s) are shown at the top of each page.

SERVICE TOOLS

Use of the correct tools contributes to an efficient, economic, and profitable repair. References have therefore been made to such tools throughout the manual.

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GENERAL DATA

ENGINE

Type	C.26.R.
Number of cylinders	6.
Bore	3·125 in. (79·375 mm.).
Stroke	3·5 in. (88·9 mm.).
Capacity	2639·4 c.c. (161 cu. in.).
Compression ratio	8·3 : 1.
Firing order	1, 5, 3, 6, 2, 4.
Cooling	Thermo-siphon; pump, fan, and thermostat.
Torque	141·5 lb. ft. (19·56 kg. m.) at 2,500 r.p.m.
B.M.E.P.	132 lb./sq. in. (9·28 kg./cm.²) at 2,500 r.p.m.

Valves

Position	Overhead, push-rod-operated.
Lift	·3145 in. (8·054 mm.).
Diameter: Head: Inlet	1·693 to 1·683 in. (42·99 to 42·75 mm.).
Exhaust	1·420 to 1·415 in. (36·07 to 35·94 mm.).
Stem: Inlet	·34175 to ·34225 in. (8·68 to 8·69 mm.).
Exhaust	·34175 to ·34225 in. (8·68 to 8·69 mm.).
Stem/guide clearance: Inlet	·0025 to ·0015 in. (·063 to ·038 mm.).
Exhaust	·002 to ·001 in. (·051 to ·025 mm.).
Valve rocker clearance	·012 in. (·305 mm.) hot.
Seat angle: Inlet	30°.
Exhaust	45°.
Seat face width: Inlet	·091 to ·097 in. (2·311 to 2·464 mm.).
Exhaust	·198 to ·217 in. (5·029 to 5·512 mm.).

Valve guides

Length: Inlet	2·266 in. (57·55 mm.).
Exhaust	2·578 in. (65·49 mm.).
Fitted height above head	·875 in. (22·22 mm.).

Valve springs

Free length: Inner	1·969 in. (50 mm.).
Outer	2·047 in. (51·99 mm.).
Fitted length: Inner	1·437 in. (36·51 mm.).
Outer	1·562 in. (39·68 mm.).
Pressure: Valve shut: Inner	30 lb. (13·6 kg.).
Outer	30 lb. (13·6 kg.).
Valve open: Inner	50 lb. (22·7 kg.).
Outer	105 lb. (47·6 kg.).
Number of working coils: Inner	$6\frac{1}{2}$.
Outer	$4\frac{1}{2}$.

Tappets

Type	Cylindrical, spherical foot.
Diameter	·93725 in. (23·81 mm.).
Length	2·548 in. (64·72 mm.).

Rockers

Bushes	Steel and white metal.
Outside diameter (before fitting)	·913 in. (23·17 mm.).
Inside diameter (reamed in position)	·8115 to ·8125 in. (20·62 to 20·65 mm.).
Clearance	·0025 to ·0005 in. (·063 to ·012 mm.).
Bore of arm	·909 to ·910 in. (23·076 to 23·101 mm.).

GENERAL DATA—*continued*

Pistons

Material	Aluminium alloy.
Clearance at skirt (right angles to gudgeon pin)	·0026 to ·0008 in. (·066 to ·020 mm.).
Width of ring groove: Compression	·0952 to ·0962 in. (2·410 to 2·436 mm.).
Oil	·189 to ·190 in. (4·81 to 4·83 mm.).
Oversizes (see Section A)	+·010 in.; +·020 in.; +·030 in.; +·040 in. (+·254 mm.; +·508 mm.; +·762 mm.; +1·016 mm.).

Piston rings

Number	3 compression (2 taper), 1 oil control.
Width: Compression	·0938 to ·0928 in. (2·383 to 2·357 mm.).
Oil	·1865 to ·1875 in. (4·737 to 4·762 mm.).
Clearance in groove: Compression	·0034 to ·0014 in. (·086 to ·036 mm.).
Oil	·0015 to ·0035 in. (·038 to ·088 mm.).
Ring gap (compression and oil)	·009 to ·014 in. (·23 to ·35 mm.).

Gudgeon pins

Type	Fully floating.
Fit	Selective; push in piston.
Diameter	·8748 to ·8750 in. (22·215 to 22·220 mm.).

Crankshaft

Journal diameter	2·3742 to 2·3747 in. (60·305 to 60·317 mm.).
Crankpin diameter	2·0000 to 2·0005 in. (50·80 to 50·8127 mm.).
Undersizes (journals and crankpins)	—·010 in.; —·020 in.; —·030 in.; —·040 in. (—·254 mm.; —·508 mm.; —·762 mm.; —1·016 mm.).
End-float	Taken on thrust washer at front middle (No. 2) main bearing: ·0025 to ·0055 in. (·063 to ·140 mm.).
Thrust washer: Standard	·091 to ·093 in. (2·315 to 2·366 mm.).
+·0025 in. (+·063 mm.)	·0935 to ·0955 in. (2·378 to 2·429 mm.).
+·005 in. (+·127 mm.)	·0960 to ·0980 in. (2·442 to 2·493 mm.).
+·0075 in. (+·190 mm.)	·0985 to ·1005 in. (2·505 to 2·556 mm.).
+·010 in. (+·254 mm.)	·1000 to ·1030 in. (2·569 to 2·620 mm.).

Main bearings

Number	4.
Type	White-metalled steel shell.
Length	1·495 to 1·505 in. (37·973 to 38·227 mm.).
Running clearance	·0013 to ·0028 in. (·033 to ·071 mm.).
Sizes for reground journals	·010 in. U/S; ·020 in. U/S; ·030 in. U/S; ·040 in. U/S (·254 mm.; ·508 mm.; ·762 mm.; 1·016 mm.).

Connecting rods

Length (centres)	6·601 to 6·605 in. (167·665 to 167·767 mm.).
Side clearance	·007 to ·004 in. (·178 to ·102 mm.).
Big-ends: Type	White-metalled steel shells, lead-indium-lined.
Clearance	·0005 to ·002 in. (·0127 to ·051 mm.).
Small-end bush	·8750 to ·8755 in. (22·225 to 22·238 mm.).
Sizes for reground crankpins	·010 in. U/S; ·020 in. U/S; ·030 in. U/S; ·040 in. U/S (·254 mm.; ·508 mm.; ·762 mm.; 1·016 mm.).

Camshaft

Journal diameters: Front	1·78875 to 1·78925 in. (45·434 to 45·447 mm.).
Middle front	1·76875 to 1·76925 in. (44·926 to 44·939 mm.).
Journal diameters: Middle rear	1·74875 to 1·74925 in. (44·418 to 44·431 mm.).
Rear	1·72875 to 1·72925 in. (43·910 to 43·923 mm.).
End-float	Taken on thrust plate at front end: ·003 to ·006 in. (·076 to ·152 mm.).

GENERAL DATA—*continued*

Camshaft bearings

Number and type	4 thin-wall rolled bush.
Outside diameter (before fitting): Front	1·9205 in. (48·780 mm.).
Middle front	1·9005 in. (48·272 mm.).
Middle rear	1·8805 in. (47·762 mm.).
Rear	1·8605 in. (47·252 mm.).
Inside diameter (reamed in position): Front	1·79025 to 1·79075 in. (45·472 to 45·485 mm.).
Middle front	1·77025 to 1·77075 in. (44·964 to 44·977 mm.).
Middle rear	1·75025 to 1·75075 in. (44·456 to 44·469 mm.).
Rear	1·73025 to 1·73075 in. (43·946 to 43·959 mm.).
Clearance	·002 to ·001 in. (·051 to ·025 mm.).

Valve timing

Chain pitch and number of pitches	·375 in. (9·525 mm.). 62.
Rocker clearance for valve	·0234 in. (·610 mm.).
Inlet valve: Opens	5° B.T.D.C.
Closes	45° A.B.D.C.
Exhaust valve: Opens	40° B.B.D.C.
Closes	10° A.T.D.C.

Lubrication

System	Pressure.
Pump type	Rotor.
External filter	Full flow; Tecalemit (element, B.M.C. Pt. No. 2H4340) or Vokes (element, B.M.C. Pt. No. 7H1927).
Oil pressure: Running	50 lb./sq. in. (3·52 kg./cm.²) at 30 m.p.h. (48 km.p.h.).
Idling	20 lb./sq. in. (1·5 kg./cm.²) at 800 r.p.m.
Release valve spring, free length	2·562 in. (65·09 mm.).
Release valve: Number of coils	13.
Diameter	·484 in. $^{+\cdot000\text{ in.}}_{-\cdot015\text{ in.}}$ (12·30 mm. $^{+\cdot000\text{ mm.}}_{-\cdot381\text{ mm.}}$).

Flywheel

Diameter	12·8125 in. (325·45 mm.).
Number of teeth on starter ring	106.

Torque wrench settings

Cylinder head studs	400 lb. in. (4·6 kg. m.).
Cylinder head nuts	900 lb. in. (10·4 kg. m.).
Main bearing nuts	900 lb. in. (10·4 kg. m.).
Connecting rod set screws	600 lb. in. (6·91 kg. m.).
Front cover screws	$\frac{7}{16}$ in. (11·11 mm.) less than 150 lb. in. (1·73 kg. m.). $\frac{1}{2}$ in. (12·70 mm.) less than 150 lb. in. (1·73 kg. m.).
Front mounting plate screws	200 lb. in. (2·30 kg. m.).
Rear mounting plate screws	600 lb. in. (6·91 kg. m.).
Flywheel bolts	600 lb. in. (6·91 kg. m.).
Rocker shaft bracket nuts	300/324 lb. in. (3·45/3·72 kg. m.).

COOLING SYSTEM

Type	Pressurized thermo-siphon; fan, pump, and thermostat.
Thermostat setting	158 to 167° F. (70 to 75° C.).

GENERAL DATA—*continued*

FUEL SYSTEM

Carburetter

Number	2.
Type	S.U. H4, 1½ in.
Needle	Standard AJ. Rich FR. Weak V2.

Fuel pump

Type	S.U. HP.
Output	12½ gallons (57 litres) per hour.
Suction lift	33 in. (83·82 cm.).
Output lift	48 in. (121·5 cm.).

CLUTCH

Type	Borg & Beck single dry plate; 9 in. (22·86 cm.).
Facing	Wound yarn.
Spring colour: Thrust	3 yellow and light green, 6 black.
Plate	6 red and violet.
Driven plate hub	1⅛ in. (28·58 mm.).

GEARBOX

Synchromesh	Second, third, and top.
Ratios: Reverse	4·493 : 1.
First	3·315 : 1.
Second	2·06 : 1.
Third	1·435 : 1.
Top	1 : 1.
Overall ratios: Reverse	17·52 : 1.
First	12·93 : 1.
Second	8·03 : 1.
Third	5·60 : 1.
Top	3·90 : 1.

FRONT SUSPENSION

Type	Torsion bar; hydraulic damper.
Initial setting	See Section KK.3.

STEERING

Camber	1° positive ±½°.
Castor	3°.
King pin inclination	6°.
Toe-in	Nil.
Track (front)	54⅜ in. (1·381 m.).
Turning circle: Right lock	39 ft. 3 in. (11·97 m.).
Left lock	40 ft. 3 in. (12·26 m.).
Box	Bishop cam with parallel-action track-rod.
Turns of wheel (lock to lock)	4⅛.
Ratio	20 : 1.

REAR SUSPENSION

Type	Semi-elliptic rubber-mounted leaf spring, hydraulic damper.

GENERAL DATA—*continued*

Spring data

Length	$49\frac{1}{4}$ in. (1·261 m.) (centres).	
	To Car No. 838	*From Car No.* 839
Camber: Free	4·5 in. (114·3 mm.).	4·64 in. (118 mm.).
Working	1 in. (25·4 mm.) neg.	·77 in. (19·70 mm.) neg.
Maximum deflection	7·5 in. (190·5 mm.).	5·41 in. (137·55 mm.).
Number of leaves	8.	
Width of leaves	$1\frac{3}{4}$ in. (44·5 mm.).	
Thickness of leaves	$\frac{1}{4}$ in. (6·35 mm.).	
	Aux. leaf $\frac{7}{16}$ in. (11·11 mm.) up to Car No. 838.	

DAMPERS

Type	Hydraulic, tubular telescopic.

Test data

Front: Rebound	500 lb. ±10% at 103 ft./min. at 18° C. (227 kg. ±10% at 31·39 m./min. at 18° C.).
Compression	250 lb. ±10% at 103 ft./min. at 18° C. (113·6 kg. ±10% at 31·39 m./min. at 18° C.).
Time setting	35 lb. ±25% at 11·6 ft./min. at 18° C. (15·9 kg. ±25% at 3·53 m./min. at 18° C.).
Length: Compressed	$10 \pm \frac{1}{8}$ in. ($254 \pm 3{\cdot}18$ mm.).
Extended	$15{\cdot}25 \pm \frac{1}{8}$ in. ($387 \pm 3{\cdot}18$ mm.).
Rear: Rebound	450 lb. ±10% at 103 ft./min. at 18° C. (204 kg. ±10% at 31·39 m./min. at 18° C.).
Compression	200 lb. ±10% at 103 ft./min. at 18° C. (90·7 kg. ±10% at 31·39 m./min. at 18° C.).
Time setting	40 lb. ±25% at 11·6 ft./min. at 18° C. (18·1 kg. ±25% at 3·53 m./min. at 18° C.).
Length: Compressed	$13{\cdot}25 \pm \frac{1}{8}$ in. ($336{\cdot}5 \pm 3{\cdot}18$ mm.).
Extended	$20{\cdot}25 \pm \frac{1}{8}$ in. ($514{\cdot}3 \pm 3{\cdot}18$ mm.).

REAR AXLE

Type	Three-quarter-floating; hypoid gears.
Ratio	3·9 : 1 (11/43).
Adjustment	Distance washer and shims.
Track	$54\frac{1}{2}$ in. (1·384 m.).

Torque wrench settings

Pinion bearing nut	1,680 lb. in. (19·4 kg. m.).
Differential bearing cap nut	780 lb. in. (8·99 kg. m.).
Crown wheel bolts	720 lb. in. (8·3 kg. m.).
Pinion bearing preload	15 to 18 lb. in. (·173 to ·207 kg. m.).

BRAKES

Type	Lockheed hydraulic; H/S (servo hydraulic booster).
Lining	DON R7.
Lining dimensions: Front	8·5 in. by 2·72 in. (215·9 mm. by 69·08 mm.).
Rear	8·5 in. by 2·22 in. (215·9 mm. by 56·39 mm.).
Total lining area	168·5 sq. in. (1086·8 cm.²).
Number of rivets (per shoe)	12.
Size of rivets	·140 to ·144 in. by ·32 in. (3·56 to 3·66 mm. by 8 mm.).

GENERAL DATA—*continued*

ELECTRICAL

Distributor rotation	Anti-clockwise—viewed from above.
Automatic advance	Centrifugal and vacuum control.
Maximum advance	36° (crank) at 1,300 r.p.m. (distributor).
Advance starts at	800 r.p.m. (engine).
Contact breaker gap	·014 to ·016 in. (·36 to ·40 mm.).
Sparking plugs	Champion N5, 14 mm., $\frac{7}{8}$ in. reach. (Formerly NA8.)
Sparking plug gap	·025 in. (·64 mm.).
Ignition timing	4 to 5° B.T.D.C.
Charging system	C.V.C.
Battery	Lucas GTW9A/2, 12-volt. Lucas GTZ9A/2, 12-volt (dry-charged—Export only).
Capacity	57-amp.-hr. at 20-hr. rate.
Earth	Positive.
Starter	Lucas M4–18G.
Starter ratio	10·6 : 1.
Dynamo	Lucas C45 PV5.
Dynamo speed	$1\frac{1}{2}\times$ engine speed.

WHEELS AND TYRES

Wheels

Type	Ventilated disc.
Size	5K × 15.
Road wheel nut torque wrench reading	60 to 62·5 lb. ft. (8·3 to 8·64 kg. m.).

Tyres

Size	6·70—15 tubeless.
Pressure: Front and rear (normal)	24 lb./sq. in. (1·69 kg./cm.²).
Front (laden)	24 lb./sq. in. (1·69 kg./cm.²).
Rear (laden)	26 lb./sq. in. (1·83 kg./cm.²).

CAPACITIES

Sump (including filter)	$11\frac{1}{2}$ pints (13·8 U.S. pints, 6·5 litres).
Gearbox	5 pints (6 U.S. pints, 2·84 litres).
Overdrive	$1\frac{1}{3}$ pints (1·6 U.S. pints, ·76 litre).
Rear axle	$3\frac{3}{4}$ pints (4·5 U.S. pints, 2·13 litres).
Cooling system	20 pints (24 U.S. pints, 11·33 litres).
Fuel tank	12 gallons (14·5 U.S. gallons, 54 litres).
Steering box	$1\frac{1}{2}$ pints (1·8 U.S. pints, ·85 litre).
Automatic gearbox	15 pints (18 U.S. pints, 8·52 litres).

GENERAL DIMENSIONS

Wheelbase	$113\frac{1}{2}$ in. (2·855 m.).
Overall length (with over-riders)	$185\frac{1}{8}$ in. (4·7 m.).
Overall width	67 in. (1·70 m.).
Overall height	61 in. (1·55 m.).
Ground clearance	$6\frac{1}{2}$ in. (16·5 cm.).
Weight: Shipping	3,505 lb. (1590 kg.).
Kerbside	3,609 lb. (1637 kg.).

WEIGHTS OF COMPONENTS

Engine:	With standard clutch	578 lb. (262·4 kg.).
	With torque converter	603 lb. (273·36 kg.).
Gearbox:	Standard	98 lb. (44·5 kg.).
	Automatic	140 lb. (63·5 kg.).
Rear axle		176 lb. (80 kg.).

GENERAL INFORMATION

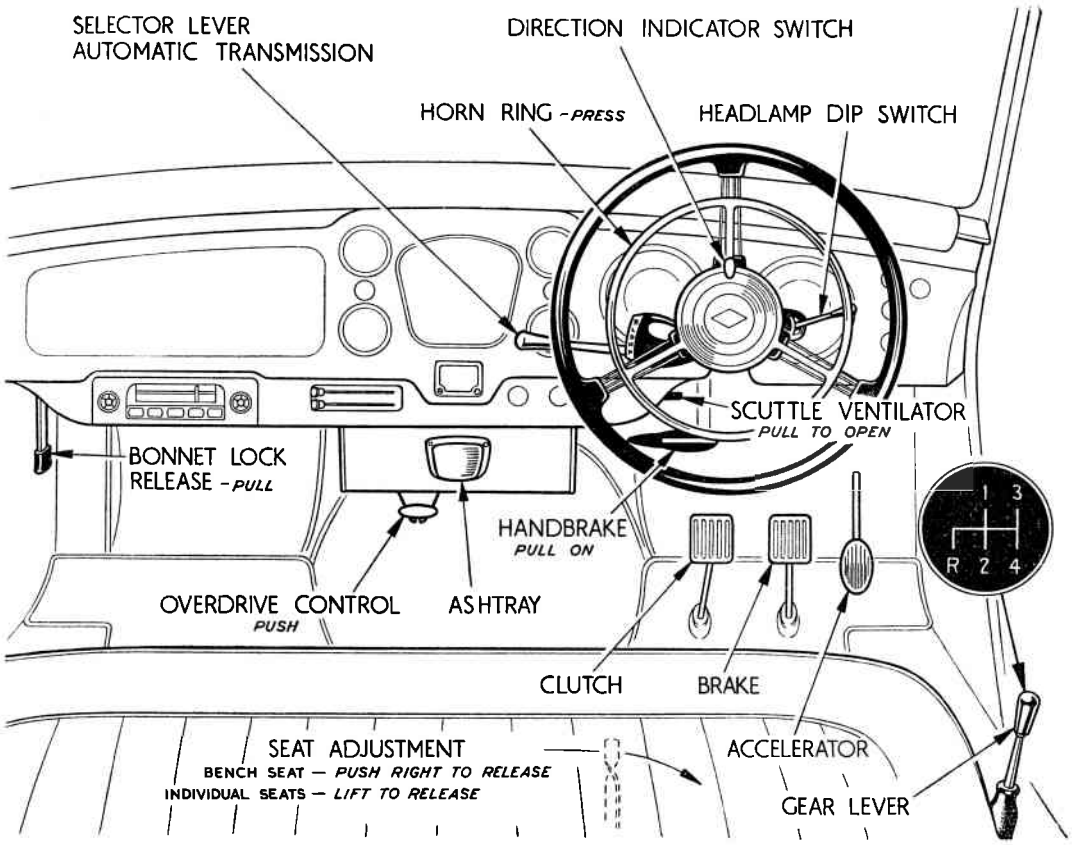
CONTROLS, INSTRUMENTS, SWITCHES

Hand brake

The hand brake lever is located beneath the fascia to the left of the steering-column. A thumb-operated release for the ratchet is incorporated in the handle. Pulling the brake towards the inside of the car operates the rear brakes mechanically. To release the brake pull on the handle to take the load and depress the catch with the thumb.

Pedal controls (synchromesh gearbox)

The pedal controls are arranged in the orthodox positions, namely, the clutch pedal, brake pedal, and accelerator, reading from left to right.



Driving controls

Gear lever (synchromesh gearbox)

The gear change lever is positioned on the floor outside the driver's seat. The four forward gears and reverse are engaged by moving the lever to the positions shown in the illustration inset. To engage the reverse gear move the lever to the left of the neutral position until resistance is felt, apply side pressure to the lever to overcome resistance, and then pull it backwards to engage the gear.

Overdrive

The overdrive control is made operative by pushing the control handle right in. Comprehensive instructions on the use and operation of this control are given in Section SC.

Automatic transmission

Comprehensive operating and driving instructions for a car fitted with automatic transmission are given in Section SB.

Headlamp beam dipping switch

The headlamp dipping switch is situated on the right-hand side of the steering-column. A dark-red warning light on the instrument panel immediately in front of the steering-column indicates when the lamp beams are in the raised position.

Direction indicator lamps

The direction indicator lamps are operated by the small lever on the steering-wheel centre provided the ignition is switched on. The switch is self-cancelling, except when a slight turn is made, when it may be necessary to return it by hand.

Horn switch

The twin horns are operated by pressing the inner plated ring of the steering wheel.

Seat adjustment

Lift the small lever located beneath the front of the driver's and passenger's seat, slide the seat to the desired position, and release the lever to re-lock the seat. The release lever on the bench-type seat is fitted beneath the driver's position and is operated by pushing the lever to the right.

Scuttle ventilator

The scuttle ventilator is operated by a control handle located beneath the fascia.

Bonnet release control

Release the bonnet catch by pulling the lever under the extreme left-hand end of the fascia. Release the safety catch by depressing the lever just beneath the centre of the bonnet. Raise the bonnet and support it with the prop clipped to the left-hand valance.

When closing the bonnet apply double-hand pressure to force it into the fully closed position. The bonnet lock will be heard to spring into engagement.

Mixture control

The mixture control can be drawn out and locked in one of several positions to give a rich mixture for starting purposes. It should be returned to the 'off' position (turn clockwise and push) as soon as possible when the engine warms up.

Ignition switch

The ignition switch is operated by a removable key which will lock the driver's door and luggage boot lid also.

The fuel pump and gauge are brought into action by this switch; it is also the master switch for the windshield wipers, direction indicators, starter switch, ventilation blower motor, temperature gauge, and stop lights.

Never leave the ignition switched on after the engine has stopped.

Ignition warning light

The ignition warning light glows red when the ignition is switched on but will go out as the engine speed is increased. Should the light glow at all engine speeds the dynamo is not charging the battery, and the circuit should be examined at once, after ensuring that the dynamo drive belt is not broken or slipping on the pulley.

Starter switch

The starter switch is operated when the knob marked 'S' is pushed inwards.

Headlamp and sidelamp switch

The headlamp and sidelamp switch is on the extreme right of the instrument panel. The sidelamps and tail lamps operate when the knob is pulled out to its first stop. A twist to the right and a further pull will switch on the headlamps.

Fog lamp switch

This is situated on the left-hand side of the radio speaker fret and is of the simple pull-push type.

Within the United Kingdom the fog lamps must only be used in fog or falling snow.

