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MINI

SALOON, COUNTRYMAN and TRAVELLER
CLUBMAN, ESTATE and 1275 GT
VAN, PICK-UP and MOKE
COOPER and COOPER 'S'

WORKSHOP MANUAL

Part No. AKD 4935 (6th Edition)

BRITISH LEYLAND

British Leyland (Austin-Morris) Limited
Service division, Cowley, Oxford, England

DRIVE SHAFTS

Type	Solid shaft, reverse spline.
Make and type of joint	Hardy Spicer, hemispherical joint.

STEERING

Type	Rack and pinion.	
Steering-wheel turns—lock to lock	$2\frac{1}{3}$.	
Steering-wheel diameter	$15\frac{3}{4}$ in. (40 cm.).	
Camber angle	1° positive to 3° positive.	
Castor angle	3°	with vehicle in an unladen condition.
King pin (swivel hub) inclination	9° 30′	
Toe-out	$\frac{1}{16}$ in. (1·6 mm.)	
Lock angle: outer wheel at 20°, inner wheel	23°	

FRONT SUSPENSION

Early models, 1959–1964	Rubber cone spring.
Later models	Hydrolastic displacers.
Fluid capacity	4 pints (5 U.S. pints, 2·27 litres).
Fluid pressure: Early models (unladen)	263 lb./sq. in. (18·49 kg./cm.²).
Later models (unladen)	282 lb./sq. in. (19·74 kg./cm.²).

(Car Nos. given in Section H.10)

REAR SUSPENSION

Type	Rubber cone spring.
Toe-in	$\frac{1}{8}$ in. (3·18 mm.).
Camber	1° positive.
Radius arm bushes (reamed bore)	·8125 to ·8130 in. (20·63 to 20·65 mm.).

HYDRAULIC DAMPERS (Rubber suspension only)

Type: Front and rear	Tubular telescopic.

BRAKES (Up to Chassis Nos. 296256 and 638878)

Lockheed hydraulic	Single-leading shoe.
Drum size	7 in. (17·8 cm.) diameter.
Lining dimensions: Front or rear	6·75 in. × 1·25 in. (17·14 cm. × 3·17 cm.).
Lining area: Front or rear	33·75 sq. in. (217·7 cm.²).
Lining material	Don 202.
Master cylinder bore diameter	$\frac{3}{4}$ in. (19·05 mm.).

Wheel cylinders

Cylinder bore diameter: Front	$\frac{13}{16}$ in. (20·64 mm.).
Rear	$\frac{5}{8}$ in. (15·87 mm.).

MINI-COOPER 'S' MK. I (970 c.c., 1071 c.c., & 1275 c.c.), & COOPER 'S' MK. II & III (1275 c.c.)—*continued*

GUDGEON PIN

Type	Pressed in connecting rod.
Fit in piston	Hand push-fit.
Diameter (outer)	·8123 to ·8125 in. (20·63 to 20·64 mm.).
Fit in connecting rod	·0008 to ·0015 in. (·020 to ·038 mm.) interference.

VALVES AND VALVE GEAR

Valves

Head diameter: Inlet	1·401 to 1·406 in. (35·58 to 35·71 mm.).
Exhaust	1·214 to 1·219 in. (30·83 to 30·96 mm.).
Valve lift	·318 in. (8·08 mm.), nominal.
Stem diameter: Exhaust	·2788 to ·2793 in. (7·08 to 7·09 mm.).
Inlet	·2793 to ·2798 in. (7·09 to 7·11 mm.).
Valve rocker clearance: Standard	·012 in. (·30 mm.) cold.
Competition	·015 in. (·38 mm.) cold.
Timing	·021 in. (·53 mm.).
Inlet valve: Opens	5° B.T.D.C.
Closes	45° A.B.D.C.
Exhaust valve: Opens	51° B.B.D.C.
Closes	21° A.T.D.C.

(Inlet valve: Opens, Closes; Exhaust valve: Opens, Closes) — with ·021 in. (·53 mm.) valve rocker clearance (for checking purposes only).

VALVE SPRINGS

Free length: Inner	1·705 in. (43·31 mm.).
Outer	1·740 in. (44·19 mm.).
Number of working coils: Inner	6¼.
Outer	4½.
Pressure: Inner: Valve closed	26·6 lb. (12·065 kg.).
Valve open	46 lb. (20·865 kg.).
Outer: Valve closed	49·6 lb. (22·498 kg.).
Valve open	94 lb. (42·638 kg.).

CAMSHAFT

Journal diameter: Rear	1·37275 to 1·3735 in. (34·87 to 34·88 mm.).
Inside diameter (reamed in position): Rear	1·3745 to 1·3750 in. (34·91 to 34·92 mm.).
Running clearance: Rear	·001 to ·00225 in. (·025 to ·057 mm.).
Bearing length: Rear	$\frac{48}{64}$ ± ·010 in. (19·45 ± ·25 mm.).

ENGINE LUBRICATION SYSTEM

Oil pressure (normal running)	60 lb./sq. in. (4·22 kg./cm.²) at 70° C. (158° F.) oil temperature.

COOLING SYSTEM

Thermostat setting	82° C. (180° F.).
Cold climates	88° C. (188° F.).
Hot climates	74° C. (165° F.).

FUEL SYSTEM

Carburetter refer to **'TUNING DATA'.**

STEERING

Type	Rack and pinion.
Steering-wheel turns—lock to lock	2·7.
Steering-wheel diameter	15·0 in. (380 mm.).
Front wheel alignment	$\frac{1}{16}$ in. (1·6 mm.) toe-out unladen.

SUSPENSION

Saloon

Type	Hydrolastic suspension.
Fluid capacity	4 pints (5 U.S. pints, 2·27 litres), approx.
*Fluid pressure (unladen)	292 lb./sq. in. (20·6 kg./cm.²), approx.
Trim height: Front and rear	$13\frac{1}{2}\pm\frac{3}{8}$ in. (343±9·5 mm.).

** Adjust to trim height.*

Estate

Type	Rubber cone spring.

HYDRAULIC DAMPERS (Estate car only)

Type: Front and rear	Tubular telescopic.

ELECTRICAL EQUIPMENT

System	12-volt, negative earth.
Charging system	Compensated voltage control.
Battery	Lucas CL7 or CLZ7.
Capacity	34 amp.-hr. at 20-hr. rate.
Dynamo	Lucas C40.
Maximum output	22 amps. at 2,250 r.p.m.
Cut-in speed	1,450 r.p.m. at 13·5 volts.
Control box	Lucas RB106/2.
Cut-out: Cut-in voltage	12·7 to 13·3.
Drop-off voltage	8·5 to 11·0.
Reverse current	5·0 amps. (max.).
Regulator (at 3,000 r.p.m. dynamo speed):	
Open-circuit setting at 20° C. (68° F.)	16·0 to 16·6 volts.
For ambient temperatures other than 20° C. (68° F.) the following allowances should be made to the above setting: For every 10° C. (18° F.) above 20° C. (68° F.) subtract ·1 volt. For every 10° C. (18° F.) below 20° C. (68° F.) add ·1 volt.	
Starter motor	Lucas M35G or M35J.
M35G Type	
Brush spring tension	15 to 25 oz. (425 to 709 gm.).
M35J Type	
Brush spring tension	28 oz. (794 gm.).
Light running current	65 amperes at 8,000–10,000 r.p.m.
Lock torque	7 lb. ft. (·97 kg. m.) with 350–375 amps.
Alternator	Lucas 16ACR.
Nominal output	34 amps. at 6,000 r.p.m.
Nominal system voltage	14·2 volts at 20% nominal output.
Maximum continuous speed	12,500 r.p.m.
Resistance of rotor winding at 20° C. (68° F.)	4·33 ohms±5%.
Brush spring tension	7 to 10 oz. (198 to 283 gm.).

ENGINE TUNING DATA

Model: **MINI Mk. I—Saloon and variants**
—Moke
MINI Mk. II—Saloon and variants
MINI 850—Saloon and variants
} **(848 c.c.)**

Year: **1959–67**
1965–69
1967–69
1969 on

ENGINE

Type: Mk. I and II models	8AM.
850 models	85H.
Capacity	848 cc. (51·7 cu. in.).
Compression ratio	8·3 : 1.
Firing order	1, 3, 4, 2.
Compression pressure	150 lb./sq. in. (10·5 kg./cm.²).
Idling speed	500 r.p.m.
Fast idle speed	900 r.p.m.
Valve rocker clearance	·012 in. (·305 mm.) (cold).
Timing marks	Dimples on timing wheels, marks on flywheel.

Ignition timing:	*Premium fuel distributor*	*Regular (commercial) fuel distributor*
Static	T.D.C.	7° B.T.D.C.
*Stroboscopic at 600 r.p.m.	3° B.T.D.C.	10° B.T.D.C.

* Crankshaft degrees and r.p.m.

DISTRIBUTOR

Make/type: Early type	Lucas DM2.	
Later type	Lucas 25D4.	
Contact breaker gap	·014 to ·016 in. (·35 to ·40 mm.).	
Rotation of rotor	Anti-clockwise.	
Dwell angle	60°±3°.	
Condenser capacity	·18 to ·24 mF.	
Serial number	40768, 41026.	40767, 41007.

Centrifugal advance	*Premium fuel distributor*	*Regular (commercial) fuel distributor*
Decelerating check*†	30° to 34° at 3,400 r.p.m.	22° to 26° at 5,000 r.p.m.
	24° to 28° at 2,500 r.p.m.	15° to 19° at 3,900 r.p.m.
	16° to 20° at 1,300 r.p.m.	1° to 5° at 1,700 r.p.m.
	9° to 15° at 900 r.p.m.	
	1° to 7° at 700 r.p.m.	
No advance below	500 r.p.m.	850 r.p.m.

Vacuum advance		
Starts	7 in. (17·7 cm.) Hg.	5 in. (12·7 cm.) Hg.
Finishes†	10° at 13 in. (33 cm.) Hg.	16° at 11 in. (27·9 cm.) Hg.

* Vacuum pipe disconnected. † Crankshaft degrees and r.p.m.

SPARKING PLUGS

Make	Champion.
Type	N5 or N9Y.
Gap	·025 in. (·625 mm.).

IGNITION COIL

Make/type	Lucas LA12.
Primary resistance at 20° C. (68° F.)	3·2 to 3·4 ohms (cold).
Consumption—ignition on	3·9 amps.

CARBURETTER

Make/type	S.U. Type HS2.
Piston spring	Red.
Jet size	·090 in. (2·29 mm.).
Needle: Standard	EB.
Rich	M.
Weak	GG.

