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SECTION 9 — FRONT PUMP AND DRIVE-SHAFT

To remove the front pump and drive-shaft, first remove the gearbox from the car as described in Section 1 then remove the following units.

Fluid coupling (see Section 2).

Side cover, sump and filter (see Section 3).

Front and rear servo units (see Section 6).

Pressure control valve (see Section 8).

If required, the front pump can be removed from the gearbox without disturbing the drive-shaft, but for the purpose of overhaul it is easier to remove the shaft at this stage. Instructions covering removal, inspection and re-assembly are included in this Section.

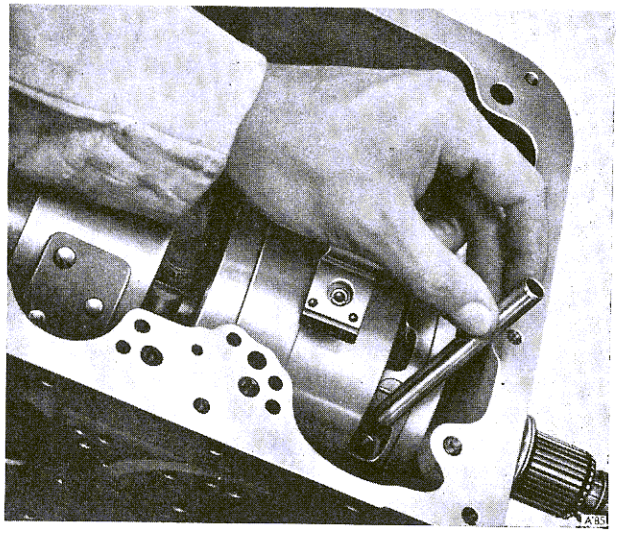

Fig. 77 Removing oil feed pipe

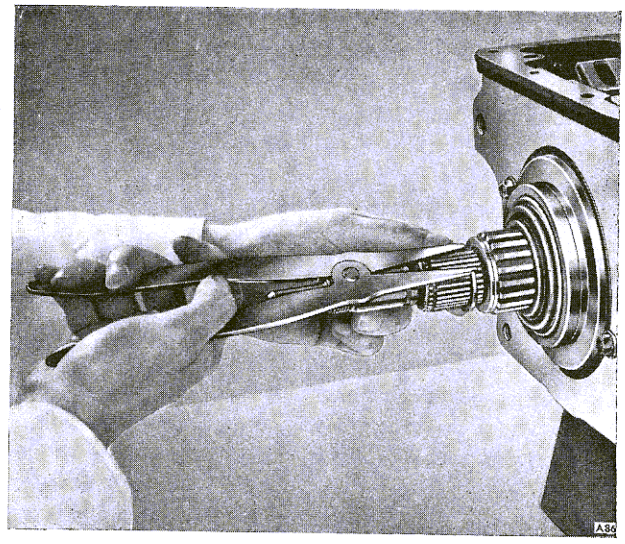

Fig. 78 Removing intermediate shaft snap ring

Front pump — To remove

Withdraw the pump-to-front servo oil feed pipe (see Fig. 77). Remove the pump-to-filter pipe.

Using spring ring pliers in the manner illustrated in Figure 78, remove the snap ring, steel backing washer and bronze thrust washer from the intermediate shaft; keep together and label them for easy identification on re-assembly.

Remove the two screws securing the front pump, then withdraw the dowel washer from its counterbore with the spring ring pliers. Taking care not to damage the drive-shaft bushes on the intermediate shaft splines, withdraw the pump together with the drive-shaft from the gearbox. It may be necessary to tap the rear face of the pump to free it initially, in which case a soft drift should be used.

Remove and discard the pump-to-gearbox gasket. From the intermediate shaft, remove the bronze thrust washer and label it for identification.

The front pump should be dismantled only if suspected of faulty operation which cleaning will usually rectify. It may be preferable to change the complete unit rather than attempt rectification if rig test facilities are not available.

