CRANKSHAFT AND MAIN BEARINGS

The crankshaft runs in five pre-finished replaceable shell bearings lined with aluminium tin.

End float is controlled by four thrust washers which are located on both sides of the centre main bearing housing. 0,19 mm (0.0075 in) oversize thrust washers are available which may be combined with standard thrust washers to give an adjustment of 0,19 mm (0.0075 in) or, when used on both sides of the bearing housing, give an adjustment of 0,38 mm (0.015 in).

The main bearings are located in position by tabs fitting into slots in the bearing housings.

The tabwashers as originally fitted to the main bearing cap setscrews have now been deleted, see 'Data' for torque.

Because Tufftrided crankshafts are fitted to some engines it will be necessary to identify the shaft before commencing regrinding operations.

It is important that the information headed 'Regrinding the Crankshaft' relevant to the Tufftriding process is adhered to.

To Renew the Thrust Washers

Renewal of thrust washers can be carried out without withdrawing the crankshaft, as follows:—

1. Remove the sump, sump strainer and the oil pump suction pipe.

2. Remove the centre main bearing cap containing the two bottom half thrust washers (see Fig. 1). The two top half thrust washers should be removed by sliding round from one side. Identify each thrust washer half to its relative position.

3. To refit the thrust washers, liberally oil the two upper halves and slide them into the recesses provided on either side of the main bearing housing.

   The steel side of the thrust washers should be towards the bearing housing and the cap. Refit the cap with the lower half bearings, secure with the setscrews tightened to the torque given in 'Data'.

Note: Later type thrust washers are non reversible and are not interchangeable with the earlier type. Replacement thrust washers must be of the same pattern as the originals.