SECTION A

THE ENGINE

† These operations must be followed by an exhaust emission check 

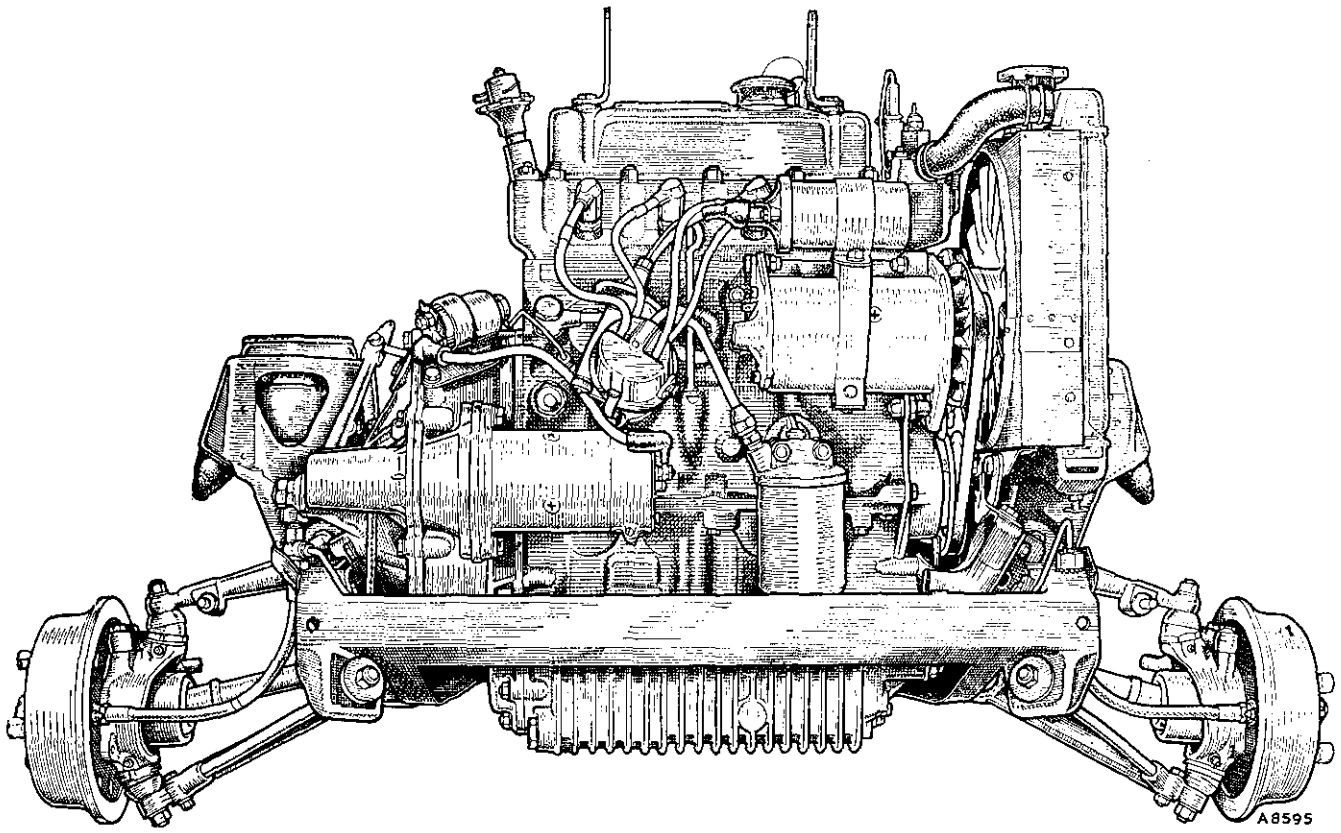


Fig. A.10
The engine and front suspension assembly

Starter ring

If a new starter ring is needed, split the old one with a cold chisel. Clean the bore of the new ring and the mating surface of the flywheel, heat the ring to a temperature of 300 to 400° C. (575 to 752° F.), indicated by a light blue colour, and fit it to the flywheel with the lead of the teeth towards the flywheel register. Allow it to cool naturally.

Refitting

(16) Assemble the clutch.
(17) Lubricate the flywheel oil seal (if fitted).
(18) Ensure that the 'C' washer is correctly positioned and then turn the crankshaft to bring Nos. 1 and 4 pistons to T.D.C.
(19) The crankshaft primary gear splines should be lightly wiped with Duckham's M–B grease.
(20) Clean and dry the crankshaft and flywheel tapers; they must be assembled dry.
(21) Fit the flywheel and clutch assembly to the shaft, replace the washer and retaining screws.
(22) Tighten the screw to the recommended torque (see **'GENERAL DATA'**) and tap over the locking washer.
(23) Refit the clutch thrust plate.
(24) Lower the engine and carry out the removal operations 1 to 8 in reverse order.

Section A.12

ENGINE AND SUB-FRAME ASSEMBLY

Removing

(1) Remove the bonnet, drain the cooling system and remove the front grille.
(2) Disconnect the battery.
(3) Disconnect the electrical connections from the engine.
(4) Disconnect the speedometer cable from the instrument.
(5) Disconnect the heater hoses.
(6) Disconnect the brake pipes at the three-way union.
(7) Use Service tool 18G 1063 and disconnect the steering-rack ball joints.
(8) Disconnect the tie-rod from the cylinder block and swing the rod away from the engine.
(9) *Cooper 'S'*. Detach the servo vacuum pipe from the inlet manifold.
(10) Remove the front hydraulic dampers (fitted to non-Hydrolastic suspension vehicles only).
(11) Remove the exhaust pipe (Section A.3).
(12) Remove the air cleaner and carburetter (Sections A.1 and A.2).
(13) *Cooper and Mk. II models.* Remove the remote control gear-change extension (Section A.32).
(14) Remove the hexagon plug with the anti-rattle spring and plunger from the gear change extension.

(8) Use Service tools 18G 304 with adaptor set 18G 304 N (cadmium-plated) to remove the flywheel.

NOTE.—The black screws from set 18G 304 M must not be used on the diaphragm clutch.

(9) Screw the three adaptor screws into the flywheel and fit the plate of tool 18G 304 over the screws with the retaining nuts screwed on evenly to keep the plate parallel with the flywheel.

(10) Screw the centre bolt of adaptor set 18G 304 N through the plate of tool 18G 304. Hold the flywheel from turning and tighten the centre bolt against the adaptor set plug until the flywheel is released from the crankshaft taper.

(11) Withdraw the flywheel assembly and remove the Service tool.

Inspecting

(12) Inspect the cover for elongation of the driving pin holes.

(13) Inspect the driving pins for ridging and wear; fit three new pins if any are worn.

(14) Inspect the driving straps; fit three new ones if any are worn.

Refitting

(15) If the driving straps have been removed from the flywheel ensure that the spacing washers are fitted between the straps and the flywheel face.

(16) Refer to instruction (6).

(17) Locate the cover and spring assembly with the clutch balance mark 'A' adjacent to the 1/4 timing mark on the flywheel (see Fig. E.2). Fit the driving pins in their original positions, tightening each a turn at a time by diametrical selection to the torque figure given in **'GENERAL DATA'.**

Ensure that the dowel portion of the driving pins has entered the holes in each pair of driving straps. Incorrect assembly can cause 'clutch judder'.

(18) Tighten the flywheel retaining screw to the torque figure given in the **'GENERAL DATA',** tap up the locking washer and refit the clutch cover.

(19) Refit the engine (see Section A.13).

Section A.29

OIL COOLER

(Cooper 'S')

Removing

(1) Remove the front grille, taking care not to lose the spacers used for each securing screw.

(2) Hold each union on the cooler from turning and disconnect both hoses from the cooler unit.

(3) Complete removal of both hoses is effected in this manner—holding each union in turn on the oil filler head and the crankcase whilst releasing the hoses.

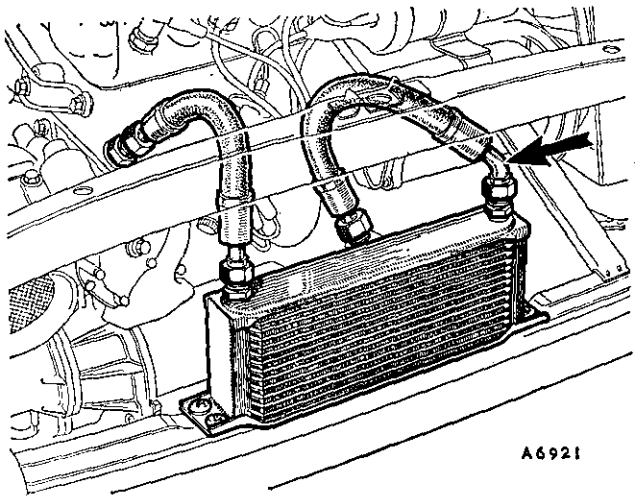


Fig. A.26

The 13 tube oil cooler fitted to the Cooper 'S'. The arrow indicates the angled hose connection

(4) Remove the cooler unit securing screws and remove the unit through the grille aperture.

Refitting

(5) Refit the cooler unit and tighten the securing screws.

(6) Connect each hose to its respective position on the oil cooler. If replacement hoses are fitted connect the hose with the angled connection to the oil cooler with its other end connected to the filter head. Ensure that the hoses are not under stress from twist—hold each union with a spanner whilst tightening the hose connections.

(7) Start and run the engine and check for oil leakage.

(8) Top up the engine oil to the 'MAX' level on the dipstick.

(9) Refit the front grille, see item (1).

Section A.30

PRIMARY GEAR OIL SEAL REPLACEMENT

Removing

(1) Remove the engine as in Section A.13.

(2) Remove the flywheel and clutch, Section A.11 (coil spring type) or Section A.28 (diaphragm spring type).

(3) Remove the primary gear 'C' washer.

(4) Screw the centre bolt of Service tool 18G 1068 securely into the crankshaft.

(5) Pull the primary gear outwards as far as possible. Pass the body of Service tool 18G 1068 over the centre bolt until the groove in the primary gear is visible inside the tool body. Fit the two half collets

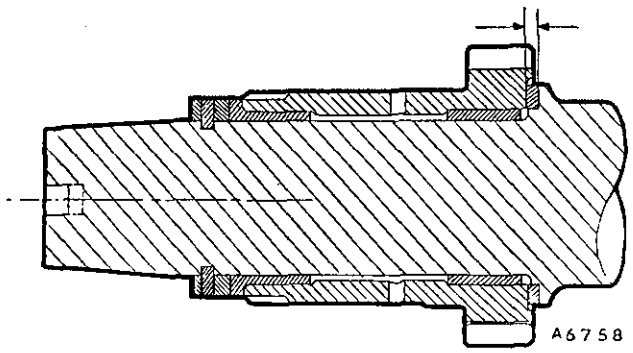


Fig. Aa.12

The converter output gear. Measure the gap indicated and fit the appropriate thrust washer

(19) Refit the transmission to engine oil feed pipe, with the spring beneath the rubber seal and refit the oil filter assembly.

(20) Refit the main oil pump to transmission oil pipe.

(21) Trim off any excess transmission joint from the rear of the unit. Clean the surfaces and fit a new converter housing gasket.

(22) Refit the converter output gear. When refitting, make certain that the correct running clearance of ·0035 to ·0065 in. (·089 to ·165 mm.) is maintained between the inner thrust washer and the converter output gear. If the clearance is outside these limits, select and fit the appropriate washer from the size range, with the chamfered inner edge of the washer to face the crankshaft.

Converter output gear thrust washers

·112 to ·114 in. (2·848 to 2·898 mm.)
·114 to ·116 in. (2·898 to 2·949 mm.)
·116 to ·118 in. (2·949 to 3·0 mm.)
·118 to ·120 in. (3·0 to 3·051 mm.)

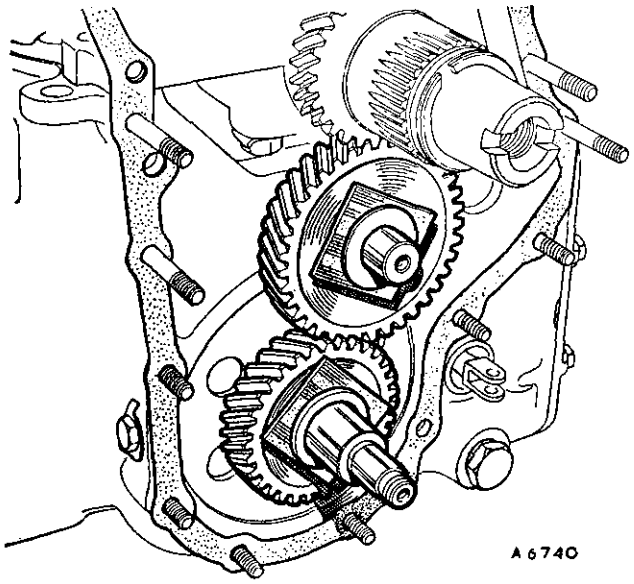


Fig. Aa.13

The idler and input gears fitted with the Service tool, 18G 1089 *(two sets of special washers, each set interposed with a wax washer)*

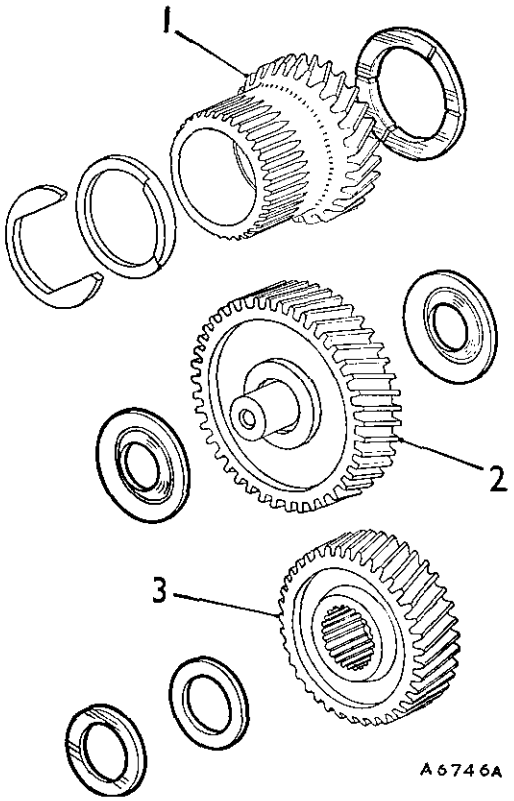


Fig. Aa.14

The converter output (1), *idler* (2), *and input gear* (3) *with their respective thrust washers*

NOTE.—Two types of input gears have been used, those fitted to earlier units have two thrust washers (Fig. Aa.14). The later gear (of increased hub thickness) has a number of thin shims fitted to the outer hub face of the gear for adjustment (see Fig. Aa.19).

