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# Land-Rover Workshop Manual—PART ONE

Series II & IIA

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Part No. 606407



## Covering:

### Engines

2 $\frac{1}{4}$  litre Petrol

2 $\frac{1}{4}$  litre Diesel

2.6 litre Petrol

### Clutches

### Gearboxes

PDF by roby65to

# Land-Rover Workshop Manual—PART ONE Series II and IIA Bonneted Control Models

1st Edition

March 1969

The Rover Company Limited  
Solihull, Warwickshire, England

Part No. 606407



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The Rover Company Limited



**THE "LAND-ROVER 88"**  
(88 inch—2,23 m—wheel base)



**THE "LAND-ROVER 109"**  
(109 inch—2,76 m—wheel base)

The two models shown are typical examples of their range, which are produced with a wide choice of body designs

## INTRODUCTION

The Land-Rover Workshop Manual is produced in two parts for convenience in handling. Part one (Part No. 606407) covers engines, clutches and gearboxes. Part two (Part No. 606408) covers all remaining items. The complete Workshop Manual covers all overhaul and repair procedures for the 'basic' Land-Rover, briefly described below, but does not include the use and overhaul of 'Optional extra equipment', which is the subject of a separate publication.

The 'basic' Land-Rover is produced in two wheel base lengths, 88 inch and 109 inch (2,23 m and 2,76 m), with a choice of three engine types; 2 $\frac{1}{4}$  litre—four cylinder Petrol and Diesel and 2.6 litre—six cylinder Petrol. Other equipment, including fuel system, electrical equipment, drive units, brakes and body vary according to model and choice.

Identification of a particular model can be made by referring to the vehicle number and the chart on the following page. The vehicle number is stamped on a plate mounted inside the driving compartment.

Although this Manual applies specifically to Bonneted Control models, most of the overhaul procedures also apply to Forward Control models when the units are removed from the vehicle.

## COMMENCING VEHICLE NUMBERS

## PETROL MODELS, 4 CYLINDER—2½ LITRE ENGINE

								1959 88	1960 88	1961 88	88
								Series II	Series II	Series II	Series IIA
Home, RHStg	..	..	..	..	..	..	..	141900001	141000001	141100001	24100001A
Export, RHStg	..	..	..	..	..	..	..	142900001	142000001	142100001	24200001A
Export, RHStg, CKD	..	..	..	..	..	..	..	143900001	143000001	143100001	24300001A
Export, LHStg	..	..	..	..	..	..	..	144900001	144000001	144100001	24400001A
Export, LHStg, CKD	..	..	..	..	..	..	..	145900001	145000001	145100001	24500001A
							1958 109	1959 109	1960 109	1961 109	109
							Series II	Series II	Series II	Series II	Series IIA
Home, RHStg	..	..	..	..	..	..	151800001	151900001	151000001	151100001	25100001A
Export, RHStg	..	..	..	..	..	..	152800001	152900001	152000001	152100001	25200001A
Export, RHStg, CKD	..	..	..	..	..	..	153800001	153900001	153000001	153100001	25300001A
Export, LHStg	..	..	..	..	..	..	154800001	154900001	154000001	154100001	25400001A
Export, LHStg, CKD	..	..	..	..	..	..	155800001	155900001	155000001	155100001	25500001A
Home, RHStg, 88 Station Wagon	..	..	..	..	..	..	..	..	..	..	Series IIA
Export, RHStg, 88 Station Wagon	..	..	..	..	..	..	..	..	..	..	31500001B
Export, RHStg, CKD, 88 Station Wagon	..	..	..	..	..	..	..	..	..	..	31600001B
Export, LHStg, 88 Station Wagon	..	..	..	..	..	..	..	..	..	..	31700001B
Export, LHStg, CKD, 88 Station Wagon	..	..	..	..	..	..	..	..	..	..	31800001B
											31900001B
							1959	1960	1961		
							Series II	Series II	Series II		Series IIA
Home, RHStg, 109 Station Wagon	..	..	..	..	..	..	161900001	161000001	161100001		26100001A
Export, RHStg, 109 Station Wagon	..	..	..	..	..	..	162900001	162000001	162100001		26200001A
Export, RHStg, CKD, 109 Station Wagon	..	..	..	..	..	..	163900001	163000001	163100001		26300001A
Export, LHStg, 109 Station Wagon	..	..	..	..	..	..	164900001	164000001	164100001		26400001A
Export, LHStg, CKD, 109 Station Wagon	..	..	..	..	..	..	165900001	165000001	165100001		26500001A

From March 1965 onwards.  
Vehicle numbers prior to this date  
are the same as for 88

## PETROL MODELS, 6 CYLINDER—2.6 LITRE ENGINE

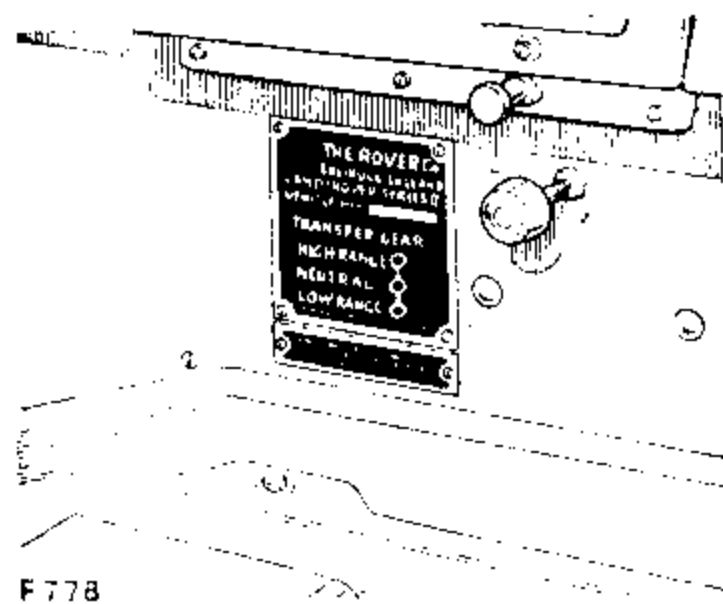
											109
											Series IIA
Home, RHStg	..	..	..	..	..	..	..	..	..	..	34500001D
Export, RHStg	..	..	..	..	..	..	..	..	..	..	34600001D
Export, RHStg, CKD	..	..	..	..	..	..	..	..	..	..	34700001D
Export, LHStg	..	..	..	..	..	..	..	..	..	..	34800001D
Export, LHStg, CKD	..	..	..	..	..	..	..	..	..	..	34900001D
											Series IIA
Home, RHStg, 109 Station Wagon	..	..	..	..	..	..	..	..	..	..	35000001D
Export, RHStg, 109 Station Wagon	..	..	..	..	..	..	..	..	..	..	35100001D
Export, RHStg, CKD, 109 Station Wagon	..	..	..	..	..	..	..	..	..	..	35200001D
Export, LHStg, 109 Station Wagon	..	..	..	..	..	..	..	..	..	..	35300001D
Export, LHStg, CKD, 109 Station Wagon	..	..	..	..	..	..	..	..	..	..	35400001D

## DIESEL MODELS, 4 CYLINDER—2½ LITRE ENGINE

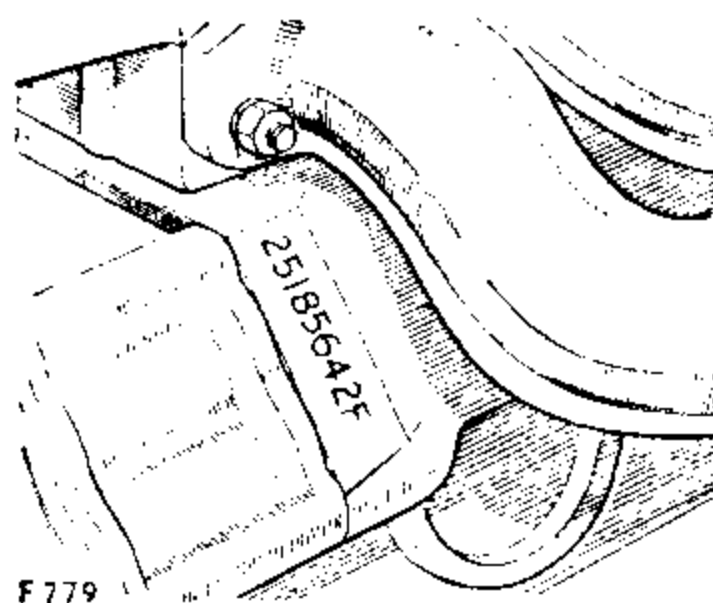
											88
											Series IIA
Home, RHStg	..	..	..	..	..	..	..	..	..	..	27100001A
Export, RHStg	..	..	..	..	..	..	..	..	..	..	27200001A
Export, RHStg, CKD	..	..	..	..	..	..	..	..	..	..	27300001A
Export, LHStg	..	..	..	..	..	..	..	..	..	..	27400001A
Export, LHStg, CKD	..	..	..	..	..	..	..	..	..	..	27500001A
											109
											Series IIA
Home, RHStg	..	..	..	..	..	..	..	..	..	..	27600001A
Export, RHStg	..	..	..	..	..	..	..	..	..	..	27700001A
Export, RHStg, CKD	..	..	..	..	..	..	..	..	..	..	27800001A
Export, LHStg	..	..	..	..	..	..	..	..	..	..	27900001A
Export, LHStg, CKD	..	..	..	..	..	..	..	..	..	..	28000001A
											Series IIA
Home, RHStg, 88 Station Wagon	..	..	..	..	..	..	..	..	..	..	32000001B
Export, RHStg, 88 Station Wagon	..	..	..	..	..	..	..	..	..	..	32100001B
Export, RHStg, CKD, 88 Station Wagon	..	..	..	..	..	..	..	..	..	..	32200001B
Export, LHStg, 88 Station Wagon	..	..	..	..	..	..	..	..	..	..	32300001B
Export, LHStg, CKD, 88 Station Wagon	..	..	..	..	..	..	..	..	..	..	32400001B
											Series IIA
Home, RHStg, 109 Station Wagon	..	..	..	..	..	..	..	..	..	..	28100001A
Export, RHStg, 109 Station Wagon	..	..	..	..	..	..	..	..	..	..	28200001A
Export, RHStg, CKD, 109 Station Wagon	..	..	..	..	..	..	..	..	..	..	28300001A
Export, LHStg, 109 Station Wagon	..	..	..	..	..	..	..	..	..	..	28400001A
Export, LHStg, CKD, 109 Station Wagon	..	..	..	..	..	..	..	..	..	..	28500001A

From March 1965 onwards.  
Vehicle numbers prior to this date  
are the same as for 88

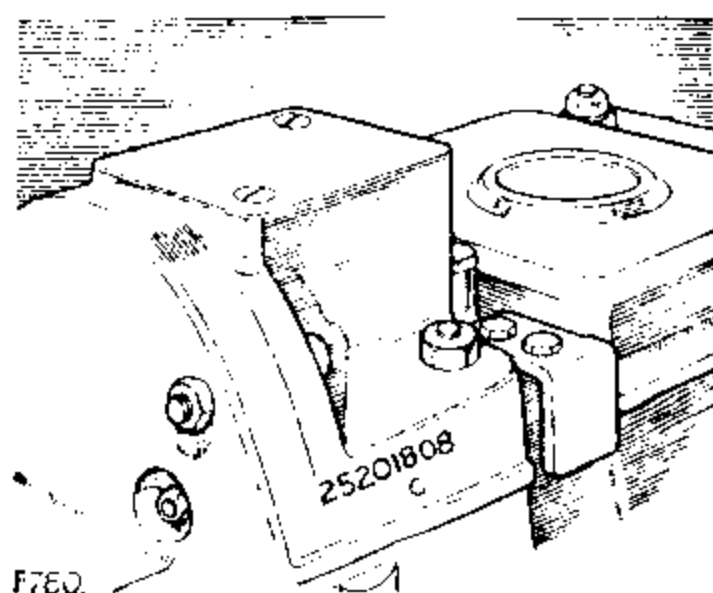
## LOCATION OF CAR AND UNIT NUMBERS



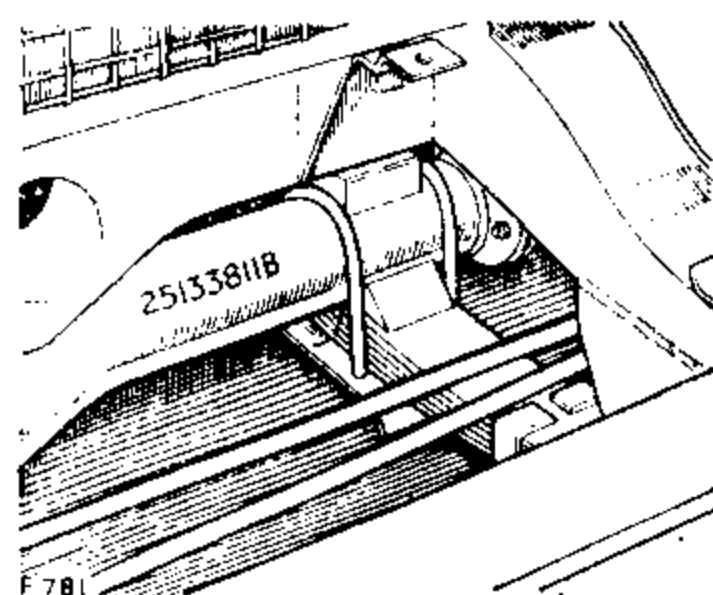
Vehicle and chassis number



Engine number



Gearbox number



Front and rear axle number

## Layout of the Workshop Manual

This Workshop Manual is designed to assist those responsible for the maintenance and overhaul of the Land-Rover. The subject matter is sectionalised as detailed in the General Index, and the pages are numbered within those sections. A further sub-index will be found at the beginning of each section.