Long-range driving lamp switch

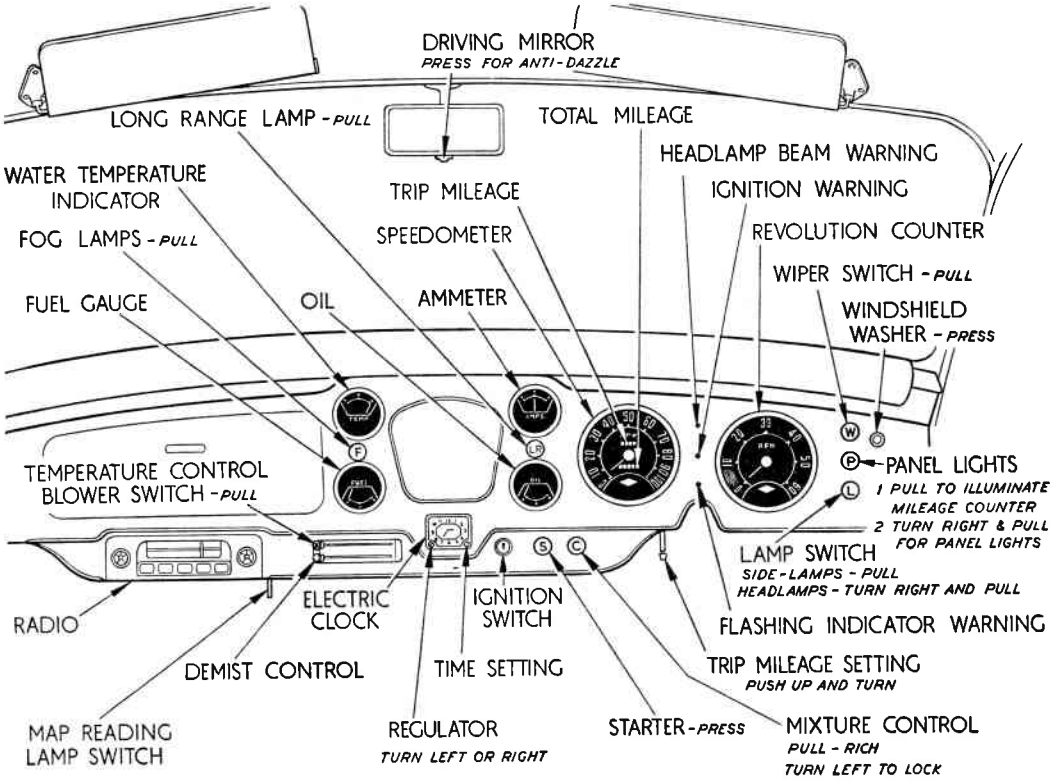
The switch for the long-range driving lamp is positioned to the right of the radio speaker fret and is of the simple pull-push type.

This lamp is intended for use in conjunction with the headlamps and is controlled by the headlamp dipping switch.

Panel light switch

This is located on the right-hand side of the instrument panel to the left of the clock and is of the pull-on type. The panel lights are in the lamp circuit and cannot work unless the car lamps are switched on.

Pull the switch knob out to its first stop to illuminate the speedometer face. A twist to the right and a further pull will switch on the remaining panel and instrument lights.



Instruments and switches

Windshield wiper switch

The two windshield wiper blades are operated by a pull-push switch situated on the right of the instrument panel. Pull the switch knob out to bring the blades into operation. Parking of the blades is effected automatically when switching off by pushing in the switch knob.

Windshield washer

Press the control button indicated in the illustration for a moment while the engine is running. The nozzles on the scuttle will discharge when the button is released. To obtain a large discharge temporarily remove the foot from the accelerator pedal while depressing the button.

Interior lights

The interior lights are controlled by a separate switch on each lamp and also by an automatic switch on each rear door pillar.

When the doors are closed the lights are off when both their individual switches are in the 'off' position. Both lights will come on when one switch lever is moved to the 'on' position.

The act of opening either rear door will switch on both interior lights and closing the doors will extinguish them.

Heater

The heater controls are to the left of the control panel: full details of their operation are given in Section RR.

Speedometer

The trip recorder can be set to zero by pushing upwards the knob below the back of the instrument and turning it anti-clockwise.

Revolution indicator

The speed of the engine is indicated by this dial, which is calibrated in hundreds of revolutions per minute.

Temperature indicator

The temperature of the cooling water leaving the cylinder head is electrically recorded by this indicator while the ignition is switched on. When the ignition is switched off the needle moves to the cold position, but registers the actual temperature immediately the ignition is switched on again. If the normal running temperature indicated is exceeded the cause must be traced and rectified immediately.

Fuel gauge

This operates only when the ignition is switched on and indicates the quantity of fuel in the tank.

Electric clock

To regulate the clock adjust the regulator screw on the lower left-hand corner of the clock face, clockwise for slow and anti-clockwise for fast. A small scale is placed just below this to show the position of the adjustment. The clock is set by the knurled knob on the lower right-hand corner of the face, which should be pushed in to engage the hands.

Door handles and interior locks

The front door locks are released by pulling the interior handles rearwards and the rear door locks by pushing the interior handles forwards. By using the individual lock on the driver's door and operating the interior handles the car can be locked against unauthorized entry.

Children's safety locking device

A safety locking device is provided which prevents the doors being opened from the inside by juvenile passengers.

The small lever located in the edge of each door should be pushed downwards. With the lever in this position the doors can be opened only from the outside.

Steering column adjustment

The steering column can be adjusted to suit the driver's position. Remove the cover over the aperture in the shroud. Turn the steering wheel to align the clamping nut with the aperture in the shroud, slacken the nut, and push or pull the steering wheel to the desired position.

Care should be taken to ensure that the clamping nut is retightened and the cover replaced.

Filling the windshield washer container

The jar should be filled with clean water from a jug or water-can through the hinged cap on the container top. Trico solvent should be added to the water in cold weather to prevent freezing. **Do not use radiator anti-freeze.**

Connecting windshield washer hoses

It is important that the suction hose from the push-button be connected to the central tube in the top of the suction chamber. To determine the correct hose start the engine and place a finger over the end of a hose while an assistant presses the button. If air is drawn into the hose as the finger is withdrawn this is the suction hose.

CAR NUMBER IDENTIFICATION CODE

The car number symbol consists of three letters and two figures followed by the usual serial number of the vehicle.

The first letter when related to the code provides an indication of the make and model of the vehicle.

The second letter provides an indication of the type of vehicle—Saloon, etc.

The third letter indicates the colour in which the vehicle is finished.

The first figure indicates the class to which the vehicle belongs—R.H.D. Home, L.H.D., etc.

The second figure indicates the type of paint used to finish the car—cellulose, synthetic, Synobel, etc. On later models this second figure is discontinued.

From this it will be clear that when an owner quotes the code number of his car it is a relatively simple matter to obtain a comprehensive picture of the vehicle concerned by reference to the following tabulated code to the symbols.

Model	*Code*	*Type*	*Code*	*Colour*	*Code*	*Class*	*Code*	*Paint*	*Code*
Wolseley 6/80	A	Saloon 4-door	A	Black	A	R.H.D. Home	1	Synthetic	1
Wolseley 4/50	B	Saloon 2-door	B	Light Grey	B	R.H.D. Export	2	Synobel	2
Morris Six	C	Tourer	C	Dark Red	C	L.H.D.	3	Cellulose	3
Morris Oxford	D	2-Seater	D	Dark Blue	D	North America	4	Metallic	4
Morris Cowley	E	Van	E	Mid Green	E	C.K.D.—R.H.D.	5	Primed	5
Morris Minor	F	Truck	F	Beige	F	C.K.D.—L.H.D.	6	Cel. body,	
Morris 5-cwt.	G	Cab	G	Brown	G			synthetic	
M.G. Midget	H	Mail	H	C.K.D. Finish	H			wings	6
M.G. 1¼-litre	J	Engineers	J	Dark Grey	J				
M.G. Magnette	K	Chassis	K	Light Red	K				
Riley 1½-litre	L	Traveller	L	Light Blue	L				
Riley 2½-litre	M	Coupé	M						
Wolseley 4/44	N								
Quarter-ton	O								
Half-ton	P			Ivory	P				
Wolseley 6/90	R			White	R				
Isis	S			Mid Grey	S				
Wolseley 15/50	T			Light Green	T				
Riley Two-Point-Six	U			Dark Green	U				
Wolseley 1500	W								

Code example for one-colour finish:

DAC 12/1001—Oxford—Saloon 4-door—Dark Red—R.H.D. Home—Synobel—Car No. 1001 (earlier models).

Code example for duotone finish:

KAKP 33/1002—M.G. Magnette—Saloon 4-door—Light Red (Top), Ivory (Bottom)—L.H.D.—Cellulose—Car No. 1002 (earlier models).

Code example for one-colour finish (later models):

UAC 1/1003—Riley Two-Point-Six—Saloon 4-door—Dark Red—R.H.D. Home—Car No. 1003.

Owing to the fact that the technique required to effect repairs to the different paint finishes varies considerably, and that the correct paint **must** be used for such purposes, it is to be noted that on earlier models the second figure of the symbols is of particular importance as it defines the nature of the paint used by the Factory to finish the car.

POWER UNIT SERIAL NUMBER CODING

The engine number comprises a series of letters and numbers, presenting in code the capacity, make, and type of unit, ancillaries fitted, and the type of compression together with the serial number of the unit.

1st PREFIX GROUP—Cubic capacity, make, and type

1st Prefix number
- 8—803 c.c.
- 9—950 c.c.
- 12—1200 c.c.
- 15—1500 c.c.
- 22—2200 c.c.
- 25—2500 c.c.
- 26—2600 c.c.

1st Prefix letter
- B—B.M.C. Industrials
- G—M.G.
- H—Miscellaneous special
- J—Commercial
- M—Morris
- R—Riley
- W—Wolseley

2nd Prefix letter A–Z used for the variations of engine type.

2nd PREFIX GROUP—Gearbox and ancillaries

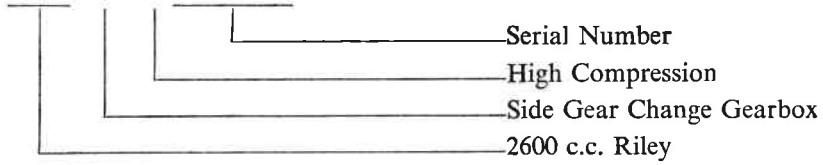
- A—Automatic gearbox
- M—Manumatic clutch
- N—Steering-column or side gear change gearbox
- O—Overdrive (Borg-Warner)
- P—Police specification
- U—Centre gear change gearbox

3rd GROUP—Compression and serial number

H—High compression
L—Low compression
} and serial number of unit

CODE EXAMPLE

26R / N / H 123456



RECONDITIONED ENGINES

On reconditioned engines the bore and crankshaft sizes are indicated by code letters appearing either under or after the engine number. The bore size is indicated by the first letter and the crankshaft size by the second letter.

The code is as follows:

Code	*Bore oversize*	*Crankshaft undersize*	*Code*	*Bore oversize*	*Crankshaft undersize*
A	Standard	Standard	G		·035 in. (·889 mm.)
B		·010 in. (·254 mm.)	H	·040 in. (1·016 mm.)	·040 in. (1·016 mm.)
C		·015 in. (·381 mm.)	J		·045 in. (1·143 mm.)
D	·020 in. (·508 mm.)	·020 in. (·508 mm.)	K		·050 in. (1·270 mm.)
E		·025 in. (·635 mm.)	L		·055 in. (1·397 mm.)
F	·030 in. (·762 mm.)	·030 in. (·762 mm.)	M	·060 in. (1·524 mm.)	·060 in. (1·524 mm.)

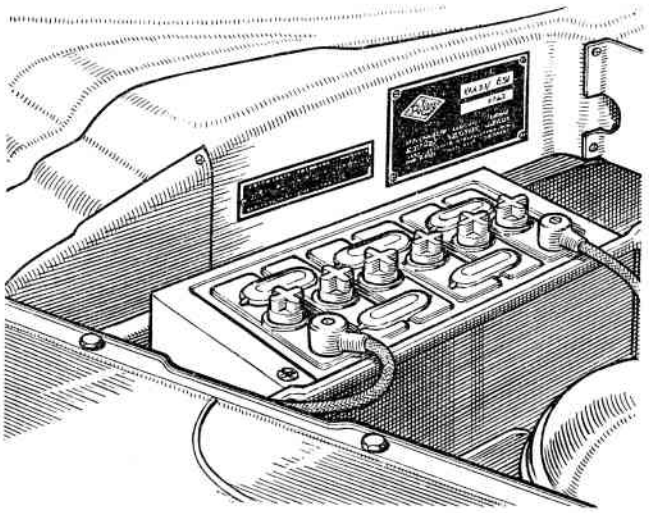
Thus, Engine No. 26R/N/H12345ME would indicate a reconditioned engine having a cylinder bore ·060 in. (1.524 mm.) oversize and a crankshaft ·025 in. (·635 mm.) undersize.

Reconditioned engines may also be fitted with ·010 in. (·254 mm.) oversize valve guides and can be identified by 'VG+·010' stamped on the outside of the cylinder head.

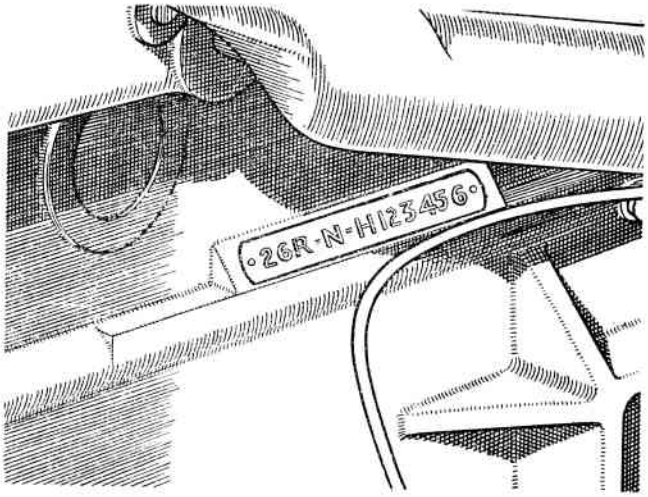
The oversize guides are identified by a shallow groove around their outer diameter.

LOCATION OF MAJOR COMPONENT SERIAL NUMBERS

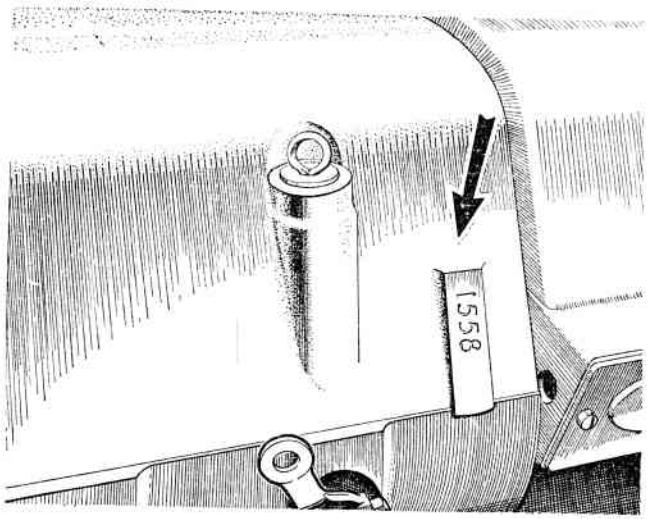
The major components of the vehicle have serial numbers. When in communication with the Company or your Dealer always quote the car and engine numbers. The registration number is of no assistance and is not required. The car and engine numbers will be found stamped on the identification plate located on the dash panel under the bonnet. The engine number is also stamped on a plate fixed to the left-hand side of the cylinder block. Other major components have their serial numbers stamped upon them and their locations are illustrated below.



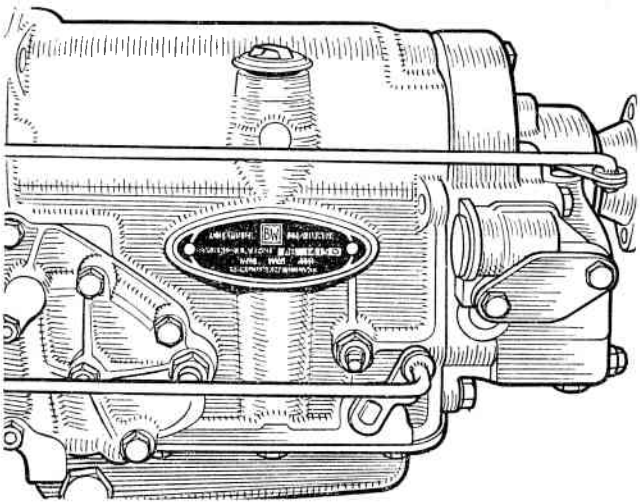
The Car (Chassis) Number is stamped on a plate secured to the left-hand side of the dash panel beneath the bonnet



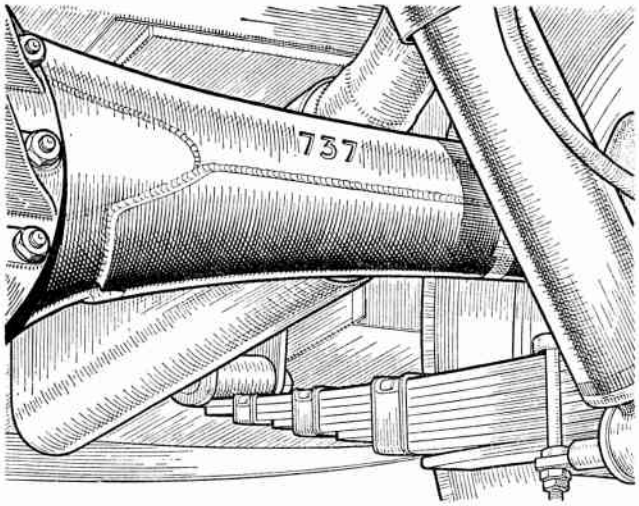
The Engine Number is stamped on a plate secured to the left-hand side of the cylinder block. On later models the engine number plate is moved forward 4 in. (10 cm.) to aid visibility



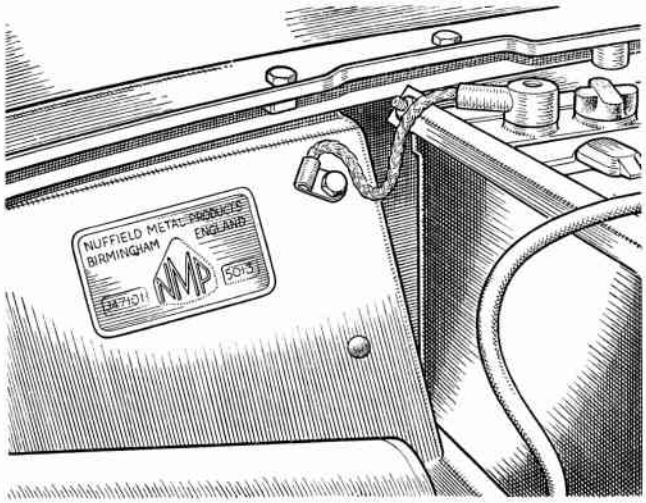
The Synchromesh Gearbox Number is stamped on the gearbox casing forward of the oil dipstick



The Automatic Transmission Number is stamped on a plate secured to the left-hand side of the transmission casing



The Rear Axle Number is stamped on the front of the left-hand rear axle tube adjacent to the spring seat



The Body Number is stamped on a plate mounted on the right-hand wing valance under the bonnet

COMMUNICATING WITH THE COMPANY

For all Home trade inquiries the address is:
RILEY MOTORS LIMITED
Abingdon, Berkshire.
Telephone: Abingdon 251–2–3–4.
Telegrams to: Riley, Abingdon.

For all Overseas inquiries the address is:
NUFFIELD EXPORTS LIMITED
Cowley, Oxford, England.
Telephone: Oxford, England, 77733.
Telex: Morex, Oxford, England.
Cables: Morex, Oxford, England.

CLAIMS UNDER WARRANTY

Claims for the replacement of material or parts under Warranty must always be submitted to the supplying Distributor or Dealer, or, when this is not possible, to the nearest Distributor or Dealer, informing them of the vendor's name and address.

PRESERVATIVES ON EXPORT MODELS

To remove the hard film preservative from the external plated parts, a cloth dipped in a solution of equal parts of white spirit and petrol (gasoline) should be used. Take care to keep this solvent from anything other than the plated components.

IDENTIFICATION OF UNIFIED SCREW THREADS

The general standardization of Unified screw threads makes it necessary to identify all nuts, bolts, and set screws with these threads in order to ensure their being matched with correspondingly threaded components and the fitting of correct replacements.

Identification has been standardized and is effected in the following manner:

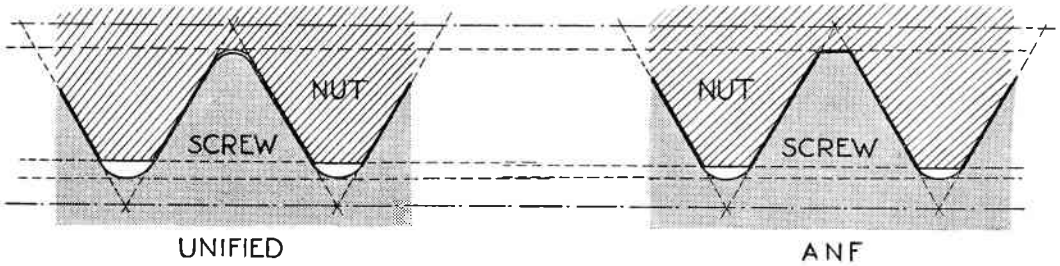
Nuts. By a circular groove turned on the end face of the nut or by connected circles stamped on one flat of the hexagon.

Bolts and set screws. By a circular depression turned on the head or by connected circles stamped on one flat of the hexagon.

Wheel stud nuts. By a notch cut in all the corners of the hexagon.

It is of the utmost importance that any nuts, bolts, or set screws marked with the above identifications are used only in conjunction with associated components having Unified threads and that only replacement parts with Unified threads are used, as these are **not** interchangeable with Whitworth, B.S.F., or Metric threads.

The Unified thread is, however, interchangeable with the American National Fine (A.N.F.) thread for all practical purposes.



This illustration of the Unified thread and the A.N.F. thread to the same scale indicates their close relationship

Spanners. It is to be noted that all A.N.F.- and Unified-threaded nuts and hexagon-headed bolts are made to the standard American hexagon sizes and that spanners of the appropriate size must be used when tightening or loosening them.

KEY TO SPANNER SIZES (Nominal widths between jaws)

Diameter of screw thread (inches)	1/4"	5/16"	3/8"	7/16"	1/2"	9/16"	5/8"	3/4"	7/8"	1"
For B.S.F. screws and nuts	·448	·529	·604	·705	·825	·925	1·016	1·207	1·309	1·489
For A.N.F. screws and nuts	·440	·504	·566	·629	·755	·880	·944	1·132	1·320	1·508
For Unified screws	·440	·504	·566	**·630**	·755	**·817**	·943	1·132	1·321	1·509
For Unified nuts (normal)	·440	·504	·566	**·692**	·755	**·880**	·943	1·132	1·321	1·509
For Unified nuts (heavy)	—	—	—	—	—	—	**1·069**	**1·258**	**1·446**	—

NOTE.—In the case of some Unified-threaded components the size of the hexagon for the nut is different from that of the bolt. Where this occurs the spanner size is shown in heavy type in the above table.

FROST PRECAUTIONS

Owing to the presence of a heater which cannot be drained satisfactorily, when frost is anticipated an anti-freeze solution must be used in the radiator.

The cooling system is of the sealed type and relatively high temperatures are developed in the radiator upper tank. For this reason anti-freeze solutions having an alcohol base are unsuitable owing to their high evaporation rate producing a rapid loss of coolant and a consequent interruption of circulation.

Only anti-freeze of the ethylene glycol type incorporating the correct type of corrosion inhibitor is suitable, and owners are recommended to use Bluecol, Shell Snowflake, or Esso Anti-Freeze, or any anti-freeze that conforms to Specification B.S.3151 or B.S.3152.

The recommended quantities of anti-freeze for different degrees of frost resistance are:

Down to 7° *F.* (−14° *C.*)	*Down to* 0° *F.* (−18° *C.*)
15 per cent. solution	20 per cent. solution

First decide what degree of frost protection is required before adding the anti-freeze to the radiator. If temperatures below 0° F. (−18° C.) are likely to be encountered a solution containing at least 25 per cent. of anti-freeze must be used. Consult the makers.