Idler and input gear adjustment (Early Models)

(23) Assemble the idler gear to the transmission with a nominal washer (from the range fitted), on the

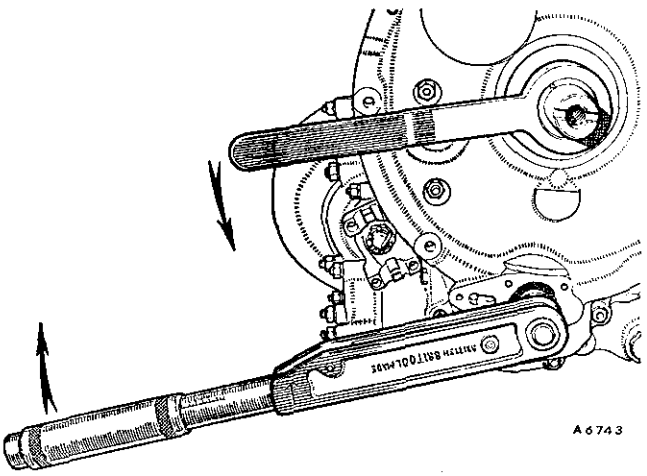


Fig. Aa.15

Using Service tools 18G 1088 *to hold the converter output gear and* 18G 592 *to tighten the input gear nut to the correct torque figure*

SECTION Ba

THE IGNITION SYSTEM

The information in this Section refers specifically to engines fitted with automatic transmission and must be used in conjunction with Section B

† These operations must be followed by an exhaust emission check 

(24) The free end of the spring blade must be deflected away from the rib on the pedestal so that a gap exists between the under-side of the blade and the rib.

(25) Refit the impact washer and the spring to the armature spindle, pass the spindle through the centre of the coil housing and screw it into the trunnion on the inner rocker.

(26) Screw the spindle into the trunnion until a steady pressure on the armature just fails to cause the outer rocker to snap over. Then unscrew the spindle seven holes (for body and coil housing screws).

(27) Position the rollers, fit the body to the coil housing and tighten the securing screws.

(28) Refit the bakelite cap, spring washers, Lucar connector, nut and terminal screws.

(29) Refit the rubber sleeve, and the dust excluders to the inlet and outlet connections.

AUF 201 type pump

This type of pump is fitted to later vehicles. The instructions given for the SP pump apply, with the exception of items (4), (6), and (18); for item (4) substitute instructions (30) and (31).

(30) Unscrew the two screws securing the spring clamp plate which holds the inlet and outlet nozzles. Remove the nozzles, filter and valve assemblies, being careful to note their correct positions for replacement.

Rocker finger settings (AUF 201)

(31) After reassembly the spring blade of the contacts should rest against the ridge of the pedestal mounting when the outer rocker is pressed onto the coil housing and a gap of ·030 in. (·76 mm.) should exist between the points. When the outer rocker is released the spring blade should be deflected away from the ridge. If necessary, set the blade and/or rocker fingers to achieve this position.

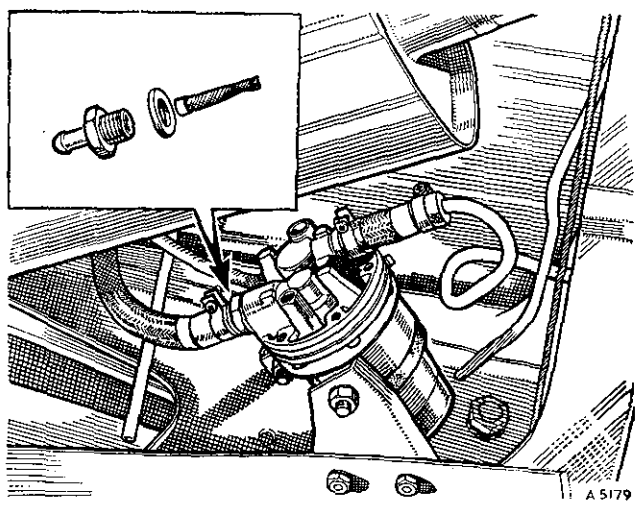


Fig. D.4

The SP-type fuel pump

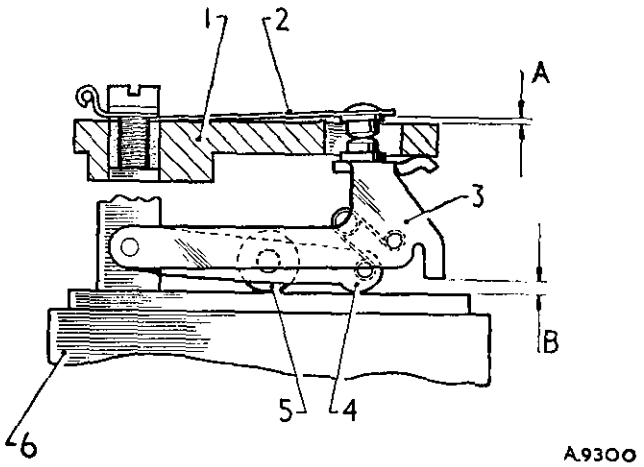


Fig. D.5

The rocker finger settings

A. ·035 in ± ·005 in. (·89 mm. ± ·12 mm.).
B. ·070 in. ± ·005 in. (1·78 mm. ± ·12 mm.).
1. Pedestal.
2. Contact blade.
3. Outer rocker.
4. Inner rocker.
5. Trunnion.
6. Coil housing.

Section D.5

FUEL PUMP TESTING

(1) Fit the SP adaptor set to a test rig, and a cut-away cap to the pump. Connect the pump to a 12-volt battery with a voltmeter and resistance in circuit.

Priming

(2) The pump should prime from dry in 10 to 15 seconds and the paraffin (kerosene) should rise in the glass container until it runs from the overflow drain pipe. If the level does not rise above the small hole in the drain pipe, the pump is faulty. Initial air bubbles should cease after a minute or two; if they do not, there is an air leak on the suction side.

Valves

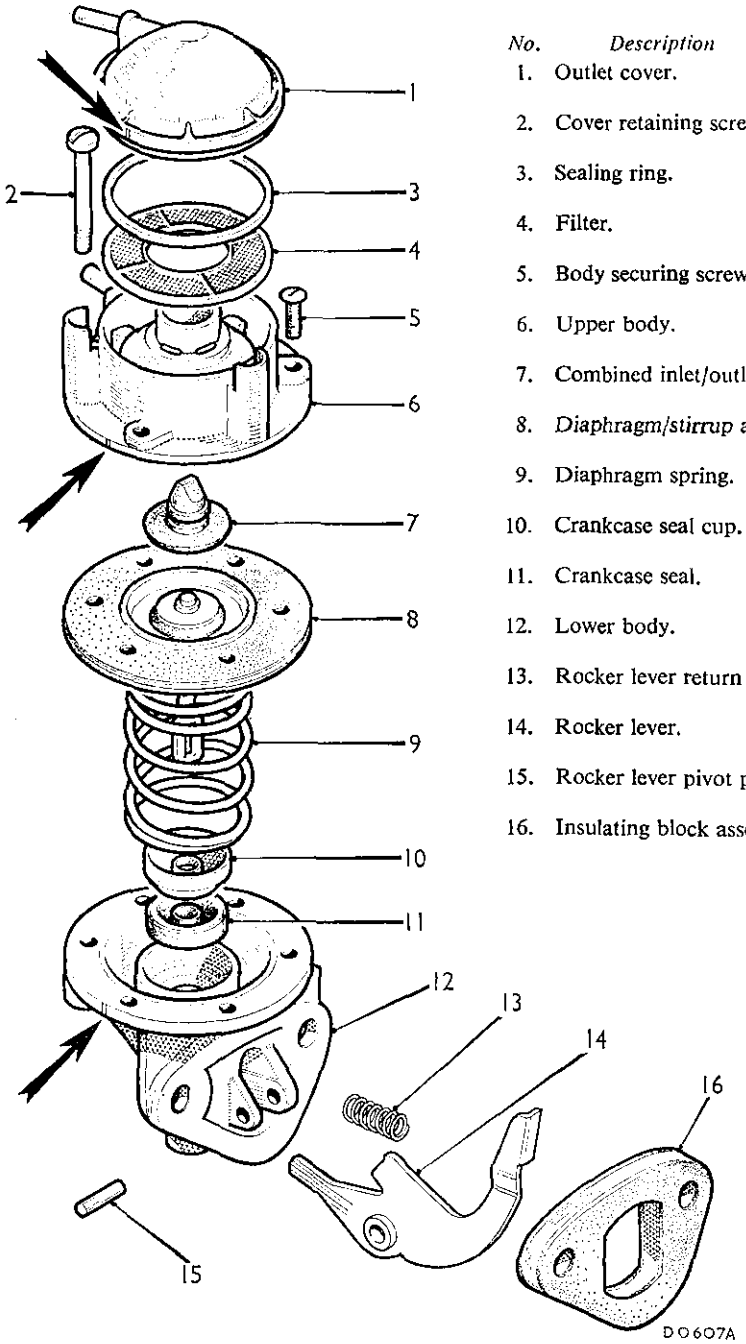
(3) Run the pump for about 10 minutes and turn off the fuel tap. If the pump beats within 12 seconds, the inlet valve is not seating correctly.

Minimum delivery

(4) Partly open the fuel tap and gradually depress the spring blade to reduce the stroke. The pump should continue working with increasing frequency until it stops owing to the lack of a gap between the points.

Reduced voltage

(5) The pump should work satisfactorily at a minimum of 9·5 volts.



No.	Description
1.	Outlet cover.
2.	Cover retaining screws.
3.	Sealing ring.
4.	Filter.
5.	Body securing screws.
6.	Upper body.
7.	Combined inlet/outlet valve.
8.	*Diaphragm/stirrup assembly.*
9.	Diaphragm spring.
10.	Crankcase seal cup.
11.	Crankcase seal.
12.	Lower body.
13.	Rocker lever return spring.
14.	Rocker lever.
15.	Rocker lever pivot pin.
16.	Insulating block assembly.