Front pump — To dismantle

Separate the pump from the drive-shaft by sliding one from the other.

Place the pump on the bench, front cover downward, then, using the holding tool shown in Figure 79, remove the four setscrews and washers. Lift the body from the front cover. If the body is held by the two dowels, gently tap the cover with a soft mallet; do not turn the cover over otherwise the pump parts will fall out and may be damaged.

Before lifting any of the parts, mark the exposed face of the pump rotor to ensure that it is fitted correctly on re-assembly. Do not use a scriber or punch for marking; an indelible pencil is recommended.

Remove the top inner vane ring, pump rotor, seven vanes and the lower inner vane ring, then lift out the slide after pushing it toward the priming springs as shown in Figure 80. Remove the two concentric priming springs; on early pumps only one single spring is fitted.

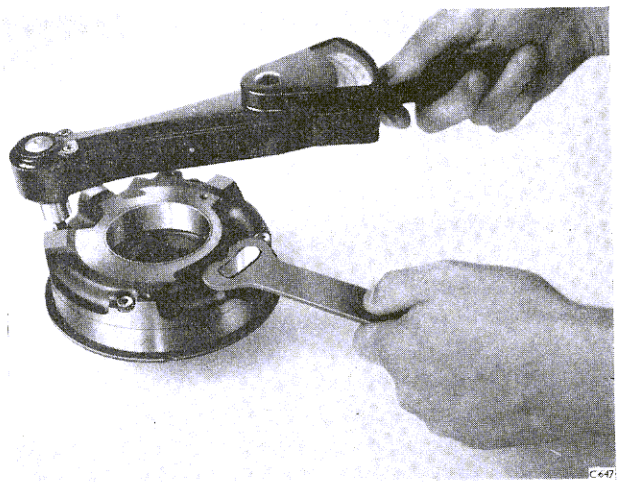

Fig. 79 Unscrewing body retaining screws

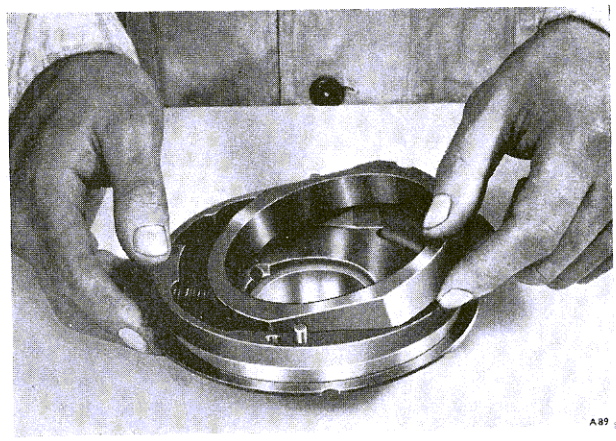

Fig. 80 Removing pump slide

Remove the relief valve from the pump body as shown in Figure 81. Depress the spring guide and withdraw the retaining pin. Relaxing the pressure on the spring, carefully remove the guide and spring; remove the valve with the spring ring pliers.

Remove and discard the oil seal ring from the oil intake pipe bore in the pump body.

Remove the piston-ring type oil seals from the pump cover.

The lip-type oil seal in the pump cover should not be removed unless renewal is necessary; the seal is a tight fit in its bore and removal may necessitate the use of a hammer and chisel.

If the lip-type seal has to be renewed on an early 'S2' front pump take careful note of the following paragraphs.

Early 'S2' front pumps are fitted with a seal identical to those fitted to 'S1' pumps, but on 'S2' pumps the seal is not pressed fully home in the pump cover recess. A modification provided for a washer interposed between the seal and the recess end face in order to more effectively control the position of the seal.

A further modification incorporated the re-positioning of the seal recess in order to obviate the necessity for a spacing washer.

Current cars are fitted with a new type of seal, (Part No. UG 4107) requiring a recess position similar to that of 'S1' pumps. No spacing washer is required and the seal is pressed fully home in the recess.