Operating instructions and details of routine maintenance will be found in the Owner's Instruction and Maintenance Manuals, a copy of each will be found in the literature pack supplied with the car.

As the Manual covers both Home and Export models, reference is made throughout the text to the 'left-hand' (LH) and 'right-hand' (RH) sides of the vehicle, rather than to 'near-side' and 'off-side'. The 'left-hand side' is that to the left hand when the vehicle is viewed from the rear; similarly, 'left-hand steering' (LHStg) models are those having the driving controls on the left-hand side, again when the vehicle is viewed from the rear.

## Measurements

All measurements are given in Imperial measure with US and metric equivalents added where possible, but in certain cases this is not practicable and the Imperial figure must be used.

## Workshop technique

When undertaking any overhaul operation, it is advisable to follow a standard technique, which will ultimately save both time and trouble. Prior to dismantling, the unit should be thoroughly cleaned externally and, as the stripping progresses, components washed in paraffin or petrol before setting out in order on a large drip tray. Small parts, such as nuts and bolts, should be placed in boxes to prevent loss, and shims attached to their respective components to facilitate assembly. All joint washers, lockers, tab washers and split pins must be renewed on assembly.

When the unit is finally rebuilt, use only the recommended lubricants. See Section X.

## Operation times

These are not included in this Manual and are the subject of a separate publication.

## Workshop tools

In order to assist the operator when following details given in this Manual, a list of the tools required for the operation has been included.

In addition, details of any special tools which are necessary, are included in the heading of the operation for which they are required. See also Section Z.

This new edition incorporates all applicable workshop information appertaining to the Land-Rover circulated by means of Land-Rover Service News Letters up to Vol. 3, No. 2.

# Index to Sections

See section title pages for detailed operation indexes

Section	Title
A-1	ENGINE—2½ litre Petrol
A-2	ENGINE—2½ litre Diesel
A-3	ENGINE—2.6 litre Petrol
B	CLUTCH UNITS
C	GEARBOX
D	PROPELLER SHAFTS
E	REAR AXLE AND SUSPENSION
F	FRONT AXLE AND SUSPENSION
G	STEERING AND LINKAGE
H	BRAKE SYSTEM
J	CHASSIS
K	COOLING SYSTEM
L	FUEL SYSTEM
M	EXHAUST SYSTEM
N	ELECTRICAL EQUIPMENT
P	INSTRUMENTS AND CONTROLS
Q	BODY
R	WHEELS AND TYRES
X	LUBRICANTS AND SERVICING MATERIALS
Z	TOOLS

Note: A comprehensive, detailed index is included at the end of this manual.

SECTION AI—2½ LITRE PETROL ENGINE

## INDEX TO OPERATIONS—SECTION A1

**Note:** A comprehensive detailed index is included at the end of this manual

Description of Listed Operations	Operation Number	
	Remove/Refit	Overhaul
Bonnet panel .. .. .	A1-1	—
Air cleaner—remove, clean and refit .. .. .	A1-2	—
Radiator and grille panel assembly .. .. .	A1-3	—
Front floor .. .. .	A1-4	—
Engine .. .. .	A1-5	—
Carburetter .. .. .	A1-6	Section L
Inlet and exhaust manifolds .. .. .	A1-7	A1-8
Starter motor .. .. .	A1-9	Section N
Dynamo .. .. .	A1-10	Section N
Water pump .. .. .	A1-11	Section K
Thermostat housing .. .. .	A1-12	Section K
Fuel pump .. .. .	A1-13	Section L
Engine side covers .. .. .	A1-14	—
Oil filter, external, to replace element .. .. .	A1-15	—
Oil filter, external .. .. .	A1-16	A1-16
Ignition timing procedure .. .. .	A1-17	—
Distributor and drive gears .. .. .	A1-18	Section N
Tappet adjustment .. .. .	A1-19	—
Valve gear, rocker shaft and push rods .. .. .	A1-20	A1-21
Cylinder head .. .. .	A1-22	A1-23
Tappet assemblies .. .. .	A1-24	—
Engine front cover and oil seal .. .. .	A1-25	—
Timing chain tensioner .. .. .	A1-26	—
Timing gears and chain, including valve timing .. .. .	A1-27	—
Crankcase sump .. .. .	A1-28	—
Oil pump .. .. .	A1-29	A1-30
Clutch assembly and flywheel .. .. .	A1-31	Section B
Rear main bearing oil seal and flywheel housing .. .. .	A1-32	—
Pistons and connecting rods .. .. .	A1-33	A1-34
Crankshaft and main bearings .. .. .	A1-35	A1-36
Camshaft .. .. .	A1-37	—
Cylinder block and camshaft bearings .. .. .	A1-38	A1-38
Reclamation of flywheel .. .. .	A1-31	A1-39

This Section concerns remove, refit and overhaul procedures for the 2½ litre petrol engine.

When carrying out a complete engine overhaul, the section can be worked straight through in the order presented.

Alternatively, the individual operations which form the greater percentage of maintenance work undertaken by Distributors and Dealers, are detailed under appropriate headings, and will be found to be complete in themselves.

Some operations are marked with an asterisk \* to indicate that they can be carried out with the engine installed. In all other cases it is necessary to remove the engine unit in order to carry out the work detailed.

Where LH (left-hand) or RH (right-hand) appears in the text, this indicates RH or LH side of vehicle or engine when viewed from the rear.

### **Brief description of engine**

The cylinder block is of cast iron. Re-boring is permitted up to a maximum of .040 in. (1,0 mm) oversize above the standard bore size of 3.562 in. (90,49 mm). Further reclamation is obtained by fitting cylinder liners and boring out to standard bore size. Liners may be re-bored up to .010 in. (0,25 mm) oversize.

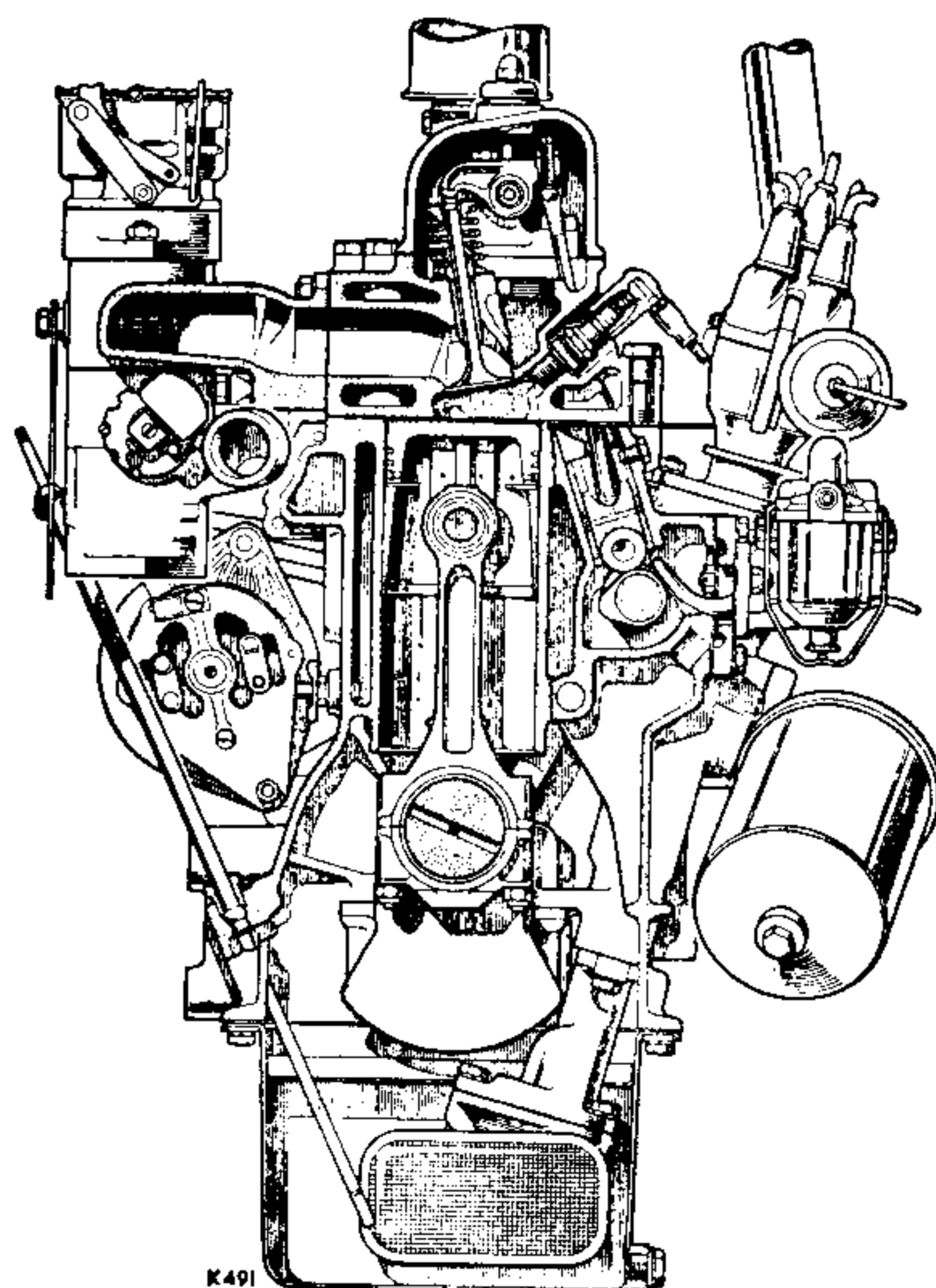
The crankshaft is supported by three bearings. The thrust is taken by the centre bearing. The bearings are white-metal lined steel shells.

The camshaft is supported by four bearings and actuates roller type cam followers operating valve rockers through push rods, and lead/tin plated bronze slides. Adjustment is made on the adjusting screws on valve rockers. The bearings are white-metal lined steel shells.

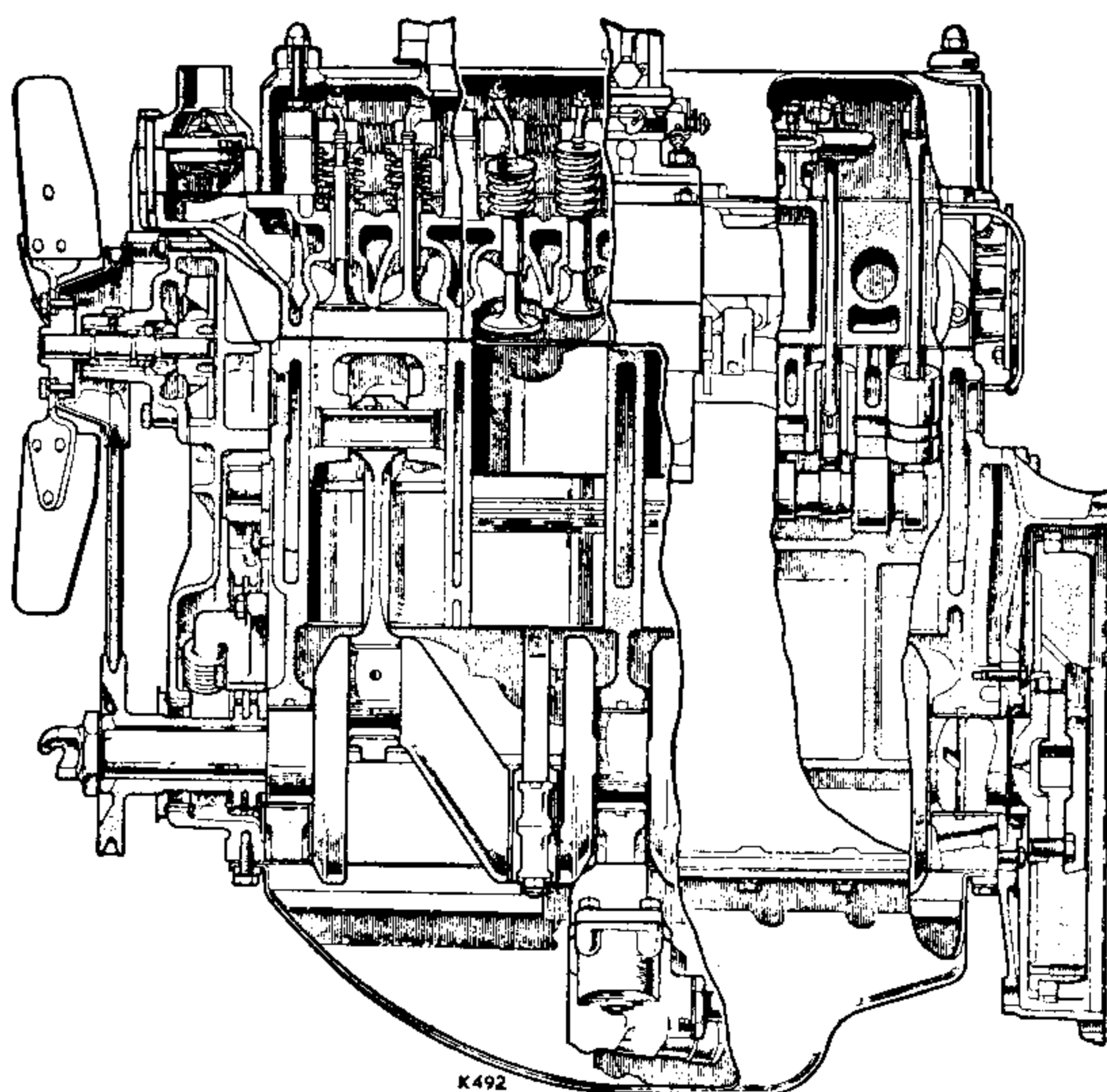
The camshaft is chain driven and a chain tensioner is fitted.