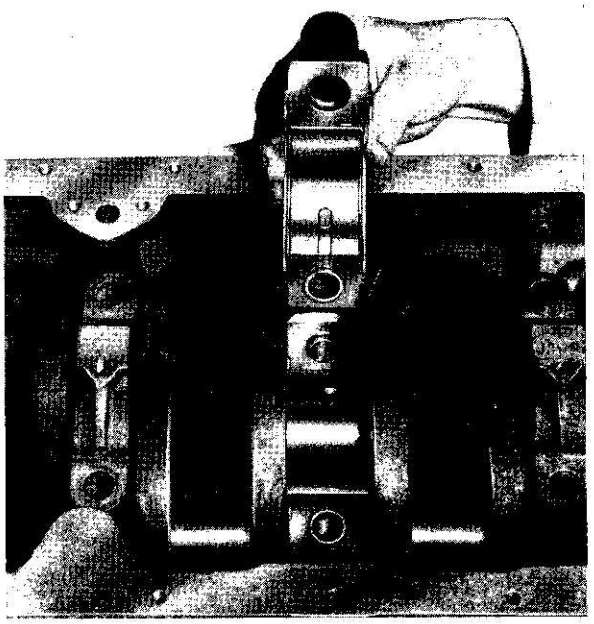


Fig. 1

4. Check the crankshaft end float for a clearance of 0,05/0,38 mm (0.002/0.015 in), Fig. 4.

5. Refit the oil suction pipe to the oil pump.

6. Refit the sump strainer and sump.

ENGINE 4.236

Crankshaft and Main Bearings

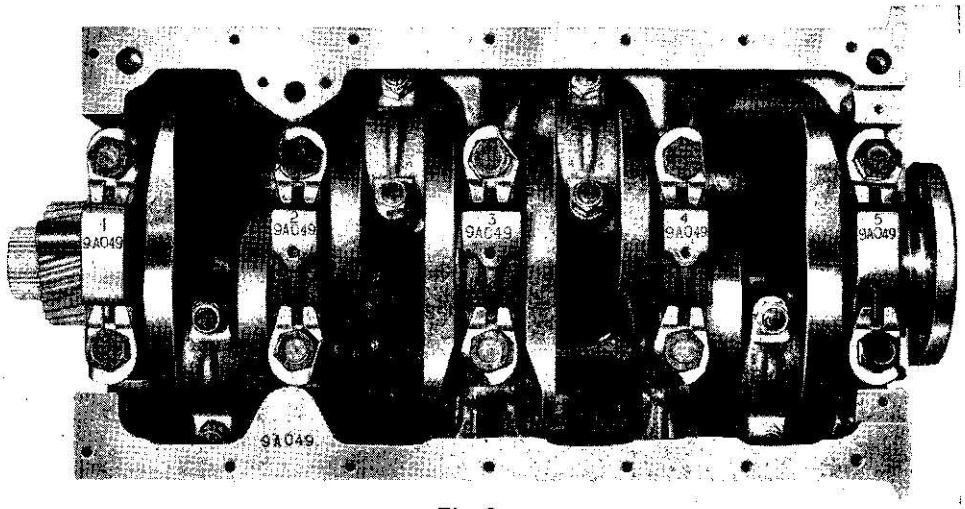


Fig. 2

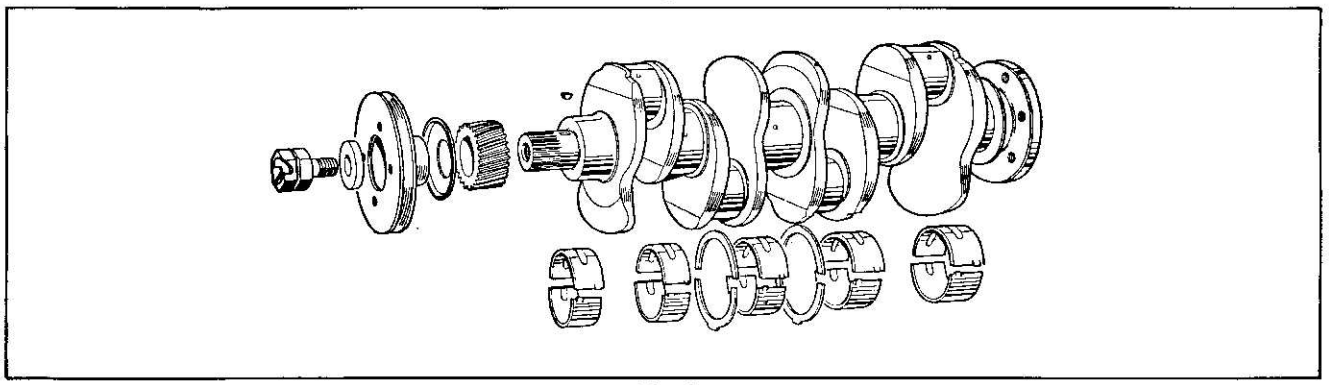


Fig. 3

To Remove the Crankshaft

It will be necessary to remove the engine from the vehicle (See A450).

1. Remove the sump, sump strainer and the oil pump suction and delivery pipes.
2. Remove the timing gears and timing case.
3. Remove the flywheel and flywheel housing.
4. Remove the connecting rod caps and big end bearings.
5. Remove the rear main bearing oil seal housing (Fig. 8).
6. Take off the rear main bearing bridge piece.
7. Remove the oil pump.
8. Remove main bearing setscrews.
9. Remove the main bearing caps and half bearings.
10. Lift out the crankshaft and remove remaining half bearings.

Regrinding the Crankshaft

Before commencing regrinding operations, examine the crankshaft to see if it has been hardened by the Tufftriding process. The shaft may be identified by Part No. which will be found on the front end or on No. 1 web.

If the crankshaft is identified as a Tufftrided shaft then it will be necessary to re-Tufftride it regardless of the diameter to which it is reground.

If facilities are not available for re-Tufftriding a replacement shaft should be obtained.

Before regrinding the crankshaft it should be crack-detected.

Demagnetise the crankshaft after crack detecting.

The main journal and crankpin diameters should be checked to ascertain the next size to which the crankshaft can be reground, i.e. -0,25 mm (-0,010 in), -0,51 mm (-0.020 in) or -0,76 mm (-0.030 in). If it requires to be reground below -0,76 mm (-0.030 in), a new crankshaft must be fitted.

After regrinding, the sharp corners on the oil holes should be removed and the crankshaft crack detected and demagnetised.

Note: It is important that the radii on the main journals and crankpins are maintained.

The crankshafts of engines fitted with Lip Type rear oil seals have a rear flange with an extended width of over 25 mm (1 in) to provide a seat for the lip seal (Page H.4). If all the three positions for this seal have been used, the sealing area of the flange may be reground to a minimum diameter of 113,17 mm (5.243 in), leaving an unmachined diameter for a distance of 4,8 mm (3/16 in) from the rear end.