Make sure that the cooling system is watertight and examine all joints, replacing any defective rubber hose with new.

Before adding anti-freeze mixture to the radiator it is advisable to clean out the cooling system thoroughly by draining out the water and swilling out the water passages with a hose inserted in the water filler cap opening, keeping the drain tap open.

Avoid excessive topping up, otherwise there is a risk of losing valuable anti-freeze due to expansion of the solution. Only top up when the cooling system is at its normal running temperature.

Generally speaking, anti-freeze is not injurious to cellulose paint, provided it is wiped off in reasonable time. It must not, however, be allowed to remain on the paintwork.

Radiator anti-freeze should not be used in the windshield-washing equipment.

RUNNING-IN SPEEDS

The treatment given to a new car will have an important bearing on its subsequent life, and engine speeds during this early period must be limited. The following instructions should be strictly adhered to.

During the first 500 miles (800 km.).

DO NOT exceed 45 m.p.h. (72 km.p.h.).
DO NOT operate at full throttle in any gear.
DO NOT allow the engine to labour in any gear.

REPLENISHING THE FUEL TANK

Considerable loss of fuel can occur as a result of filling the fuel tank until the fuel is visible in the filler tube. If this is done and the vehicle is left in the sun, expansion due to heat will cause leakage, with consequent loss of and danger from exposed fuel.

When filling up the tank:

(1) Avoid filling the tank until the fuel is visible in the filler tube.
(2) If the tank is inadvertently overfilled, take care to park the vehicle in the shade with the filler as high as possible.

MAINTENANCE ATTENTION

500 MILES (800 Km.) FREE SERVICE

During the early life of the car, soon after it has completed 500 miles (800 km.), you are entitled to have it inspected free of charge by the Riley Dealer from whom you purchased it, or, if this should not be convenient, by any other Riley Dealer by arrangement. This attention given during the critical period in the life of the car makes all the difference to its subsequent life and performance.

This service includes:

1. Drain oil from engine, gearbox (not automatic), and rear axle, and refill.
2. Oil and grease all points of the car.
3. Tighten cylinder head and manifold nuts to recommended pressures.
4. Check tightness of valve rocker shaft brackets to recommended pressures.
5. Check valve rocker clearances, and reset if necessary.
6. Tighten fan belt if necessary.
7. Check all water connections, and tighten clips if necessary.
8. Examine and clean carburetters, and reset slow-running adjustment if necessary.
9. Check automatic transmission selector and governor linkages, and adjust if necessary.
10. Examine, and adjust if necessary, sparking plug and distributor points.
11. Check working of automatic ignition controls and, if necessary, reset ignition timing.
12. Check front wheel alignment and steering connections. Adjust if necessary.
13. Check tightness of universal joint nuts, wheel nuts, spring clips, and wing (fender) bolts.
14. Check clutch pedal for free movement, and bleed if necessary.
15. Check fluid level in brake and clutch master cylinder, and top up if necessary.
16. Check braking system functionally, and bleed lines if necessary.
17. Check electrical system functionally.
18. Examine battery and top up to proper level with distilled water as may be required. Clean and tighten terminals.
19. Inspect hydraulic dampers for leaks.
20. Test tyres for correct pressure.
21. Check doors for ease in opening and closing. If necessary, lightly smear with a suitable lubricating agent all dovetails and striking plates.

Regular servicing, as proven by presentation of completed counterfoils, could well enhance the value of your vehicle in the eyes of a prospective purchaser.

ALL MATERIALS CHARGEABLE TO THE CUSTOMER

PERIODICAL

Daily

Check oil level in crankcase. Top up if necessary.
Check water level in radiator. Top up if necessary.

Weekly

Test tyre pressures, and regulate if necessary.

1,000 miles (1600 km.) service

1. *Engine*
   Top up carburetter piston dampers.
   Lubricate carburetter controls.
   Top up radiator.
2. *Brakes*
   Check brake pedal free travel and report if adjustment is required.
   Make visual inspection of brakes line and pipes.
   Check level of fluid in the master cylinder supply tank.
3. *Hydraulic dampers*
   Examine all hydraulic dampers for leaks.
4. *Electrical*
   Check battery cell specific gravity readings and top up levels.
5. *Lubrication*
   Top up engine, gearbox (not automatic), and rear axle oil levels.
   Lubricate all grease nipples.
   Give the distributor drive-shaft greaser cap one half-turn.
6. *Wheels and tyres*
   Check tyre pressures.
   Check wheel nuts for tightness.
7. *Automatic transmission*
   Lubricate governor and selector lever linkages.

2,000 miles (3200 km.) service

Carry out the **1,000 miles (1600 km.) service.**

3,000 miles (4800 km.) service

1. *Engine*
   Top up carburetter piston dampers.
   Lubricate carburetter controls.
   Top up radiator.
   Check dynamo drive belt tension.

3,000 miles (4800 km.) service—*continued*

2. *Ignition*
   Lubricate distributor drive shaft (one half-turn).
3. *Brakes*
   Check brakes, and adjust if necessary.
   Make visual inspection of brake lines and pipes.
   Check level of fluid in the master cylinder supply tank.
4. *Hydraulic dampers*
   Examine all hydraulic dampers for leaks.
5. *Body*
   Lubricate door hinges, door locks, bonnet lock, and operating mechanism.
6. *Electrical*
   Check battery cell specific gravity readings and top up levels.
7. *Lubrication*
   Change engine oil.
   Top up gearbox, rear axle, steering gearbox, and automatic gearbox (see Section SB(a), and Recommended Lubricants).
   Lubricate all grease nipples.
8. *Wheels and tyres*
   Check tyre pressures.
   Change road wheels round diagonally, including spare, to regularize tyre wear.

4,000 miles (6400 km.) service

Carry out the **1,000 miles (1600 km.) service.**

5,000 miles (8000 km.) service

Carry out the **1,000 miles (1600 km.) service.**

6,000 miles (9600 km.) service

1. *Engine*
   Top up carburetter piston dampers.
   Lubricate carburetter controls.
   Top up radiator.
   Check dynamo drive belt tension.
   Lubricate water pump sparingly with oil.
   Check valve rocker clearances, and adjust if necessary.
   Clean air cleaner element.
   Clean carburetter and fuel pump filters.

MAINTENANCE ATTENTION—*continued*

6,000 miles (9600 km.) service—*continued*

2. *Ignition*
   Check automatic ignition control, lubricating distributor drive shaft (one half-turn), cam, and advance mechanism.
   Check, and adjust if necessary, distributor contact points.
   Clean and adjust sparking plugs.
3. *Brakes*
   Check brakes, and adjust if necessary.
   Make visual inspection of brake lines and pipes.
   Check level of fluid in the master cylinder supply tank.
   Clean and re-oil brake servo air cleaner.
4. *Hydraulic dampers*
   Examine all hydraulic dampers for leaks.
5. *General*
   Tighten rear road spring seat bolts.
6. *Body*
   Check body bolts, and tighten if necessary.
   Check, and tighten if necessary, door hinges and striker plate securing screws.
   Lubricate door hinges, door locks, bonnet lock, and operating mechanism.
7. *Electrical*
   Check battery cell specific gravity readings and top up levels.
8. *Lubrication*
   Change oil in engine, gearbox (not automatic), rear axle, and overdrive (where applicable).
   Top up automatic gearbox (if applicable).
   Top up steering gearbox oil level.
   Fit new oil filter element.
   Lubricate all grease nipples.
   Repack front hub caps with grease.
9. *Wheels and tyres*
   Check tyre pressures.
   Check front suspension heights.
   Check wheel alignment.
   Change road wheels round diagonally, including spare, to regularize tyre wear.

7,000 miles (11200 km.) service

Carry out the **1,000 miles (1600 km.) service.**

8,000 miles (12800 km.) service

Carry out the **1,000 miles (1600 km.) service.**

9,000 miles (14400 km.) service

Carry out the **3,000 miles (4800 km.) service.**

10,000 miles (16000 km.) service

Carry out the **1,000 miles (1600 km.) service.**

11,000 miles (17600 km.) service

Carry out the **1,000 miles (1600 km.) service.**

12,000 miles (19200 km.) service

1. *Engine*
   Remove carburetter suction chambers and pistons, clean, reassemble, and top up.

12,000 miles (19200 km.) service—*continued*

   Remove carburetter float-chambers, empty sediment, and refit.
   Lubricate carburetter controls.
   Check valve rocker clearances, and adjust if necessary.
   Clean air cleaner element.
   Check dynamo drive belt tension.
   Lubricate water pump sparingly with oil.
   Clean carburetter and fuel pump filters.
2. *Ignition*
   Check automatic ignition control, lubricating distributor drive shaft (one half-turn), cam, and advance mechanism.
   Check, and adjust if necessary, distributor contact points.
   Fit new sparking plugs.
3. *Steering*
   Check steering and suspension moving parts for wear.
4. *Brakes*
   Check brakes, and adjust if necessary.
   Make visual inspection of brake lines and pipes.
   Check level of fluid in the master cylinder supply tank.
   Clean and re-oil brake servo air cleaner.
5. *Hydraulic dampers*
   Examine all hydraulic dampers for leaks.
6. *Radiator*
   Drain, flush out, and refill radiator.
7. *General*
   Tighten rear road spring seat bolts.
8. *Body*
   Check body bolts, and tighten if necessary.
   Check, and tighten if necessary, door hinges and striker plate securing screws.
   Lubricate door hinges, door locks, bonnet lock, and operating mechanism.
9. *Electrical*
   Check battery cell specific gravity readings and top up levels.
   Lubricate dynamo bearing.
10. *Lubrication*
    Drain and flush out engine, filling with fresh oil.
    Change oil in gearbox (not automatic), rear axle, and overdrive (where applicable).
    Top up automatic gearbox (if applicable).
    Top up oil in steering gearbox.
    Fit new oil filter element.
    Lubricate all grease nipples.
    Repack front hub caps with grease.
    Lubricate speedometer and tachometer cables.
11. *Wheels and tyres*
    Check tyre pressures.
    Check front suspension heights.
    Check wheel alignment.
    Change road wheels round diagonally, including spare, to regularize tyre wear.
12. *Headlamps*
    Check headlamp beam setting, and reset if necessary.

24,000 miles (38400 km.) service

Carry out the **12,000 miles (19200 km.) service,** with the following additions:

1. *Automatic transmission*
   Change oil in automatic gearbox.
2. *Engine*
   Renew air cleaner element.

MAINTENANCE ATTENTION—*continued*

Every 6,000 Miles (10000 Km.)—*continued*

6. *Body*
   Check body bolts, and tighten if necessary.
   Check, and tighten if necessary, door hinges and striker plate securing screws.
   Lubricate door hinges and bonnet lock and operating mechanism.

7. *Electrical*
   Check battery cell specific gravity readings and top up levels.
   Lubricate dynamo bearing.

Every 12,000 Miles (20000 Km.)

1. *Engine*
   Remove carburetter suction chamber and piston, clean, reassemble, and top up.
   Remove carburetter float-chamber, empty sediment, and refit.
   Lubricate carburetter controls.
   Check valve rocker clearances, and adjust if necessary.
   Clean air cleaner element (replace the element every 24,000 miles).
   Check dynamo drive belt tension.
   Lubricate water pump sparingly with oil.
   Clean carburetter and fuel pump filters.

2. *Ignition*
   Check automatic ignition control, lubricating distributor drive shaft (one turn), cam, and advance mechanism.
   Check, and adjust if necessary, distributor contact points.
   Fit new sparking plugs.

3. *Steering*
   Check steering and suspension moving parts for wear.

4. *Brakes*
   Check brakes, adjust if necessary, and change road wheels round diagonally to regularize tyre wear.
   Make visual inspection of brake lines and pipes.
   Check level of fluid in the brake master cylinder supply tank.
   Clean and re-oil brake servo air cleaner.

5. *Hydraulic dampers*
   Examine all hydraulic dampers for leaks.

8. *Lubrication*
   Change oil in engine, gearbox (not automatic), rear axle, and overdrive (where applicable).
   Top up automatic gearbox (if applicable).
   Top up steering gearbox oil level.
   Fit new oil filter element.
   Lubricate all grease nipples.
   Repack front hub caps with grease.

9. *Wheels and tyres*
   Check tyre pressures.
   Check front suspension heights.
   Check wheel alignment.

6. *Radiator*
   Drain, flush out, and refill radiator.

7. *General*
   Tighten rear road spring seat bolts.

8. *Body*
   Check body bolts, and tighten if necessary.
   Check, and tighten if necessary, door hinges and striker plate securing screws.
   Lubricate door hinges and bonnet lock and operating mechanism.

9. *Electrical*
   Check battery cell specific gravity readings and top up levels.
   Lubricate dynamo bearing.

10. *Lubrication*
    Drain engine and refill with fresh oil.
    Change oil in gearbox (automatic at 24,000 miles [40000 km.] only), rear axle, and overdrive (where applicable).
    Top up automatic gearbox (if fitted).
    Top up oil in steering gearbox.
    Fit new oil filter element.
    Lubricate all grease nipples.
    Repack front hub caps with grease.

11. *Wheels and tyres*
    Check tyre pressures.
    Check front suspension heights.
    Check wheel alignment.

SECTION A

THE ENGINE

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For additional information see also Section AA

GENERAL DESCRIPTION

The six-cylinder overhead-valve engine is built in unit construction with a single dry-plate clutch. The valves are set in line in the detachable cylinder head and are operated by rockers and push-rods from the camshaft on the right-hand side of the engine. Oil seals are fitted to the valves and there is the normal provision on the rockers for clearance adjustment. The camshaft is roller-chain-driven from the crankshaft. The chain is tensioned by an automatic adjuster spring-operated and supplied with oil to lubricate a synthetic rubber slipper. The end-thrust of the camshaft, which runs in four renewable white-metal-lined steel bearings, is taken by a plate secured to the front end of the cylinder block. The oil pump and distributor are driven from the camshaft. The T slot pistons are of aluminium alloy with anodized finish and carry three compression rings and a slotted oil control ring. The gudgeon pins are offset in the pistons towards the thrust side and are fully floating in the connecting rods, which have steel-backed renewable bearings. Four white-metal renewable bearings support the forged-steel counterbalanced crankshaft and the end-thrust is taken by split thrust plates on No. 2 main bearing housing.

A centrifugal water pump with fan blades attached to the pulley is driven from the crankshaft by the dynamo belt.

LUBRICATION SYSTEM

The oil supply is carried in the sump below the cylinder block and the filler cap is fitted on the forward end of the rocker cover. The oil indicator rod is on the right-hand side of the engine and is marked to indicate the maximum and minimum levels. The eccentric-vane type oil pump driven by the camshaft is mounted below the crankcase and is partially submerged in the oil reservoir.

Oil is drawn through a gauze strainer secured to the oil pump and passes through a drilling up the right-hand side of the crankcase to the oil filter, passing the non-adjustable pressure release valve. After leaving the full-flow filter the oilway divides, one drilling passing up the right-hand side of the cylinder block through the cylinder head to a pipe feeding oil to No. 4 rocker shaft bracket. From here oil passes through the hollow centre of the rocker shaft to lubricate all rocker bearings and through drillings in the rockers to lubricate the valve gear. Oil returning to the sump from the rockers lubricates the tappets. The second oilway from the oil filter passes round No. 3 camshaft bearing, lubricating this bearing as it does so, to the oil gallery on the left-hand side of the engine. From the gallery, drillings in the cylinder block take oil to each main bearing and, through the crankshaft, to the big-ends. Oilways from the main bearings also supply the camshaft bearings. The connecting rods have jet holes to deliver oil quickly to the cylinder walls when starting the engine.

A vent pipe is attached to the rear tappet chamber cover and a breather in the valve rocker cover is connected to the air silencer.

An oil pipe connects the rear end of the main oil gallery on the left-hand side of the engine with the oil gauge on the instrument panel.

Section A.1

DRAINING THE SUMP

The sump on new and reconditioned engines must be drained and filled with new oil after the first 500 miles (800 km.) and at intervals of every 3,000 miles (4800 km.). The sump should be allowed to drain for at least 10 minutes before the drain plug is replaced. The oil will flow more readily if it is drained while the engine is hot.

At every alternate oil change, or every 6,000 miles (9600 km.), a new external oil filter element should be fitted.

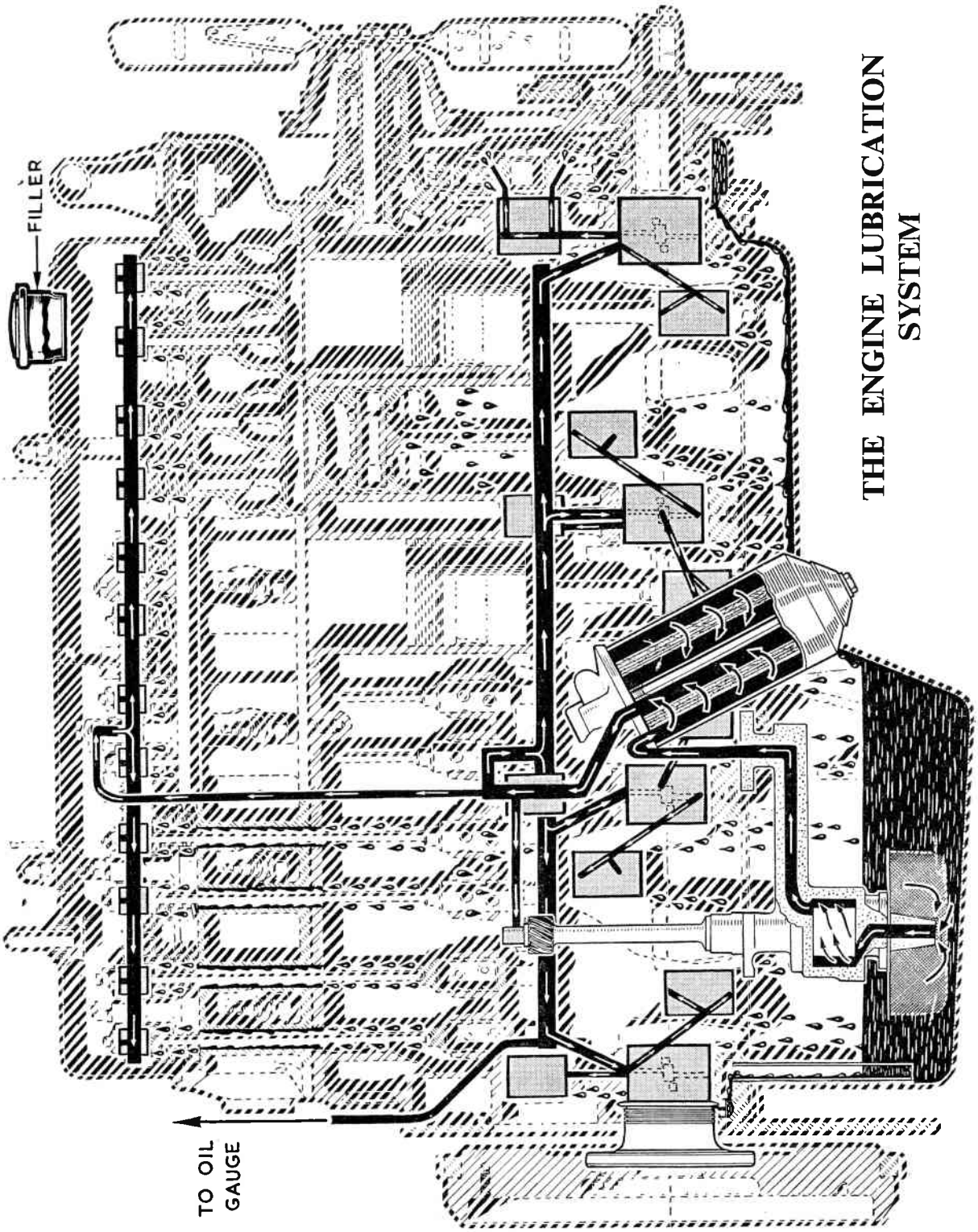
Section A.2

EXTERNAL OIL FILTER

The external filter is a full-flow type, thus ensuring that all oil in the lubrication system passes through the filter before reaching the bearings.

Fig. A.1
Lowering the oil filter container

THE ENGINE LUBRICATION SYSTEM



The element of the filter is of star formation in which a special-quality felt, selected for its filtering properties, is used.

Oil is passed to the filter from the pump at a pressure controlled by the engine oil release valve. Some pressure is lost in passing the oil through the filter element; this will only be a pound or two per sq. in. with a new element, but will increase as the element becomes progressively contaminated by foreign matter removed from the oil.

Should the filter become completely choked due to neglect, a balance valve is provided to ensure that oil will still reach the bearings. This valve, set to open at a pressure difference of 15 to 20 lb./sq. in. (1·05 to 1·4 kg./cm.^{2}), is non-adjustable and is located in the filter head casting. When the valve is opened unfiltered oil can bypass the filter element and reach the bearings.

Every alternate oil change or every 6,000 miles (9600 km.) a new external oil filter element must be fitted.

Make certain that the correct element is obtained (see **'GENERAL DATA'** for the make of filter fitted).

To renew the element proceed as follows.

Unscrew the centre-fixing bolt, and the container complete with element can be removed.

Withdraw the contaminated element and carefully cleanse the container of all foreign matter that has been trapped.

After ensuring that no fibres from the cleansing operation have been left in the container, put in a new element, prime the filter, and refit to the head casting, tightening the centre-fixing bolt sufficiently to make an oiltight joint. Check the level of oil in the sump by means of the dipstick.

Section A.3

OIL PRESSURE RELEASE VALVE

The non-adjustable oil pressure release valve is situated at the rear of the right-hand side of the cylinder block behind the oil filter and is held in position by a hexagon nut sealed by a copper washer. The release valve spring retains a valve cup against a seating machined in the block.

The valve should be examined to ensure that the cup is seating correctly and that the release spring has not lost its tension. The cup can be removed and ground into its seating with the Service tool illustrated in Fig. A.3. The latter can be checked by measuring the length of the spring (see **'GENERAL DATA'**).

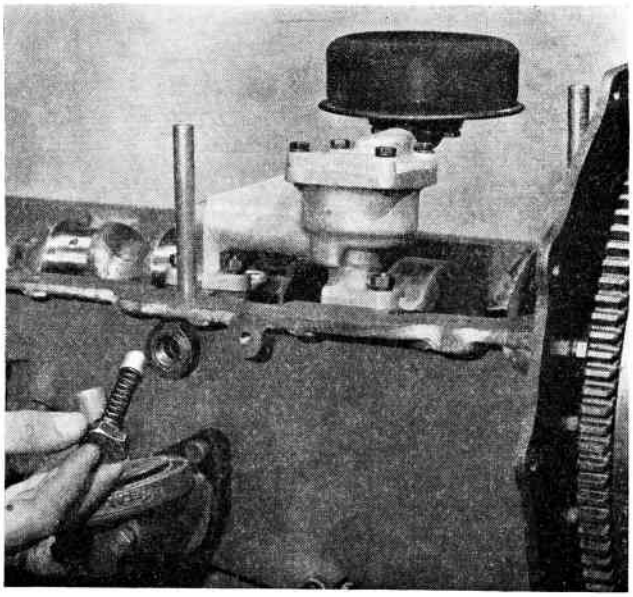


Fig. A.2
The oil pressure release valve

Section A.4

OIL PRESSURE

Should there be a noticeable drop in pressure, the following points should be checked over:

(1) That there is a good supply of the correct grade of oil in the engine sump.

(2) That there is no air leakage between the oil pump cover and the pump body on the suction side of the pump or between the body and the crankcase on the delivery side.

(3) That the strainer in the sump is clean and not choked with sludge.

(4) That the bearings, to which oil is fed under pressure, have the correct working clearances. Should the bearings be worn and the clearances excessive, the oil will escape more readily from the sides of the bearings, particularly when the oil is warm and becomes fluid. This will cause a drop in pressure on the gauge as compared with that shown when the bearings are in good order.