The engine is lubricated by a pressure fed oil system which incorporates a pump located in the crankcase sump and an external full flow oil filter.

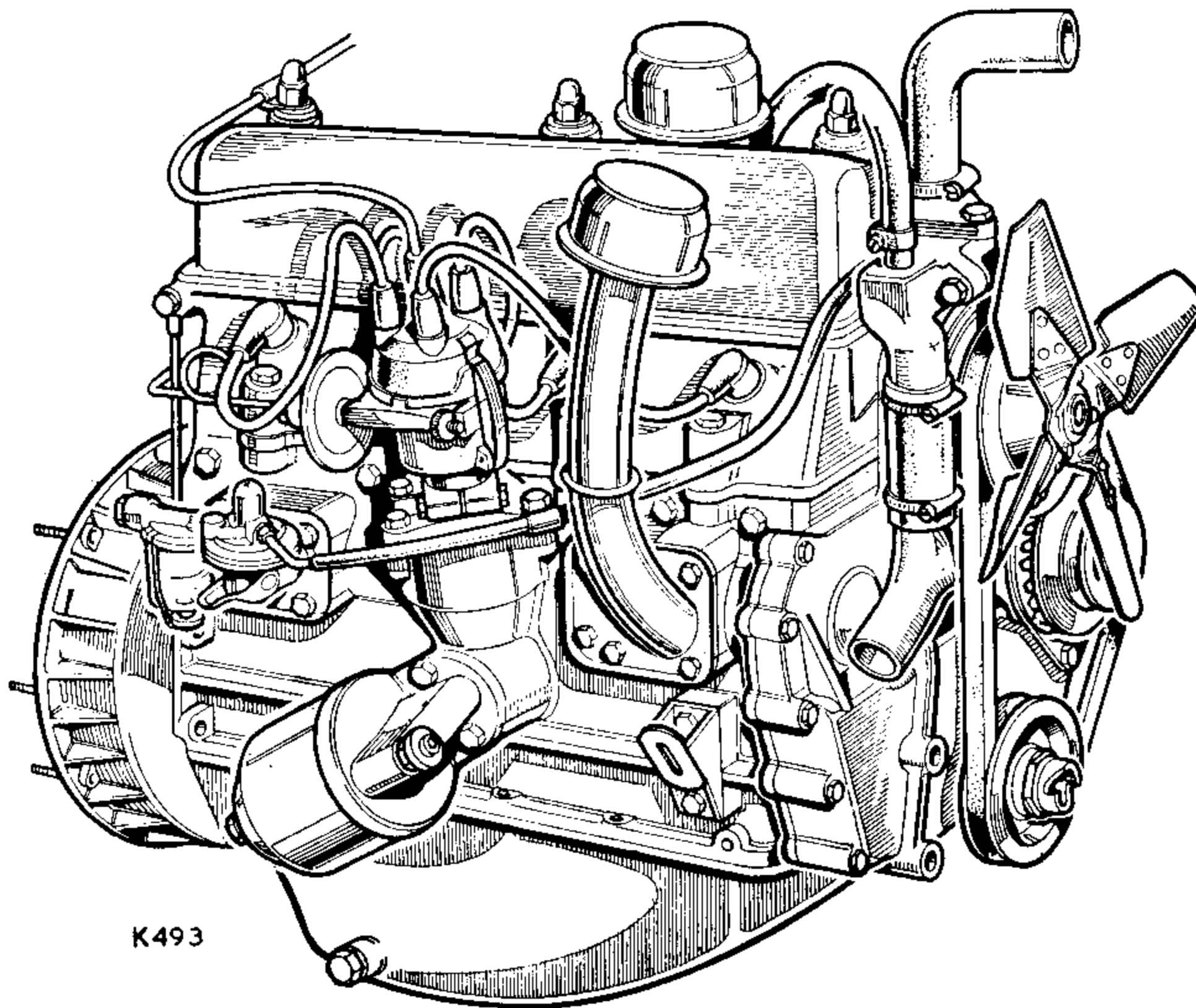
Engine component dimensions are provided in the Detail Data at the end of this Section.



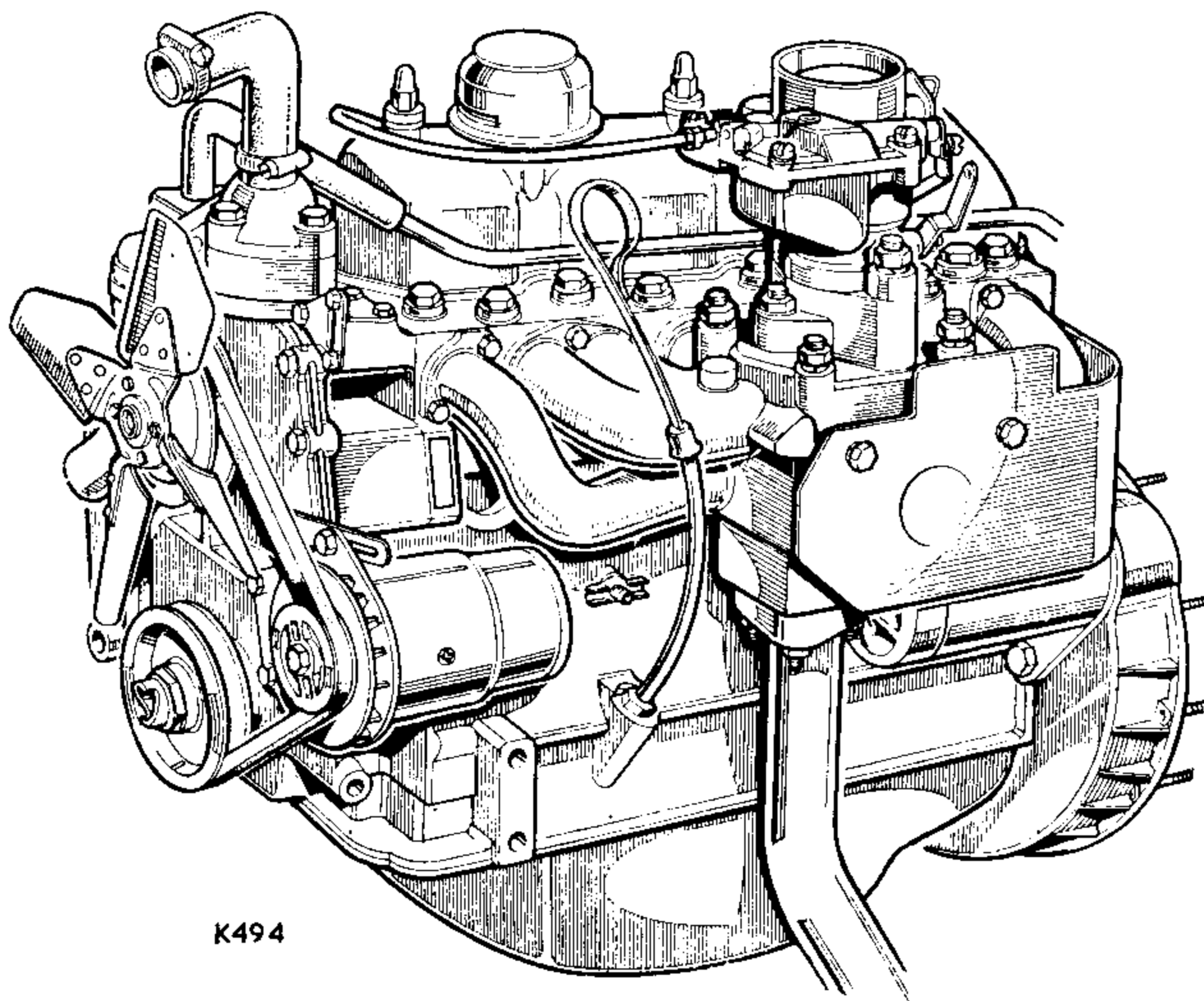
Cross-section view of engine



Longitudinal section of engine



General view of engine, RH side



General view of engine, LH side

**\*Bonnet panel, remove and refit—Operation A1-1**

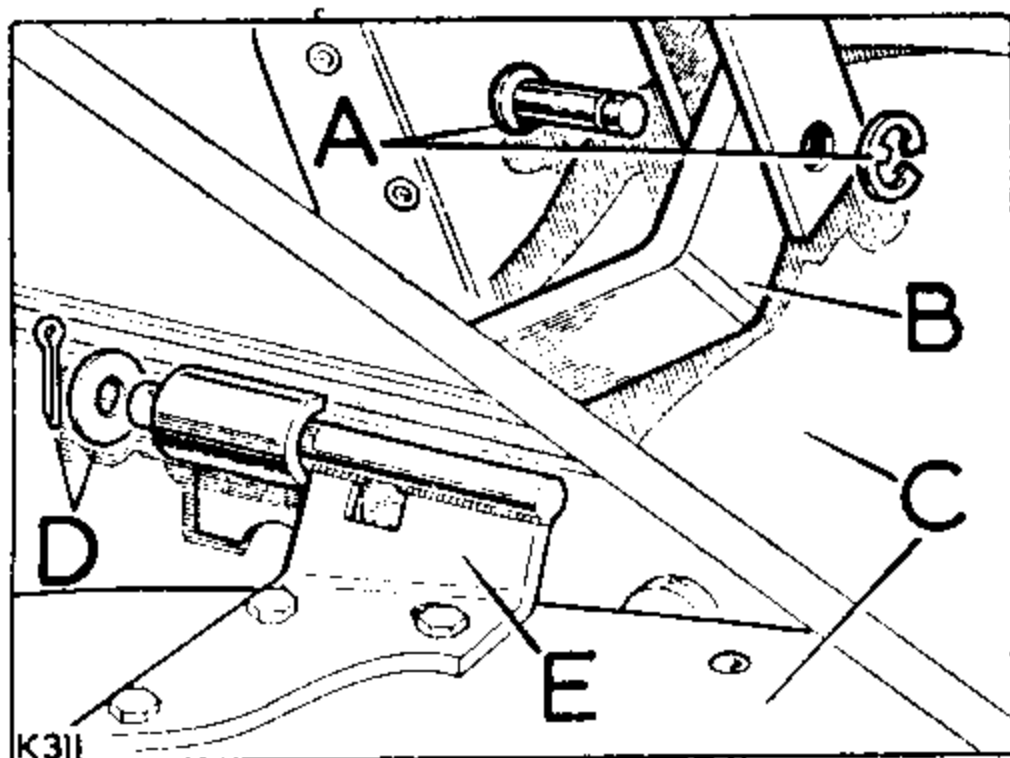
Workshop hand tools:  
Screwdriver (medium), Pliers

**To remove**

1. Remove the spare wheel from the bonnet panel, if fitted.
2. Remove fixings at prop rod and bonnet hinge.

**To refit**

1. Refit the bonnet panel, using suitable coverings on the wings to avoid damage to paintwork.
2. Refit the spare wheel, if fitted, to bonnet panel.



**Fig. A1-1. Fixings at bonnet panel**

- A—Prop rod fixings  
B—Bonnet prop rod  
C—Bonnet panel  
D—Bonnet hinge fixings, RH side only  
E—Bonnet hinge

3. Remove bonnet panel.

*Operations marked with an asterisk (\*) can be carried out with the engine installed in the vehicle*

## \*Air cleaner, remove, clean and refit—Operation A1-2

Workshop hand tools:  
Spanner sizes:  $\frac{7}{16}$  in. AF open ended  
Screwdriver (medium)

### To remove

1. Lift and prop bonnet.
2. Remove air intake elbow from carburettor.

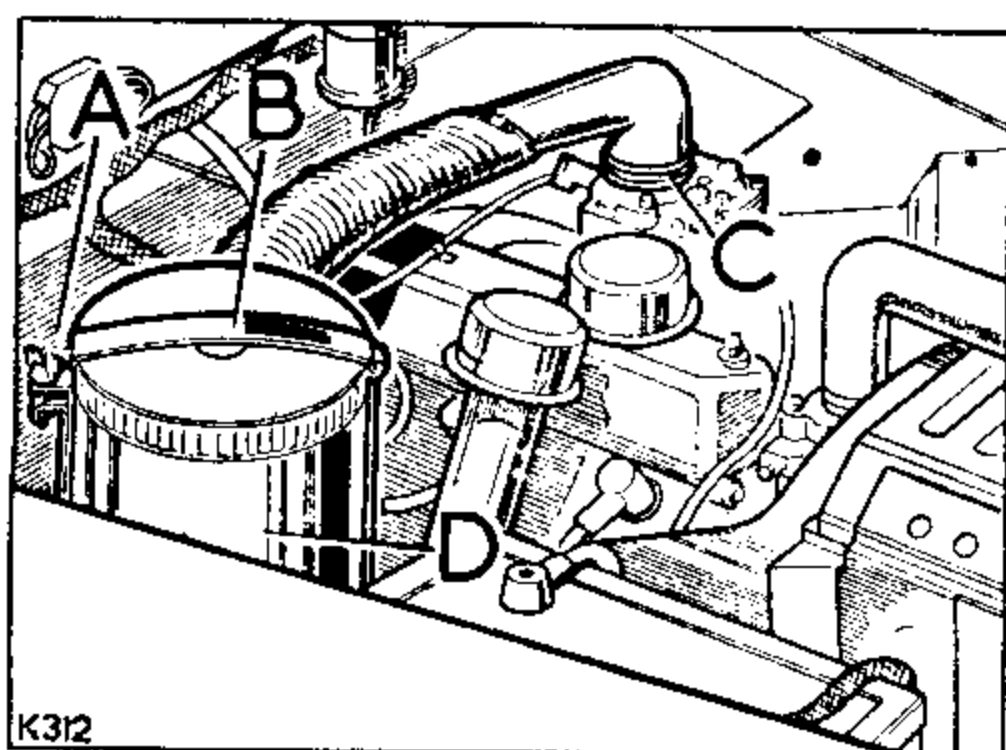


Fig. A1-2. Air cleaner and elbow fixings

- A—Retaining strap fixings
- B—Air cleaner retaining strap
- C—Elbow fixings at carburettor
- D—Air cleaner