Seal (UG 4107) will be supplied as a replacement for fitting to all 'S' series cars but existing seals (UG 3670) may be used if in stock.

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SEPTEMBER 1963

TSD 2042

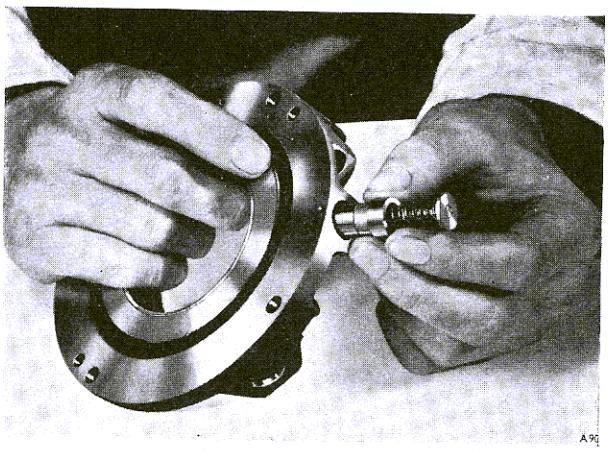

Fig. 81 Removing relief valve

Seal (UG 3670) — To fit

Remove the old seal by tapping it outward, taking care not to damage the adjacent machined faces.

Using a depth gauge or vernier caliper, measure dimensions 'A' and 'B' given in Figure 82. Subtract dimension 'B' from dimension 'A'. A reading between 0·355 in. and 0·400 in. indicates that the cover is not of the modified type and that a washer must be fitted; a reading between 0·415 in. and 0·450 in. indicates a modified pump, requiring no action.

Insert the washer, if fitted, into the recess (chamfered edge leading); apply a smear of jointing compound to the outer wall of the recess, lubricate the new seal with transmission fluid, then press the seal home in its bore.

Seal (UG 4107) — To fit

It will be necessary, in some cases, to carry out a machining operation on the pump cover in order to accommodate this seal. Identification of covers requiring machining is by the dimensional check outlined in the instructions for fitting the (UG 3670) seal. A dimension between 0·415 in. and 0·450 in. indicates that the cover must be machined to accept the seal. A dimension between 0·355 in. and 0·400 in. indicates that the cover will accept the seal without modification. **Where a spacing washer has been fitted, this should be removed before refitting the new seal.**

Pump cover — To modify

Extract the oil seal from the cover, then remove the front pump from the gearbox as previously described.

Machine the pump cover to increase by 0·050 in. the depth of the seal location bore (dimension 'B' Fig. 82). Thoroughly clean the cover to remove all swarf, then assemble the pump. Refit the pump to the gearbox.

Fit a new seal as described earlier in this Section.

Front pump — To inspect

Clean all parts thoroughly, taking care to remove any traces of sludge; flush out all oil passages with a suitable cleaning fluid. Using a piece of strong wire, check that the bleed holes and passages are clear, then blow them through with compressed air. Rag should not be used for cleaning purposes owing to the danger of fluff entering the control system and fouling the various valves.