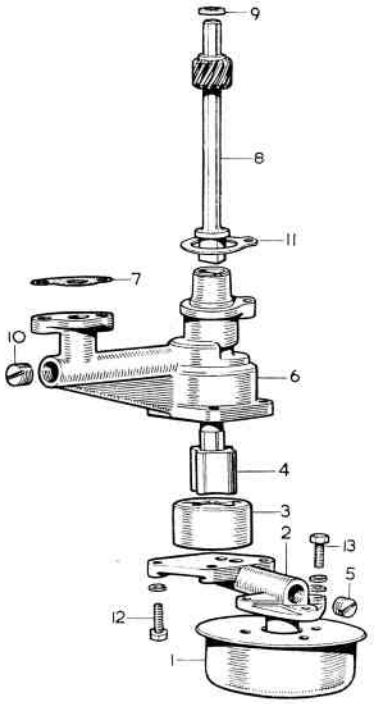
Fig. A.3
Oil release valve grinding-in tool

NOTE.—The automatic release valve in the lubrication system deals with any excessive oil pressure when starting from cold. When hot the pressure drops as the oil becomes more fluid.

Continuous cold-running and the unnecessary use of the mixture control are often the cause of serious oil dilution by petrol (gasoline) and a consequent drop in pressure.

New engines with new oil will give considerably higher pressure readings than those given in the General Data section.

Particular attention is called to the recommended change of oil every 3,000 miles (5000 km.).



1. Pick-up strainer.
2. Bottom lower plate.
3. Outer rotor.
4. Inner rotor.
5. Screw plug.
6. Pump body.
7. Joint washer.
8. Driver spindle.
9. Drive spindle thrust washer.
10. Screw plug.
11. Joint washer.
12. Screw plate to body.
13. Screw plate to filter.

Fig. A.4

Oil pump components

Section A.5

REMOVING THE OIL PUMP

Remove the sump as in Section AA. Remove the nuts with spring washers from the studs securing the oil pump assembly to the crankcase and withdraw the oil pump. If the oil pump is removed while the engine is in position, the drive shaft will be free to disengage from the camshaft and care should be taken that it does not fall out. Note also the thrust washer on the drive shaft above the gear.

When replacing the pump, clean off the mating faces and fit new joint seals to ensure airtight joints.

Dismantling

Take out the three bolts with spring and flat washers to release the strainer from the body.

The oil pump cover is attached to the body of the pump by four bolts and spring washers, and when these bolts are removed the oil pump cover, the outer rotor, and the combined oil pump shaft and inner rotor may be extracted.

Reassembly

Is a reversal of the above procedure.

Section A.6

MAIN AND BIG-END BEARINGS

Unless the bearing journals are badly worn the big-end bearings and the Nos. 2 and 3 main bearings may be renewed without removing the crankshaft. To renew the front and rear main bearings the engine must be removed from the car as in Section AA. Liners are used both for the main and the big-end bearings, which are of the shimless type and therefore non-adjustable.

Big-end bearings

Drain the engine oil and remove the sump as in Section AA, and the oil pump as in Section A.5.

As the bearings are of the shimless type it is essential that no attempt should be made to adjust them when worn. Always fit new bearings in place of worn parts. If the crankshaft journals are found to be in a worn condition it is advisable to fit a service reground crankshaft, complete with main and big-end bearings.

Both the big-end and main bearing liners are located in position in the bearing housings by a small tag on one side of each half-bearing, and it should be noted that the bearings are fitted so that the tags come on the same joint edge of the bearing housing although on opposite corners.

To detach the big-end bearings, unscrew the self-locking nuts and remove the bolts. Remove the connecting rod caps and extract the bearings. Care should be exercised to see that the bearing journals, etc., are thoroughly cleaned before installing new bearings. No scraping is required, as the bearings are machined to give the correct diametrical clearance given in the General Data section.

Main bearings

Nos. 2 and 3 main bearing liners may be renewed without removal of the engine and end plates necessary when dealing with the front and rear main bearings to ensure correct seating and sealing of the square-section cork bearing cap seals. The front main bearing cap is also secured by two bolts through the front end plate.

To reach the two centre bearings remove the sump and oil pump and the bearing cap self-locking nuts. No. 2 main bearing takes the crankshaft end thrust on washers each side of the bearing housing. Each thrust washer consists of two semicircular halves, and the upper half of each is free to rotate with the crankshaft after the bearing cap is removed and may be withdrawn from the housing without removal of the crankshaft. The lower half of each washer is locked against rotation by a lug which registers in the bearing cap. The washers are available in four sizes given in the General Data section.

For removal of the front and rear main bearings remove the engine from the car as in Section AA; remove the flywheel and clutch (Section A.29), the timing chain (Section A.25), the sump (Section AA), and oil pump (Section A.5) and the front and rear engine plates.

Remove the bolts securing the bearing caps to the cylinder block. A special tool to assist in the removal of the bearing caps is shown at the end of Section A.

When fitting new bearings no scraping is required as the bearings are machined to give the correct diametrical clearance.

In the case of a ' run ' bearing, it is always essential thoroughly to clean out all the oilways in the crankshaft and blocks, wash out the engine base with paraffin (kerosene), and clean the oil pump and strainer to ensure that no particles of white metal are left anywhere in the lubricating system. Replace each main bearing and cap, replacing the thrust washers in their correct positions with the oil grooves away from the bearing.

Section A.7

THE WATER PUMP

The water pump is of the centrifugal impeller type and is mounted on a common spindle with the fan in a casting fastened to the front of the cylinder block.

The water seal is effected by a spring-loaded carbon gland washer bearing on a seating in the impeller housing. It is necessary to remove and dismantle the pump and fan assembly to obtain access to the sealing gland.

To remove

Drain the water from the cooling system.

Slacken the clips and disconnect the radiator hose from the pump.

Release the belt tension by slackening the dynamo pivot bolts and slotted link bolts. If necessary, remove the fan blades by withdrawing the four set pins.

Remove the four nuts securing the pump to the front of the cylinder block and withdraw the pump from the studs.

When the fan and water pump assembly has been removed from the engine, the water pump may be dismantled as detailed in Section C.7.

Replacement

The fan and pump assembly is a reversal of this procedure, but the joint faces of the pump body and the cylinder block must be clean and a new joint seal must be fitted.

Section A.8

REMOVING THE ROCKER SHAFT ASSEMBLY

Remove the air cleaner. Remove the two dome nuts with sealing washers and lift off the rocker cover, taking care not to damage the cork gasket.

Fig. A.5

The rocker shaft assembly

Unscrew the oil feed pipe at the union on the cylinder head and remove the rocker shaft bracket fixing nuts and spring washers. Remove the rocker assembly, complete with brackets and rockers and oil feed pipe.

Section A.9

DISMANTLING THE ROCKER SHAFT ASSEMBLY

Remove the split pin from one end of the rocker shaft to release the thrust washer and double-coil spring.

Withdraw rockers, rocker shaft brackets, thrust washers, and springs.

The oil feed pipe banjo bolt fitted to No. 4 bracket is also a dowel bolt locating the rocker shaft in position in the mounting bracket and this bolt must be withdrawn to allow the bracket to be removed from the shaft. Note that a copper washer is fitted each side of the oil pipe banjo. When reassembling the rocker gear, commence with No. 4 bracket and secure the oil feed pipe with the washers in position, ensuring that the dowel on the banjo bolt locates in the rocker shaft.

The brackets are fitted with the deepest side on the right-hand side of the engine and the rocker shaft is fitted with the oilway screwed-in end plug to the front. The rear end tapered plug is a drive fit.

A thrust washer is fitted each side of each rocker shaft bracket, and all springs, rockers, and the remaining brackets are interchangeable.

Section A.10

REMOVING AND REPLACING ROCKER BUSHES

Remove and dismantle the rocker shaft as in Sections A.8 and A.9.

To remove and replace worn rocker bushes the use of service tool 18G21 is recommended; the bushes and the rockers can be very easily damaged by using improvised drifts. Place the rocker on the anvil and press the worn bush out (Fig. A.6).

Place a new bush on the driver and position the bush with the butt joint at the top of the rocker bore and with the end of the oil groove picking up the oilway to the adjuster end of the rocker.

It will be necessary to drill the oil holes in the bush to coincide with the oilways in the rocker. The oil hole to the adjuster end can be drilled before the bush is fitted, extra care being taken to keep the holes of the bush and rocker in line during the pressing-in operation.

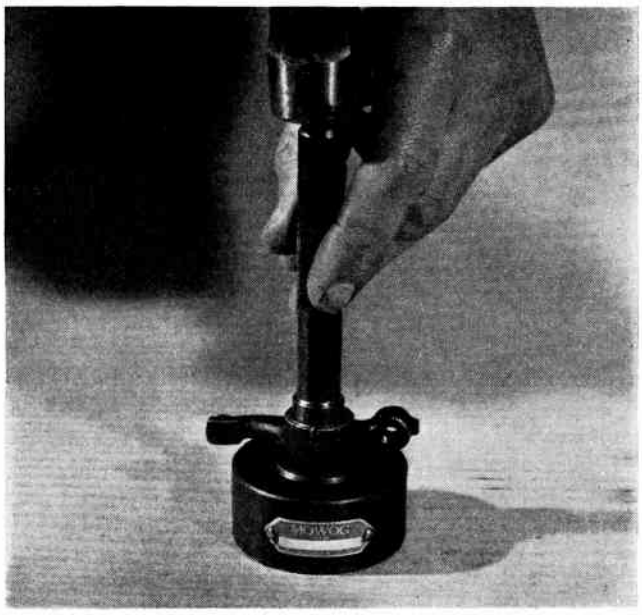


Fig. A.6

Renewing a rocker shaft bush with special service tool 18G21

If the holes are drilled after fitting, the following procedure must be adopted. Remove the adjuster screw and use a No. 43 drill, ·089 in. (2·26 mm.), to drill out the end plug and to continue the oilway through the bush. Replug the end after this operation with a rivet, Part No. 5C2436, and weld the plug into position. The oil hole in the top of the rocker barrel must be continued through the bush with a No. 47 drill, ·0785 in. (1·98 mm.).

Finally burnish-ream the bush to the dimensions given in the General Data section.

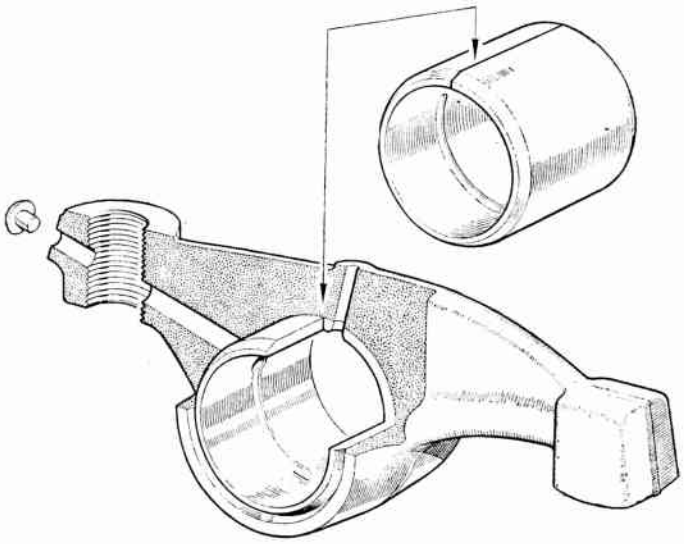


Fig. A.7

Make certain the bush is positioned to align the end of the oil groove with the oilway from the rocker adjusting screw. The joint in the bush should be in the position indicated by the arrow.

Section A.11

THE CYLINDER HEAD

To remove

Drain the water from the cooling system by means of the two drain taps. One is situated at the base of the radiator and the other at the rear left-hand side of the engine. If anti-freeze mixture is in use it should be drained into a suitable clean container and carefully preserved for future use.

Disconnect the positive cable from the battery.

Slacken both the hose retaining clips and remove the hose connecting the radiator to the thermostat housing. Extract the thermostat housing securing nuts and remove the housing and thermostat.

Remove the air cleaner and carburetters as described in Section AA.

Remove the heat shield and exhaust manifolds as described in Section AA.

Detach the high-tension cables and remove the sparking plugs, taking care not to damage the porcelain insulators. Disconnect the cable from the temperature gauge unit.

Release the suction advance pipe clip from the right-hand side of the cylinder head. If the car is fitted with a heater, slacken the retaining clip and detach the heater hose from the heater control valve, which is also on the rear right-hand side of the cylinder head.

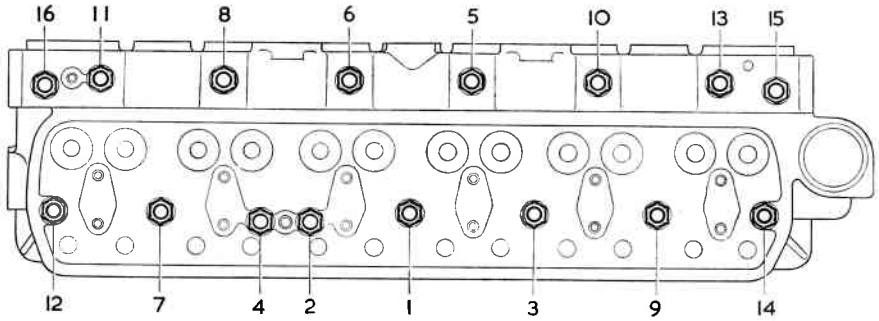


Fig. A.8

The order of tightening the cylinder head nuts

Remove the rocker assembly as described in Section A.8. Withdraw the push-rods, keeping them in order of removal.

Remove the cylinder head nuts and flat washers and lift off the cylinder head.

NOTE.—To facilitate breaking the cylinder head joint, the cylinder block is relieved in two places on the right-hand side and the head in two places on the left-hand side to permit the use of a lever. When lifting the head a direct pull should be given so that the head is pulled evenly up the studs.

Refitting the cylinder head

Make sure that the surfaces of both the cylinder block and the cylinder head are clean; it is not necessary to use jointing compound or grease for the gasket. The cylinder head gasket cannot be replaced incorrectly. Having slipped the gasket over the studs, next lower the cylinder head onto the block and position the cylinder head stud nut washers. Ensure that a bronze washer is fitted below the steel washer on each stud which passes through the inlet manifold on the left-hand side of the head. Fit the stud nuts finger-tight and then tighten them a part turn at a time with a torque wrench set to break at the torque figure given in the General Data section, proceeding in the order given in Fig. A.8.

Insert the push-rods, replacing them in the positions from which they were taken, and continue the assembly in the reverse order of that used for dismantling.

Check the valve clearances as in Section A.21. These, of course, must be finally adjusted after the engine has been completely reassembled and run for a short period and the air cleaner should be left off until this adjustment is completed.

Replace the exhaust manifolds.

Switch on the ignition and check the fuel system for leaks.

Start the engine and run it until the normal working temperature is reached, checking it for water leaks as it warms. Remove the rocker cover and finally tighten the cylinder head nuts with a torque wrench set to the recommended reading, and check the valve clearances (see Section A.21). Replace the rocker cover.

Section A.12

REMOVING A PISTON AND CONNECTING ROD

The pistons and connecting rods must be withdrawn from the top of the cylinder block.

Remove the cylinder head as in Section A.11. Drain and remove the sump as in Section AA, and oil pump Section A.5.

Remove the big-end bearing cap nuts and the bearing cap. Release the connecting rod from the crankshaft and push the assembly upwards until the piston rings are above the cylinder bore.

Withdraw the piston and connecting rod from the top of the cylinder block and refit the bearing cap. It may be necessary to remove the ring of carbon or ridge from the top of the bores prior to pushing the pistons upwards, to avoid piston ring fracture. The big-end bearings are offset in the connecting rods; the rods in Nos. 1, 3, and 5 cylinders are offset towards the front and those for Nos. 2, 4, and 6 cylinders are offset towards the rear. When used parts are replaced after dismantling it is essential that they should be fitted in their original positions. In order to ensure this, mark the caps and connecting rods on their sides which are fitted together with the number of the cylinder from which each was taken.

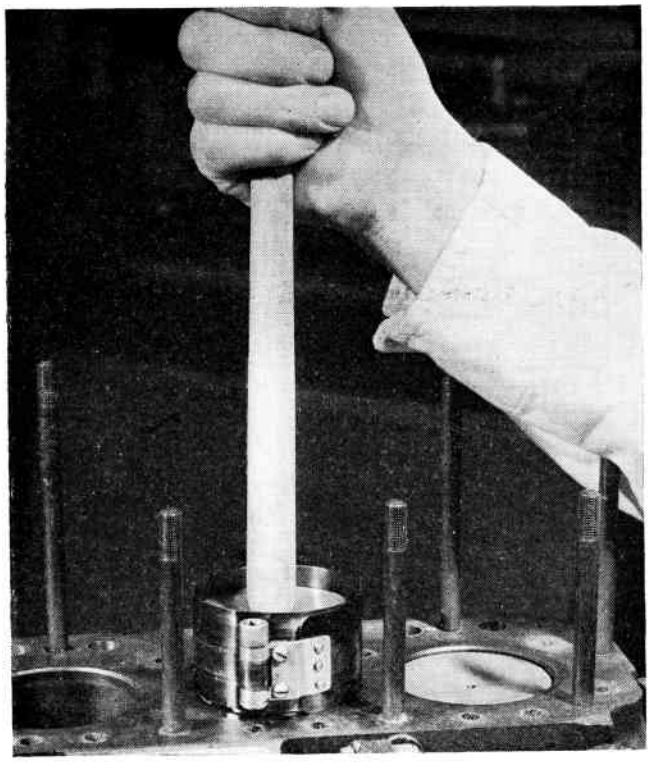


Fig. A.9

Inserting a piston with the aid of the ring compressor 18G55

Replacement of the piston and connecting rod is a direct reversal of the above, but the piston ring gaps should be set at approximately 180° to each other.

If the piston rings have been removed from the piston they must be replaced as detailed in Section A.14.

It is essential that the connecting rod and piston assemblies should be replaced in their own bores and fitted the same way round, i.e. with the piston slot on the side of the engine opposite to the camshaft. The piston crowns are marked 'Front' to facilitate this. Use the piston ring compressor shown in Fig. A.9 to make refitting an easy operation and to avoid broken piston rings.

Refit the big-end bearings in their original positions.

Section A.13

DISMANTLING A PISTON AND CONNECTING ROD

Remove the two circlips securing each gudgeon pin in its piston and press the gudgeon pin out. Mark the gudgeon pins and pistons for reassembly to their original positions and to their original connecting rods.

Check the gudgeon pin and the connecting rod little-end bearings for wear, with the dimension given in the General Data section. If the bush is worn it should be removed and a new bush fitted. A light press is most suitable for this operation.

When pressing in the new bush ensure that the oil hole in the bush is in line with the oil hole in the connecting rod.

Replacement bushes must be finish reamed to size after pressing into the connecting rod (see the General Data section for the correct dimensions). The piston gudgeon pin bosses must not be reamed as oversize gudgeon pins are not supplied.

Assemble the pistons to the connecting rods by inserting the gudgeon pins, which should be a hard hand-push fit at a room temperature of 68° F. (20° C.). Secure each gudgeon pin in position with the two circlips, ensuring that they fit well into their grooves.

IMPORTANT.—When assembling the piston to the connecting rod make certain that the slot in the piston will be on the opposite side to the camshaft when the assembly is fitted to the cylinder block.

Section A.14

REMOVING AND REPLACING PISTON RINGS

If no special piston ring expander is available, use a piece of thin steel such as a smoothly ground hacksaw blade or a disused ·020 in. (·50 mm.) feeler gauge.

Raise one end of the ring out of its groove. Insert

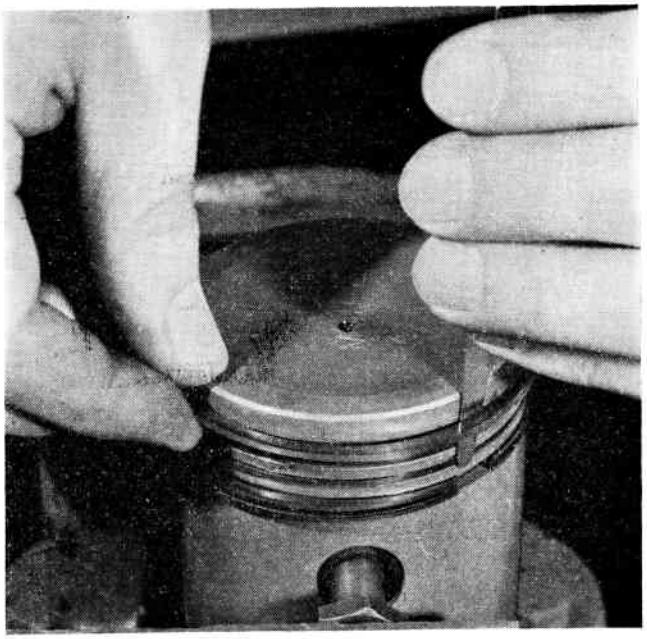


Fig. A.10

Remove and replace the rings over the crown of the piston

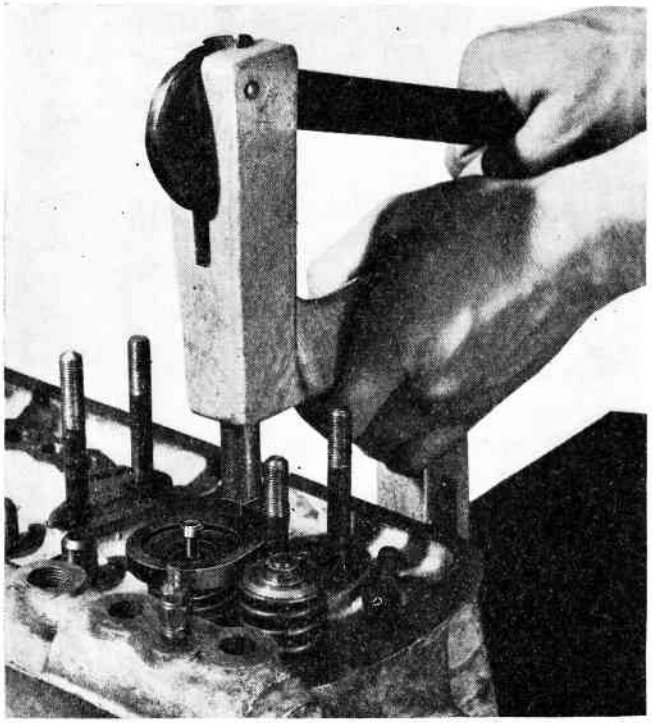


Fig. A.11
Using the special valve spring compressor to replace the split conical cap retainers

the steel strip between the ring and the piston. Rotate the strip around the piston, applying slight upward pressure to the raised portion of the ring until it rests on the land above the ring grooves. It can then be eased off the piston. Always remove and replace the rings over the top of the piston, never over the piston skirt.

Before fitting new rings, clean the grooves in the piston to remove any carbon deposit. Care must be taken not to remove any metal, or side-play between the ring and groove will result, with consequent excessive oil consumption and loss of gastightness.

New rings must be tested in the cylinder bore to ensure that the ends do not butt together. The best way to do this is to insert the piston approximately 1 in. (2·54 cm.) into the cylinder bore, push the ring down onto the top of the piston, and hold it there in order to keep the ring square with the bore. The correct ring gaps are given in the General Data section.

Section A.15

PISTON SIZES AND CYLINDER BORES

When fitting new pistons selective assembly is necessary, and to facilitate this the pistons are stamped with identification figures on their crowns. Oversize pistons are marked with the actual oversize dimensions. A piston stamped ·020 is only suitable for a bore ·020 in. (·508 mm.) larger than the standard bore, and similarly pistons with other markings are only suitable for the oversize bore indicated.

After reboring an engine, or whenever fitting pistons differing in size from those removed during dismantling, ensure that the size of the piston fitted is stamped clearly on the top of the cylinder block alongside the appropriate cylinder bore.

Oversize pistons are supplied in the size indicated in the following table:

Piston marking	*Suitable bore size*	*Metric equivalent*
STANDARD	3·1257 to 3·1260 in.	79·392 to 79·400 mm.
OVERSIZE		
+·010 in. (·254 mm.)	3·1357 to 3·1360 in.	79·646 to 79·654 mm.
+·020 in. (·508 mm.)	3·1457 to 3·1460 in.	79·900 to 79·908 mm.
+·030 in. (·762 mm.)	3·1557 to 3·1560 in.	80·154 to 80·162 mm.
+·040 in. (1·016 mm.)	3·1657 to 3·1660 in.	80·408 to 80·416 mm.