3. Slacken the fixings and move aside the retaining strap.
4. Remove air cleaner complete with hose and elbow.

### To dismantle and clean

1. Separate the air cleaner body assembly from the oil container, retained by clips.

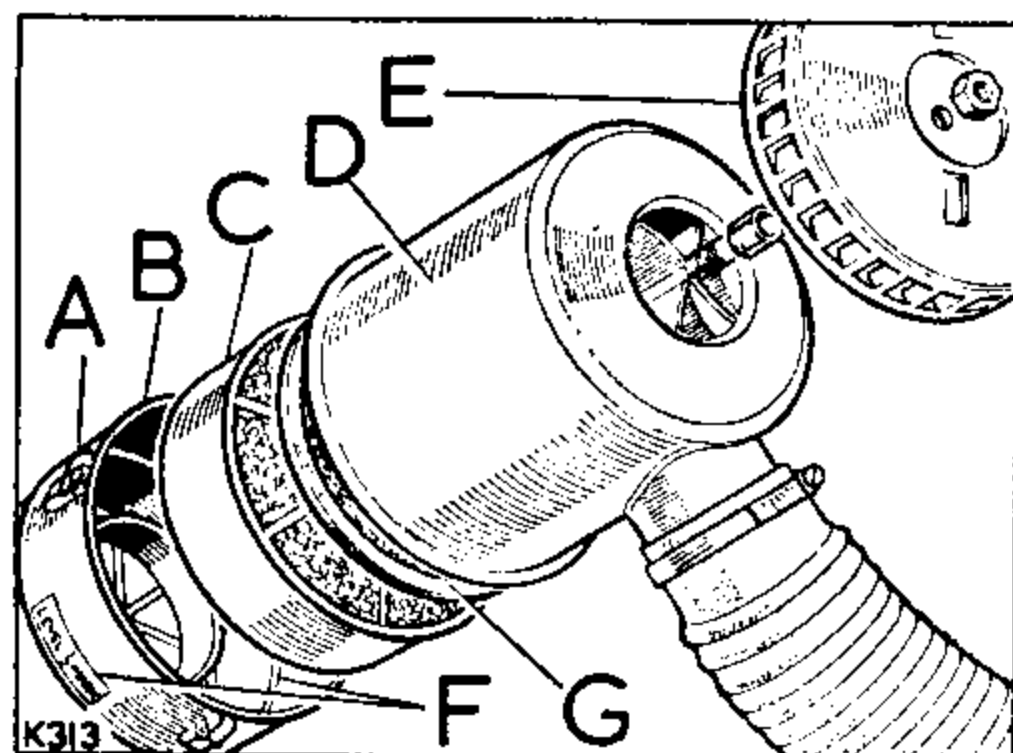


Fig. A1-3. Exploded view of air cleaner

- A—Hinged clips
- B—Oil container
- C—Wire mesh unit
- D—Air cleaner and mesh assembly
- E—Air intake cap and fixings
- F—Oil level mark
- G—Sealing washer

2. Drain the oil and withdraw the wire mesh unit.
3. Wash all components in clean fuel.

### To assemble

1. Fill the oil container with clean engine oil to the oil level mark on the container. See Fig. A1-3.
2. Reverse the dismantling procedure, fitting a new sealing washer between the oil container and the air cleaner body.

### To refit

1. Refit the air cleaner and hose; if necessary, reposition the air cleaner body relative to the oil container to prevent the hinged clips from fouling on the retaining strap supports when fitted.
2. When fitting the elbow to the carburettor, ensure that the sealing sleeve is fitted correctly on to the carburettor before tightening clip.

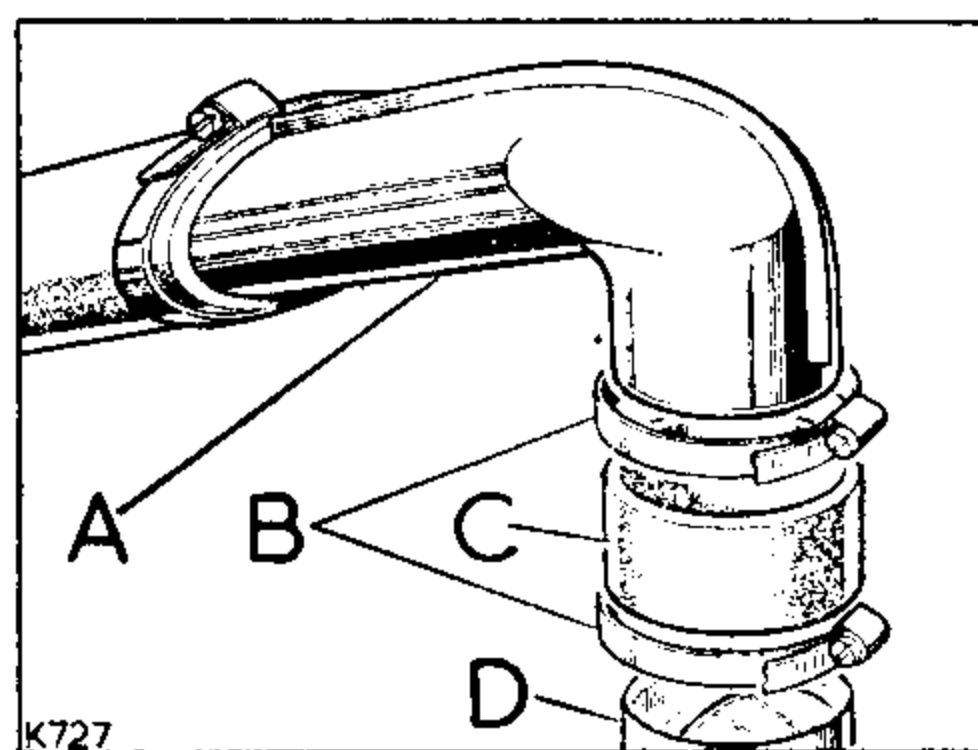


Fig. A1-4. Air intake elbow details

- A—Elbow
- B—Fixing clips
- C—Sealing sleeve
- D—Carburettor air intake

Operations marked with an asterisk (\*) can be carried out with the engine installed in the vehicle

### \*Radiator and grille panel assembly, remove and refit—Operation A1-3

Workshop hand tools:

Spanner sizes:  $\frac{7}{16}$  in. x  $\frac{1}{2}$  in. AF open ended, 2 off. 2 BA open ended  
Screwdriver (medium), Pliers