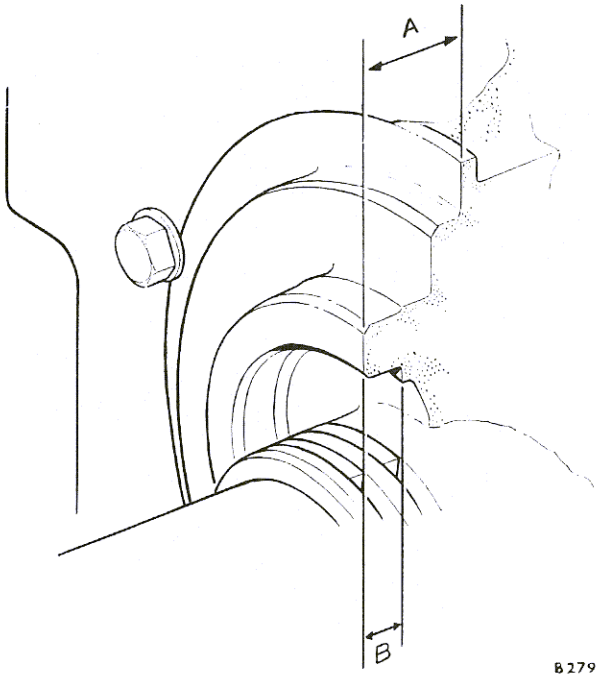

Fig. 82 Pump cover checking dimensions

Examine all parts for cracks or damage and check all sliding surfaces for scores, burrs and roughness.

Check that the halves of the pump mate without a gap. Small burrs may be removed but the joint face must not be scraped or lapped.

Reference should be made to the Spares Schedule before renewing any distorted or damaged parts, as many of the components are selectively fitted after manufacture and must not be renewed separately.

Check that the dowels are secure in the front cover.

Ensure that the pump slide moves freely in the front cover and that the relief valve and regulator valve are free in their respective bores.

Examine the relief valve spring and the priming springs for damage and general condition; slight polishing of the coil outer diameter is permissible.

Check that the pump vanes are free in their slots.

Insert the oil rings into position in the torus cover neck, then check that the gap is within the limits given in the 'Summary of Repair Data.'

Inspect the drive-shaft bush in the pump body for heavy uneven wear, scores, flaking and security; slight wear of the bush is normal and can be disregarded. If wear or damage is excessive, the complete pump should be renewed as it is not advisable to fit a new body to an old cover.

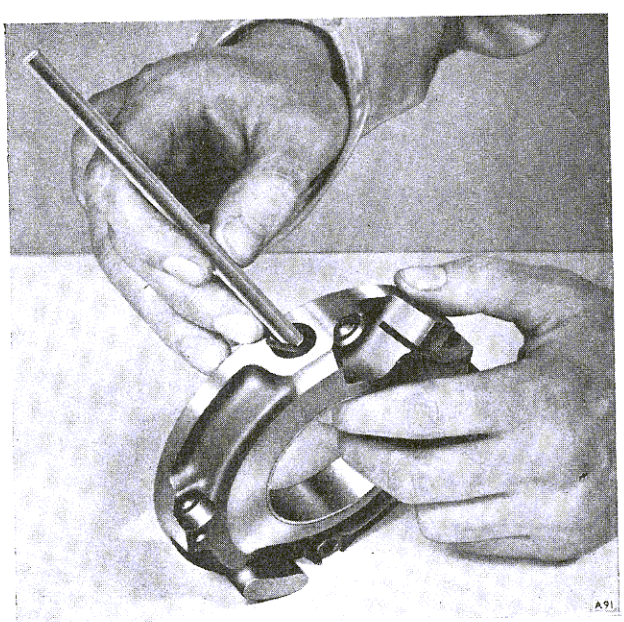

Fig. 83 Fitting intake pipe sealing ring

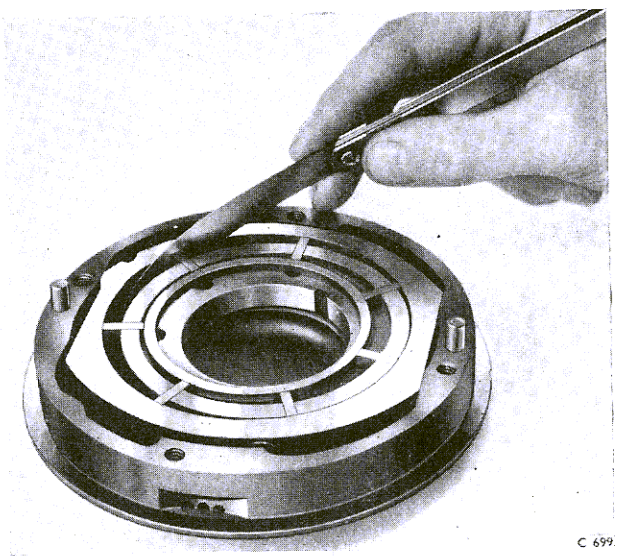

Fig. 84 Checking vane clearance

Check the key in the drive-shaft and the keyway in the pump rotor for burrs and wear.