Section A.16

REMOVING THE VALVES

Remove the cylinder head as in Section A.11.

Compress the valve springs with a suitable valve spring compressor and remove the valve circlip, the two cap retainers, and valve stem oil seal. Release the valve spring and remove the compressor, valve spring cap, oil deflector, and valve spring.

Withdraw the valve from the guide.

Keep the valves in their relative positions when removed from the engine to ensure replacement in their original valve guides or stamp the head of each valve with a number to indicate its position in the cylinder head. Commence with No. 1 valve at the front of the engine. The exhaust valve heads are smaller in diameter than the inlet valves.

To replace the valves, place each valve in its guide and replace the oil deflector.

Fit a new rubber oil seal. The correct position for the seal is immediately below the cap retainers; do not refit an old seal or oiltightness may be lost. The oil seals are fitted more easily if they have been soaked in engine oil for a short period before use.

Replace the valve spring cap and compress the spring.

Refit the two cap retainers and secure them with the valve circlip. Remove the compressor.

Section A.17

DECARBONIZING

Drain the cooling water from the engine and the radiator.

Remove the cylinder head as described in Section A.11.

Withdraw the valves as described in Section A.16.

Remove the cylinder head gasket and plug the waterways with clean rag.

If special equipment is not available for decarbonizing it will be necessary to scrape the carbon deposit from the piston crowns, cylinder block, and cylinder head, using a blunt scraper.

A ring of carbon should be left round the periphery of the piston crown and the rim of carbon round the top of the cylinder bore should not be touched. To facilitate this, an old piston ring can be sprung into the bore so that it rests on top of the piston.

The cylinder head is next given attention. The sparking plugs must be removed, cleaned, and adjusted. Clean off the carbon deposit from the valve stems, valve ports, and combustion spaces of the cylinder head. Remove all traces of carbon dust with compressed air or by the vigorous use of a tyre pump and then thoroughly clean with paraffin (kerosene) and dry off.

Fit a new cylinder head gasket when replacing the head.

Section A.18

VALVE GRINDING

Remove the valves as in Section A.16.

Each valve must be cleaned thoroughly and carefully examined for pitting. Valves in a pitted condition should be refaced with a suitable grinder or new valves fitted. The exhaust valve seat angle is 45° and the inlet is 30°.

If the valve seats show signs of pitting or unevenness they should be trued by the use of special service cutting tools illustrated at the end of Section A. These tools will save lengthy and wasteful grinding in. When using a cutting tool take care to remove only as much metal as necessary to ensure a true surface. Worn valve seats usually have a glass-hard surface and a glaze breaker should be used to prepare the valve seat surface for any re-cutting that may be necessary. Narrowing cutters should be used to maintain the valve seats at their correct widths as given in the General Data section.

When grinding a valve onto its seating the valve face

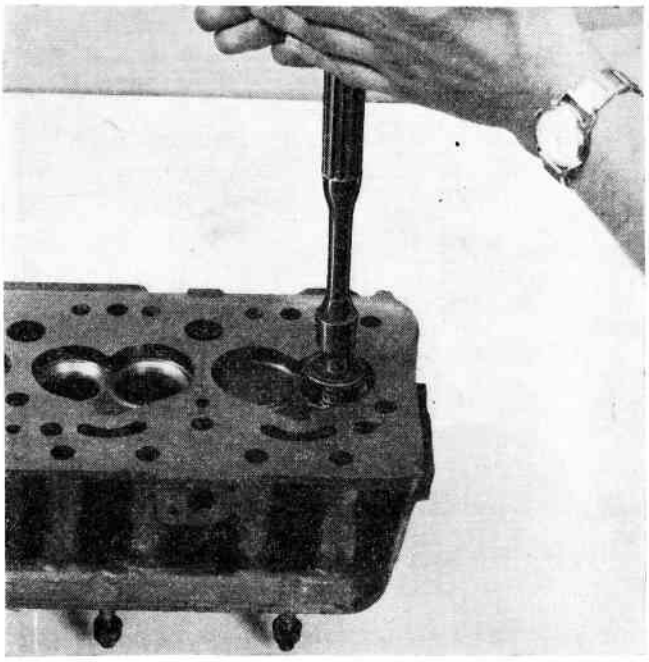


Fig. A.12

Allow the valve to rise frequently from its seat to avoid grooving

should be smeared lightly with fine or medium grade carborundum paste and then lapped in with a suction grinder. Avoid the use of excessive quantities of grinding paste and see that it remains in the region of the valve seating only.

A light coil spring placed under the valve head will assist considerably in the process of grinding. The valve should be ground to its seat with a semi-rotary motion and occasionally allowed to rise by the pressure of the light coil spring. This assists in spreading the paste evenly over the valve face and seat. It is necessary to carry out the grinding operation until a dull, even, matt surface, free from blemish, is produced on the valve seat and valve face.

On completion, the valve seat and ports should be cleaned thoroughly with a rag soaked in paraffin (kerosene), dried, and then thoroughly cleaned by compressed air. The valves should be washed in paraffin (kerosene), and all traces of grinding paste removed.

Fit new oil seals when refitting the valves.

Section A.19

REMOVING AND REPLACING VALVE GUIDES

Remove the cylinder head as detailed in Section A.11.

Remove the appropriate valve and spring as in Section A.16. Rest the cylinder head with its machined

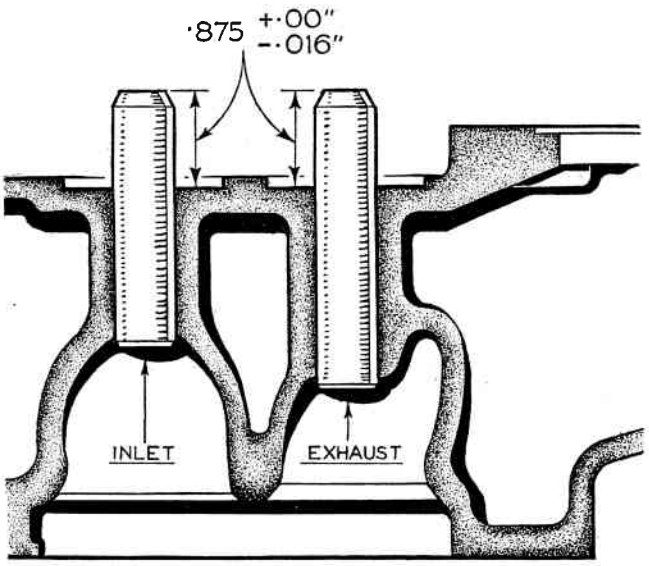


*Fig. A.*13
Showing the correct fitting of the valve guides

face downwards on clean wooden blocks with the valve guide to be removed over the space between them. Drive the valve guide downwards into the combustion space with a suitable-sized drift. This should take the form of a hardened-steel punch $\frac{1}{2}$ in. (12·7 mm.) in diameter and not less than 4 in. (10 cm.) in length, with a locating spigot $\frac{5}{16}$ in. (7·9 mm.) diameter machined on one end for a length of 1 in. (2·5 cm.) to engage the bore of the guide.

New guides should be driven in from the top of the cylinder head until they are ·875 in. (22·2 mm.) above the machined surface of the valve spring seating (see Fig. A.13.). The exhaust valve guides should have their counterbored ends at the bottom.

Section A.20

REMOVING AND REPLACING TAPPETS

Remove the valve rocker shaft assembly as detailed in Section A.8.

Disconnect the dynamo terminals and remove the set bolt securing the dynamo to the slotted link.

Take out the bolts on which the dynamo pivots and remove the dynamo.

Release the front tappet chamber cover by removing the five securing bolts.

The centre tappet chamber cover gives access to the valves for Nos. 3 and 4 cylinders when the single retaining bolt is removed.

To reach the rear four tappets take out the set bolt securing the lower end of the tappet chamber breather pipe and the cover retaining bolt.

Withdraw the push-rods, keeping them in their respective positions to ensure their replacement onto the same tappets. Lift out the tappets, also keeping them in the same respective location.

New tappets should be fitted by selective assembly so that they just fall into their guides under their own weight when lubricated.

Assembly is a reversal of the above procedure, but care should be taken to see that the tappet cover joints are oiltight and that the rockers are adjusted to give the correct valve clearance.

Section A.21

ADJUSTING VALVE ROCKER CLEARANCES

If the engine is to give its best performance and the valves are to retain their maximum useful life, it is essential to maintain the correct valve clearance. Accordingly it is recommended that the clearance be checked at regular intervals of 6,000 miles (10000 km.) and any necessary adjustments made.

The clearance for both the inlet and exhaust valves is ·012 in. (·305 mm.) when the engine is hot. The engine has been designed to operate with this clearance and no departure from it is permissible.

Provision for adjusting the valve clearance is made in the rocker arm by an adjustable screw and locknut.

The rocker adjusting screw is released by slackening the hexagon locknut with a spanner, while holding the screw against rotation with a screwdriver. The valve clearance can then be set by carefully rotating the rocker screw while checking the clearance at the other end of the rocker with a feeler gauge. This screw is then

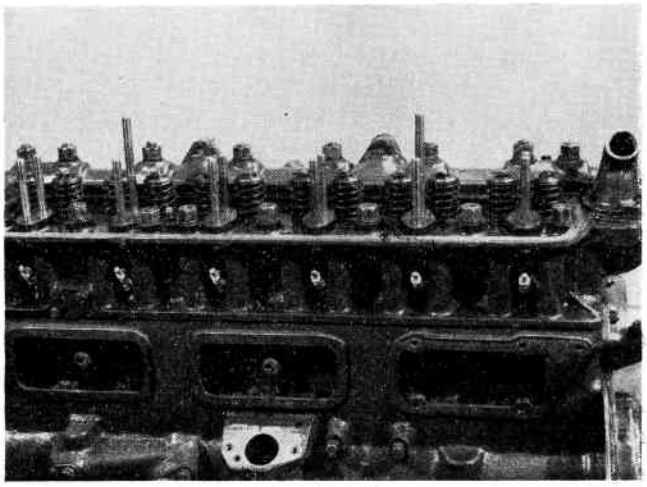


*Fig. A.*14
The cylinder block with the tappet covers and tappets removed

relocked by tightening the hexagon locknut while again holding the screw against rotation.

It is important to note that while the clearance is being set the tappet of the valve being operated upon is on the back of its cam, i.e. opposite to the peak.

As this cannot be observed accurately, the rocker adjustment is more easily carried out in the following order, and this also avoids turning the engine over more than is necessary:

Adjust	No.	1	rocker	with	No.	12	valve	fully	open.
,,	,,	7	,,	,,	,,	6	,,	,,	,,
,,	,,	9	,,	,,	,,	4	,,	,,	,,
,,	,,	2	,,	,,	,,	11	,,	,,	,,
,,	,,	5	,,	,,	,,	8	,,	,,	,,
,,	,,	10	,,	,,	,,	3	,,	,,	,,
,,	,,	12	,,	,,	,,	1	,,	,,	,,
,,	,,	6	,,	,,	,,	7	,,	,,	,,
,,	,,	4	,,	,,	,,	9	,,	,,	,,
,,	,,	11	,,	,,	,,	2	,,	,,	,,
,,	,,	8	,,	,,	,,	5	,,	,,	,,
,,	,,	3	,,	,,	,,	10	,,	,,	,,

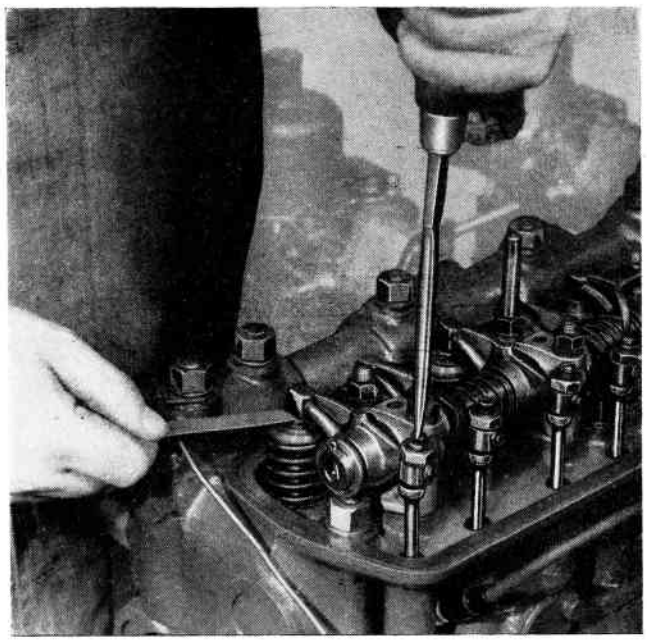


Fig. A.15

The correct method of measuring and adjusting the valve rocker clearance

Section A.22

CHECKING VALVE TIMING

Set No. 1 cylinder inlet valve to ·030 in. (·762 mm.) clearance with the engine cold, and then turn the engine until the valve is about to open.

The indicating notch in the flange of the crankshaft

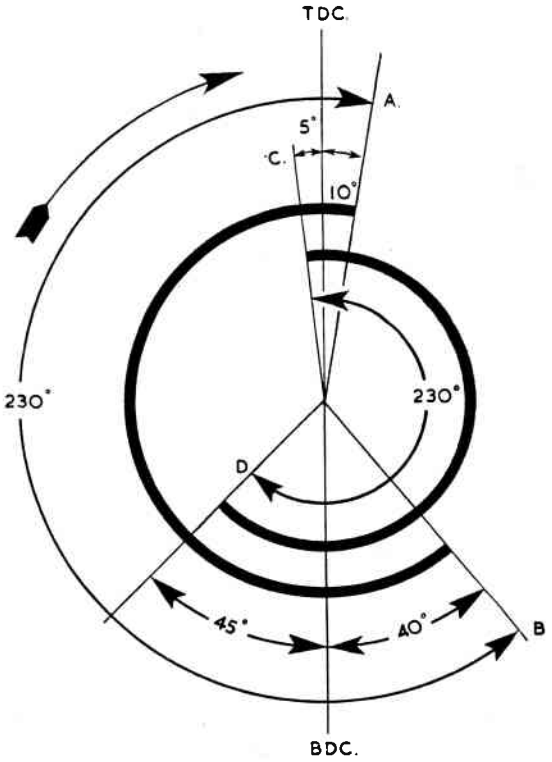


Fig. A.16

Valve timing diagram. Exhaust closes at (A) *and opens at* (B). *Inlet opens at* (C) *and closes at* (D)

pulley should then be opposite the pointer on the timing cover, i.e. the No. 1 valve should be about to open at T.D.C. and No. 6 piston will be at T.D.C. on its compression stroke.

NOTE.—Do not omit to reset the inlet valve clearance to ·012 in. (·305 mm.) with the engine hot when the timing check has been completed. The clearance of ·030 in. is necessary to bring the opening position of the valve to T.D.C. as the normal opening is 5° B.T.D.C.

Section A.23

THE TIMING COVER

To remove

Drain the cooling system and remove the radiator.

Slacken the dynamo attachment bolts sufficiently to release the belt and retighten the support link.

Bend back the tab on the starting dog nut locking washer. Unscrew the starting dog nut, using shock spanner 18G391 (Fig. A.17). In some cases it may be possible to remove the crankshaft damper and pulley complete as one unit. If, however, the pulley is tight on the crankshaft, it will be necessary to undo the six nuts securing the damper, and with this component removed the pulley can be drawn off with a removing tool.

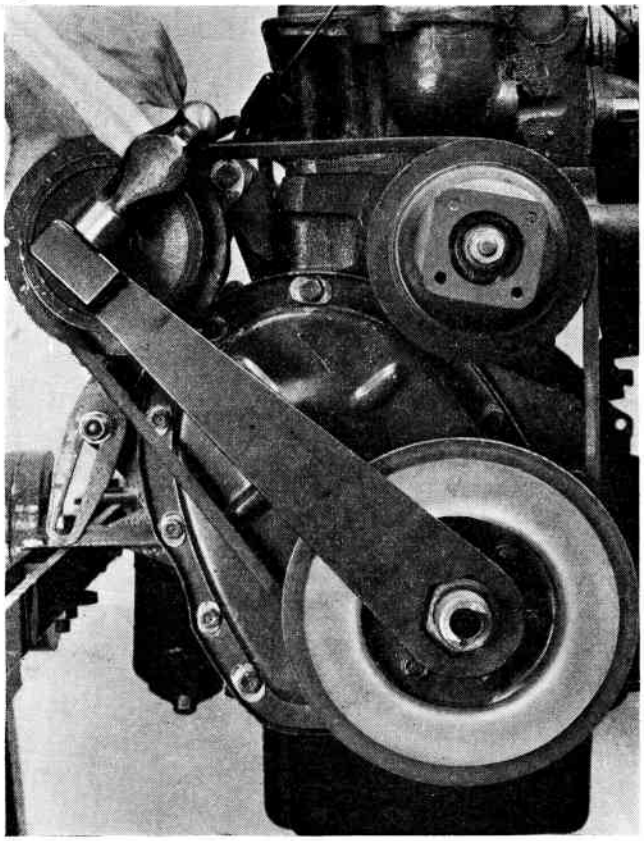


Fig. A.17

Use the special shock spanner to release the starting handle dog nut

The timing cover is secured by seven large bolts and five small ones, each with a plain washer. Remove the bolts and washers and remove the timing cover.

Care should be taken not to damage the timing cover gasket. If it is damaged, clean the face of the cover flange and the front engine mounting plate and fit a new gasket when reassembling.

The oil seal situated in the timing cover should also be renewed if necessary.

It should be noted that the oil thrower, which is located behind the crankshaft pulley, is fitted with its concave side facing towards the timing cover.

Section A.24

THE TIMING CHAIN TENSIONER

The chain tensioner is secured to the front engine mounting plate by the two bolts locked by wire.

Before removing the assembly from the engine unlock the tab washer and remove the bottom plug from the tensioner body. Insert a $\frac{1}{8}$ in. Allen key to engage the cylinder and turn the key clockwise until the rubber slipper is completely free of spring pressure. Between a half and one full turn is all that is necessary.

Unlock and remove the bolts to release the chain tensioner assembly and the backplate.

Withdraw the plunger and slipper assembly from the tensioner body and engage the lower end of the cylinder with the Allen key. Turn the key clockwise, holding the key and plunger securely until the cylinder and spring are released from inside the plunger.

The components should be cleaned thoroughly in petrol (gasoline) and the ·031 in. (·79 mm.) diameter inlet oil hole in the spigot and the ·040 in. (1·02 mm.) outlet oil hole in the slipper should be cleaned with compressed air before reassembling.

When the tensioner is in operation and the engine is running, oil from the lubrication system enters the spigot on the back face under pressure and lubricates the bearing surface through a hole in the slipper pad. The pad is held against the chain by the coil spring.

Should the chain stretch with use the slipper plunger rises and the limiting peg, bearing on the top of the helical slot, rotates the cylinder until the next recess in the

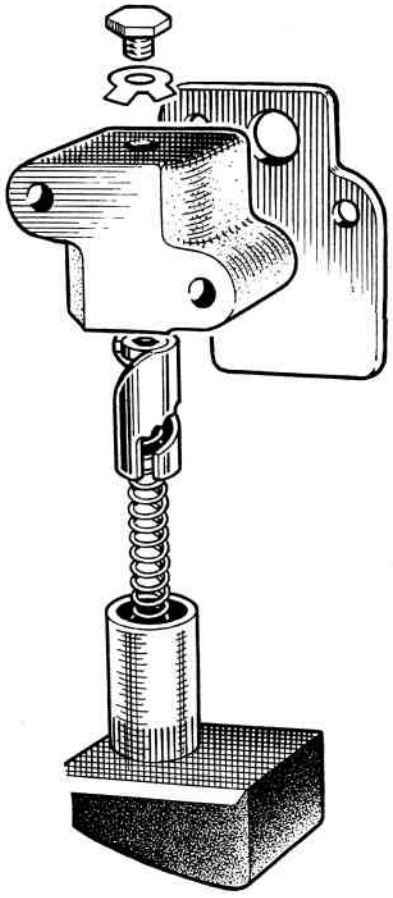


Fig. A.18

The chain tensioner components

lower edge of the slot comes into line with the limiting peg and prevents the plunger returning to its original position and allowing the chain to become slack again.

When reassembling insert the spring in the plunger and place the cylinder on the other end of the spring. Compress the spring until the cylinder enters the plunger bore, engaging the helical slot with the peg in the plunger. Hold the assembly compressed in this position and engage the Allen key. Turn the cylinder clockwise until the end of the cylinder is below the peg and the spring is held compressed. Withdraw the key and insert the plunger assembly in the body. Replace the back-plate and secure the assembly to the cylinder block.

When the timing chain is in position the tensioner is released for operation by inserting the key and turning clockwise until the slipper head moves forward under spring pressure against the chain. **Do not attempt to turn the key anti-clockwise or force the slipper head into the chain by external pressure.**

Lock the securing bolts with wire, replace the bottom plug, and lock with a tab washer.

Section A.25

REMOVING AND REPLACING THE TIMING CHAIN

To remove

Remove the timing cover and chain tensioner as detailed in Sections A.23 and A.24.

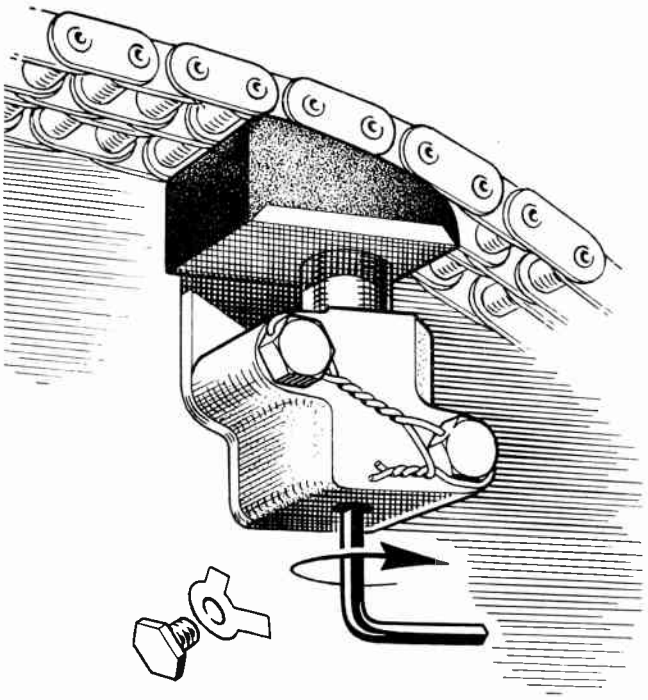


Fig. A.19

Adjusting the timing chain tensioner

Remove the dished oil thrower from the crankshaft.

Unlock and remove the camshaft chain wheel nut and remove the nut and lock washer. Note that the locating tag on the lock washer fits into the keyway of the camshaft chain wheel.

The camshaft and crankshaft chain wheels may now be removed, together with the timing chain, by easing each wheel forward a fraction at a time with suitable small levers.

As the crankshaft gear wheel is withdrawn care must be taken not to lose the gear packing washers immediately behind it. When reassembling, replace the same number of washers as was found when dismantling unless new camshaft or crankshaft components have been fitted which will disturb the alignment of the two gear wheels. To determine the thickness of washers required, place a straight-edge across the sides of the camshaft wheel teeth and measure with a feeler gauge the gap between the straight-edge and the crankshaft gear.

To refit

When replacing the timing chain and gears, set the crankshaft and camshaft with the keyways approximately at T.D.C. when seen from the front.

Double the timing chain, bringing both bright links together. This gives a long and short portion of the chain on either side of the bright links.

With the shorter part of the chain on the right (the bright links facing the operator) and the longer on the left, engage the camshaft sprocket tooth marked with a 'dimple' with the top bright link, and the crankshaft sprocket with the tooth marked with a 'dimple' coinciding with the other bright link.

Place the sprockets in their respective positions on the camshaft and crankshaft complete with the chain and push the assembly home. Carefully keep the sprockets in line with each other all the time to avoid straining the chain.

Replace the oil thrower, concave side forward, and the remaining components as detailed in Section A.23.

Section A.26

REMOVING THE CAMSHAFT

Drain the sump and remove the oil pump (Section A.5).

Remove the radiator (Section AA), and take off the rocker assembly (Section A.8).