Fig. Db.2

The fuel pump components. Mark the components (arrowed) for correct reassembly

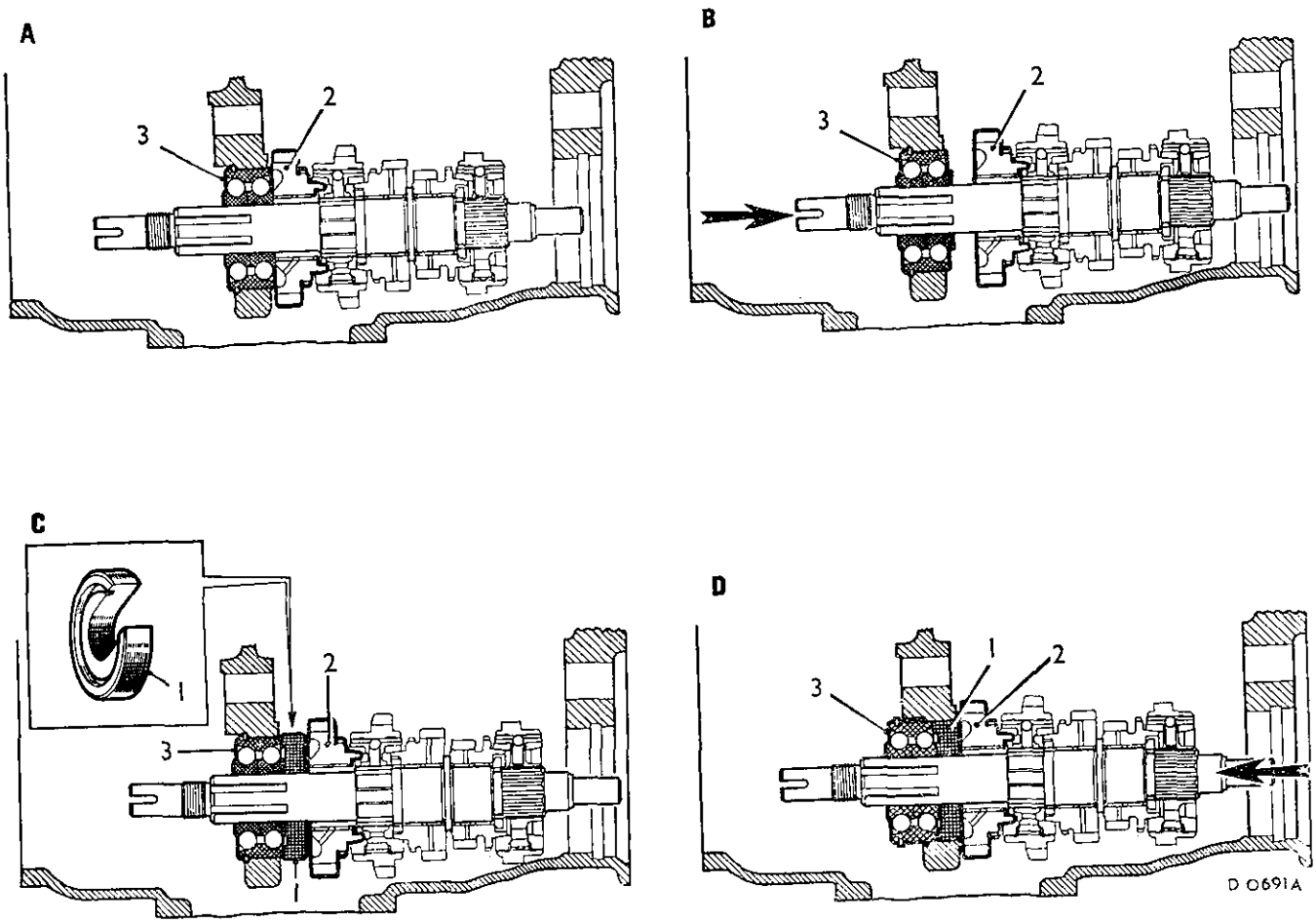


Fig. F.2

Removing the third motion shaft bearing

(18) Refer to Fig. F.2. Drift the third motion shaft backwards, as indicated by the arrow in (B), until a special Service tool (1) can be placed between the first speed gear (2) and the bearing (3), as illustrated in (C). On three-speed synchromesh gearboxes use 18G 613, and on four-speed units 18G 1127 with their relieved side towards the bearing. These two tools must not be interchanged, or the bearing or casing will be damaged. Drift the third motion shaft forward as illustrated in (D), to push the bearing (3) from the web, taking care not to damage the selector forks. Pull the bearing from the shaft, and lift the shaft from the casing.

(19) Remove the strainer assembly.

(20) Withdraw the reverse shaft, gear and selector fork.

The following operations are only necessary if complete stripping of the casing is required.

(21) Unscrew the selector shaft/fork locking screws and withdraw the shafts and forks.

(22) Remove the circlip from the reverse gear shifter lever pivot pin and remove the lever.

Reassembling

(23) If the gearbox has been completely stripped, first refit the reverse gear shifter lever and pivot pin. Push in the selector rods from the front of the casing, engage them with the selector forks, tighten the selector screws, and secure the lock nuts.

(24) Position the reverse gear and fork, and refit the reverse shaft, with the plain end foremost.

(25) Refit the oil strainer and smear some grease onto the sealing ring to assist when fitting the oil suction pipe.

(26) Refer to item (18). Refit the third motion shaft assembly with the slotted end passing through the centre web of the casing. Engage the sliding hubs with the selector forks.

(27) Refer to item (17). Drift the first motion shaft and bearing assembly into the casing using Service tool 18G 579 (modified).

Use Service tool 18G 569 to gauge the correct thickness of circlip required to retain the bearing assembly. Try the thicker side of the gauge first; the two sizes are marked on the handle. Refer to

The regulator valve controls the main line pressure, a secondary piston on the valve boosts this pressure when reverse is selected.

The governor valve movement is controlled by the mechanical governor and it directs the oil flow to the appropriate clutch or servo for automatic gear-shifts.

The relay valves are used for shifts from second to third and third to top. They enable the clutch or servo required to be supplied either from the selector valve in 'manual' control or the governor valve in 'automatic'. In addition, pistons are fitted in front of the second and third relay valves to ensure that on up-shifts the engagement of the new ratio and release of the old occur simultaneously to prevent engine overspeeding between shifts. A relay valve is not required for the first gear as the torque reaction is controlled mechanically by a one-way clutch.

The tow-start valve short-circuits the auxiliary pump under all normal driving conditions but supplies the required line pressure for tow-starting. Immediately the engine starts the main pump automatically takes over.

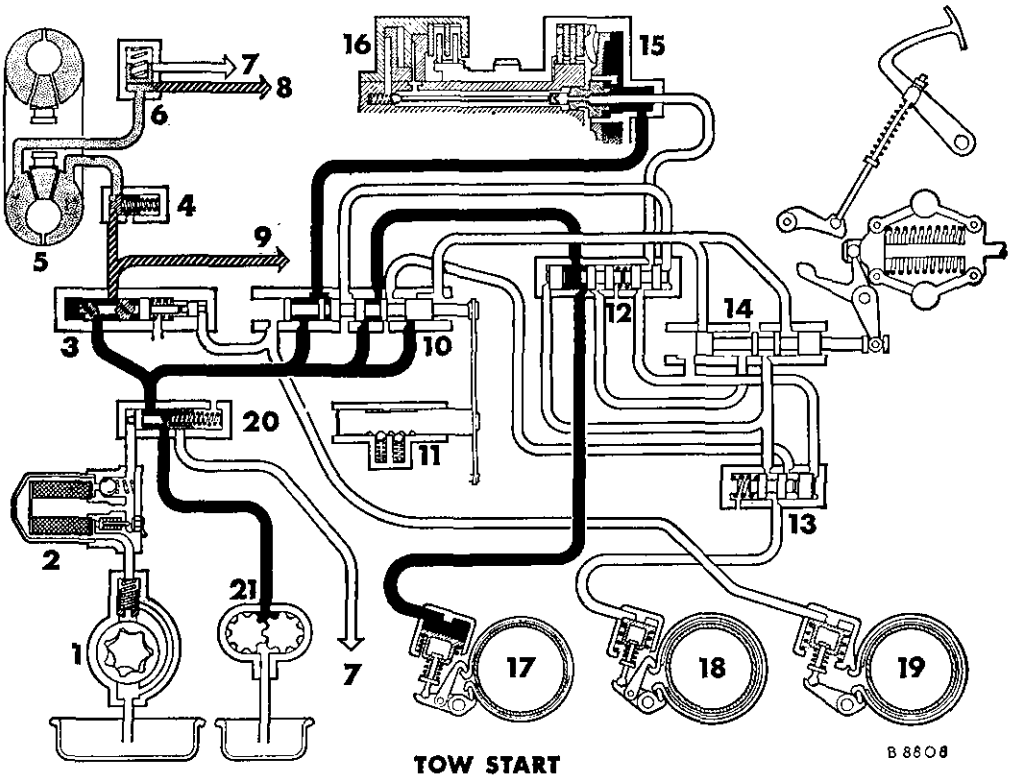
The low-pressure valve

This valve controls the pressure in the converter to 30 lb./sq. in. (2·1 kg./cm.^{2}). When the engine is stopped the valve is seated, preventing the converter draining. This avoids difficulties in checking the combined engine/transmission oil level and prevents a noisy and inefficient converter when restarting the engine.

The auxiliary pump

This unit is used for tow-starting. It is of limited capacity and is responsive to road speed only.

LINE PRESSURE AND LUBRICATION DIAGRAMS



TOW START

KEY TO DIAGRAM

1. Main oil pump
2. Oil filter.
3. Regulator valve.
4. Engine lubrication relief valve.
5. Converter.
6. Low pressure valve.
7. Engine lubrication.
8. Gear train lubrication.
9. Engine lubrication.
10. Selector valve.
11. Selector valve detent.
12. Second and top gear valves.
13. Third gear valve.
14. Governor valve.
15. Forward clutch.
16. Top and reverse clutch
17. Second gear brake band.
18. Third gear brake band.
19. Reverse gear brake band.
20. Tow start valve.
21. Auxiliary pump.

Line pressure.

Lubrication.

Exhaust.

Converter pressure.

A6898

(39) Refit the top and reverse clutch hub washer and the Torrington needle thrust bearing into position with grease.

(40) Ensure that the top and reverse clutch friction plates are free to drop before refitting the gear train assembly into the transmission. Correctly position the second, third, and reverse gear bands in the case and refit the gear train, using hand pressure only to push it into position. Quick rotation of the input gear will assist in engaging the top and reverse clutch friction plates. When correctly reassembled the dowel bolt will engage easily in the freewheel support (Fig. Fa.11).

(41) Refit the dowel bolt with a new lock washer.

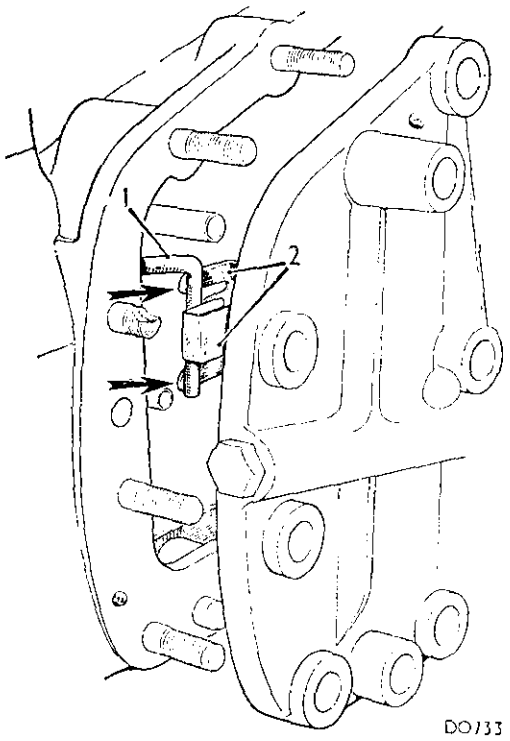


Fig. Fa.21

Engaging the valve block linkage (1) *with the spring clip drive mechanism* (2) *of the later-type governor*

(42) Screw the gear change selector rod fully into the valve block linkage. Check and reset if necessary the selector rod adjustment (see Section Fa.2).

(43) Adjust the second, third, and reverse servos (see Fig. Fa.23). Slacken the locknut (1) and the spherical adjuster (2) until each brake band (3) is in contact with the transmission casing stops (4). Adjust each adjuster (2) until the clearance 'A' is obtained, and tighten the locking nut (1).

(44) Fit a new seal to the front cover bobbin, and refit the cover using a new joint washer.

On early units the front cover connecting bobbin can be removed and requires two oil seals.

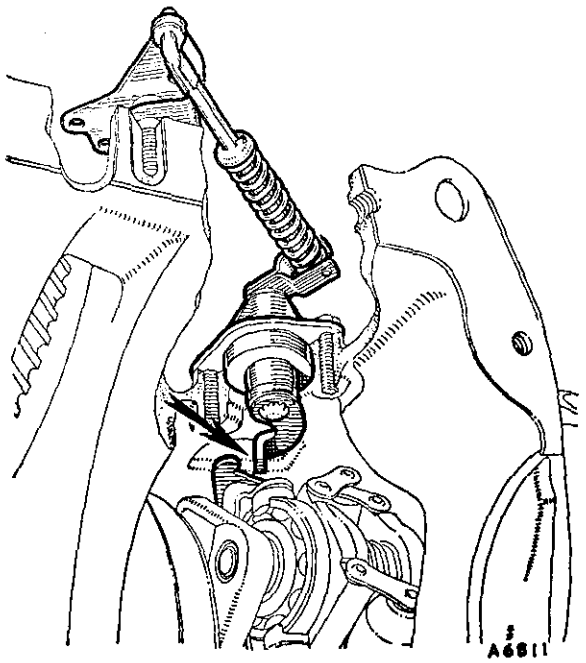


Fig. Fa.22

The correct position of the kick-down rod assembly

(45) Refit the main oil strainer and pick-up pipe using new seals (if these items were removed), see item (2*a*).

(46) Refit the differential assembly as detailed in Section Fa.9.

(47) Refit the engine to the transmission as detailed in Section Aa.4 (if removed see item (2*a*)).

(48) Refit the converter and components removed in item (2*b*).

(49) Refit the engine/transmission unit to the car as detailed in Section Aa.3.

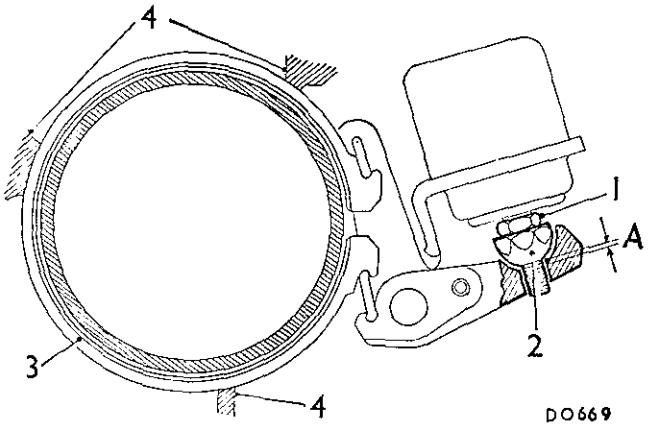


Fig. Fa.23

The servo unit band adjustment

A = ·040 to ·080 in. (1·02 to 2·03 mm.)