Examine the drive-shaft splines for wear, the gear teeth for damage and the journal surface for scoring.

Check the two bushes in the shaft for security, scoring, flaking and uneven wear.

Examine the steel backing washer and bronze thrust washer for ridges or heavy scoring.

Front pump — To assemble

When all parts have been carefully inspected, cleaned and dried, lubricate all the moving parts with clean gearbox oil and rebuild the pump in the following order.

Fit a new intake pipe oil seal ring into the bore of the pump body as shown in Figure 83. Check that the ring is fitted correctly by entering and withdrawing the intake pipe, after ensuring that the end of the pipe has no sharp edges and is lightly smeared with gearbox oil.

Refit the relief valve with its spring guide and retaining pin.

Fit the pump slide, together with its two concentric priming springs, into the front cover; if a single spring was fitted originally, this should be discarded and a replacement pair fitted. Ensure that the outer spring is correctly located in the recesses of the pump cover and the slide, then check that the slide will move through its full stroke and return under spring pressure.

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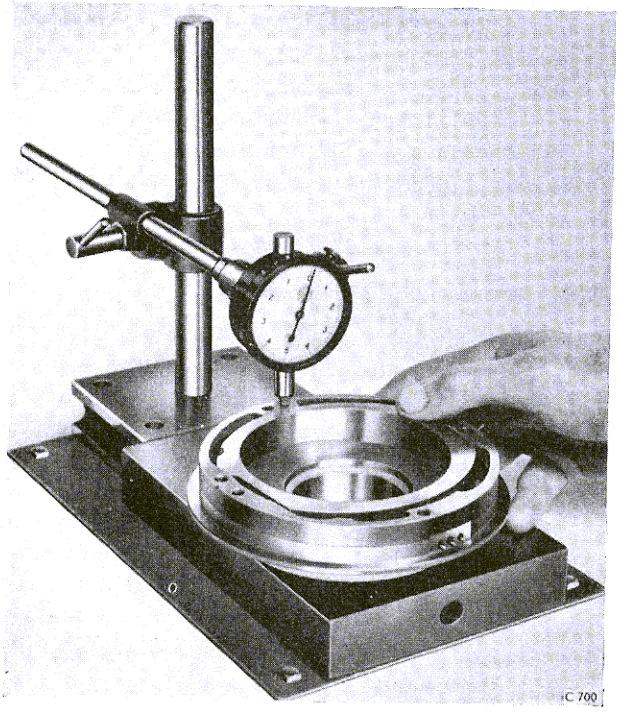

Fig. 85 Checking slide end clearance

Fit one of the vane rings and then the rotor with its marked face upward.

Fit the seven vanes and position them according to the wear pattern on the radiused ends; the edge polished along its length should contact the inner bore of the slide, the inside edge being polished only where contact is made with the vane rings.

Fit the second vane ring and ensure that the vanes are positioned correctly between the vane ring and the pump slide. Rotate the rotor several times to ensure freedom of movement.

If any of the vanes appear excessively loose, their diametrical clearance should be checked in the manner illustrated in Figure 84, to ascertain if it is within the limits given in the 'Summary of Repair Data.'

Check the end clearance between the slide and the pump body, using a dial test indicator as shown in Figure 85. The initial reading should be taken from the joint face, then the assembly moved so that the stem of the indicator runs on to the slide.

The difference in the two readings should coincide with the limits given in the 'Summary of Repair Data.' Check the end clearance of the rotor in the manner described in the previous paragraph.