#### To remove

1. Remove bonnet panel. Operation A1-1.
2. Disconnect battery leads.
3. Remove front apron panel.

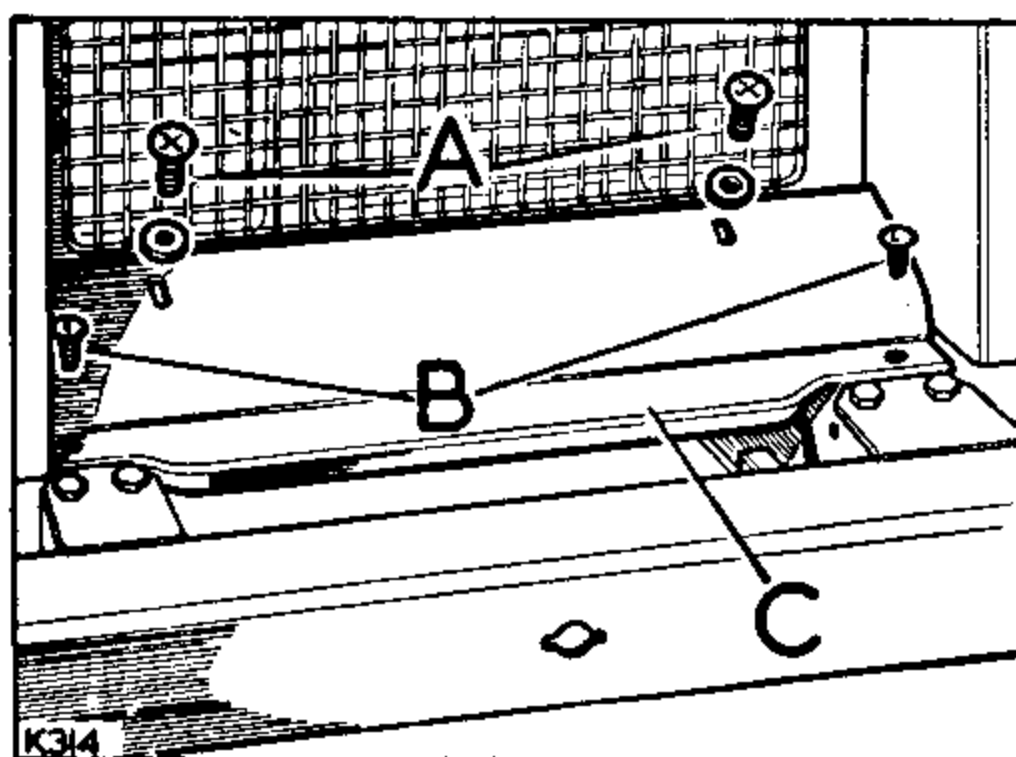


Fig. A1-5. Apron panel fixings

A—Fixings at cross member brackets  
B—Fixings at side members  
C—Apron panel

4. Remove nameplate and radiator grille.

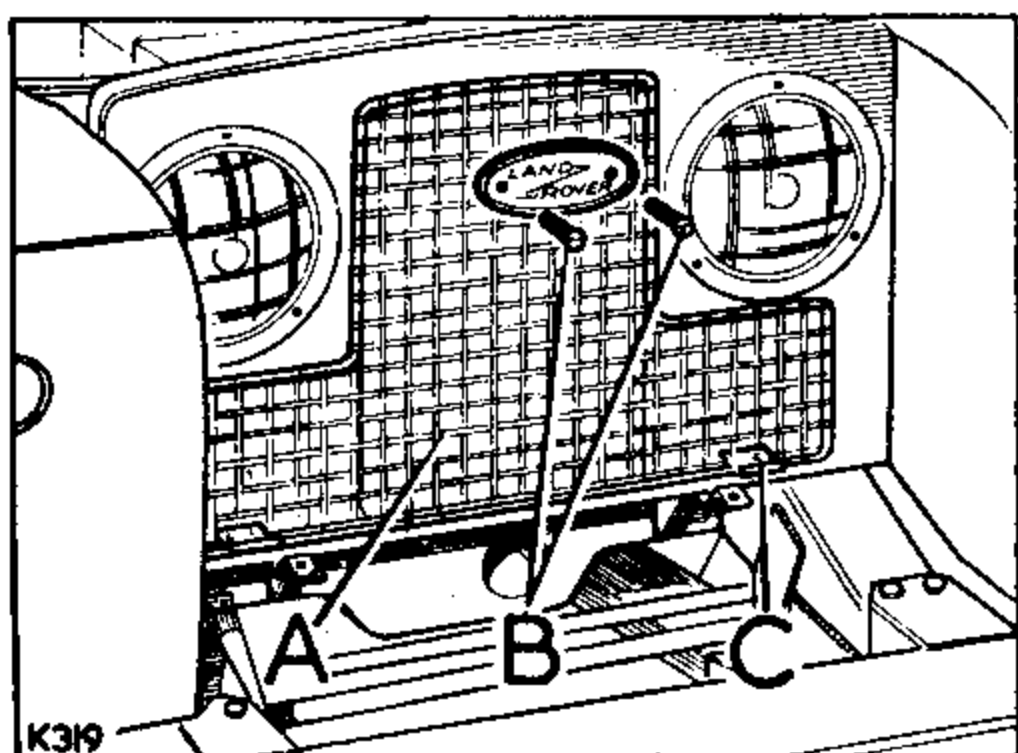


Fig. A1-6. Radiator grille fixings

A—Radiator grille  
B—Fixings for nameplate and grille  
C—Support brackets

5. Remove radiator cap, drain off coolant.

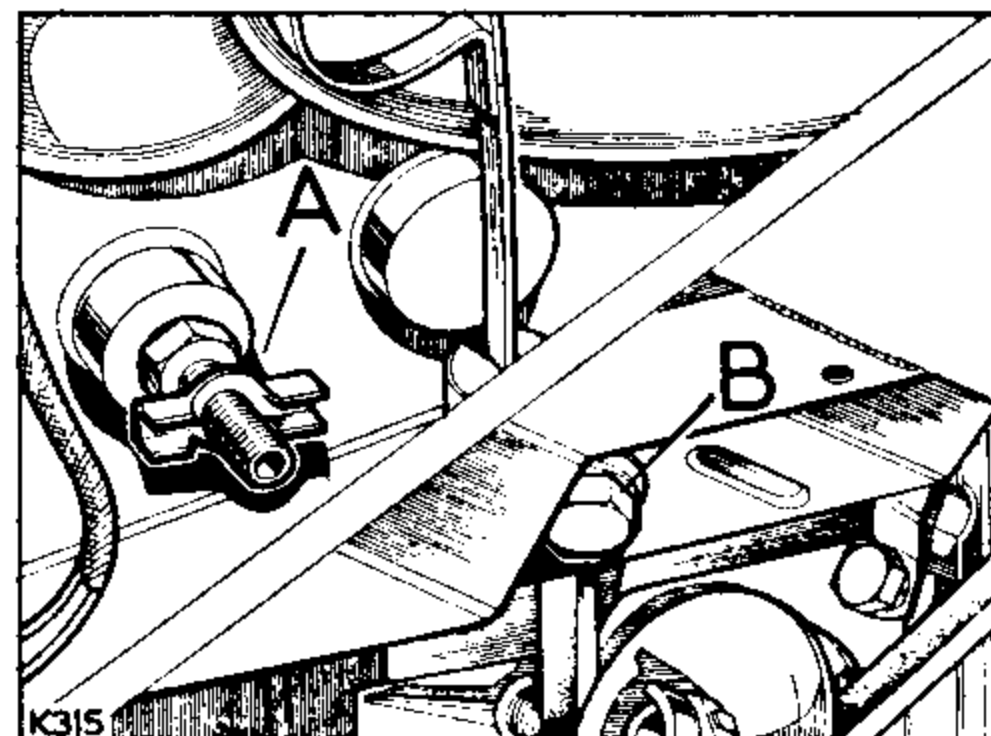


Fig. A1-7. Coolant drain points location

A—At engine block  
B—At radiator

6. Remove the shroud from the radiator fan cowl.

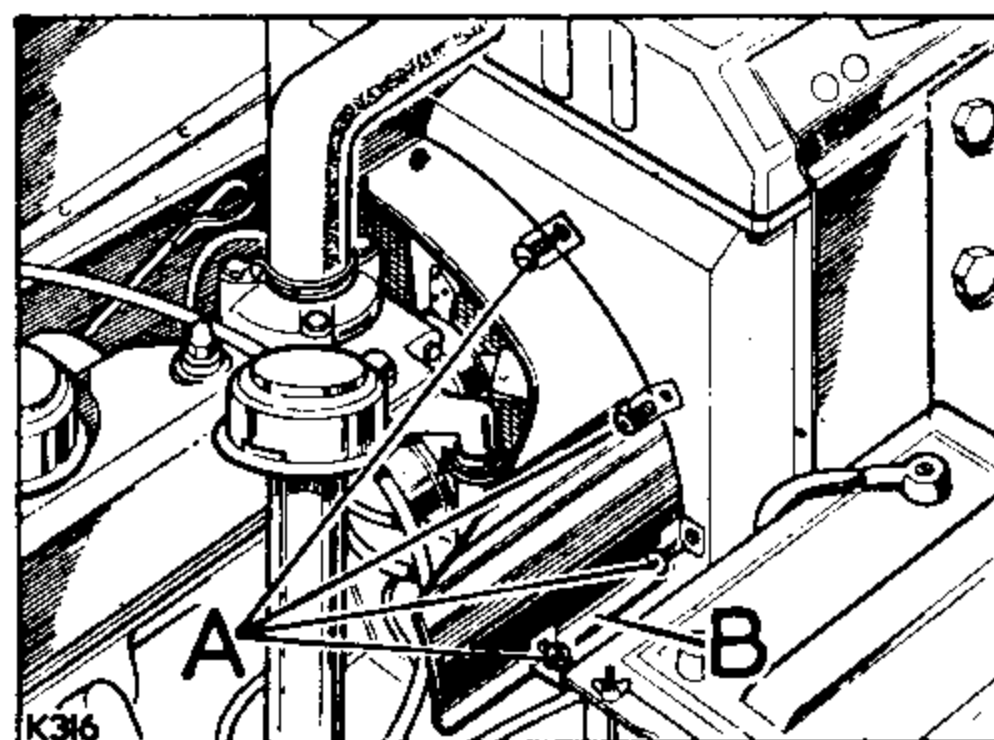


Fig. A1-8. Fan shroud fixings

A—Fixings for shroud  
B—Fan shroud

7. Slacken the fixings and detach the radiator coolant hoses.
8. Remove the fan blades fixings and lower fan blades to rest on lower part of fan cowl. Remove the fan blades when access is obtained during grille panel removal.

Operations marked with an asterisk (\*) can be carried out with the engine installed in the vehicle

## Operation A1-3—continued

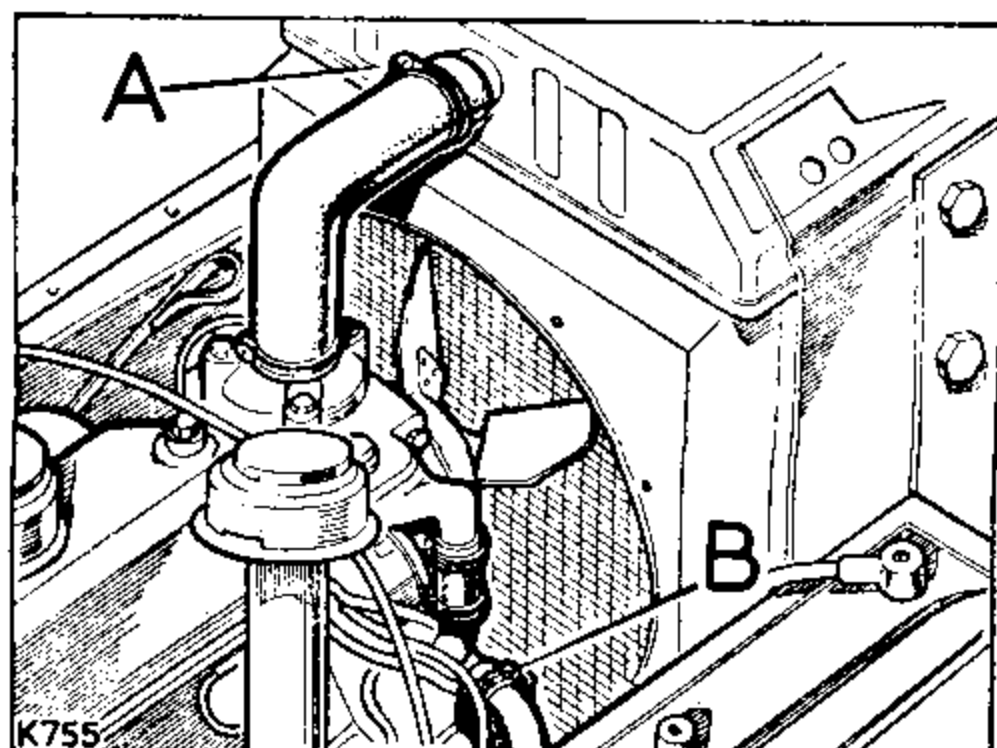


Fig. A1-9. Radiator hose fixings

- A—Fixings at top hose  
B—Fixings at bottom hose

9. Disconnect the electrical leads for the front lamps at the snap connectors and earth terminal. Withdraw leads clear of grille panel.

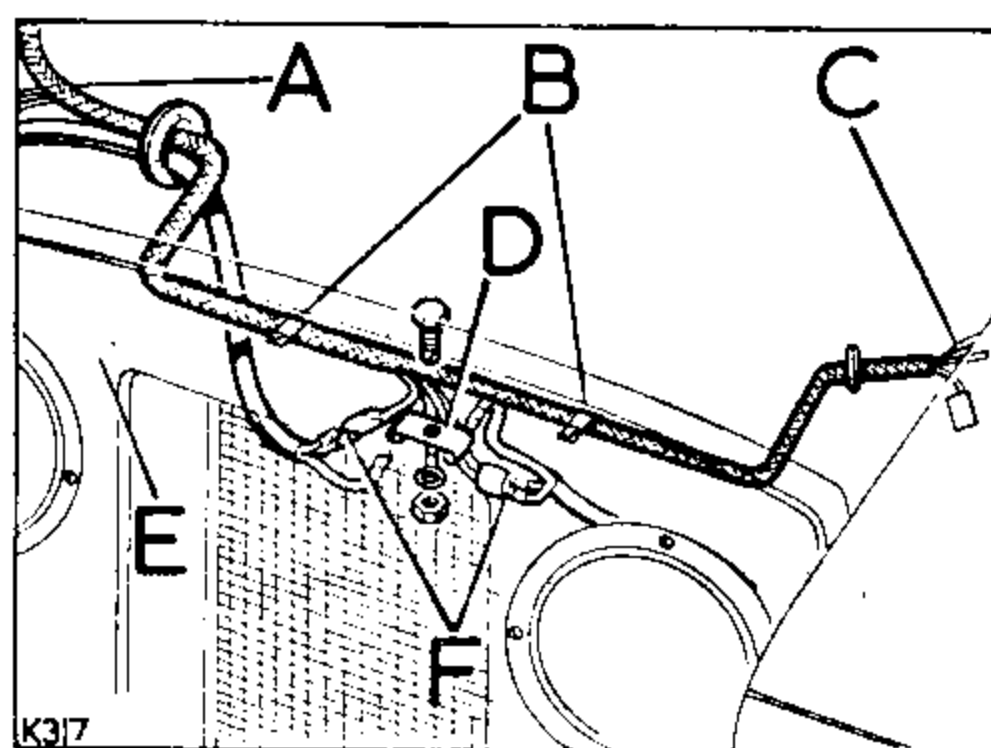


Fig. A1-10. Front lamps electrical leads

- A—Electrical leads harness  
B—Cable clips for harness  
C—Wing lamp leads snap connectors  
D—Earth connection  
E—Grille panel  
F—Headlamp leads snap connectors

- 10 Remove the grille panel to front wings fixings, the securing nuts and washers are located in the respective wheelarches.

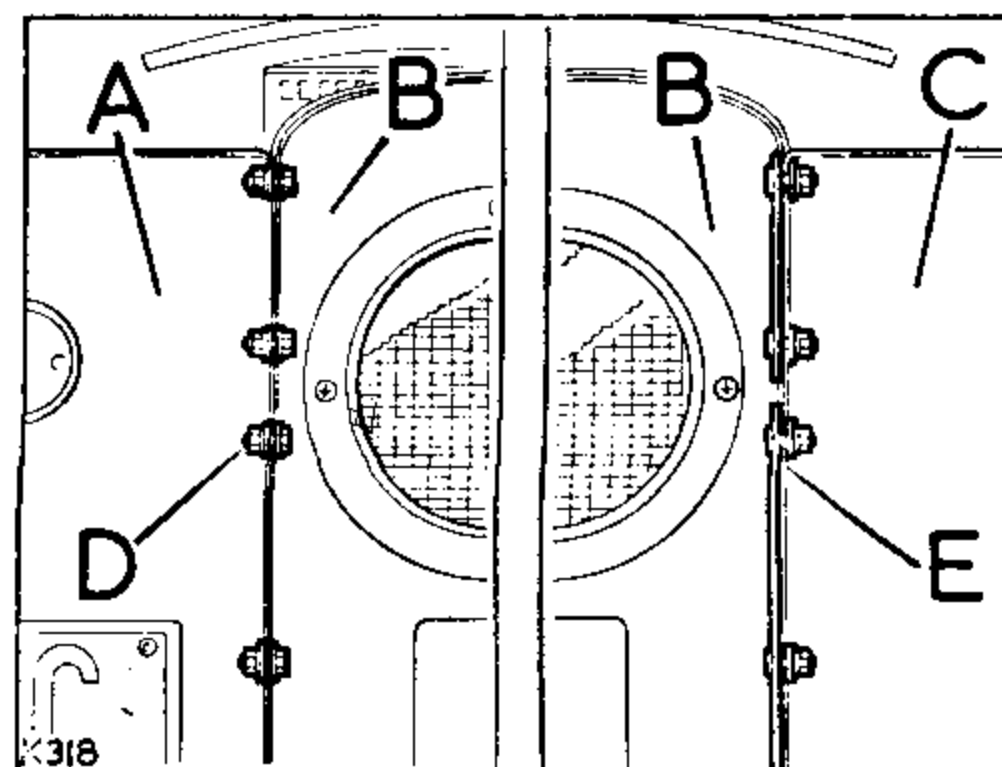


Fig. A1-11. Radiator grille panel fixings

- A—Front wing, RH side  
B—Radiator grille panel  
C—Front wing, LH side  
D—Fixings at RH side  
E—Fixings at LH side