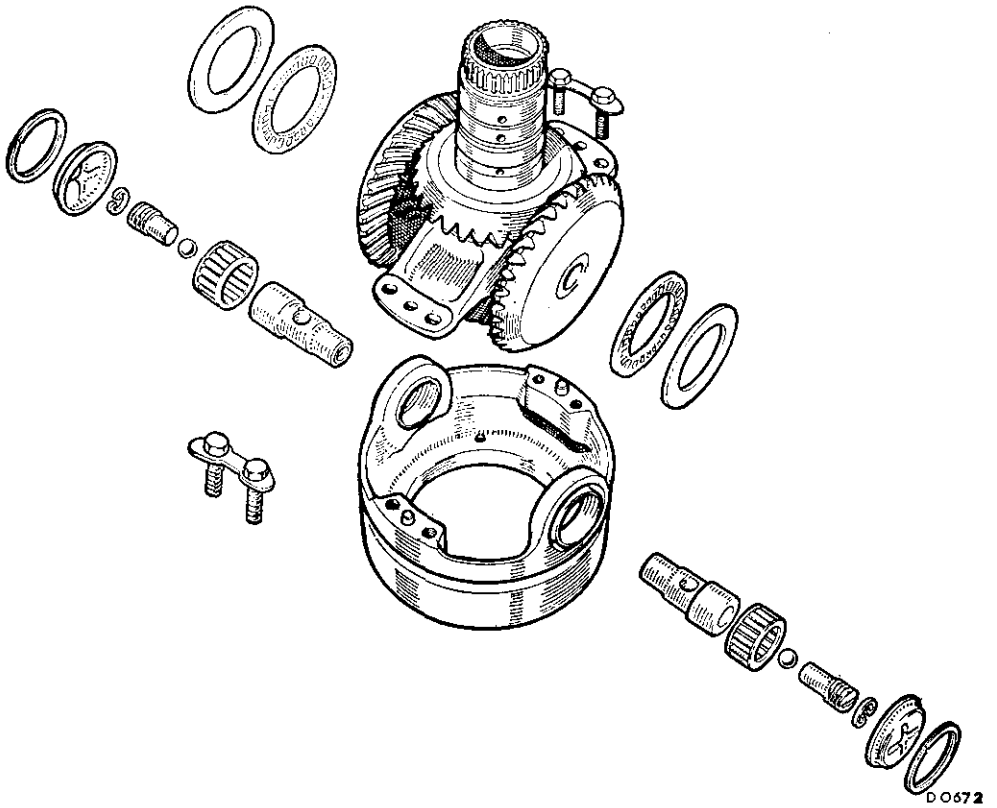


Fig. Fa.43

The later-type gear train, with the forward and reverse output gears and the planetary gears removed from the carrier

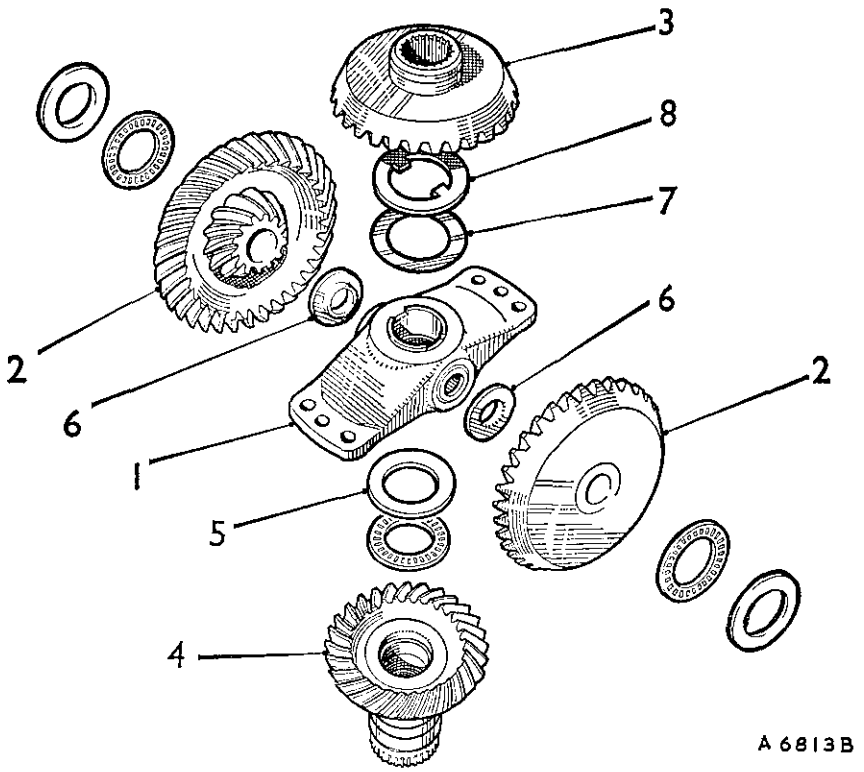


Fig. Fa.44

A dismantled view of the later-type gear train assembly

1. Gear carrier.
2. Planetary gears.
3. Forward output gear.
4. Reverse output gear.
5. Steel washer (reverse output gear).
6. Planetary gear washers.
7. Steel shim (forward output gear).
8. Bi-metal washer (forward output gear).

SECTION G

THE DRIVE SHAFTS

SECTION H

THE REAR SUSPENSION

SECTION J

THE STEERING

Section K.3

SWIVEL HUB BALL JOINTS

Removing

●(1) Compress the rubber spring unit as detailed in Section K.1 or depressurize the Hydrolastic system, see Section H.7.

(2) Carry out operations (1), (2) and (4) in Section K.2.

(3) Fit Service tool 18G 304 with adaptor bolts 18G 304 F to the wheel hub studs, ensure that the swivel hub is free of the upper and lower suspension arms and extract the hub from the drive shaft.

Dismantling

(4) Remove the Service tool and secure the swivel hub assembly firmly in a vice.

(5) Remove the ball housing dust seal and lubricator.

(6) Tap back the lock washer and unscrew the upper ball pin retainer using Service tool 18G 587.

(7) Repeat operation (6) on the lower ball joint noting the spring fitted under the ball pin seat.

(8) Clean and examine the components and fit replacements as necessary.

Adjusting

(9) Reassemble the upper ball pin assembly; refit the ball pin seat, pin and retainer without the packing shims and locking washer.

(10) Screw down the ball pin retainer until there is no free movement between the ball pin and its seating. Measure the gap between the retainer and the swivel hub, see Fig. K.6.

(11) Note that the thickness of a new locking washer is ·036 in (·9 mm.); deduct this figure from the gap measurement taken in operation (10) to obtain the correct thickness of shims required.
The final assembly must have no nip to ·003 in. (·7 mm.) end-float, add a further shim if necessary to obtain the correct adjustment.

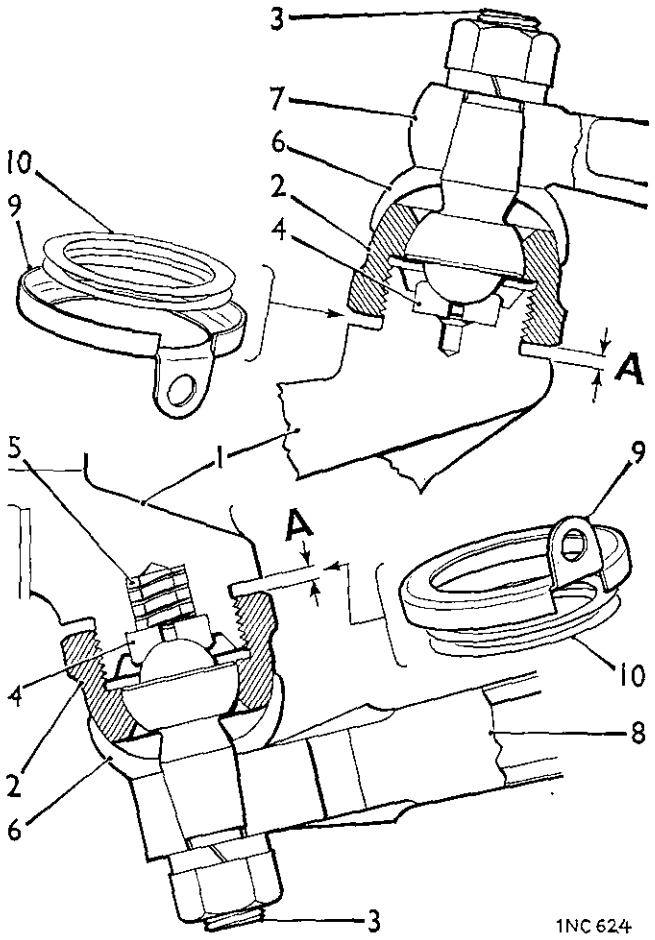
(12) Pack the joint with grease and refit the assembly complete with shims and a new locking washer to the hub.

(13) Tighten the ball pin retainer with Service tool 18G 372 and adaptor 18G 587 to the torque figure given in **'GENERAL DATA'.**

(14) Repeat operations (9) to (13) for the lower ball pin, except that the spring fitted in the lower assembly must be removed when taking the gap measurement as detailed in operation (10) and refitted under the ball pin seating on final assembly.

(15) Tap up the locking washer against three flats of the ball pin retainer, (one flat must be adjacent to the brake disc on disc brake models).

(16) Fit new ball pin dust seals if required.



●*Fig. K.6*

A section through the swivel hub ball joints. 'A' indicates the gap measured for shim adjustment

1. Hub assembly.
2. Ball pin retainer.
3. Ball pin.
4. Ball pin seat.
5. Seat spring (lower assembly only).
6. Dust seal.
7. Suspension upper arm.
8. Suspension lower arm.
9. Locking washer } fitted on final assembly.●
10. Shims }

Refitting

(17) Refitting is a reversal of the removing procedure, tighten the upper and lower ball pin nuts to the torque figure given in **'GENERAL DATA'.**

(18) Tighten the drive shaft nut to the correct torque figure, see **'GENERAL DATA'** for the particular model application.

(19) Release the rubber spring unit from compression as detailed in Section K.1, operation (9); or pressurize the Hydrolastic system as detailed in Section H.7.

(20) Tighten the brake pipe connection and bleed the braking system (Section M.8).

(21) **Disc brake models.** Refit the brake calliper.

(22) Refit the road wheel and lower the car.●

Refitting

(7) Refit the inner bearing race (if extracted).

(8) Fit the new seal and apply a suitable amount of lubricant to the lip to prevent burning.

(9) Insert the outer bearing distance piece into the seal with the chamfered bore to the outside.

(10) Assemble the drive flange to the hub, drifting it into position gently, turning the flange 180 degrees several times to align the bearing distance piece with the flange boss.

(11) Refit the brake-drum.

(12) Refit the drive shaft washer, chamfered bore facing inward and replace the nut.

(13) Tighten the shaft nut to the torque figure given in **'GENERAL DATA'** and secure with the split pin.

(3) Unscrew the two bolts securing the calliper to the hub, detach both parts of the dust cover and remove the calliper without disconnecting the brake pipe.

(4) Withdraw the pads.

(5) Clean the outside of the calliper.

(6) Clamp the piston in the mounting half of the calliper.

(7) Apply the brake pedal gently to force the other piston from the calliper.

(8) Withdraw the fluid seal and the dust seal.

Reassembling

(9) Coat a new fluid seal with Lockheed Disc Brake Lubricant and then ease it into its groove.

(10) Slacken the bleeder screw one complete turn.

(11) Coat the piston with Lockheed Disc Brake Lubricant, insert it into the bore with the cut-away face facing upwards and press it in with Service tool 18G 672 until about $\frac{5}{16}$ in. (8 mm.) remains protruding.

(12) Coat a new, dry dust seal with Lockheed Disc Brake Lubricant, fit it to the retainer and position the seal and retainer on the protruding part of the piston with the seal innermost.

(13) Press home the piston and seal.

(14) Retighten the bleeder screw.

(15) Clamp the piston in the rim half of the calliper and then repeat instructions (7) to (12).

(16) Disconnect the hose and then repeat (13) and (14).

(17) Reconnect the hose and refit the calliper and the two parts of the dust cover to the hub.