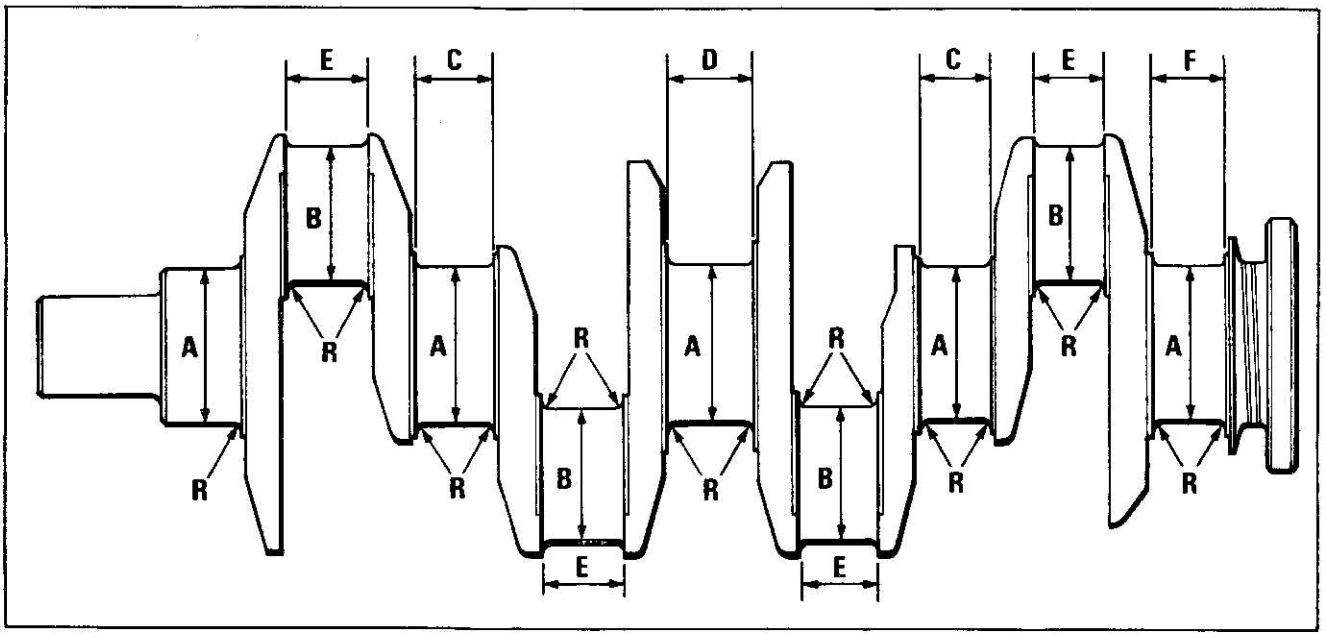
Only the minimum of metal should be ground off to ensure removal of the seal wear grooves and the surface finish should be the same as the crankpins and journals.

It is not necessary to re-Tufftride the flange after this operation.

Fig. 4

ENGINE 4.236

Crankshaft and Main Bearings



Tufftrided Crankshafts		Perkins Part Numbers			
31315542	31315884	31316204	31315872	31316224	31316235
0,25 mm (0.010 in) Undersize		0,51 mm (0.020 in) Undersize		0,76 mm (0.030 in) Undersize	
A 75,91/75,93 mm (2.9884/2.9892 in)		75,65/75,67 mm (2.9784/2.9792 in)		75,40/75,42 mm (2.9684/2.9692 in)	
B 63,22/63,24 mm (2.4888/2.4896 in)		62,96/62,98 mm (2.4788/2.4796 in)		62,70/62,72 mm (2.4688/2.4696 in)	

C 39,47 mm (1.554 in) maximum

D 44,68 mm (1.759 in) maximum

E 40,55 mm (1.5965 in) maximum

F 39,47 mm (1.554 in) maximum

R 3,68/3,96 mm (0.145/0.156 in) all journals and crankpins

Surface finish, journals and crankpins 0,4/0,2 microns (16 to 18 micro inches) C.L.A.

Surface finish, fillet radii 0,8 microns (32 micro inches) C.L.A.

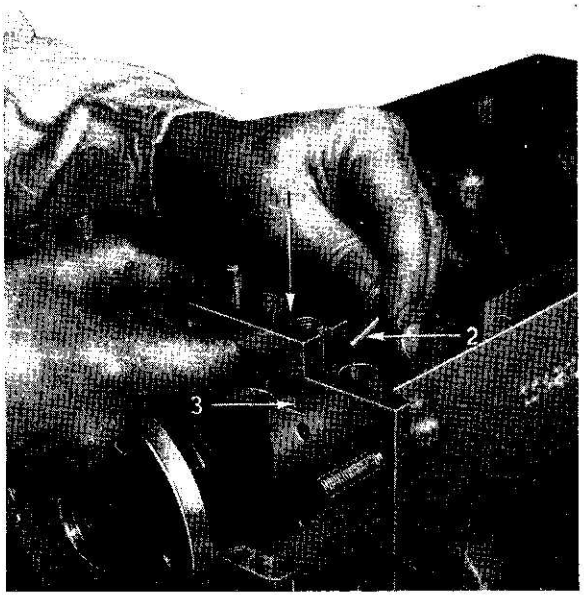


Fig. 5

1. BRIDGE-PIECE
2. BRIDGE-PIECE END SEAL
3. JOINT

To Refit the Crankshaft

1. The oilways in the cylinder block and crankshaft must be free from obstruction.

2. Check the main bearing setscrews for stretch or damage. Only setscrews supplied by the engine manufacturer should be used as they are of a special heat treated high grade steel.