11. Remove the grille panel fixings at the brackets on the chassis cross member.

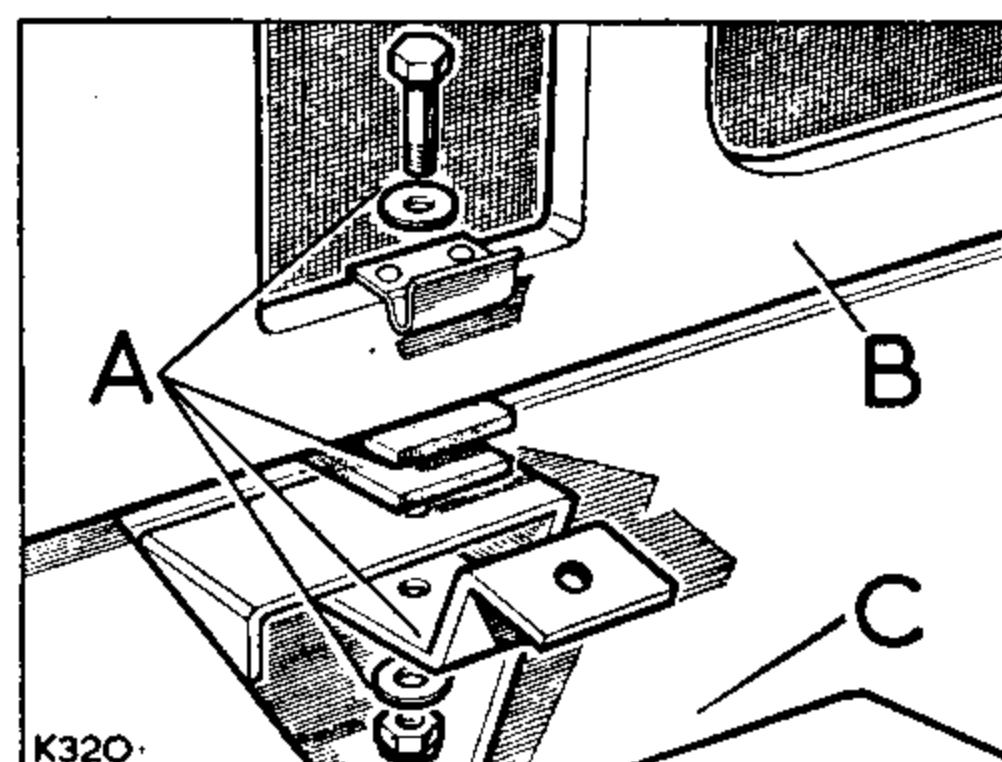


Fig. A1-12. Fixings at chassis cross member

- A—Panel fixings  
B—Radiator grille panel  
C—Chassis cross member

12. Carefully withdraw the assembly and the previously released fan blades from the engine compartment.

**To refit**

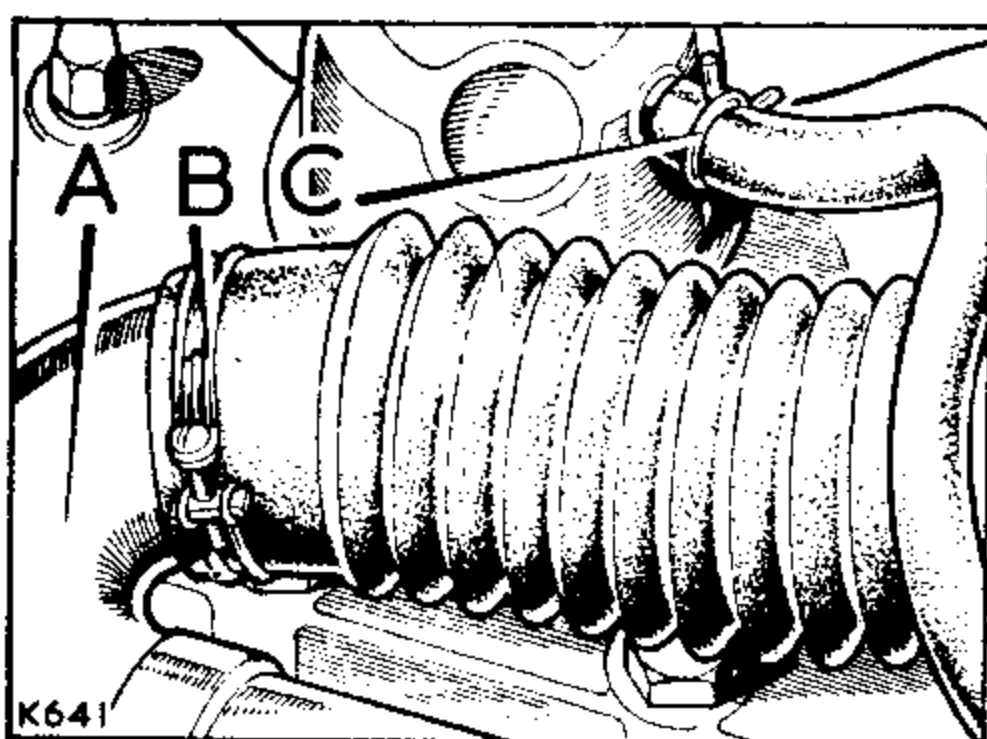
1. Position the radiator and grille panel assembly on to the vehicle. Fit the fan blades to the fan pulley before engaging the grille panel fixings. See Figs. A1-11 and A1-12 for fixings details.

**\*Inlet and exhaust manifolds, remove and refit—Operation A2-8**

Workshop hand tools:

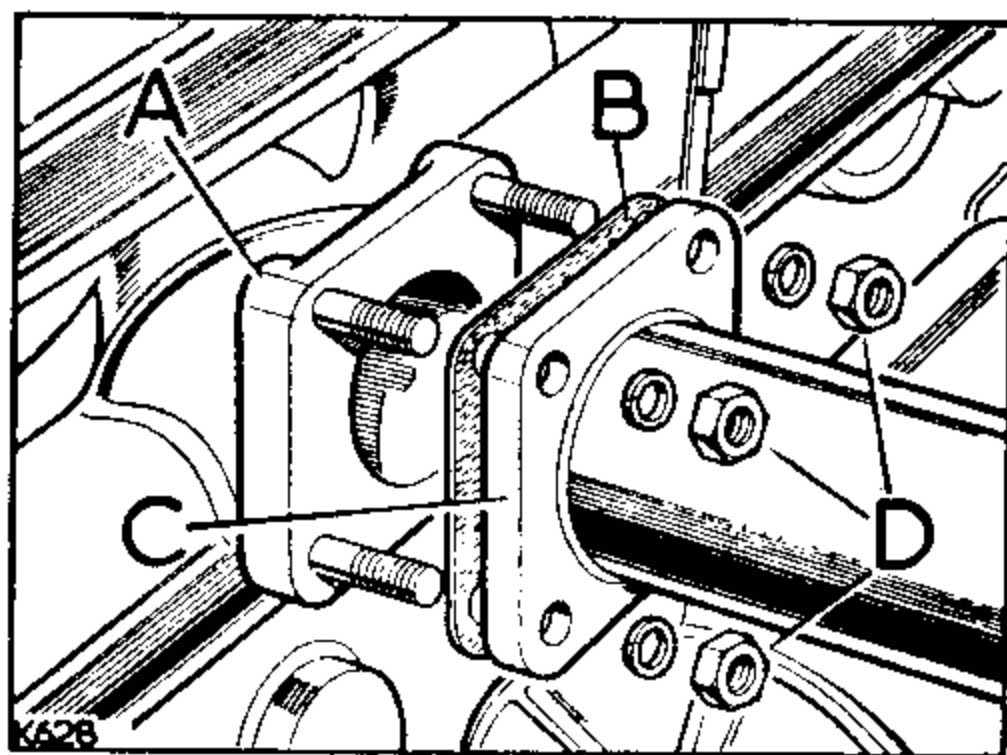
Spanner sizes: ½ in. AF ring, ½ in. AF open end, ½ in. AF socket  
Screwdriver (medium)**To remove**

1. Remove bonnet panel. Operation A2-1.
2. Disconnect the air cleaner hose at inlet manifold and the engine breather pipe if fitted.

**Fig. A2-34. Inlet manifold connections**

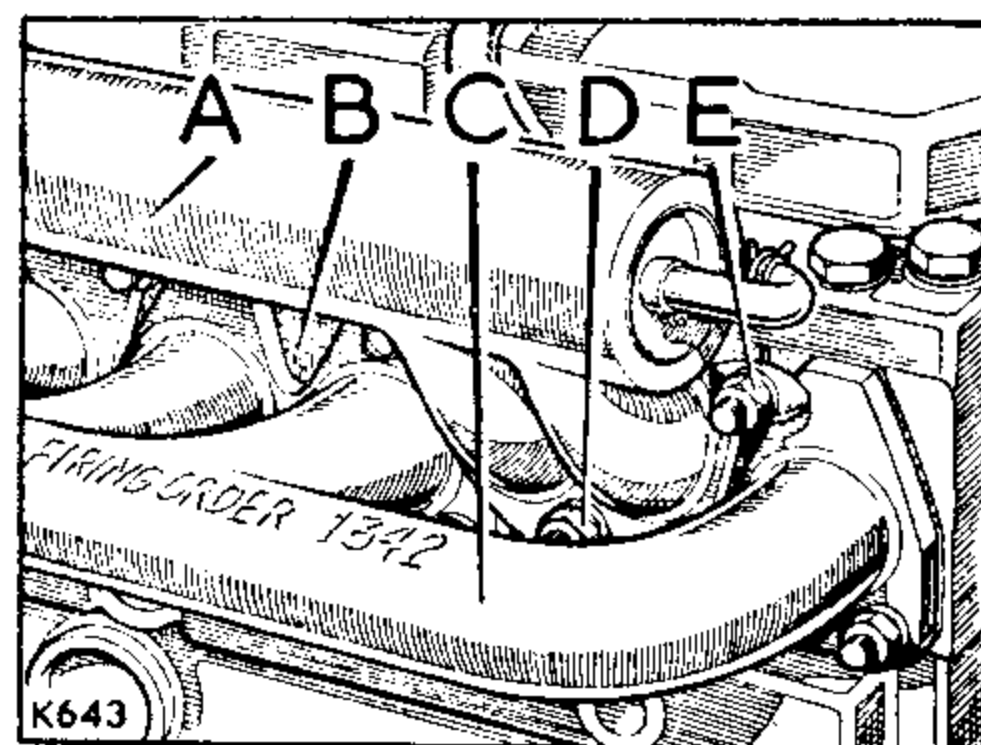
A—Inlet manifold  
B—Air cleaner hose fixing  
C—Breather pipe fixing

3. Disconnect front exhaust pipe at manifold.

**Fig. A2-35. Exhaust pipe fixings**

A—Exhaust manifold  
B—Joint washer  
C—Front exhaust pipe  
D—Fixings

4. Withdraw the oil level dipstick, remove the fixings and withdraw the manifolds.

**Fig. A2-36. Manifolds fixings**

A—Inlet manifold  
B—Joint washer  
C—Exhaust manifold  
D—Lower fixings (5 off)  
E—Upper fixings (4 off)

**To refit**

1. Fit the joint washer and position the exhaust manifold on the studs.
2. Position the inlet manifold and fit the clamp plates to the upper fixings to secure the two manifolds. Do not fully tighten at this stage.
3. Fit the remaining fixings to the lower studs and tighten all fixings evenly. Refit exhaust pipe.
4. Refit the inlet manifold connections, referring to Fig. A2-34.
5. Refit the bonnet panel. Operation A2-1.

Operations marked with an asterisk (\*) can be carried out with the engine installed in the vehicle

**\*Starter motor, remove and refit—Operation A2-9***(For overhaul instructions, Section N refers)*

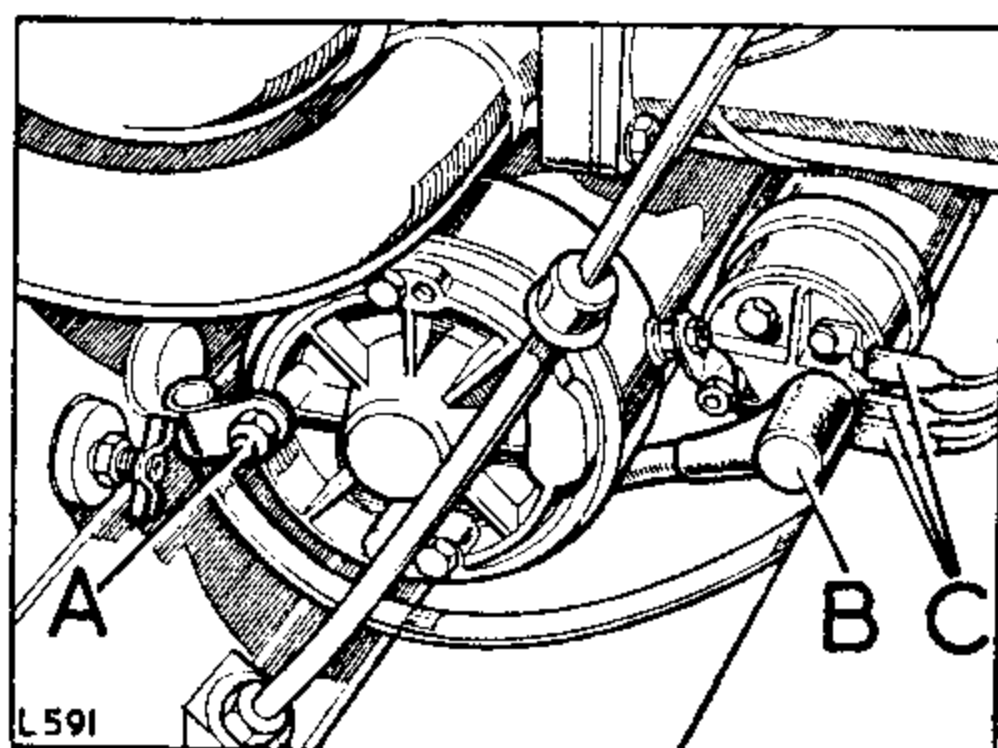
Workshop hand tools:

Spanner sizes:  $\frac{1}{2}$  in. AF,  $\frac{9}{16}$  in. AF,  $\frac{11}{16}$  in. AF open end  
Screwdriver (medium), Pliers**To remove**