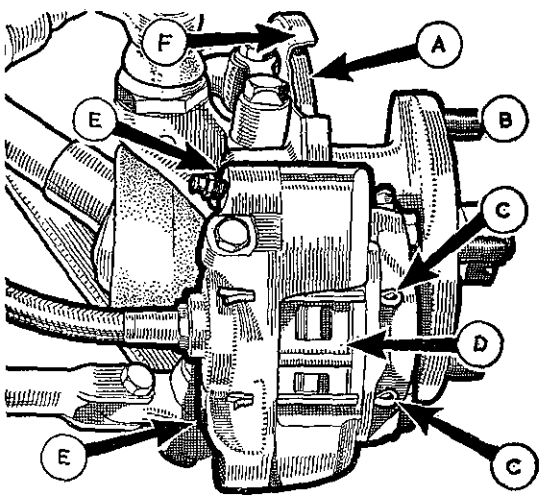


Fig. M.7

The disc brake assembly

A. Brake disc.
C. Split pins.
D. Pad retaining spring.
E. Calliper mounting bolts.
F. Dust cover.

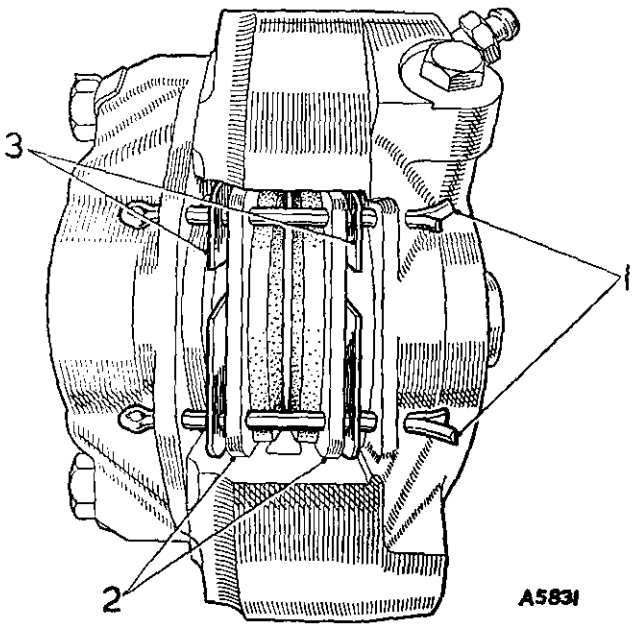


Fig. M.8

The modified calliper assembly

1. Pad-retaining split pins.
2. Brake pads.
3. Anti-squeak shims.

(18) Refit the dust cover locking plate.

(19) Reconnect the tie-rod.

(20) Tighten the calliper mounting bolts.

(21) Fit the pads.

(22) Bleed the brakes.

(23) Apply the brakes several times to adjust.

Section M.8

BLEEDING

(1) Adjust the brakes.

(2) Slacken the bleeder screw on the intensifier (COOPER, when fitted) and pump the pedal until fluid comes out free from air.

(3) Tighten the bleeder screw and top up the master cylinder.

(4) Bleed the wheel cylinders. (Remove the front wheels—early COOPER).

Section M.9

VACUUM SERVO (Cooper 'S')

Removing

(1) Disconnect the heater hose from the grille, release the clip retaining the hose to the slave cylinder and secure the hose out of the way.

(2) Disconnect the hydraulic pipes from the slave cylinder, and plug the open ends of the pipes.

Servo cylinder assembly

(17) Grip the slave cylinder in a soft-jawed vice, position the mounting face joint washer and refit the servo shell. After correctly positioning the abutment plate and locking plate, which must be renewed if it has been used more than once previously, tighten the three bolts evenly to the torque figure given in **'GENERAL DATA'** and tap up the locking plate tabs.

(18) Pull out the push-rod to its limit, fit the main return spring followed by the diaphragm support, with its key slot facing upwards. Make sure that the two end coils are located round the abutment plate and support boss respectively. Press the support into the shell until the groove in the end of the push-rod aligns with the key slot, and insert the key.

Ensure that both the rubber diaphragm and its support are perfectly dry and then fit the diaphragm to the support. Gently stretch the diaphragm to seat its inner edge in the groove of the support.

(19) Smear the outer edge of the rubber diaphragm with Lockheed Disc Brake Lubricant where it will contact the rim of the end cover and of the shell, and position the diaphragm evenly around the rim of the shell.

(20) Position the end cover with the shell so that the elbow is in alignment with the air valve and secure the two parts with the clamping ring.
Early units. Using Service tool C 2030* secured to the end cover, turn it clockwise as far as the stops will allow whilst maintaining downward pressure on the end cover. Take care not to trap the edge of the rubber diaphragm; remove the Service tool.

(21) Push in the non-return valve with its rubber mounting.

Air valve assembly (*Fig. Mb.2*)

(22) Using only the fingers, fit the rubber cup to the spigot of the air valve piston, with the lips pointing away from the drilled head, and insert the piston into its bore, spigot end first. Do not bend over the lips of the cup.

(23) Fit the valve housing, with its joint washer, to the mounting face of the slave cylinder and tighten the three securing screws to the torque figure given in **'GENERAL DATA'.**

(24) Insert the spigot of the diaphragm support into the drilled head of the air valve piston, and then fit the inner edge of the air valve diaphragm into the groove of its support and align the screw hole slots. Do not use any lubricant.

(25) Refit or replace the filter and snap-fit the dome cover if these have been removed in item (6). Place the valve cover over the diaphragm making sure that the projections on the under surface of the cover engage in the slots of the diaphragm. Tighten the five securing screws firmly, progressively and diametrically; do not overtighten, since the smallest air leakage into the air valve assembly will impair the action of the servo.

(26) Refit the rubber pipe to join the end cover elbow to the valve cover port.

Refitting

(27) Reverse the removing procedure, items (1) to (4).

(28) Bleed the braking system (Section Mb.5), using a recommended brake fluid, see **'GENERAL DATA'.**
Fluid drained from the system or that used for bleeding should be discarded.

*Obtainable from V. L. Churchill & Co. Ltd.

Section Mb.2

INERTIA VALVE
(Split braking system)

An inertia valve is fitted in the fluid line to the rear brakes; it replaces the pressure regulating valve described in Section M.5 and is similarly located on the rear sub-frame cross-member.

The angle at which the assembly is mounted allows the steel ball inside the body to hold the valve in the open position, so that fluid may pass to the rear brakes. When braking heavily, the weight transfer to the front of the vehicle causes the ball to move away from the valve, which is then closed by a light spring. Thus further pressure is prevented from reaching the rear brakes, and all additional pressure is transferred to the front brakes.

Removing

(1) Remove, and then plug the ends of, the hydraulic brake pipes.

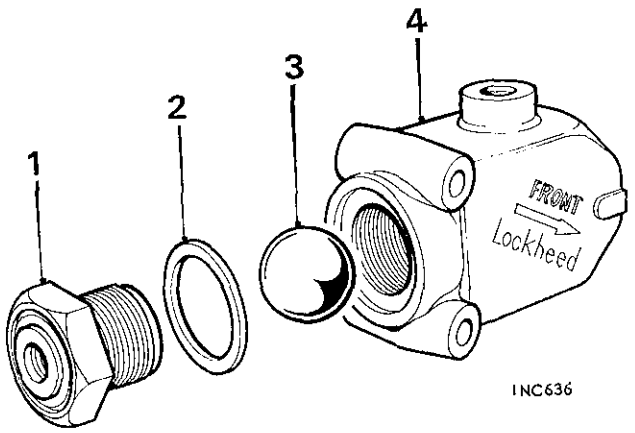


Fig. Mb.5
The inertia valve assembly components

1. Valve sub-assembly.
2. Copper washer.
3. Steel ball.
4. Valve body.

SECTION N

THE ELECTRICAL SYSTEM

KEY TO WIRING DIAGRAM

No.	Description
1.	Dynamo.
2.	Control box.
3.	12-volt battery.
4.	Starter solenoid.
5.	Starter motor.
6.	Lighting switch.
7.	Headlamp dip switch.
8.	R.H. headlamp.
9.	L.H. headlamp.
10.	Main-beam warning lamp.
11.	R.H. sidelamp.
12.	L.H. sidelamp.
14.	Panel lamps.
15.	Number-plate illumination lamp.
16.	R.H. stop and tail lamp.
17.	L.H. stop and tail lamp.
18.	Stop lamp switch.
19.	Two-way fuse unit: 1–2, 35 amp.; 3–4, 35 amp.
23.	Horn.
24.	Horn-push.
25.	Flasher unit.
26.	Direction indicator switch.
27.	Direction indicator warning lamp.
28.	R.H. front flasher lamp.
29.	L.H. front flasher lamp.
30.	R.H. rear flasher lamp.
31.	L.H. rear flasher lamp.
34.	Fuel gauge.
35.	Fuel gauge tank unit.
36.	Windscreen wiper switch.
37.	Windscreen wiper motor.
38.	Ignition starter switch.
39.	Ignition coil.
40.	Distributor.
41.	Fuel pump.
42.	Oil pressure switch.
43.	Oil pressure warning lamp.
44.	Ignition warning lamp.
45.	Speedometer.
64.	Bi-metal instrument voltage stabilizer.
83.	Induction heater and thermostat.
84.	Suction chamber heater.
94.	Oil filter switch.
105.	Oil filter warning lamp.

CABLE COLOUR CODE

B.	Black.	G.	Green.	W.	White.
U.	Blue.	P.	Purple.	Y.	Yellow.
N.	Brown.	R.	Red.	L.G.	Light Green.

When a cable has two colour code letters the first denotes the main colour and the second denotes the tracer colour.

(5) Turn the voltage adjustment screw (1) (Fig. N.3), in a clockwise direction to raise the voltage and anti-clockwise to lower it. Turn only a fraction of a turn at a time. This adjustment should be completed within 30 seconds or the settings will be affected by heat. Do not run the dynamo at a higher speed than is necessary for the adjustment to be made.

Mechanical

(6) Slacken the fixed contact and voltage adjusting screws until they are clear of the moving contact and the tension spring respectively. Slacken the two armature assembly securing screws.

(7) Insert a ·021 in. (·53 mm.) feeler gauge between the armature and the core shim. Press the armature squarely down against the gauge and tighten the armature assembly securing screws.

(8) With the gauge still in position, screw the adjustable contact down until it just touches the armature contact. Tighten the locking nut.

(9) Reset the voltage adjusting screw as in item (5).

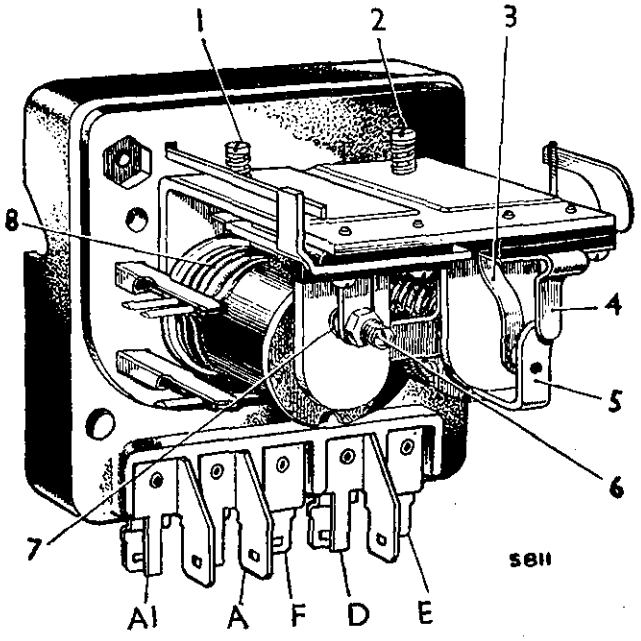


Fig. N.3

The control box

1. Regulator adjusting screw.
2. Cut-out adjusting screw.
3. Fixed contact blade.
4. Stop arm.
5. Armature tongue and moving contact.
6. Regulator fixed contact screw.
7. Regulator moving contact.
8. Regulator series windings.