Remove the push-rods and take out the tappets (Section A.20).

Remove the timing cover, timing chain tensioner, chain, and gears (Sections A.23 and A.24).

Remove the distributor (Section BB) and withdraw the distributor drive gear (Section AA).

Take out the two set screws which secure the camshaft locating plate to the cylinder block, and withdraw the camshaft.

Replacement of the camshaft is a reversal of the above procedure. Refer to Section AA when replacing the distributor drive gear.

Section A.27

REMOVING AND REPLACING CAMSHAFT LINERS

When new liners are to be fitted the engine must be removed from the car (Section AA) and the engine plates and the crankshaft removed from the engine.

Worn liners can be removed and new liners pressed into position with service tool 18G124A used in conjunction with the appropriate adaptors shown at the end of Section A.

Removing the front and rear liners

Insert the small end of the adaptor 18G124F into the front camshaft liner from the inside of the cylinder block, thread the body of the tool onto the centre screw, and pass the screw through the adaptor from the front of the block. Place the slotted washer on the flat at the rear of the centre screw and insert the tommy bar into the screw behind the slotted washer.

Tighten up the wing nut to withdraw the worn liner.

The rear liner is withdrawn by the same method, using the adaptor 18G124C and withdrawing the liner from the rear of the block.

Removing the centre liners

Insert the stepped pilot adaptor 18G124H into the camshaft liner front bore from the inside of the cylinder block and the adaptor 18G124E into the front centre liner from the rear, small end first. With the body of the tool positioned on the centre screw, pass the screw through the pilot adaptor located in the front liner and the adaptor in the front centre liner.

Place the slotted washer on the flat at the rear of the centre screw and insert the tommy bar into the screw behind the slotted washer.

Tighten up the wing nut to withdraw the old liner.

The rear centre liner is withdrawn by the same method, using the stepped adaptor 18G124L in the rear liner with the adaptor 18G124D inserted into the rear centre liner from the front, small end first.

Replacing the front and rear liners

Place the new liner on the smallest diameter of the adaptor 18G124F and insert the adaptor into the camshaft front liner bore from the inside, largest diameter first. Line up the oil holes in the liner and the cylinder block and make certain they remain correctly positioned during the whole operation.

Thread the body of the tool onto the centre screw and pass the screw through the adaptor from the front of the block. Position the larger of the two 'D' washers on the centre screw with the cut-away portion turned away from the butt joint of the liner; this joint must be covered by the washer. Place the slotted washer on the flat at the rear of the centre screw and insert the tommy bar into the hole behind the slotted washer. Tighten the wing nut to pull the liner squarely into position.

The rear liner is replaced by the same method, using the adaptor 18G124C and pulling the liner into position from the rear of the block.

Replacing the centre liners

Insert the stepped pilot adaptor into the front liner from the inside of the block. Place a new centre liner on the small end of the adaptor 18G124E and position the adaptor in the front centre liner bore from the rear, larger diameter first. Ensure that the oil holes in the liner and the cylinder block are lined up and remain so during the whole operation.

With the body of the tool positioned on the centre screw, insert the screw through the pilot adaptor located in the front liner and the adaptor in the centre liner bore. Position the larger of the two 'D' washers on the centre screw with the cut-away portion turned away from the butt joint of the liner; this joint must be covered by the washer. Place the slotted washer on the flat of the screw and insert the tommy bar to prevent the screw from turning. Tighten up the wing nut to pull the liner into position.

The rear centre liner is replaced by the same method, using the stepped adaptor 18G124L in the rear liner bore with the adaptor 18G124D inserted into the rear centre liner from the front, larger diameter first.

Section A.28

REAMING THE CAMSHAFT LINERS

Reaming the front and centre (rear) liners

Insert the pilots 18G123R and 18G123AB into the centre front and rear liners respectively (see Fig. A.20). Place the pilot 18G123L on the arbor followed by the front end cutter 18G123E.

Pass the arbor through the front liner and the pilot in the centre (front) liner.

Place the cutter for the centre (rear) liner on the arbor and push the arbor through the centre liner and on through the pilot located in the rear liner.

Secure the cutter and pilots in their respective positions shown in Fig. A.20, ensuring that the locating pins

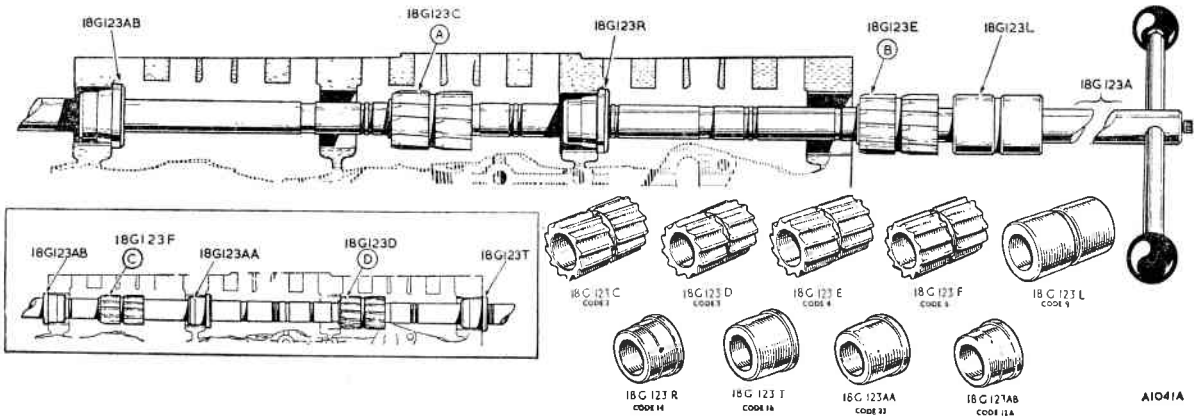


Fig. A.20

Cutters and pilots positioned for reaming the front and centre (rear) liners. The inset shows the cutters and pilots positioned for reaming the rear and centre (front) liners

A. Locate the cutter in arbor position '4'.
B. Locate the cutter in arbor position '10'.
C. Locate the cutter in unnumbered arbor position between positions '1' and '2'.
D. Locate the cutter in arbor position '6'.

of the cutters are engaged in the correct numbered hole in the arbor. If the cutters are secured in their correct positions the cutter for the front liner will finish its cut as the cutter 18G123C enters the centre (rear) liner. Make certain all the swarf is cleared away from the front liner before the plain pilot 18G123L is allowed to enter.

When the cut is finished, free the cutters and withdraw the arbor.

Reaming the rear and centre (front) liners

Insert the pilots 18G123T, 18G123AA and 18G123AB into the front, centre (rear) and rear liners respectively as in Fig. A.20 (inset).

Lubricate the liners before inserting the pilots.

Pass the arbor through the pilot in the front liner and place the cutter 18G123D for the centre (front) liner on the arbor. Push the arbor through both centre liners and place the cutter 18G123F for the rear liner on the arbor.

Push the arbor through the rear liner and secure the cutters and pilots in position as shown in Fig. A.20, ensuring that the locating pins of the cutters engage in their correct numbered hole in the arbor.

The cutter for the centre (front) liner will cut first and will finish as the cutter 18G123F enters the rear liner.

IMPORTANT.—The arbor should be lightly lubricated before assembling the cutters and pilots.

Position the cutters on the arbor with the relieved flutes of the roughing cutter to enter the liner first.

Feed the reamer very slowly and keep the cutters dry.

Keep the cutter flutes clear of swarf at all times during the operation, preferably with air blast equipment.

Withdraw the cutter half-way through the cut in each liner and remove the swarf from the cutter flutes.

Cover all oilways, bearings, and bores with clean cloth while reaming and blow out the oilways with a compressed-air line immediately afterwards.

Section A.29

REMOVING THE FLYWHEEL
(Engine Out of Car)

Remove the clutch by unscrewing the six bolts and spring washers securing it to the flywheel. Release the bolts a turn at a time to avoid distortion of the cover flange. Two dowels locate the clutch cover on the flywheel.

Unlock and remove the four bolts and two lockplates which secure the flywheel to the crankshaft and remove the flywheel.

When replacing the flywheel, ensure that the T.D.C. mark on the crankshaft pulley is set in line with the pointer on the timing cover. Fit the flywheel with the figure 1 stamped on the periphery set vertical or alternatively with the timing mark on the periphery of the flywheel in line with and on the same side as the first and sixth throws of the crankshaft.

Section A.30

REMOVING THE CRANKSHAFT
(Engine Out of Car)

The power unit must be removed from the car (Section AA) and completely dismantled. Take off the clutch and the flywheel (Section A.29), the timing cover (Section A.23), the chain tensioner (Section A.24), the timing wheels and chain (Section A.25).

Remove the cylinder head (Section A.11), the sump (Section AA) and oil pump (Section A.5), pistons and connecting rods (Section A.12), camshaft (Section A.26).

Remove the front and rear engine plates and the main bearing caps (Section A.6).

Lift the crankshaft out of the bearings.

Replacement of the crankshaft is a reversal of the above operations.

IMPORTANT.—Before replacing the crankshaft thoroughly clean out all oilways.

Section A.31

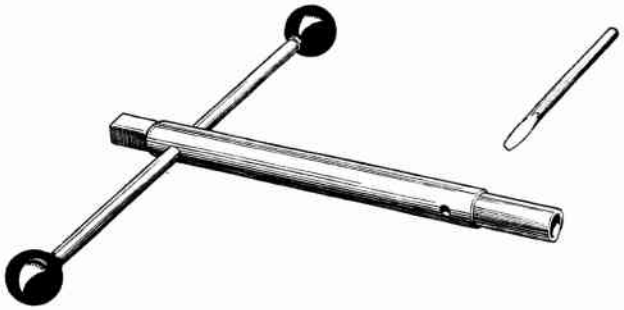
TIMING CHAIN TENSIONER OVERHAUL

If the rubber slipper head of the timing chain tensioner is found to be badly worn, then either the complete adjuster, or the slipper head and cylinder assembly, must be renewed.

Remove the tensioner and dismantle as described in Section A.24. Check the bore in the adjuster body for ovality. If the degree of ovality when measured on the diameters at the mouth of the bore is greater than ·003 in. (·076 mm.) the complete adjuster assembly must be renewed. If the bore is within the acceptability limits, then fit a new slipper head and cylinder assembly in the existing body. Ensure that the bore of the body, and all component parts, are scrupulously clean before re-assembling the adjuster (refer to Section A.24).

Refit the adjuster to the engine (Section A.24) and check that the slipper head does not bind on the back-plate when it is moved in the body.

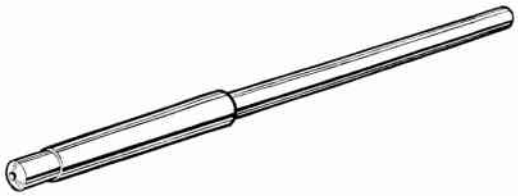
SPECIAL SERVICE TOOLS



18G27A

18G27A. Valve Seat Cutter Handle

Both the pilot and the handle are used with the finishing cutter, the glaze breaker, and the narrowing cutter.



18G174D

18G174D. Valve Seat Cutter Pilot

18G373 and 18G28

18G373A and 18G28A

18G373. Valve Seat Finishing Cutter—Inlet

18G28. Valve Seat Finishing Cutter—Exhaust

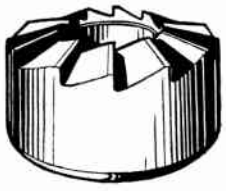
The use of these cutters will save lengthy and wasteful grinding in when the valve seats are pitted.

18G373A. Valve Seat Glaze Breaker—Inlet

18G28A. Valve Seat Glaze Breaker—Exhaust

Worn valve seats usually have a glass-hard face. These glaze breakers will prepare the seats for any cutting that may be necessary.

18G28C



18G28B

18G28B. Valve Seat Narrowing Cutter—Top—Exhaust

18G28C. Valve Seat Narrowing Cutter—Bottom—Exhaust and Inlet

These narrowing cutters will enable the valve seats to be maintained at their original dimensions. See the General Data section.

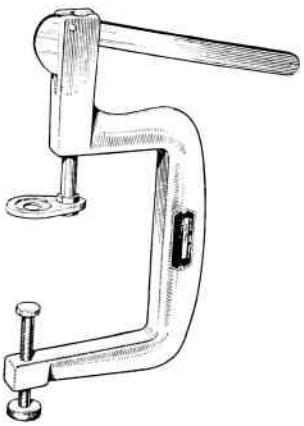
18G29. Valve Suction Grinder

A metal handle complete with a detachable rubber suction pad. Replacement pads 18G29A are supplied separately.

18G29

18G106. Valve Spring Compressor

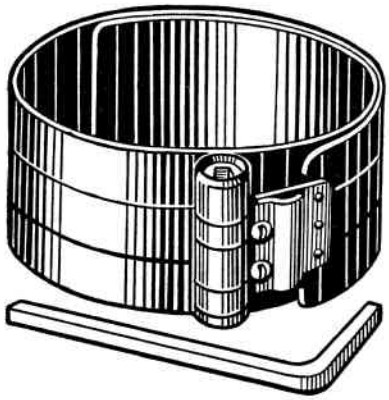
This tool is designed with cam and lever action which is both positive and speedy. The adaptor ring is specially shaped to facilitate the removal and replacement of split collets. Screw adjustment is also provided.



18G106

18G55. Piston Ring Compressor

This compressor is easy to operate and will make piston assembly to the bore a quick and easy operation.



18G55

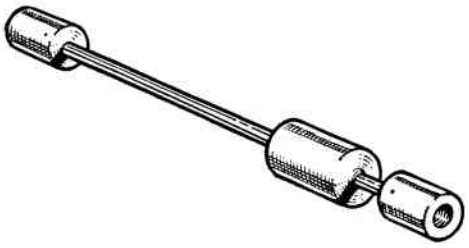
18G69. Oil Pump Release Valve Grinding-in Tool

Designed to facilitate the removal and grinding in of the engine oil release valve. Tightening the set screw expands the rubber plunger, which ensures that the tool is a tight fit when inserted into the hollow oil release valve.

18G69

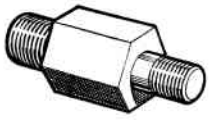
18G284. Impulse Extractor—U.N.F.

A universal type of extractor; used with the adaptor 18G284A the main bearings caps can be removed easily and without damage.

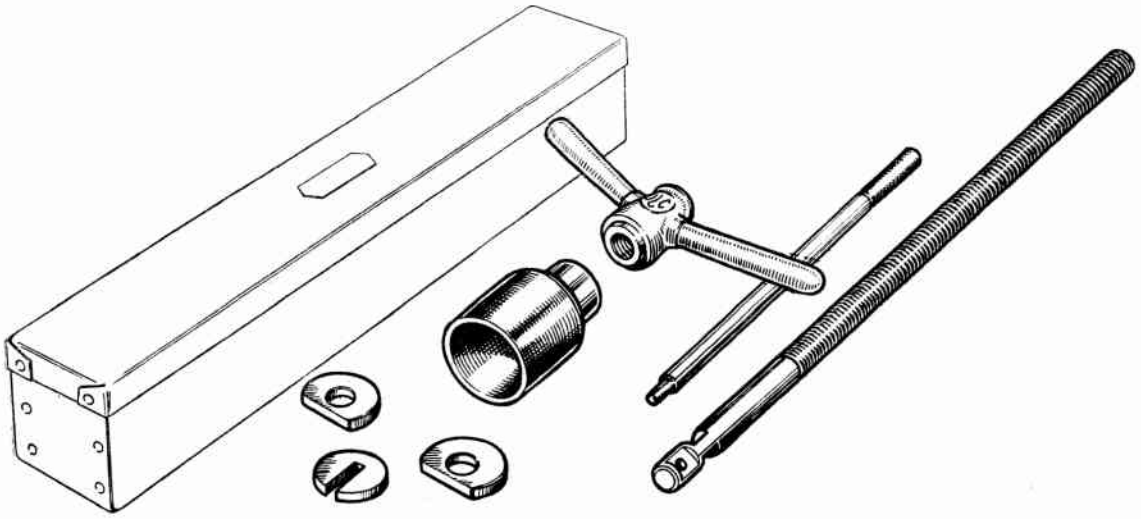


18G284

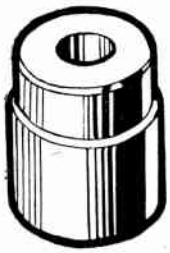
18G284A. Main Bearing Cap Removal Adaptor



18G284A



18G124A



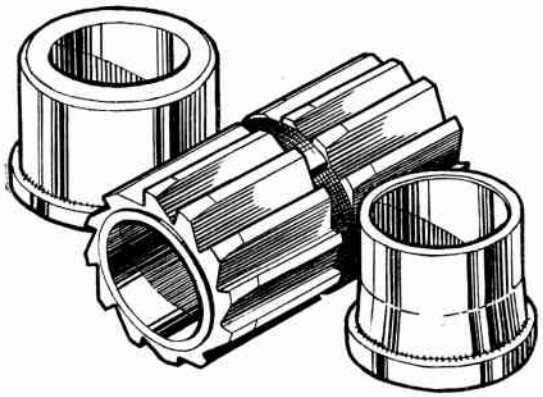
18G124C 18G124D
18G124E 18G124F
18G124H

18G124L

18G124A. Camshaft Liner Remover and Replacer (basic tool)

Adaptors 18G124C, 18G124D, 18G124E, 18G124F, 18G124H, 18G124L.

This equipment consists of a basic tool 18G124A and various adaptors supplied separately. Liners can be removed and new liners pulled into the cylinder block without the damage invariably associated with the use of improvised drifts. Full operating instructions are included with each basic tool.



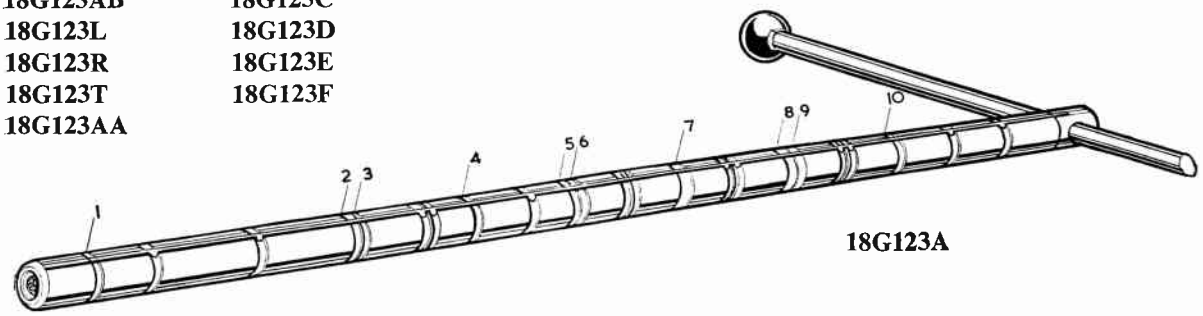
18G123AB
18G123L
18G123R
18G123T
18G123AA

18G123C
18G123D
18G123E
18G123F

18G123A. Camshaft Liner Reamer (basic tool)

Cutters: 18G123C, 18G123D, 18G123E, 18G123F.
Pilots: 18G123AB, 18G123L, 18G123R, 18G123T.

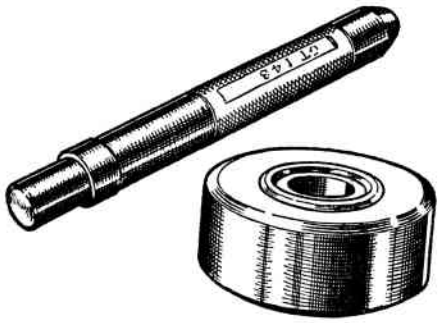
This equipment is essential when reconditioning cylinder blocks, otherwise camshaft liners cannot be reamed in line and in consequence the clearance between the camshaft journal and the liner will be incorrect. The basic tool must be used with the cutters and pilots supplied separately. Operating instructions are supplied with each basic tool.



18G123A

18G21. Valve Rocker Bush Remover and Replacer

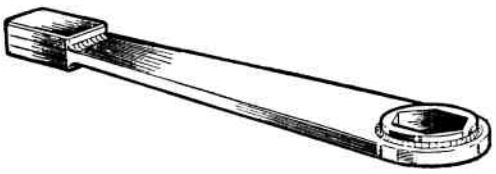
The use of a light press is desirable when using this tool, alternatively a copper-faced hammer may be used.



18G21

18G391. Starting Dog Nut Spanner

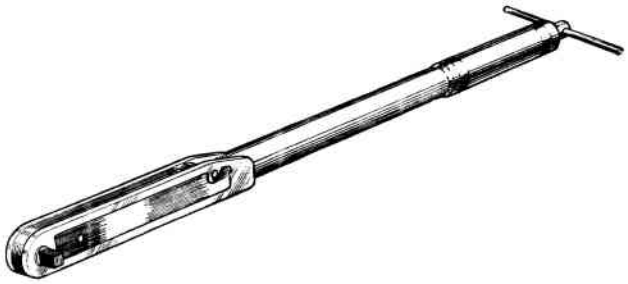
A 'shock type' spanner removes the starting dog without locking the crankshaft.



18G391

18G372. Torque Wrench

A universal torque spanner for use with standard sockets. This tool is essential if the recommended torque for various studs is not to be exceeded.