Fit the pump body over the dowel pins in the front cover. Fit the four setscrews and washers, then, using the special tool shown in Figure 79, tighten the screws to the correct torque loading. Turn the rotor several times to check for freedom of movement, then by pushing against the internal bore of the rotor, ensure that the slide is free and the priming springs return it to the maximum delivery position.

Refit the oil seal rings into their grooves in the front cover. Fit a new lip-type seal if necessary.

Pour a little clean gearbox oil into the pump intake bore and turn the rotor several times to ensure thorough internal lubrication.

Front pump — To fit

Fit the bronze thrust washer over the intermediate shaft so that it is in position against the shoulder of the front planet carrier. After a liberal application of clean gearbox oil, slide the front drive gear over the intermediate shaft into the main casing, turning it slightly to mesh with the planet gears. During this operation care must be exercised to avoid damage to the bushes by the intermediate shaft splines.

Fit the bronze thrust washer and the steel backing washer over the intermediate shaft, then fit the snap ring using the special pliers.

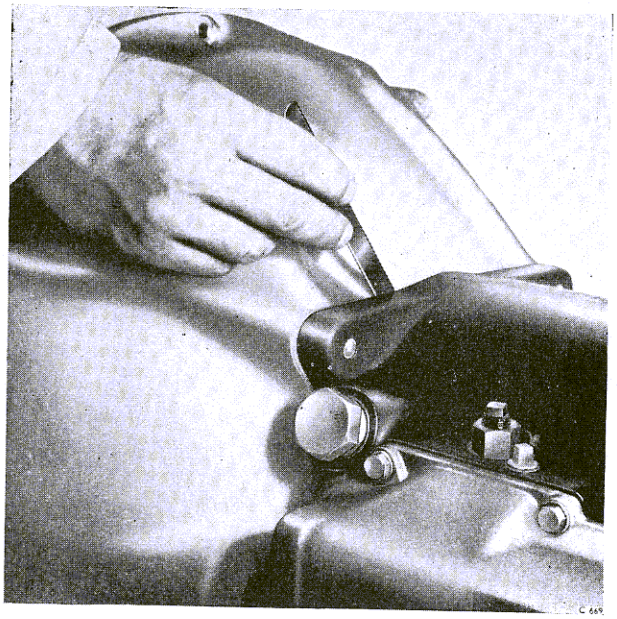

Fig. 86 Checking pump flange projection

Fit a new gasket under the pump cover flange.

Before fitting the pump, lubricate the drive-shaft bush in the pump body with a liberal amount of clean gearbox oil. Align the drive-shaft key with the keyway in the pump and slide the pump body into position; the key should enter the keyway smoothly and easily.

Align the pump flange with the dowel washer location in the gearbox front face and insert the dowel washer. Fit the two retaining setscrews and tighten to the correct torque loading.

If a replacement pump has been fitted, the following check should be made to ensure the correct nip of the pump flange by the flywheel housing.

Check that the projection of the pump flange from the front face of the gearbox is within the limits given in the 'Summary of Repair Data'. This can be done with a straight edge and feeler gauges, or alternatively by refitting the bell housing, lightly tightening the retaining setscrews and measuring the gap between the housing and the gearbox face in the manner illustrated in Figure 86. If the clearance is incorrect, renew the gasket.

Fit the remaining assemblies in the following order.

Pressure control valve (see Section 8).

Front and rear servo units (see Section 6).

Side cover, sump and filter (see Section 3).

Fluid coupling (see Section 2).

Finally re-install the gearbox in the car as described in Section 1.

Oil pressure—To check

Fit an oil pressure gauge as described under 'Oil pressure test' in Chapter 2, then run the engine at idling speed and check the oil pressure. Select Reverse and again note the pressure. If the pump is working satisfactorily the pressure should not be less than 75 lb/sq.in.

Reverse pressure should not be less than that obtained in Neutral and is usually approximately 150 lb/sq.in. Finally, carry out a normal road test to ensure that all the components are functioning correctly. Details of change points and testing procedure are given in Chapter 2.