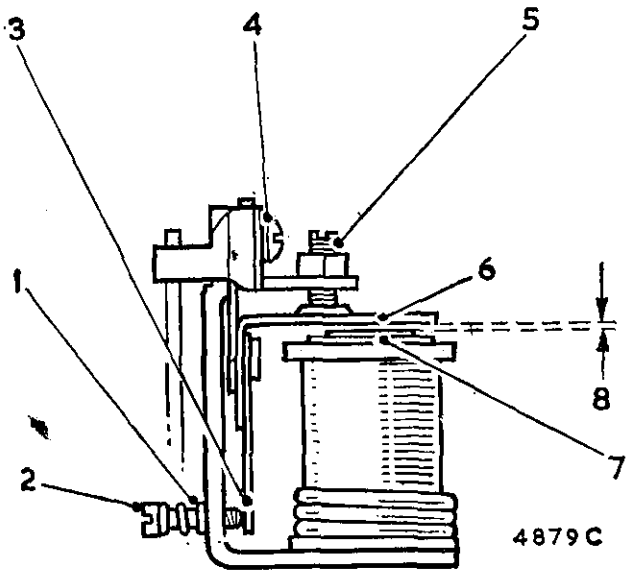


Fig. N.4

Mechanical setting of the regulator

1. Locknut.
2. Voltage adjusting screw.
3. Armature tension spring.
4. Armature securing screws.
5. Fixed contact adjustment screw.
6. Armature.
7. Core face and shim.
8. ·021 in. (·533 mm.).

Section N.5

CUT-OUT

Adjustment

Electrical

(1) To check, connect the voltmeter between terminals 'D' and 'E'. Start the engine and slowly increase the speed until the contacts close; this should occur at 12·7 to 13·3 volts.

(2) To adjust, turn the adjusting screw clockwise to raise the voltage and anti-clockwise to reduce it. Turn only a fraction at a time. Make the adjustments as quickly as possible to avoid temperature effects.

Mechanical

(3) Unscrew the cut-out adjusting screw until it is clear of the armature tension spring. Slacken the armature securing screws.

(4) Press the armature down against the copper-sprayed core and tighten the securing screws.

(5) Bend the armature stop arm until the gap between it and the tongue is ·030 in. (·76 mm.) when the armature is pressed squarely against the core face (8) (Fig. N.6).

(6) Bend the fixed contact blade so that there is a gap of ·010 to ·020 in. (·25 to ·50 mm.) between the contact points when the armature is free.

(7) Reset the cut-out adjusting screw.

SECTION Nb

THE ELECTRICAL SYSTEM

The information contained in this section refers specifically to new or modified components fitted to the Mini range coincident with the introduction of NEGATIVE earth electrical systems and must be used in conjunction with Section N.

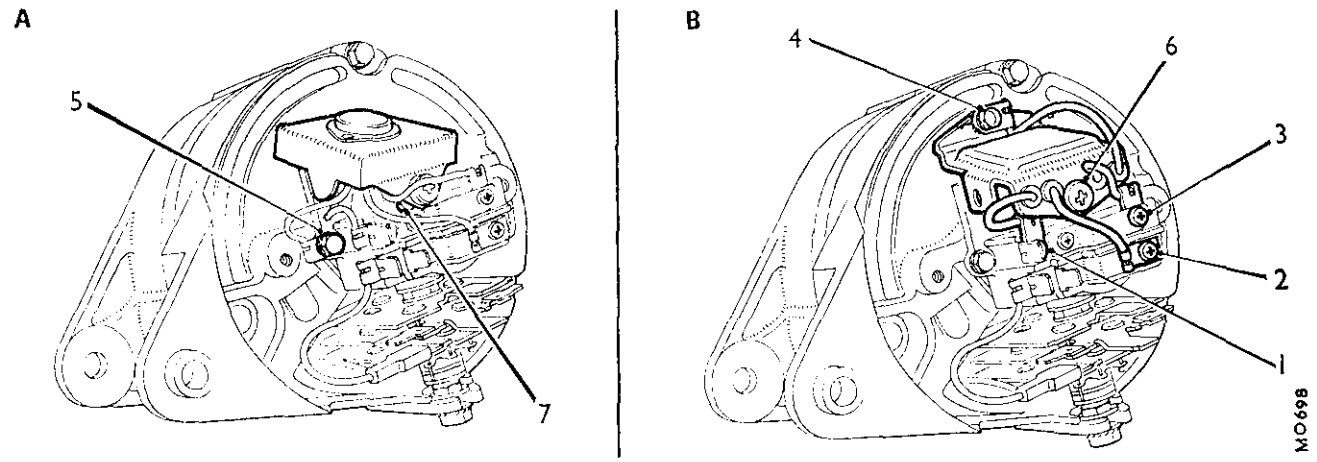


Fig. Nb.12

The in-built regulator connections, showing 'A' the 11TR and 'B' the 8TR type of regulator unit

1. B+.
2. Positive (+).
3. Field (F).
4. Earth (−)—8TR.
5. Earth (−)—11TR.
6. Mounting screw—8TR.
7. Long mounting screw and spacer—11TR.

(4) Switch on the ignition and connect up a voltmeter with its negative lead to earth and with its positive lead to each cable connector blade of the two connector blocks in turn. If battery voltage is not available at any cable, locate and remedy the fault.

(5) Remove the alternator end cover.

(6) The leads from the in-built regulator to the alternator are unmarked. Refer to Fig. Nb.12 and then bridge the regulator field connector to a suitable earth, such as the earth-lead tag.

(7) Refit the three-way connector block to the alternator. Do not refit the two-way connector block, instead, connect an ammeter in series with its positive blade and the main positive output terminal of the alternator. Do not make any connection to the inner (negative) main terminal.

(8) Start the engine and run it at 2,800 r.p.m. The ammeter should read 34 amps. nominal. If the correct alternator output cannot be obtained, repair or replace the alternator.

Regulator test

(9) Disconnect the lead which was connected up in item (6) to bridge the regulator field connector to earth.

(10) Connect a voltmeter across the battery terminals. Start the engine and run it at 2,800 r.p.m. If the ammeter which was connected for item (7) of the output test reads zero, the regulator pack must be replaced.

(11) Adjust the engine speed until the ammeter reading falls below 10 amps. The voltmeter should read between 14·0 and 14·4 volts. If it does not, either the regulator is faulty or there is a high resistance in the charging circuit cables; restore the original connections to the alternator and then check the charging circuit resistance.

Charging circuit resistance test

(12) Connect a voltmeter between the positive terminal of the alternator and the positive terminal of the battery. Start the engine, switch on the headlamps, and run the engine at 2,800 r.p.m. The voltmeter reading should not exceed ·5 volt.

(13) Transfer the voltmeter connections to the negative terminals of the alternator and battery. With the engine running at 2,800 r.p.m. the voltmeter reading should not exceed ·25 volt.

(14) If either of the readings in (12) and (13) exceed the voltage stated, the charging circuit has developed a high-resistance fault, which must be traced and remedied.

If this test is satisfactory, then the incorrect voltage reading obtained in (11) would have been caused by a faulty regulator pack, so the alternator must either be replaced or removed for overhaul.

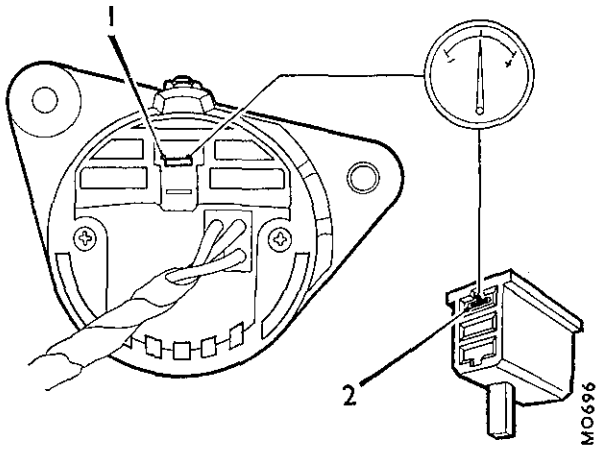


Fig. Nb.13

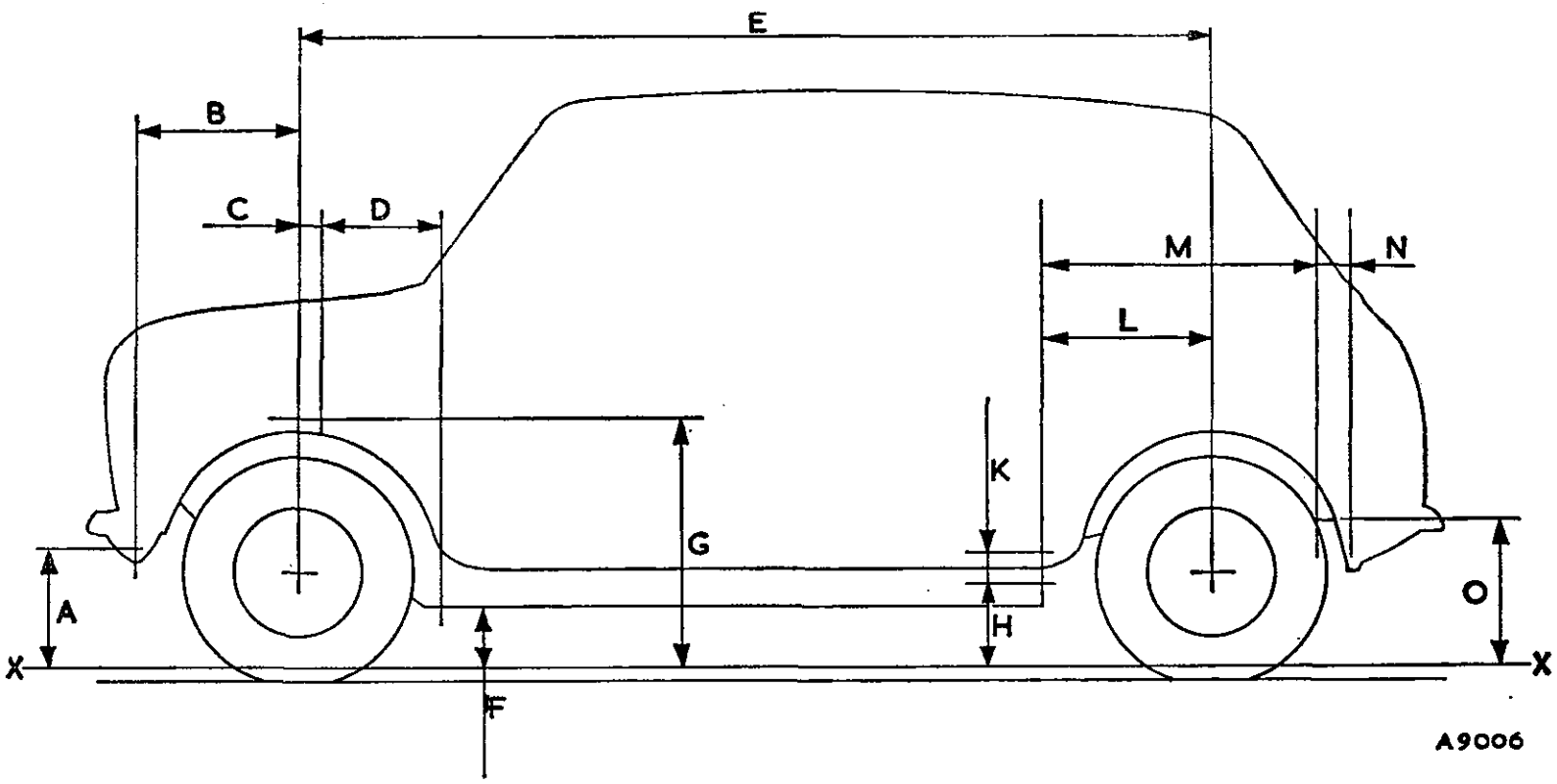
Alternator output test

1. Positive terminal of alternator.
2. Positive blade of two-way connector block.

SECTION R

THE BODY

VERTICAL ALIGNMENT CHECK



Code Letter	Dimension	Location
A	10 $\frac{13}{16}$ in. (274·64 mm.)	Front sub-frame mounting (front)
B	16 $\frac{11}{16}$ in. (423·86 mm.)	Front sub-frame mounting (front) to wheel centre
C	1 $\frac{25}{32}$ in. (45·24 mm.)	Wheel centre to tower mounting
D	10 $\frac{7}{32}$ in. (259·56 mm.)	Front sub-frame mounting (tower) to front sub-frame mounting (extreme rear)
E	80 $\frac{5}{32}$ in. (2036·37 mm.)	Saloon — wheelbase
	84 $\frac{5}{32}$ in. (2137·97 mm.)	Van, Countryman, Traveller, and Pick-up — wheelbase
F	5 $\frac{27}{32}$ in. (148·43 mm.)	Body sill to datum line
G	20 $\frac{37}{64}$ in. (523·08 mm.)	Tower mounting (sub-frame) to datum line