18G372

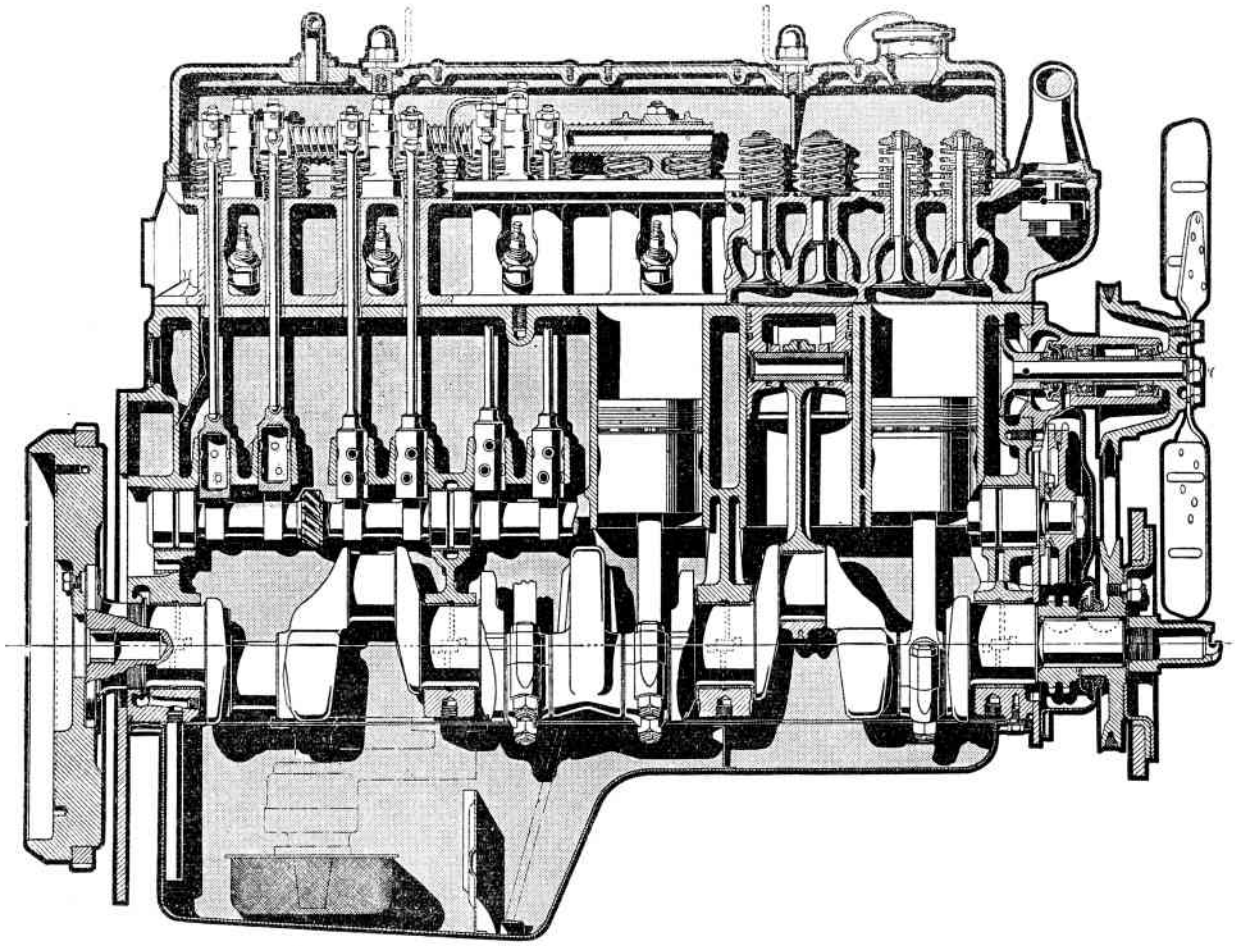
SECTION AA

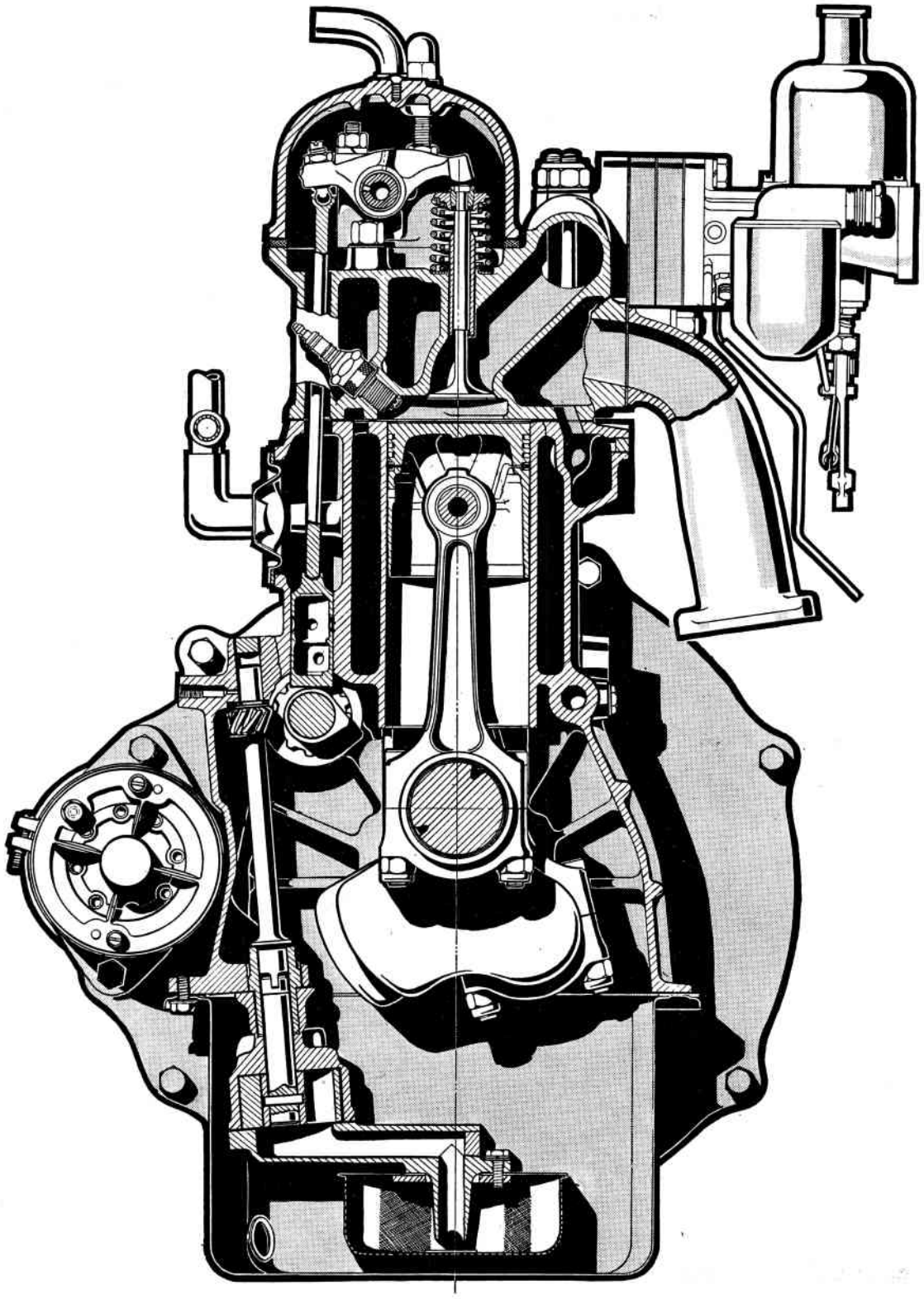
THE ENGINE

This Section is a Supplement to Section A

	Section
Carburetters—removing and replacing	AA.2
Cylinder liners—fitting	AA.8
Distributor drive	
Removing	AA.4
Replacing	AA.5
Exhaust manifold—removing and replacing	AA.3
Flywheel starter rings—fitting	AA.7
Power unit—removing and replacing	AA.6
Sump—removing and replacing	AA.1

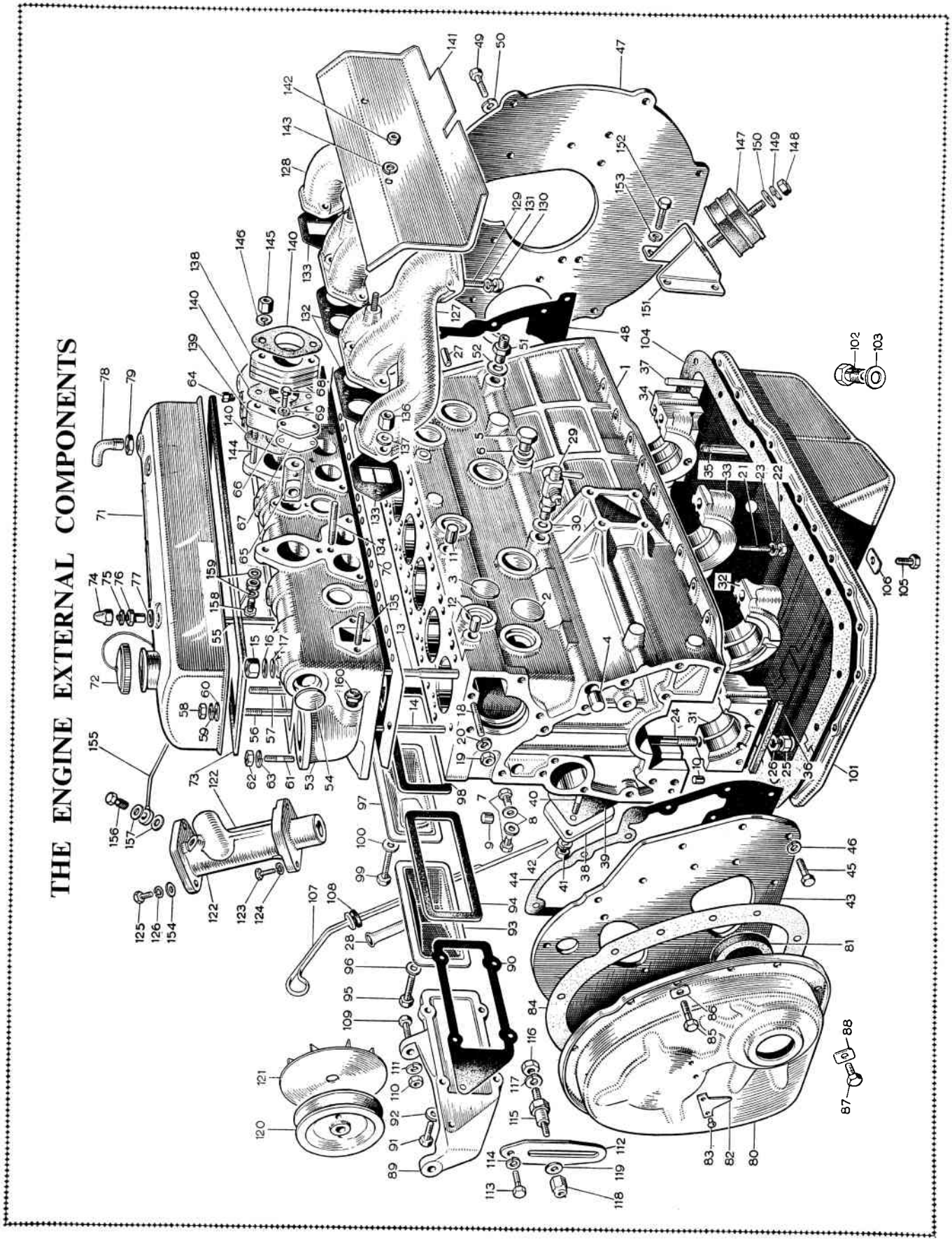
THE ENGINE (Longitudinal Section)





THE ENGINE (Transverse Section)

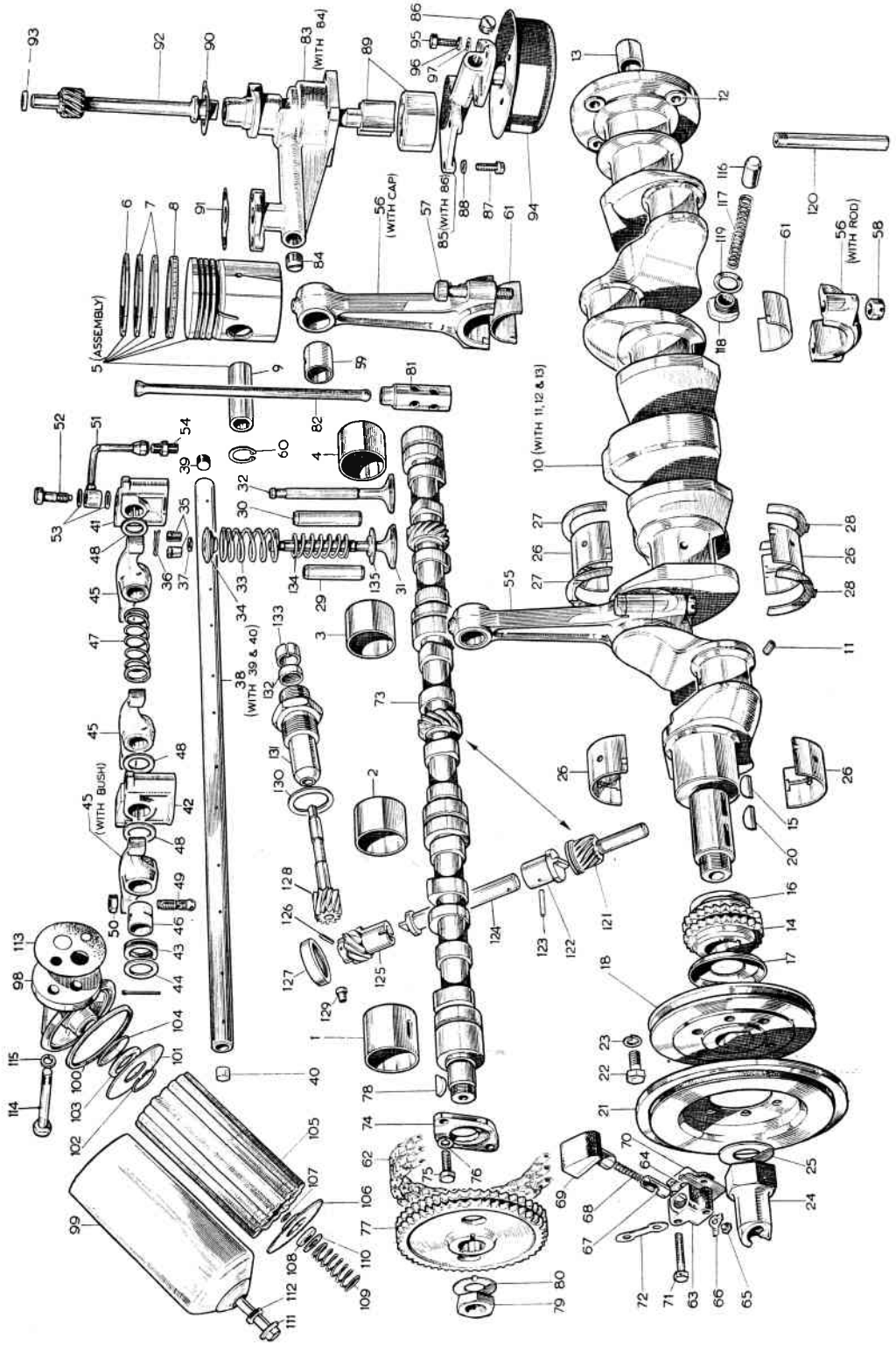
THE ENGINE EXTERNAL COMPONENTS



KEY TO THE ENGINE EXTERNAL COMPONENTS

No.	Description
1.	Block assembly—cylinder.
2.	Plug—large—core hole.
3.	Plug—small—core hole.
4.	Plug—oil gallery.
5.	Plug—oil filter feed hole.
6.	Washer—feed hole plug.
7.	Plug—oil pump feed hole.
8.	Washer—feed hole plug.
9.	Plug—oil pump boss.
10.	Plug—tensioner feed hole.
11.	Plug—large—water gallery.
12.	Plug—small—water gallery.
13.	Stud—long—cylinder head.
14.	Stud—short—cylinder head
15.	Nut—cylinder head stud.
16.	Washer—steel—cylinder head stud.
17.	Washer—bronze—cylinder head stud.
18.	Stud—water pump.
19.	Nut—water pump stud.
20.	Washer—spring—water pump stud.
21.	Stud—oil pump.
22.	Nut—oil pump stud.
23.	Washer—spring—oil pump stud.
24.	Stud—main bearing cap.
25.	Nut—main bearing cap stud.
26.	Washer—spring—main bearing cap stud.
27.	Dowel—rear plate to block.
28.	Tube—oil level indicator guide.
29.	Tap—water drain.
30.	Washer—drain tap.
31.	Cap—front main bearing.
32.	Cap—No. 2—main bearing.
33.	Cap—No. 3—main bearing.
34.	Cap—rear main bearing.
35.	Tube—drain.
36.	Seal—front and rear main bearing cap.
37.	Plug—front and rear main bearing cap.
38.	Plate—R/H—cylinder block blanking.
39.	Joint—blanking plate.
40.	Stud—cylinder block blanking plate.
41.	Nut—blanking plate stud.
42.	Washer—spring—blanking plate stud.
43.	Plate—front—cylinder block.
44.	Joint—plate to block.
45.	Screw—plate to block.
46.	Washer—spring—plate screw.
47.	Plate—rear—cylinder block.
48.	Joint—plate to block.
49.	Bolt—plate to block.
50.	Washer—shakeproof—plate bolt.
51.	Union—oil gauge pipe.
52.	Washer—union.
53.	Head—cylinder.
54.	Plug—core hole.
55.	Stud—rocker bracket and cover.
56.	Stud—long—rocker bracket.
57.	Stud—short—rocker bracket.
58.	Nut—rocker bracket stud.
59.	Washer—spring—rocker bracket stud.
60.	Washer—plain—rocker bracket stud.
61.	Stud—elbow.
62.	Nut—elbow stud.
63.	Washer—spring—elbow stud.
64.	Adaptor—vacuum take-off.
65.	Plug—carburetter balance.
66.	Cover—balance plug.
67.	Joint—cover to head.
68.	Screw—cover to head.
69.	Washer—spring—cover screw.
70.	Gasket—head to block.
71.	Cover—cylinder head.
72.	Cap—oil filler.
73.	Joint—cover to head.
74.	Cap nut—cover stud.
75.	Washer—cap nut.
76.	Adaptor—cap nut.
77.	Washer—adaptor.
78.	Pipe—breather.
79.	Locknut—breather pipe.
80.	Case—timing.
81.	Felt.
82.	Pointer—timing.
83.	Rivet—pointer.
84.	Joint—case to engine.
85.	Screw—long—case to engine.
86.	Washer—case screw.
87.	Screw—short—case to engine.
88.	Washer—case screw.
89.	Cover—front—tappet.
90.	Joint—cover to block.
91.	Screw—cover to block.
92.	Washer—cover screw.
93.	Cover—centre—tappet.
94.	Joint—cover to block.
95.	Bolt—cover to block.
96.	Washer—cover bolt.
97.	Cover—rear—tappet.
98.	Joint—cover to block.
99.	Bolt—cover to block.
100.	Washer—cover bolt.
101.	Sump—oil.
102.	Plug—drain.
103.	Washer—drain plug.
104.	Joint—sump to block.
105.	Bolt—sump to block.
106.	Washer—sump bolt.
107.	Indicator—oil level.
108.	Dust cap—oil level indicator.
109.	Bolt—dynamo to tappet cover.
110.	Nut—dynamo bolt.
111.	Washer—spring—dynamo bolt.
112.	Link—dynamo adjusting.
113.	Bolt—link to dynamo.
114.	Washer—spring—link bolt.
115.	Pillar—dynamo mounting.
116.	Nut—pillar to engine.
117.	Washer—spring—pillar nut.
118.	Nut—link to pillar.
119.	Washer—link nut.
120.	Pulley—dynamo.
121.	Fan—dynamo.
122.	Housing—distributor.
123.	Screw—housing to engine.
124.	Washer—spring.
125.	Screw—distributor to housing.
126.	Washer—spring.
127.	Manifold—front—exhaust.
128.	Manifold—rear—exhaust.
129.	Stud—outlet flange.
130.	Nut—flange stud.
131.	Washer—spring—flange stud.
132.	Gasket—inner—manifold to head.
133.	Gasket—outer—manifold to head.
134.	Stud—long—manifold to head.
135.	Stud—short—manifold to head.
136.	Nut—manifold stud.
137.	Washer—plain—manifold stud.
138.	Distance piece—insulating.
139.	Distance piece—aluminium.
140.	Gasket—carburetter.
141.	Shield—heat.
142.	Nut—shield to engine.
143.	Washer—spring.
144.	Stud—carburetter to head.
145.	Nut—carburetter stud.
146.	Washer—spring—carburetter stud.
147.	Rubber—front mounting.
148.	Nut—rubber to engine and frame.
149.	Washer—spring—mounting rubber nut.
150.	Washer—plain—mounting rubber nut.
151.	Bracket—mounting rubber to engine.
152.	Screw—bracket to engine.
153.	Washer—spring—bracket screw.
154.	Washer—plain.
155.	Oil feed pipe—tachometer drive.
156.	Banjo bolt—oil feed pipe to housing.
157.	Washer—banjo bolt.
158.	Banjo bolt—pipe to crankcase.
159.	Washer—banjo bolt.
160.	Gland nut—temperature gauge pipe.

THE ENGINE INTERNAL COMPONENTS



KEY TO THE ENGINE INTERNAL COMPONENTS

Description	*Description*
g—front—camshaft.	Bearing—front—camshaft.
g—No. 2—camshaft.	Bearing—No. 2—camshaft.
g—No. 3—camshaft.	Bearing—No. 3—camshaft.
g—rear—camshaft	Bearing—rear—camshaft
assembly.	Piston assembly.
-compression.	Ring—compression.
-taper—compression.	Ring—taper—compression.
-oil control.	Ring—oil control.
udgeon.	Pin—gudgeon.
shaft assembly.	Crankshaft assembly.
tor.	Restrictor.
flywheel bolt.	Nut—flywheel bolt.
-drive gear.	Bush—drive gear.
-timing.	Gear—timing.
gear.	Key—gear.
r—gear packing.	Washer—gear packing.
er—oil.	Thrower—oil.
—driving.	Pulley—driving.
pulley.	Key—pulley.
er—crankshaft.	Damper—crankshaft.
—damper stud.	Screw—damper stud.
r—spring—damper stud	Washer—spring—damper stud.
starting handle.	Dog—starting handle.
washer—starting handle	Lock washer—starting handle dog.
g—crankshaft main.	Bearing—crankshaft main.
r—upper—crankshaft th	Washer—upper—crankshaft thrust.
r—lower—crankshaft th	Washer—lower—crankshaft thrust.
—inlet valve.	Guide—inlet valve.
—exhaust valve.	Guide—exhaust valve.
—inlet.	Valve—inlet.
—exhaust.	Valve—exhaust.
—valve.	Spring—valve.
spring.	Cap—spring.
ier—spring.	Retainer—spring.

No.	*Description*
36.	Circlip—retainer.
37.	Grommet—valve stem.
38.	Shaft—rocker.
39.	Plug—screwed.
40.	Plug—plain.
41.	Bracket—tapped—rocker shaft.
42.	Bracket—plain—rocker shaft.
43.	Washer—spring—rocker shaft.
44.	Washer—plain—rocker shaft.
45.	Rocker assembly.
46.	Bush.
47.	Spring—rocker spacing.
48.	Washer—rocker spacing.
49.	Screw—rocker adjusting.
50.	Locknut—adjusting screw.
51.	Pipe—rocker oil feed.
52.	Bolt—pipe to rocker bracket.
53.	Washer—pipe bolt.
54.	Union—rocker oil feed pipe.
55.	Rod assembly Nos. 2, 4, and 6—connecting.
56.	Rod assembly Nos. 1, 3, and 5—connecting.
57.	Bolt—cap.
58.	Nut—cap bolt.
59.	Bearing—small-end.
60.	Circlip—gudgeon pin.
61.	Bearing—big-end.
62.	Chain—timing.
63.	Body—chain tensioner.
64.	Backplate—body.
65.	Plug—body.
66.	Lock washer—plug.
67.	Cylinder.
68.	Spring.

No.	*Description*
69.	Slipper head.
70.	Joint—tensioner to block.
71.	Bolt—tensioner to block.
72.	Lock washer—tensioner bolt.
73.	Camshaft.
74.	Plate—camshaft locating.
75.	Screw—plate to engine.
76.	Washer—spring—plate screw.
77.	Gear—timing.
78.	Key—gear.
79.	Nut—gear.
80.	Lock washer—gear nut.
81.	Tappet.
82.	Push-rod assembly.
83.	Body—oil pump.
84.	Plug.
85.	Cover—body.
86.	Plug.
87.	Screw—cover to body.
88.	Washer—spring—cover screw.
89.	Shaft with rotors.
90.	Joint—pump to block.
91.	Joint—pump filter flange to block.
92.	Shaft and gear—pump driving.
93.	Washer—thrust—shaft and gear.
94.	Strainer assembly—oil.
95.	Screw—strainer to pump.
96.	Washer—spring—strainer screw.
97.	Washer—plain—strainer screw.
98.	Head assembly—filter.
99.	Sump.
100.	Seal—sump to head.
101.	Plate—element clamp.
102.	Circlip—plate to head.

No.	*Description*
103.	Washer—felt—clamp plate.
104.	Washer—dished—clamp plate.
105.	Element.
106.	Plate—pressure.
107.	Circlip—plate to centre bolt.
108.	Washer—felt—pressure plate.
109.	Spring—pressure plate.
110.	Washer—plain—pressure plate spring.
111.	Bolt—centre.
112.	Seal—bolt to sump.
113.	Joint—filter to block.
114.	Bolt—filter to block.
115.	Washer—spring—filter bolt.
116.	Valve—oil pressure release.
117.	Spring—valve.
118.	Plug—valve.
119.	Washer—plug.
120.	Pipe—valve drain.
121.	Gear—distributor driving.
122.	Dog—distributor driving.
123.	Pin—driving dog.
124.	Spindle—distributor driving.
125.	Driving gear—tachometer.
126.	Pin—tachometer gear.
127.	Oil seal—distributor housing.
128.	Pinion—tachometer drive.
129.	Thrust button—tachometer pinion.
130.	Joint washer—tachometer bush.
131.	Bush—tachometer pinion.
132.	Oil seal—tachometer pinion.
133.	Retaining ring—pinion seal.
134.	Valve spring—inner.
135.	Collar—valve spring.

AA

Section AA.1

REMOVING AND REPLACING THE SUMP

Drain the oil. Turn the engine to bring Nos. 3 and 4 pistons to T.D.C. Unscrew the front engine mounting bolts and raise the engine. Take out the sump bolts and lower the sump.

When refitting the sump to the engine give particular attention to the sealing gaskets for the crankcase face and the two oil seal packings for the crankcase which fit into recesses in the crankcase.

If the gaskets are in good condition and have not been damaged during removal of the sump they may be used again, but it is always advisable to fit new ones. Before fitting new gaskets remove all traces of the old ones from the sump and crankcase faces. Smear the faces of the crankcase joint with grease and fit the two halves of the large gasket. Lift the sump into position on the crankcase, insert the 19 bolts, and tighten them evenly.