1. Remove bonnet panel. Operation A2-1.
2. Disconnect battery.
3. Disconnect electrical leads.

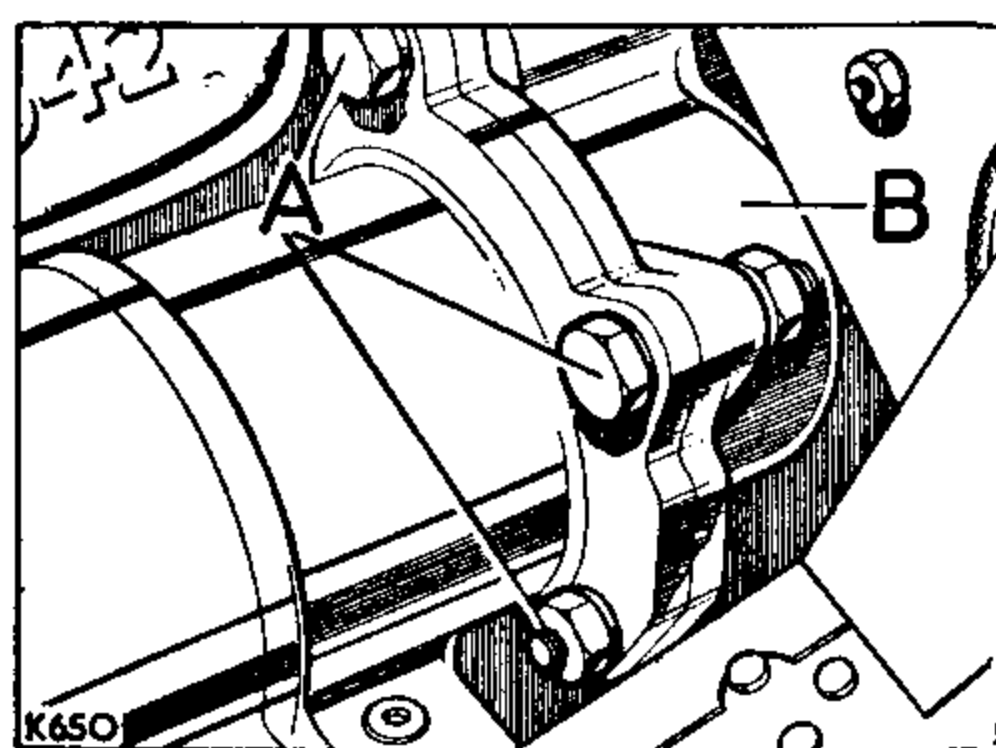
**To refit**

1. Reverse the removal procedure.

**Fig. A2-37. Electrical leads at starter**

- A—Earth strap terminal  
B—Withdraw rubber boot for access to lead  
C—Push-on type connectors

4. Remove fixings at engine and withdraw starter.

**Fig. A2-38. Starter motor fixings**

- A—Fixings  
B—Flywheel housing (LH side)

*Operations marked with an asterisk (\*) can be carried out with the engine installed in the vehicle*

**Fault diagnosis—Engine—2½ litre Diesel—continued**

Symptom	Possible cause	Investigation	Remedy
<b>G—Low oil pressure—cont.</b>	Excessively worn bearings	Check bearing clearances at main journals, connecting rod big ends and camshaft as necessary	Replace bearings, referring to the appropriate overhaul procedure
<b>H—Oil pressure warning light remains 'ON', with engine running</b>	Low oil pressure	Refer to paragraph G for checks and remedy	
	Oil pressure switch unserviceable	Check by substitution of serviceable component	Replace switch
	Electrical fault	Check circuit	Rectify poor connections or replace leads as applicable
<b>J—Warning light fails to glow with engine stopped and ignition switch 'ON'</b>		Check warning lamp bulb by substitution of serviceable bulb	Replace bulb
		Check oil pressure switch by substitution of a serviceable switch	Replace switch
		Check electrical circuit	Rectify poor connections or replace leads as applicable
<b>K—Noisy valve mechanism</b>	Valve operation incorrect	Check for excessive tappet clearances	Reset
		Rotate engine and check for sticking valves and broken or defective valve springs. Check for excessively worn components	Carry out cylinder head overhaul procedure. Replace valve springs
<b>L—Main bearing rattle</b>	Low oil pressure	Refer to paragraph G for checks and remedy	
	Component or assembly defects	Check if main bearing cap fixings are loose	Tighten to correct torque loading
		Check bearing clearance. Examine bearings and crankshaft for wear	Carry out the overhaul procedure
<b>M—Black smoke issues from exhaust</b>	Fuel system defects	Check for defective fuel injection nozzles as described in Section L	Reset injectors (Section L) or replace as necessary
		Check for incorrect fuel injector pump timing	Reset timing
<b>N—White vapour issues from exhaust</b>	Internal coolant leakage	Check for coolant leakage into combustion chamber. Do not confuse with vapour apparent immediately after starting, caused by condensation in exhaust system	Rectify as necessary
	Fuel system defects	Check as described in Para. M	
	Insufficient compression in cylinders	Check as described in Para. B	

## Cylinder block, to overhaul—Operation A3-37

### Workshop hand tools:

Spanner sizes:  $\frac{7}{16}$  in. AF,  $\frac{1}{2}$  in. AF,  $\frac{9}{16}$  in. AF  
 $\frac{5}{8}$  in. AF,  $\frac{3}{4}$  in. AF  
 Screwdrivers, medium and large

### Special tools:

Reboring jig block (Part No. 261288)  
 Cylinder liner press block (Part No. 246650)  
 Extractor (Part No. 262749)

Carry out the engine removal and dismantling work previously detailed as necessary until the cylinder block only remains

### Cylinder block, preparation

1. Clean out the main oil gallery and all oilways; renew all blanking plugs.
2. If necessary, remove the oil gallery pipe from the block by using extractor (Part No. 262749).
3. Clean out the water gallery and water jacket.

### Cylinder block, checks

1. Examine the block for cracks and distortion of machined faces.
2. The cylinder block must be checked by first assembling the crankshaft bearing caps (without the bearing shells) to the crankcase. Ensure correct location by means of the dowels. Bearing caps are numbered in their respective order from the front of the engine.
3. Tighten both securing bolts for each cap to 75 lb/ft (10,0 mkg). Slacken one bolt of each pair right off. There should be no clearance at the joint face. **If there is clearance, this indicates that the caps have been filed. The cylinder block is scrap and must be replaced.**
4. Check for stripped threads and general damage to cylinder block.
5. Measure the amount of wear in each cylinder bore.

### Reboring

1. Although the cylinder head is inclined at an angle of  $22^\circ$ , standard boring equipment can be used in conjunction with a special jig block (Part No. 261288).

### Cylinder liners

1. Cylinder liners may be fitted; note the following points:
  - (a) Machine the cylinder block bores to 3.200 in. plus .001 in. (81,28 mm plus 0,025 mm). This gives an interference fit of .003 to .004 in. (0,07 to 0,10 mm).
  - (b) Prior to pressing in the liner, allowance must be made for twist up to  $\frac{3}{16}$  in. (5 mm) clockwise. To facilitate realignment should the liner not be positioned correctly at the first attempt, scribe lines down the sides of the liner from the two peaks, and make corresponding marks on the cylinder block.
  - (c) Press in the liner, using a special press block (Part No. 246650), until the top edge is level with the bottom of the exhaust valve pocket. Blend to the shape of the cylinder block.

Bore to the selected diameter to suit pistons. Liners may only be bored to suit standard or .010 in. (0,25 mm) oversize pistons. For piston selection see Operation A3-33.

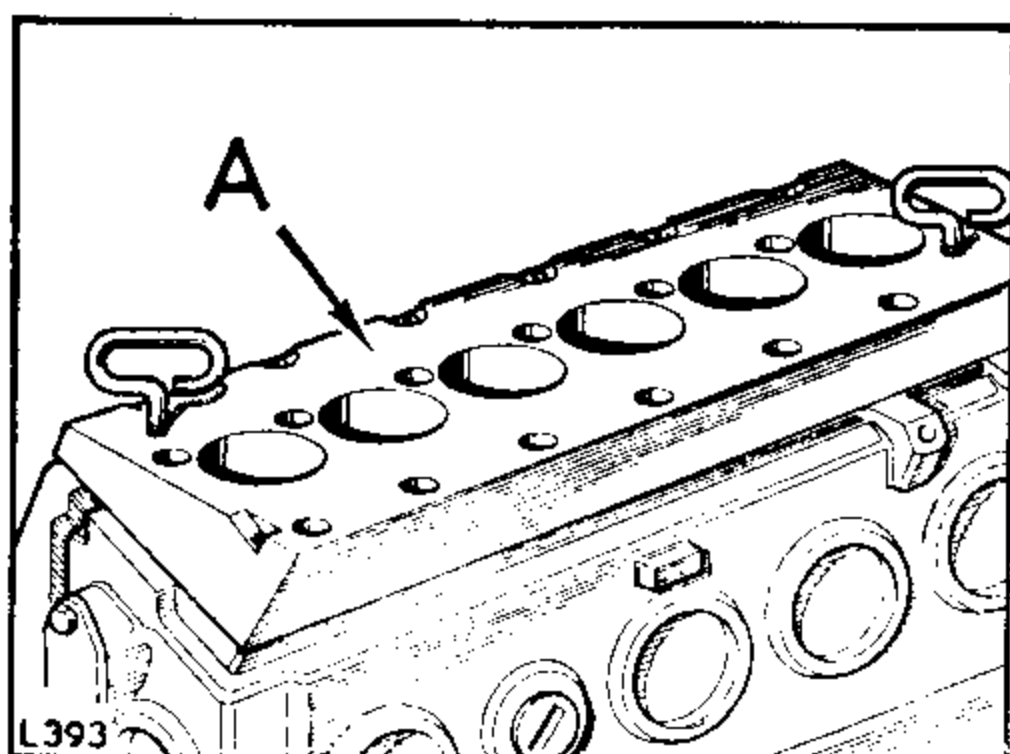


Fig. A3-149. Jig block for reboring

A—Jig block, Part No. 261288

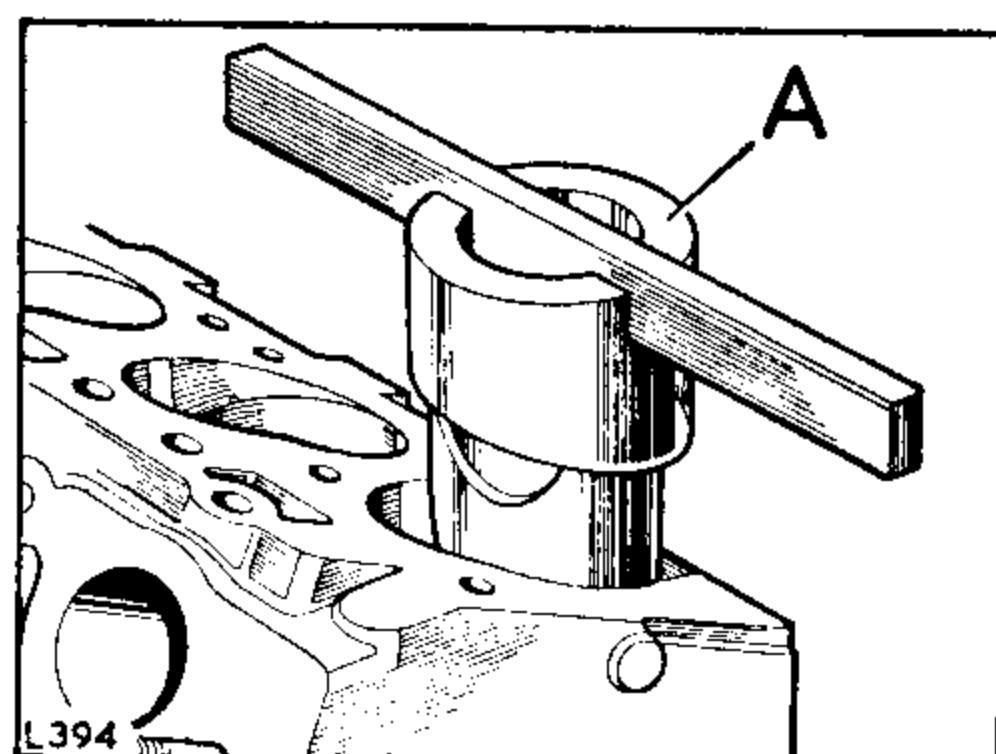


Fig. A3-150. Fitting a cylinder liner

A—Press block, Part No. 246650

## Reclamation of flywheel and starter ring—Operation A3-38

### Wear or scoring on the flywheel pressure face

1. Remove the clutch bolts and dowels from the flywheel.
2. Check the thickness of the flywheel before commencing machining, as it may have been previously machined.

The maximum amount of metal which may be removed from the flywheel face is .030 in. (0,76 mm). If the face is not satisfactory after machining to these limits, the flywheel must be scrapped. See chart below.

3. Machine the **whole** pressure face, not merely inside the bolts and dowels, until the score marks are removed.

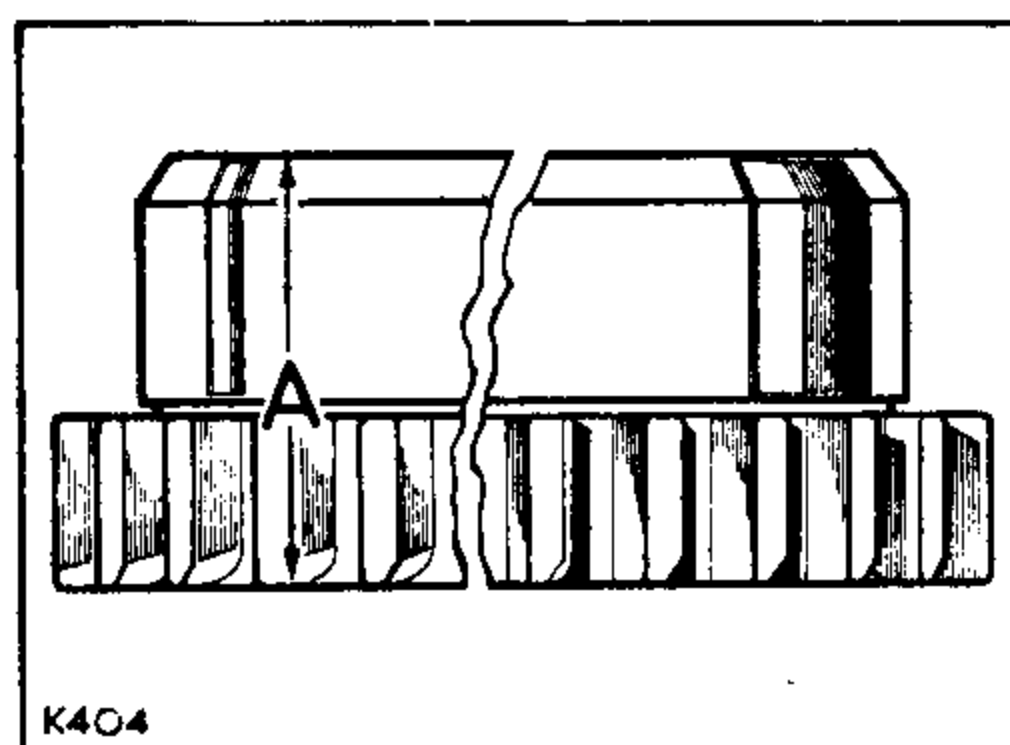


Fig. A3-151. Machining flywheel  
A—Minimum thickness after refacing

### Starter ring excessively worn or damaged

#### Petrol models

1. Remove the scrap starter ring by securing the flywheel in a vice fitted with jaw protectors, then drill a  $\frac{3}{8}$  in. (4 mm) diameter hole axially between the root of any one tooth and the inner diameter of the starter ring  $\frac{3}{8}$  in. (4 mm) deep. Care must be taken to prevent the drill entering the flywheel.