Code Letter	Dimension	Location
H	8 $\frac{3}{4}$ in. (212·72 mm.)	Lower rear sub-frame mounting (front) to datum line
K	2 $\frac{1}{4}$ in. (57·15 mm.)	Mounting hole centres—rear sub-frame mounting (front)
L	14 $\frac{23}{64}$ in. (367·11 mm.)	Rear sub-frame mounting (front)—body face to wheel centre
M	23 $\frac{37}{64}$ in. (599·28 mm.)	Rear sub-frame mounting (front)—body face to rear sub-frame mounting (rear) forward fixing hole
N	2 $\frac{1}{4}$ in. (57·15 mm.)	Rear sub-frame mounting (rear) fixing hole centres
O	12 $\frac{15}{64}$ in. (310·75 mm.)	Rear sub-frame mounting (rear)—body face to datum line

R

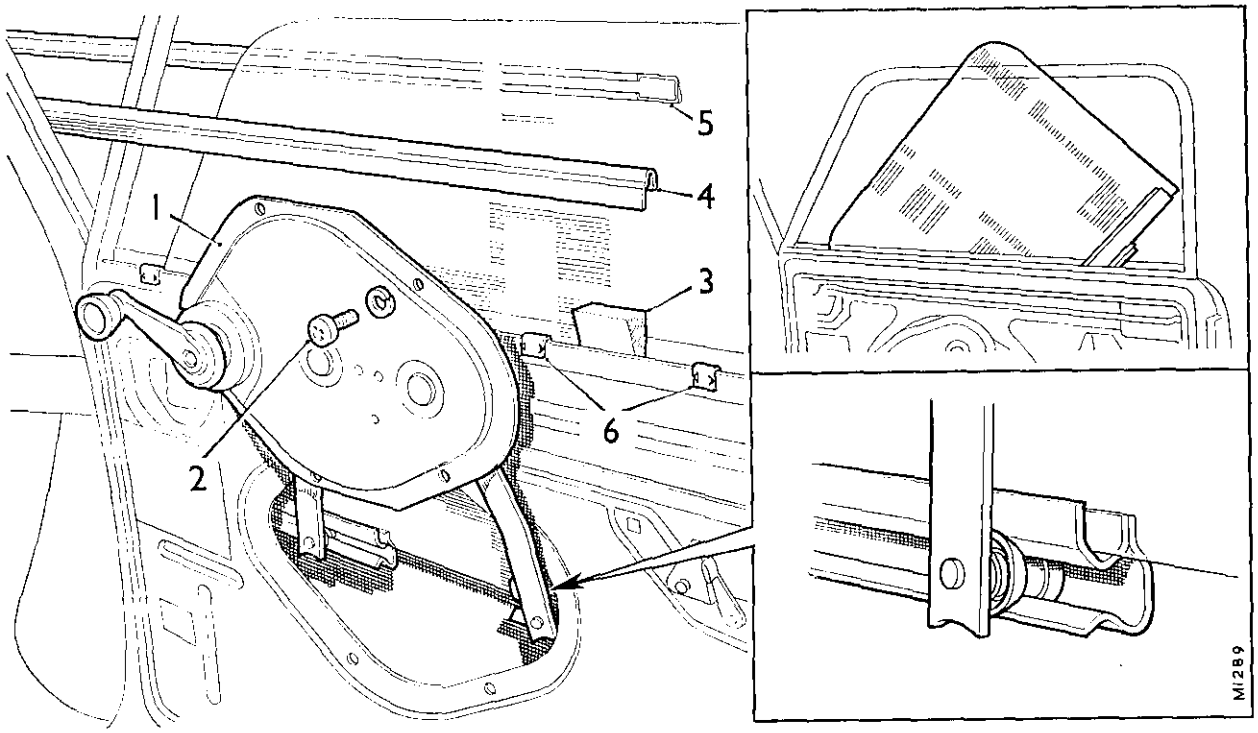


Fig. Rb.8

Removing the door glass regulator, with insets showing the regulator arms and position of the door glass for removal

1. Regulator unit.
2. Regulator securing screws.
3. Wedge (to secure glass).
4. Waist rail finisher (inner).
5. Waist rail finisher (outer).
6. Securing clips for finishers.

Section Rb.9

DOOR GLASS REGULATOR

Removing

(1) Remove the interior handles, door trim, and regulator assembly—see Section Rb.8, operations (1), (3), and (4).

Refitting

(2) Apply sealer around the edge of the regulator plate. Ensure that the lip on the front edge of the regulator is engaged inside the door frame. The remainder is a reversal of the removing procedure.

Section Rb.10

DOOR GLASS CHANNEL

Removing

(1) Follow the instructions given in Section Rb.8 for door glass removal.

(2) Remove the glazing channel rubber strip and pull the channel from the door frame.

Refitting

(3) Fit a new glazing channel into the door frame and refit the rubber securing strip.

(4) The remainder is a reversal of the removal procedure as detailed in Section Rb.8, items (6) to (10).

Section Rb.11

ROOF LINING
(Mini Saloon range)

Removing

(1) Disconnect the battery earth cable.

(2) Disconnect and remove the roof lamp.

(3) Remove both front seats and the rear seat squab (to give increased access).

(4) Remove the sun visors and driving mirror.

(5) Remove the front and rear screens as detailed in Sections R.1 and R.2.

(6) Remove the rear quarter-light glass assemblies (hinged or fixed type).

(7) Release the door seals from around the top of the door apertures.

(8) The roof lining is secured with adhesive to the roof cant-rail and on the outside flanges of the front and rear screens, door and quarter-light apertures. Release the stuck down areas of the lining, pull the lining towards the front and disengage the lining support rails from the roof cant-rails.

(9) Before refitting or replacing the liner remove surplus adhesive from the body using white spirit.

Refitting

(10) If fitting a new roof liner, remove the support rails from the old liner and insert them into the new

Operation	*Tool No.*	*Page No.*
Hydrolastic suspension—checking pressure	18G 685	S.17
	18G 703	S.17
Hydrolastic suspension—depressurizing, evacuating, and pressurizing	18G 703	S.17
Radius arm bush reaming	18G 588	S.15
	18G 588 A	S.15
Radius arm bushes removing and replacing	18G 583	S.14
	18G 584	S.15
Radius arm needle bearing removing and replacing	18G 583	S.14
	18G 583 B	S.15
	18G 620	S.16
Radius arms (Hydrolastic suspension) removing and refitting	18G 703	S.17
Sub-frame (Hydrolastic models) removing and refitting	18G 703	S.17

STEERING GEAR

●Steering-column bush (upper) removing and replacing	18G 1191	S.21 ●
Steering rack dismantling and reassembling	18G 207	S.10
	18G 207 A	S.10
	18G 707	S.17
Steering rack tie-rod ball joint removal	18G 1063	S.18
Torque setting	18G 372	S.11
	18G 537	S.12

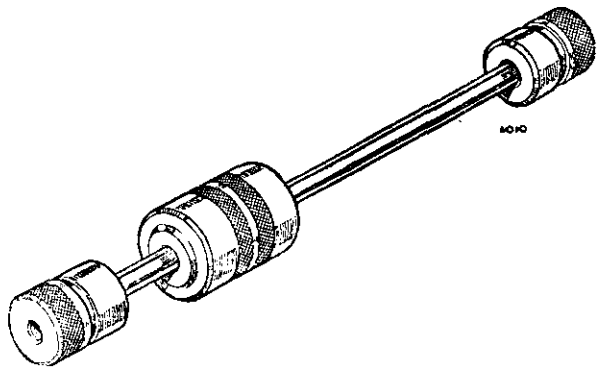
FRONT SUSPENSION

Displacer unit or strut removing and refitting	18G 703	S.17
Hydrolastic suspension—checking pressure	18G 685	S.17
	18G 703	S.17
Hydrolastic suspension—depressurizing, evacuating, and pressurizing	18G 703	S.17
Lower arm removal	18G 1063	S.18
Spring unit or strut (Rubber suspension models) removing and refitting	18G 574 B	S.13
	18G 1063	S.18
Swivel hub joint removing and replacing	18G 587	S.15
	18G 1063	S.18
Swivel hub dismantling, fitting bearings, and reassembling	18G 304 or	S.11
	18G 304 Z	S.11
	18G 304 F	S.11
	18G 575	S.14
	18G 260	S.10
	18G 260 H	S.10

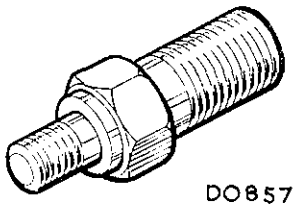
SECTION S

SERVICE TOOLS

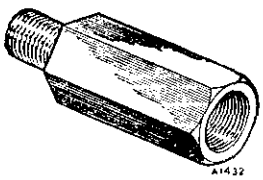
This Section includes all Service tools for the Mini range of vehicles including the Mini-Cooper and Mini-Cooper 'S'. The tools which are applicable to the Cooper and Cooper 'S' only are shown in brackets after the 'Operation' description



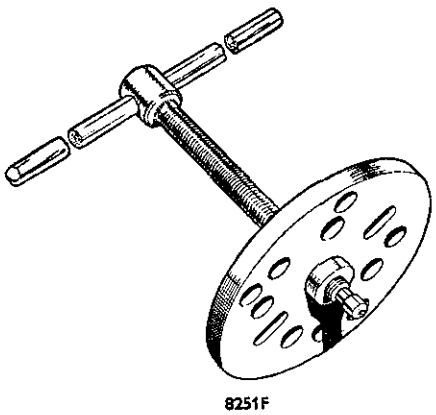
18G 284. Impulse Extractor (basic tool)



18G 284 AJ. Planetary Gear Spindles Remover Adaptor

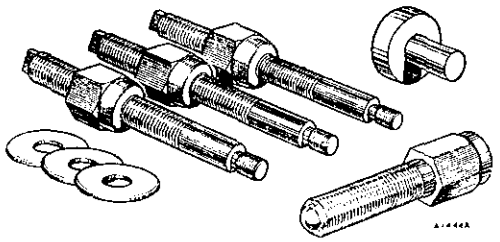


18G 284 B. First Motion Shaft Remover Adaptor

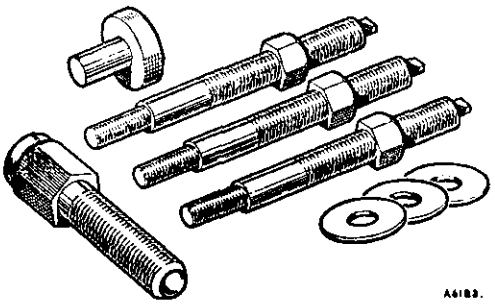


18G 304. Front and Rear Hub Remover (basic tool)

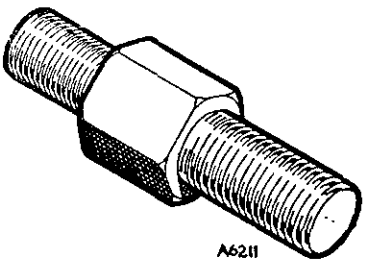
18G 304 F. Front and Rear Hub Remover Bolt Adaptor



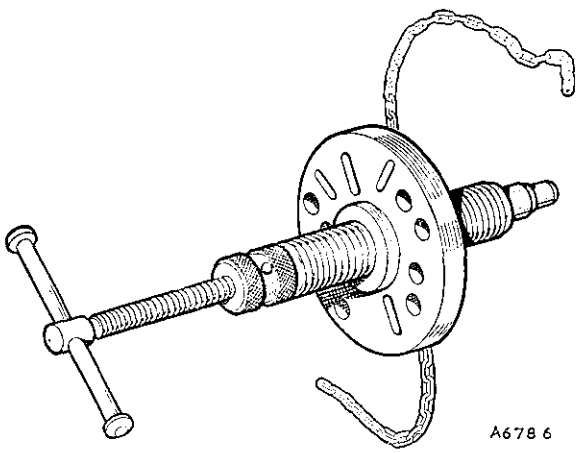
18G 304 M. Flywheel and Clutch Remover Adaptor



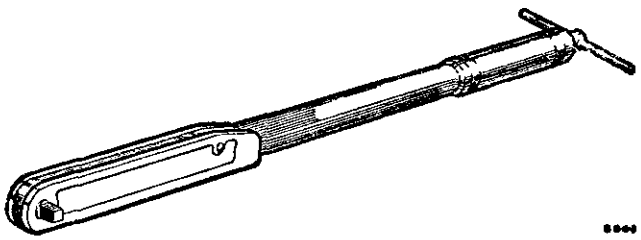
18G 304 N. Flywheel and Clutch Remover Adaptors



18G 304 P. Drive Flange Remover Adaptor



18G 304 Z. Hub Remover—Hydraulic (basic tool)



18G 372. Torque Wrench—30 to 140 lb. ft. (4 to 20 kg.m.)