Section AA.2

REMOVING AND REPLACING THE CARBURETTERS

Remove the air cleaner.

Disconnect the throttle cable.

Disconnect the suction advance pipe union from the rear carburetter. Disconnect the petrol flexible hose.

Loosen the mixture control outer casing clamping screw on the set link and detach the inner cable from the jet lever. Take out the nuts and washers securing each carburetter and distance piece to the inlet manifold and lift off the carburetters.

Separate the two carburetters by slackening the throttle spindle link clamp bolts and nuts.

To refit

Reverse the above procedure. It should be noted that the distance piece which fits between the carburetter flange and the flange on the induction manifold has a gasket fitted on each side of it. If either of these gaskets is damaged the faces of the distance piece and the carburetter flange must be cleaned so that no trace of the old gasket remains, and a new gasket must be fitted.

The twin carburetters feed directly into an inlet manifold which is incorporated in the cylinder head and is not detachable.

Section AA.3

REMOVING AND REPLACING THE EXHAUST MANIFOLDS

Remove the air cleaner and carburetters as in Section AA.2.

Take out the two screws with flat washers which secure the heat shield and suction advance pipe to the manifolds.

Disconnect each exhaust pipe flange by removing the three stud nuts and washers. Five brass nuts with flat washers secure each exhaust manifold to the cylinder head.

To refit

Reverse the above procedure, but before doing so clean excessive carbon from the mating faces and fit a new gasket with the perforated metal face towards the manifold.

Section AA.4

REMOVING THE DISTRIBUTOR DRIVE

Remove the distributor as in Section BB.3.

Unscrew the collar and withdraw the revolution indicator cable from the spindle housing.

Extract the three screws securing the spindle housing to the cylinder block and withdraw the housing complete with drive spindle and revolution indicator gear. Screw a $\frac{5}{16}$ in. U.N.F. bolt approximately $3\frac{3}{4}$ in. (95 mm.) long

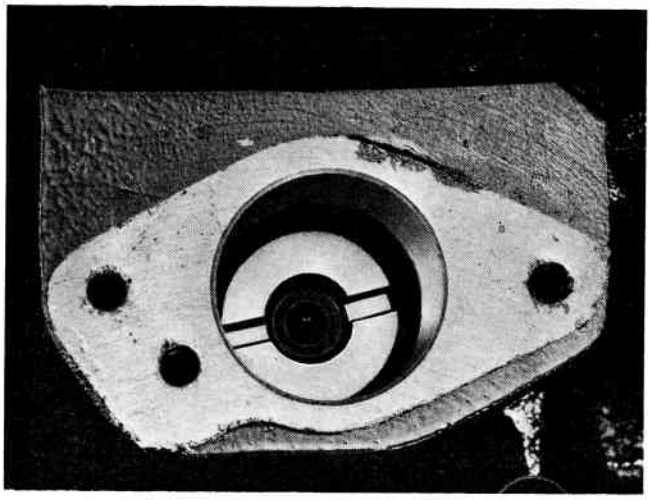


Fig. AA.1

The distributor driving gear with the slot in the correct position for replacing the distributor.

into the distributor drive gear as an extractor and withdraw the gear from the cylinder block.

To dismantle the distributor housing unscrew the revolution indicator drive gear bearing and extract the gear. Note the seal and spacer in the cable end of the bearing. Tap out the pin and remove the driving dog from the bottom of the distributor drive spindle and withdraw the spindle upwards from the housing. Reassembly is a reversal of this procedure.

The procedure for replacing the distributor drive is given in Section AA.5.

Section AA.5

REPLACING THE DISTRIBUTOR DRIVE

Turn the engine until No. 6 piston is at T.D.C. on its compression stroke. When the valves on No. 1 cylinder are 'rocking' (i.e. exhaust just closing and inlet just opening) No. 6 piston is at the top of its compression stroke. If the engine is set so that the groove in the crankshaft pulley is in line with the pointer on the timing chain cover, or the 'dimple' marks and bright links of the timing chain and gears are in line, the piston is exactly at T.D.C.

Screw a $\frac{5}{16}$ in. U.N.F. bolt approximately $3\frac{3}{4}$ in. (95 mm.) into the threaded end of the distributor drive gear and insert it with the large segment away from the engine and the slot at approximately 4 o'clock. As the gear engages with the camshaft the slot will turn in an anticlockwise direction until it just passes the horizontal position (see Fig. AA.1).

Remove the bolt from the gear, insert the tachometer drive housing with the large segment of the driving shaft away from the engine (see Fig. AA.2), and secure it with the three hexagon set screws and spring washers.

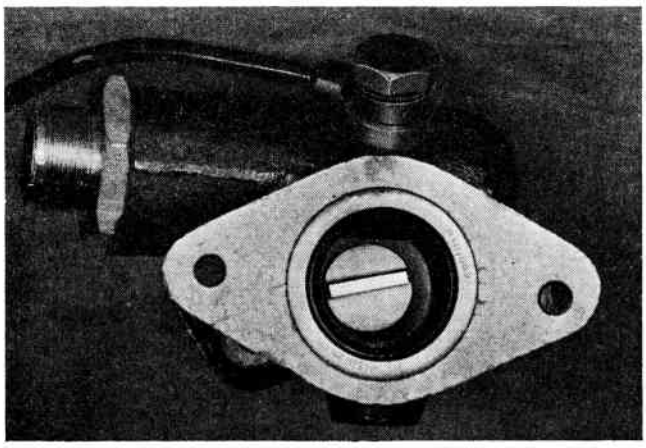


Fig. AA.2

When replacing the tachometer drive housing and spindle the large segment at the upper end of the spindle must be away from the engine

Replace the revolution indicator cable, making sure that the seal and distance piece are in position in the bearing.

Refit the distributor, referring to Section BB.5 if the clamp plate has been released.

Section AA.6

REMOVING THE POWER UNIT

It is best, whenever the engine or gearbox requires overhaul, to remove both together as a unit. The sequence of operations involved is detailed below under component headings.

Oil and water

Drain the oil from the engine and gearbox.

Drain the water from the cooling system. If anti-freeze is in use the water should be collected in a clean container.

Bonnet

Take off the bonnet by removing the two nuts securing each hinge bracket, accessible from beneath the engine bulkhead. This method of removal will avoid having to reset the bonnet hinge. When refitting renew the joint between the bracket and the bulkhead.

Battery

Disconnect both battery leads. Unscrew the nuts on the battery bolts: the bolts are loosely hooked at their lower ends into the end plates of the battery compartment, and when the nuts have been removed from one bolt and slackened on the other it is possible to unhook both and remove the retainer bar. Lift out the battery.

Air cleaner

Release the breather tube clip on the under side of the air cleaner and the clip at the air intake pipe. Remove the support bracket screw and lift the air cleaner from the engine.

Windshield washer

Pull off the windshield washer rubber tubes and remove the glass fluid container; unscrew the three screws (nuts below the wing) and remove the container bracket.

Radiator

Unscrew the clip and remove the top water hose to the radiator.

Unscrew the clips and pull the upper end of the lower hose from the water pump and the short branch hose from the heater tube.

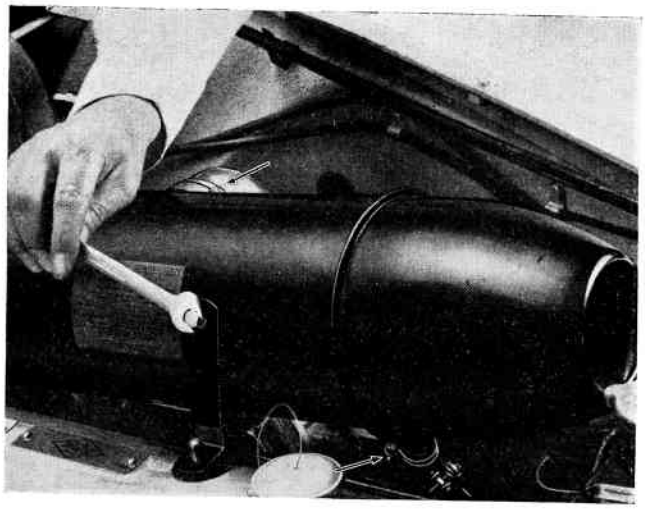


Fig. AA.3
Slacken the two hose clips and remove the bracket screw to release the air cleaner

Remove the three bolts securing the right-hand side of the radiator to the support angle: remove the corresponding three bolts from the left-hand side, and also the three set bolts securing the angle to the body at this side. Radiator-to-angle bolts have a nut with a spring washer and two plain washers each, while the set bolts have a spring washer and plain washer only. Take out the left-hand support angle.

Lift the radiator carefully so that it is not damaged by the fan blades and remove it complete with the lower water hose from the car.

It is advisable, though not essential, to the removal of the power unit to take off the radiator grille; to do so unscrew the four screws located at each corner of the grille.

Fan

Unscrew the four set bolts and remove the fan blades.

Carburetter heat shield

Two set bolts secure the heat shield to threaded bosses on the manifold. One of the two bolts is more easily reached through the radiator and grille aperture.

Controls

Extract the split pin from the throttle control rod at the rear carburetter, remove the plain washer, and withdraw the right-angled end of the rod from the carburetter lever (see Fig. AA.4). Disconnect the ball joint at the connection to the accelerator linkage and pull the rod from the rubber-mounted bush on the engine dash (see Fig. AA.5).

Slacken the pinch-bolts and remove the inner and outer choke wires from the carburetter levers.

Disconnect the gear change rod, withdraw the split pins, extract the clevis pins, and remove the rods.

NOTE.—If the vehicle is fitted with automatic transmission disconnect the ball joint at the upper end of the gear selector rod, withdraw the split pin, extract the clevis pin from the lower end, and remove the rod. Disconnect the ball joint at the upper end of the governor control rod, extract the split pin, and remove the plain and anti-rattle washer at the gearbox end. Remove the control rod.

Wiring

Disconnect the dynamo leads, the starter lead, coil leads, reverse light wires, engine earthing strip, and the thermometer lead at the thermostat housing.

Exhaust pipe

Unscrew the six brass nuts at the two exhaust pipe to manifold flanges.

Remove the two bolts from the forward exhaust pipe support bracket and disconnect the mounting from the body.

Pipes and hoses

Unscrew the union nut and disconnect the flexible fuel input pipe at the rear carburetter union.

Unscrew the clips and disconnect the heater input hose from the union on the right-hand side of the cylinder head and the outlet hose above the rear end of the rocker cover.

Slacken the locknut of the windshield washer suction union at the rear of the induction manifold and pull out the short brass tube with rubber attached.

Disconnect the oil gauge pipe at its union on the crankcase.

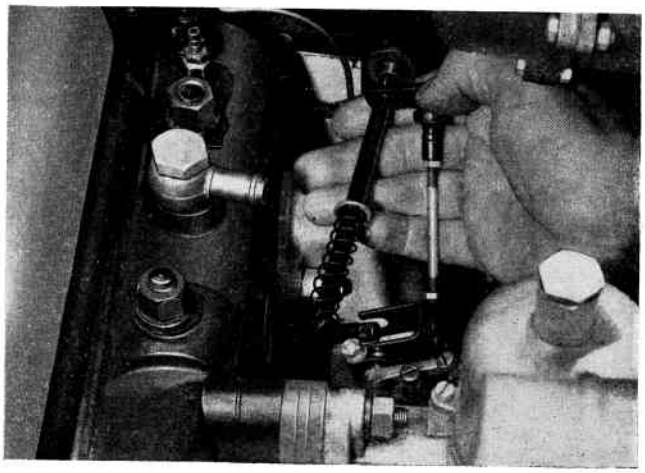


Fig. AA.4
Removing the throttle control linkage from the carburetter

Oil filter and heater

Remove the oil filter from the right-hand side of the engine and the heater blower motor from the engine dash.

Front engine mountings

Unscrew and remove the upper and lower nut and spring and plain washer from the two engine mounting bolts.

Rear end

Unscrew the brass nut and withdraw the speedometer drive from the side of the gearbox.

Disconnect the flexible hose to the clutch slave cylinder at either the union on the cylinder or the bracket on the frame.

To release the radial-type arm remove the two lower clutch housing bolts and the bolt and nut securing the arm to the right-hand chassis frame brace.

Remove the four self-locking nuts from the rear universal joint and withdraw the propeller shaft from the gearbox. If automatic transmission is fitted remove the self-locking nuts and withdraw the bolts from the front universal joint.

Rear engine mountings (synchromesh gearbox)

Support the rear of the unit either by means of a sling or with a jack below the rear extension. If a rope sling is used it must be adjusted so that the unit hangs as nearly horizontal as possible.

Unscrew the self-locking nut on the engine control link and pull out the pin. Withdraw the bolts securing

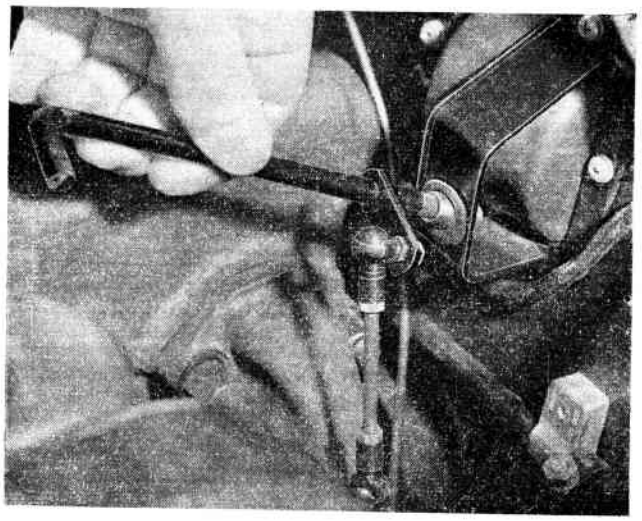


Fig. AA.5

Pull the throttle control rod from the rubber-mounted bush on the bulkhead

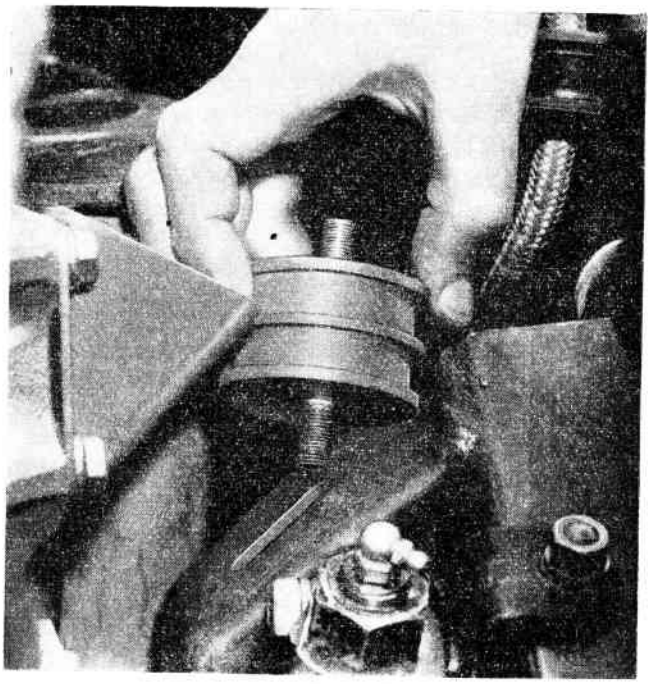


Fig. AA.6

A front engine mounting removed with the front of the engine lifted

the centre mounting member to the side brackets and remove the engine control link. Note that one hole in the control link is large enough to allow one of the rubber bushes to be refitted with the link in position, which is then retained by the flat head of the pin.

Take off the nuts securing the rear extension rubber mountings to the side brackets, withdraw the bolts through the side brackets and frame, and remove the brackets.

Rear engine mountings (automatic transmission)

Support the rear of the unit either by means of a sling or with a jack and a wooden block below the rear of the gearbox casing. If a rope sling is used it must be adjusted so that the unit hangs as nearly horizontal as possible.

Remove the four nuts, spring washers, flat washers, and screws securing the rear engine mounting rebound brackets to the right-hand and left-hand mounting brackets. Remove the eight nuts, spring washers, flat washers, and screws securing the two mounting brackets to the chassis, and the four nuts, spring washers, and screws securing the rear mounting rubbers to the mounting brackets and withdraw the brackets.

Lifting the engine

Raise the front of the unit sufficiently to allow the removal of the front mountings.

When lifting the power unit from the car it must be slung so that the rear end is considerably lower than the front, and also it must first be moved forward to allow the end of the rear extension to pass down between the torsion bars. This can be done in two ways: (*a*) The unit can be slung nearly horizontally while the rear mountings are disconnected, then lifted slightly and moved forwards so that the sump rests on the front cross-member; the rear end can then be supported on blocks while the position of the sling is changed to give the correct angle for unit withdrawal. (*b*) The unit can be slung for final lifting and then supported at the rear by a trolley jack or an operator under the car while it is drawn forwards until the rear end can be lowered through the torsion bars.

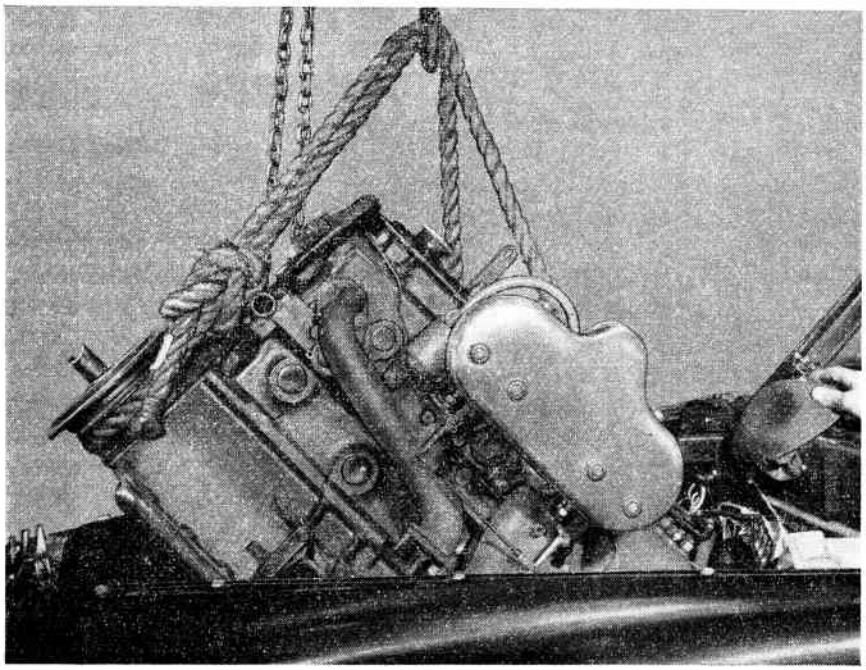


Fig. AA.7
Showing the angle at which the engine must be slung when lifting

When the unit has been lifted far enough the car must be pushed back or the unit drawn forwards as lifting continues. Take care that the cut-out is not damaged; move the rear of the engine to the left and hold the blower hose clear so that the engine passes the cut-out.

Replacement

Replacement is a reversal of the above procedure.

Refill the engine and gearbox with oil to Ref. A (page P.2).

Refill the automatic gearbox, if fitted, with fluid to Ref. E (page P.2).

Section AA.7

FITTING FLYWHEEL STARTER RINGS

To remove the old starter ring from the flywheel flange split the ring gear with a cold chisel, taking care not to damage the flywheel.

Make certain that the bore of the new ring and its mating surface on the flywheel are free from burrs and are perfectly clean.

To fit the new ring it must be heated to a temperature of 300 to 400° C. (575 to 752° F.), indicated by a light blue surface colour. Do not exceed this temperature, otherwise the temper of the teeth will be affected. The use of a thermostatically controlled furnace is recommended. Place the heated ring on the flywheel with the lead of the ring teeth uppermost.

The expansion will allow the ring to be fitted without force by pressing or tapping it lightly until the ring is hard against its register.

This operation should be followed by natural cooling, when the 'shrink fit' will be permanently established and no further treatment required.

Section AA.8

FITTING CYLINDER LINERS

Should the condition of the cylinder bores be such that they cannot be cleaned up to accept standard oversize

pistons, dry cylinder liners can be fitted. This operation may be carried out by the use of specialized proprietary equipment or with a power press using pilot adaptors to the dimensions shown in Fig. AA.8. The press must be capable of 3 tons (3048 kg.) pressure to fit new liners and 5 to 8 tons (5080 to 8128 kg.) to remove old liners.

Remove the engine from the vehicle as detailed in Section AA.6, dismantle the engine, and remove the cylinder head studs. If liners have not previously been fitted the bores must be machined and honed to the dimensions given in the table below.

To remove worn liners

Place the cylinder block face downwards on suitable wooden blocks on the bed of the press, making sure that there is sufficient space between the block and the bed of the press to allow the worn liner to pass down. Insert the pilot in the bottom of the liner and carefully press the liner from the bore.

To press in new liners

Thoroughly clean the inside of the bores and the outside of the liners. Stand the cylinder block upright on the bed of the press, insert the pilot guide in the top of the liner, and position the liner with its chamfered end in the top of the bore. Make certain that the liner is square with the top of the block and that the ram of the press is over the centre of the pilot. Press the liner fully into the bore.

Each liner must be machined to the dimensions given in the table below after pressing into position.

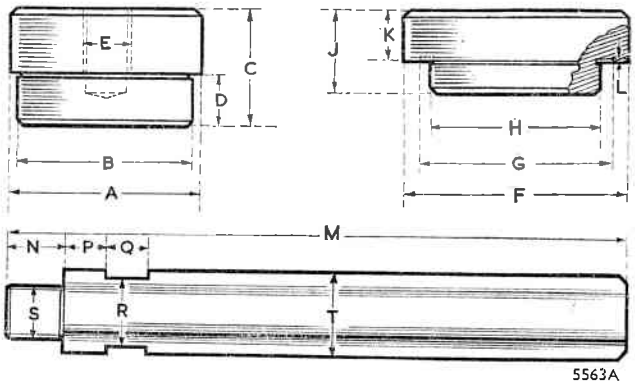


Fig. AA.8

Cylinder liner pilots should be made to the above dimensions from 55-ton hardening and tempering steel and hardened in oil at a tempreature of 550° C. (1,020° F.)

Pressing-out pilot

A. $3\frac{17}{64}\ ^{+\cdot 005}_{-\cdot 0}$ in. (82·94 $^{+\cdot 127}_{-\cdot 0}$ mm.).
B. $3{\cdot}112\ ^{+\cdot 0}_{-\cdot 005}$ in. (79·04 $^{+\cdot 0}_{-\cdot 127}$ mm.).
C. $1\frac{3}{4}$ in. (44·45 mm.).
D. $\frac{3}{4}$ in. (19·05 mm.).
E. $\frac{3}{4}$ in. BSW thread.

Pressing-in pilot

F. $3\frac{11}{16}$ in. (93·66 mm.).
G. $3\frac{11}{32}$ in. (84·93 mm.).
H. $3{\cdot}095\ ^{+\cdot 0}_{-\cdot 005}$ in. (78·61 $^{+\cdot 0}_{-\cdot 127}$ mm.).
J. $1\frac{1}{4}$ in. (31·75 mm.).
K. $\frac{3}{4}$ in. (19·05 mm.).
L. ·015 in. (·38 mm.).

Pilot extension

M. $14\frac{1}{2}$ in. (36·83 cm.).
N. $\frac{7}{8}$ in. (22·22 mm.).
P. $\frac{5}{8}$ in. (15·87 mm.).
Q. $\frac{5}{8}$ in. (15·87 mm.).
R. 1 in. (25·4 mm.) flats.
S. $\frac{3}{4}$ in. BSW thread.
$1\frac{1}{4}$ in. (31·75 mm.).

Engine type	*Liner Part No.*	*Machine bores of cylinder block to this dimension before fitting liner*	*Outside diameter of liner*	*Interference fit of liner in cylinder block bore*	*Machine liner bore to this dimension after fitting*
'C'	AEC607	3·301 to 3·303 in. (83·845 to 83·896 mm.)	3·305 to 3·307 in. (83·947 to 83·997 mm.)	·002 to ·006 in. (·051 to ·152 mm.)	3·1245 to 3·126 in. (79·362 to 79·4 mm.)