**Important Note:** The starter ring will normally split harmlessly but on remote occasions rings have been known to fly asunder when split; it is therefore important that the operator should take suitable precautions. For instance a cloth may be laid over the upper part of the starter ring.

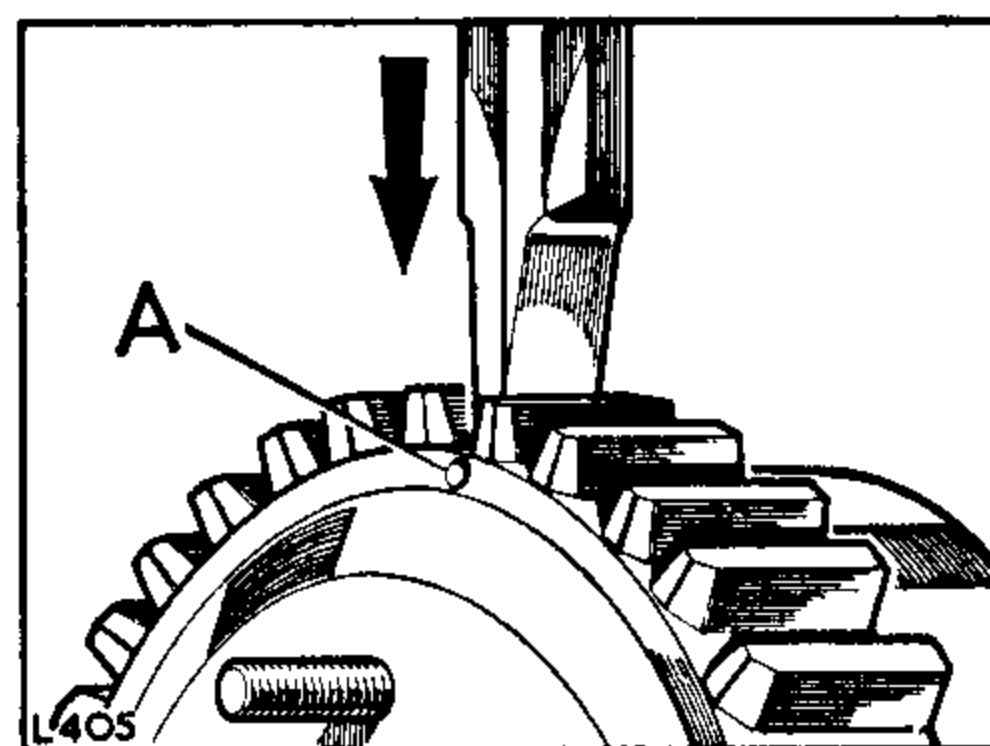


Fig. A3-152. Removing an unserviceable starter ring  
A—Drilled hole

Models	Flywheel Part Number	Ring Gear Part Number	Dimension 'A' Minimum thickness after refacing	Flywheel Part Number when re-conditioned	Remarks
2.6 litre Petrol models . . . .	541760	506799	1.204 in. (30,5 mm)	600537	Cast-iron flywheel. Detachable ring gear fitted as original equipment. No machining necessary other than for refacing.

## GEARBOX DESCRIPTION AND OPERATION

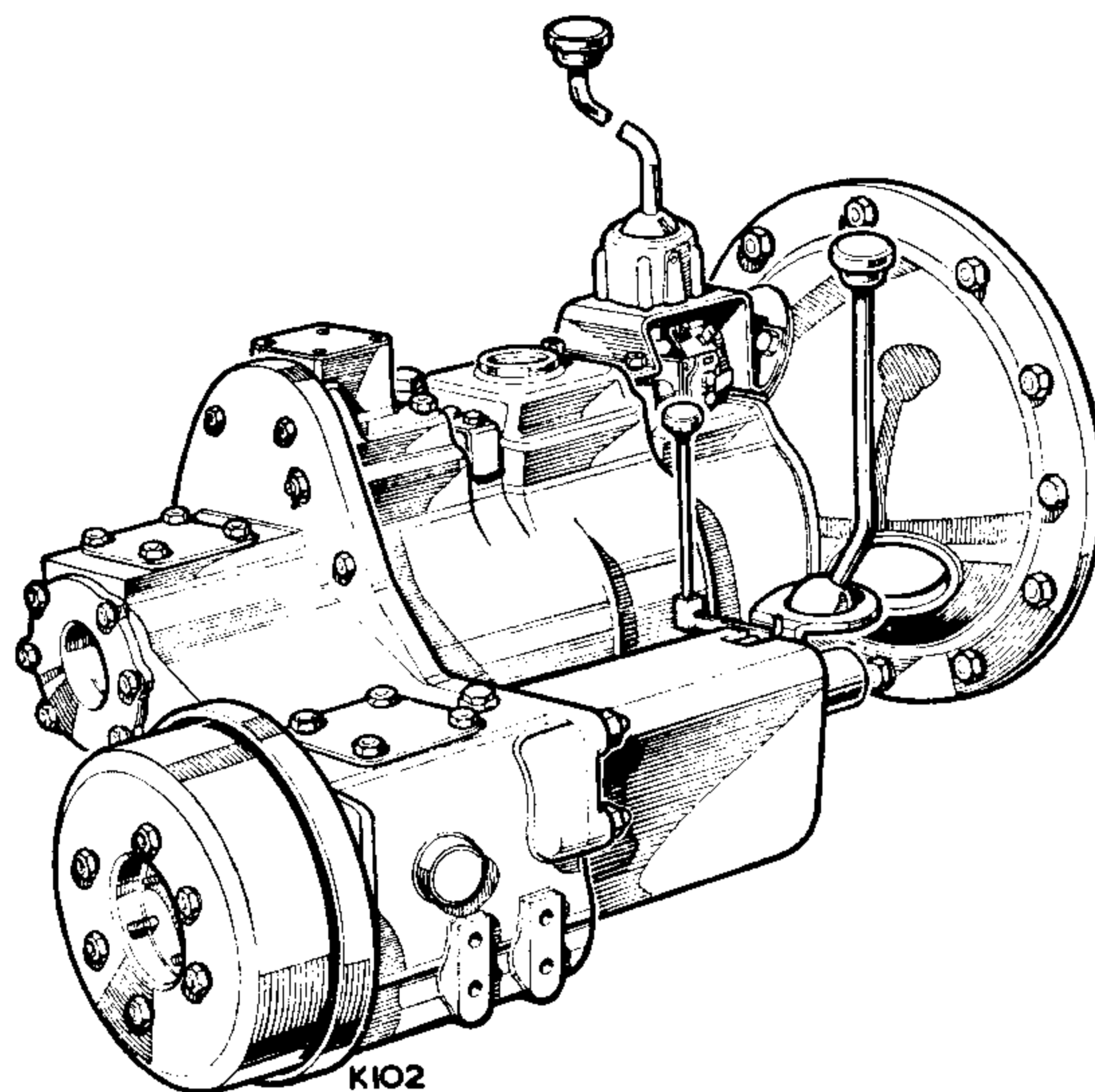


Fig. C1-11. Gearbox assembly complete

### 1. Description

The Land-Rover gearbox comprises three units. One, a main gearbox, which has four forward speeds and one reverse.

The gears are selected by the main lever which has a black knob.

To the rear end of the main gearbox is attached the second unit, a two speed transfer box; high or low range can be selected by the transfer gear lever which has a red knob. Use of these two ratios give a total of eight forward gears and two reverse.

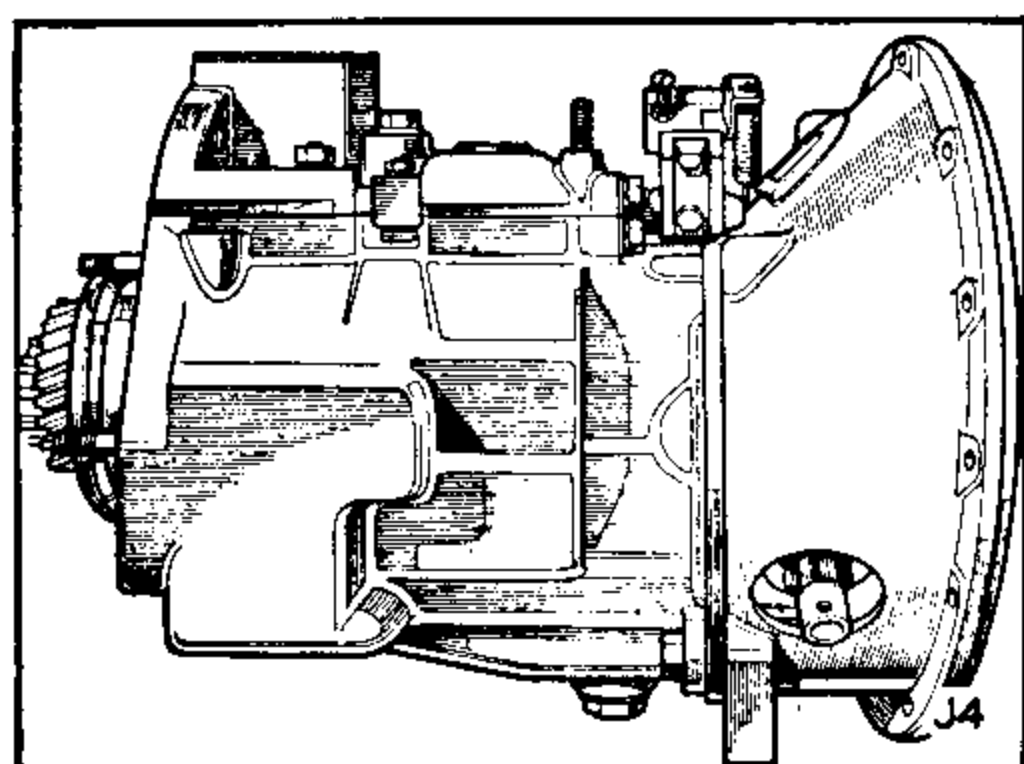


Fig. C1-12. Main gearbox unit

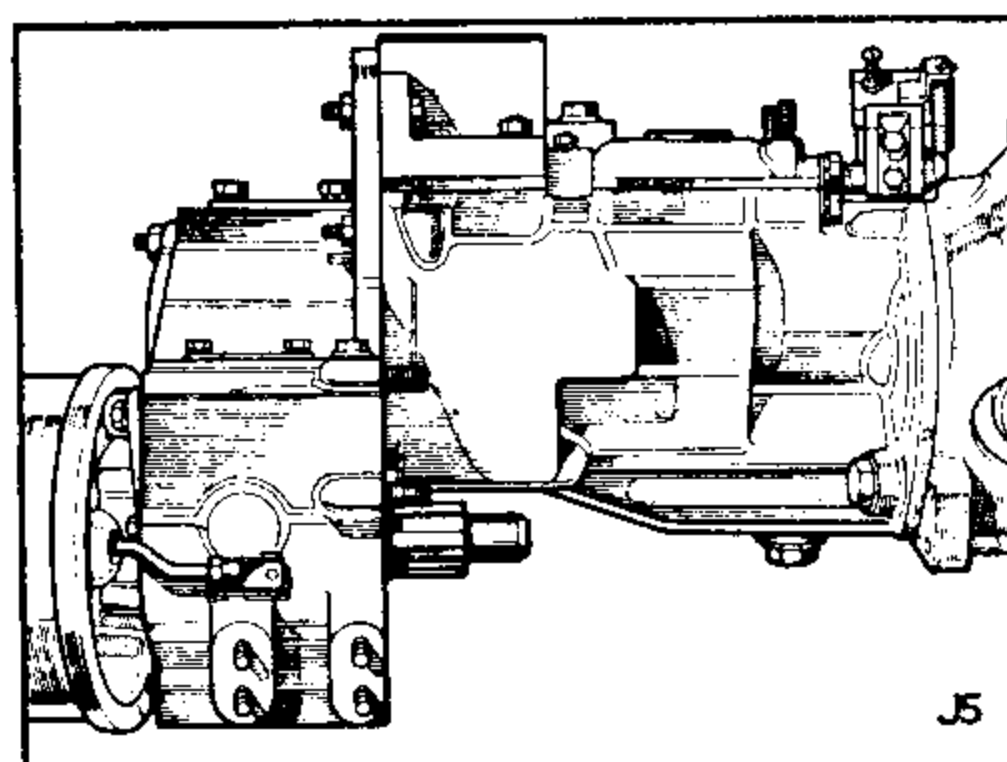


Fig. C1-13. Transfer box, secured to rear of main gearbox

## DETAILED INDEX

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	Technical data—refer to end of each Section .. .. .	—	—
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	Thermostat, 2.6 litre Petrol .. .. .	A3-12	K1-1
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