3. Clean the bearing housings, place the top half bearings in position and liberally oil.

4. Position the crankshaft.

5. Oil the two upper thrust washer halves and slide into the recesses provided on either side of the centre main bearing housing.

6. Liberally oil and fit the lower halves of the main bearings to the bearing caps. Fit the caps to their respective positions so that the lower halves of the thrust washers are correctly positioned on either side of the centre main bearing cap. The main bearing caps are numbered, No. 1 commencing at the front of the engine. Each cap is also marked with a serial number as stamped on the cylinder block bottom face. These should read in line (Fig. 2).

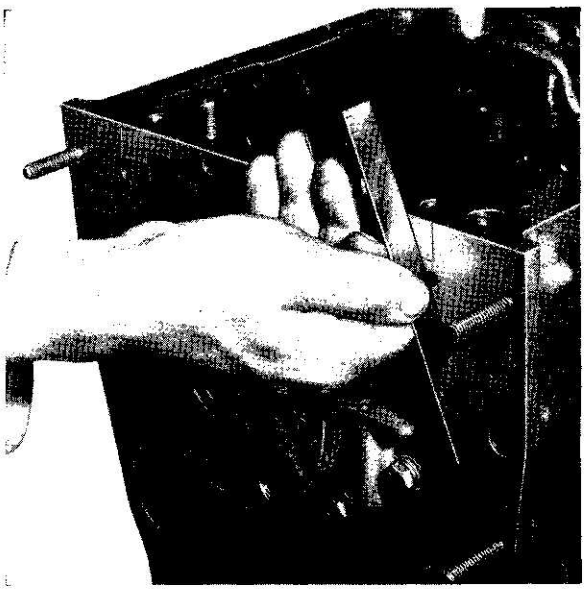


Fig. 6

7. Fit the setscrews. Shim washers originally fitted between the setscrew head and the main bearing cap have now been deleted.

8. Tighten the main bearing setscrews to the torque given in 'Data'.

9. Check the crankshaft end float for a clearance (Fig. 4).

10. Refit the connecting rod caps and big end bearings.

Fig. 7

11. Refit the rear main bearing bridge piece to the cylinder block (Fig. 5). The rear face should be flush with the rear face of the cylinder block (Fig. 6).

12. Fit new seals in the rear main bearing oil seal housings and refit the housings as described in "Crankshaft Rear End Oil Seal".

13. Refit and correctly align the flywheel housing. Refit the flywheel.

14. Refit the oil pump, timing case and timing gears.

15. Refit the sump strainer, oil pump suction and delivery pipes and sump.

Rope Type Rear End Oil Seal

The housing consists of two halves bolted around the rear of the crankshaft which has a shallow spiral oil return groove machined in it to a depth of 0,10/0,20 mm (0.004/0.008 in). The bore of the housing accommodates a rubber cored asbestos strip comprising two sections.

When fitting the seal the following procedure should be adopted:—

1. Set up a half housing in the vice with the seal recess uppermost and settle approximately 25 mm (1 in) of the strip, at each end, into the ends of the groove so that each end of the strip protrudes 0,25/0,50 mm (0.010/0.020 in) beyond the half housing joint face.

2. With the thumb or finger press the remainder of the strip into the groove, working from the centre. Use a round bar to further bed in the strip by rolling and pressing its inner diameter (Fig. 7).

3. Fit the sealing strip to the other half housing in a similar manner.

4. Fit a new joint using jointing compound applied to both sides.

5. Spread a film of graphite grease over the exposed rear journal and fasten together (Fig. 8).

7. Swivel the complete seal housing on the shaft to bed in the strips and to establish that the assembly turns easily on the shaft.

8. Bolt the seal housing to the block and rear bridge piece.

Lip Type Rear End Oil Seal

Later engines will be fitted with a circular spring loaded lip seal that locates around the periphery of the flange of the crankshaft. The seal is designed to function correctly with the direction of rotation of the engine and for identification purposes the seal is marked with an arrow.

In order to identify engines fitted with the lip type oil seal, a letter "L" is added at the end of the engine number. The lip type oil seal assembly and its counterpart crankshaft are not interchangeable with previous types.

This seal is easily damaged and extreme care should be taken when handling and fitting it. Any visual damage across the lip of a new seal will cause leakage and prevent bedding-in of the seal.

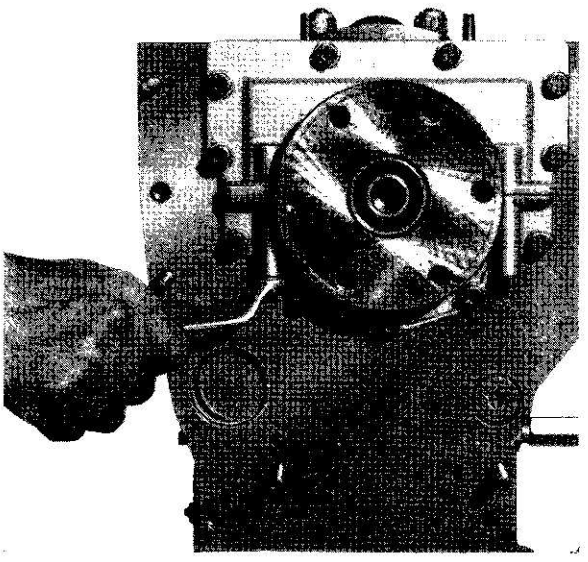


Fig. 8

On production, this seal is fitted with its rear face flush with the rear face of the single piece housing. When renewing the seal, examine the crankshaft flange and if it is found to be grooved, the seal should be pressed further into the housing, in the first instance to 3,17 mm (1/8 in) and later to 6,35 mm (¼ in) from the rear face of the housing, see Fig. 9. Before pressing the seal into its housing, lubricate the outside of seal and the inside of housing with clean engine oil.

If all three positions have been used, the worn sealing area of the crankshaft flange may be machined as described previously.

Clean engine lubricating oil should also be used to lubricate the flange periphery before fitting the seal assembly to the crankshaft. Seal guide PD 145 will prevent damage to the seal and will also ensure correct positioning.

Using a new joint coated with Hylomar jointing compound and ensuring that the housing is correctly located onto the dowels situated in the cylinder block, tighten the securing setscrews and washers progressively.

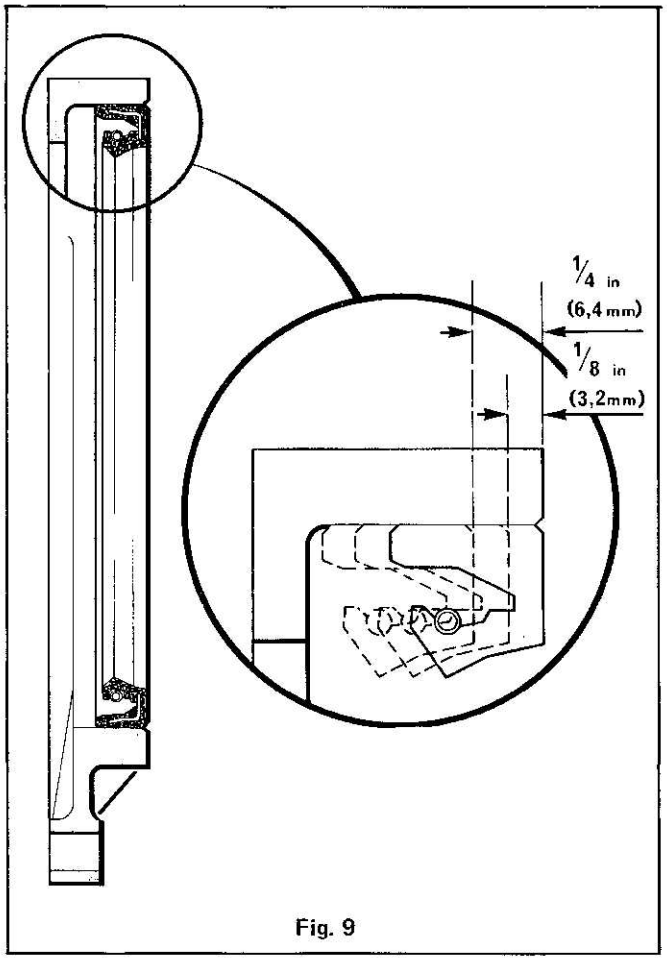


Fig. 9