

# LUBRICATING SYSTEM

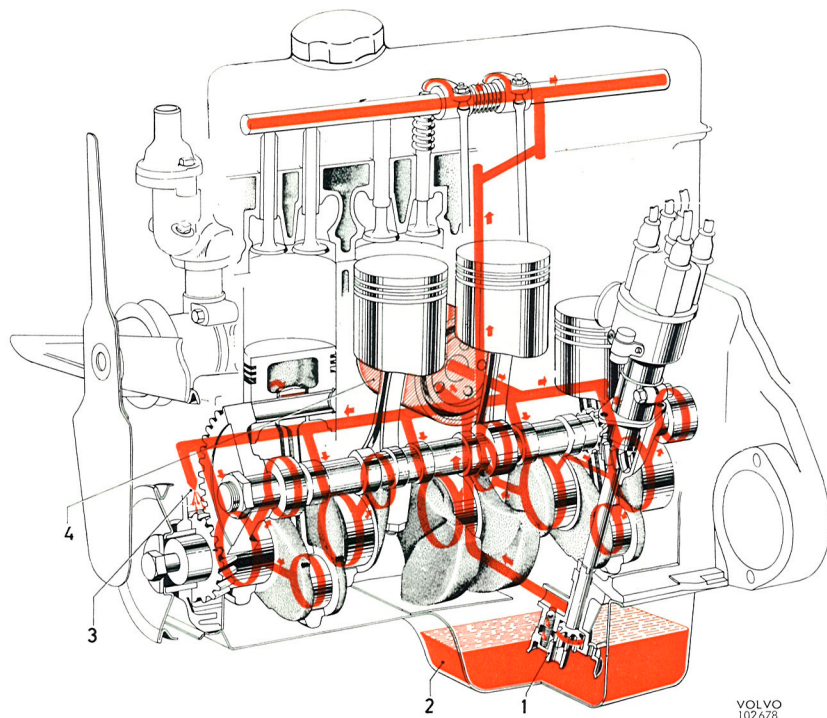
## DESCRIPTION

The engine has a force-feed lubricating system, see Fig. 2-51. Pressure is provided by a gear pump driven from the camshaft and fitted under the crankshaft in the sump. The gear pump forces the oil past the relief valve, which is also fitted on the pump, through

the oil filter and then through oilways out to the various lubricating points. All the oil supplied to the lubricating points, therefore, first passes through the oil filter.

Fig. 2-51. Lubricating system

1. Oil pump
2. Sump
3. Nozzle
4. Oil filter



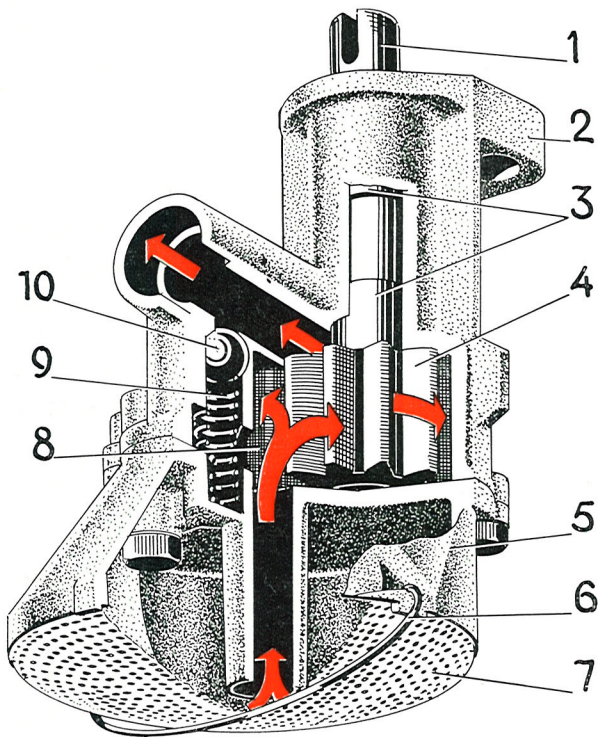
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### OIL PUMP, RELIEF VALVE

The oil pump, see Fig. 2-52, is of the gear type and is driven through a gear train from the camshaft. The delivery pipe from the pump to the cylinder block does not have screw unions and is, therefore, automatically tightened in position when the attaching bolts for the pump are tightened. At each end of the pipe there are sealing rings made of special rubber. The relief valve is fitted directly on the pump and consists of a spring-loaded ball. The ball has a cylindrical guide with a stop at the end position and, therefore, operates flexibly. Even at idling speed there is a certain amount of overflow, so that the oil pressure is then relatively low.

### OIL FILTER

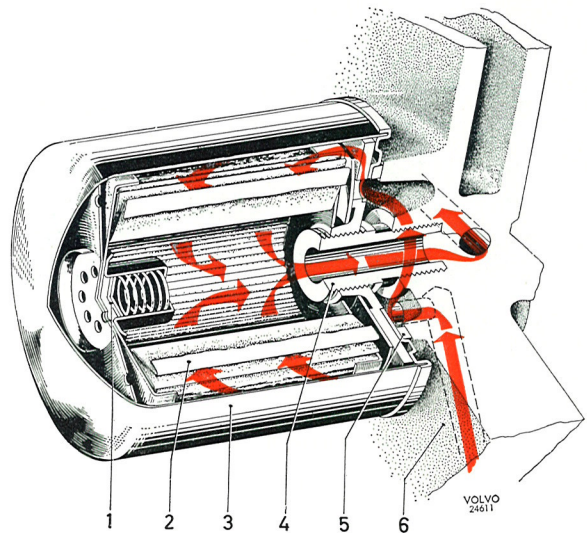
The oil filter (see Fig. 2-53), which is manufactured as a single unit complete with element, is of the full-flow type and is screwed directly into the cylinder block. The oil which is fed out to the various lubricating points in the engine first passes through the oil filter element which is made of special paper. In the oil filter there is a by-pass valve which allows the oil to by-pass the element if resistance to flow should become excessive. When replacing the filter, the old one is discarded completely and a new one fitted.



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Fig. 2-52. Oil pump

- |                 |                            |
|-----------------|----------------------------|
| 1. Drive shaft  | 6. Retainer clip           |
| 2. Pump body    | 7. Strainer                |
| 3. Bushes       | 8. Drive gear              |
| 4. Driving gear | 9. Spring for relief valve |
| 5. Cover        | 10. Valve ball             |



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Fig. 2-53. Oil filter

- |                   |                   |
|-------------------|-------------------|
| 1. Overflow valve | 4. Nipple         |
| 2. Element        | 5. Gasket         |
| 3. Body           | 6. Cylinder block |

## REPAIR INSTRUCTIONS

### REPLACING THE OIL FILTER

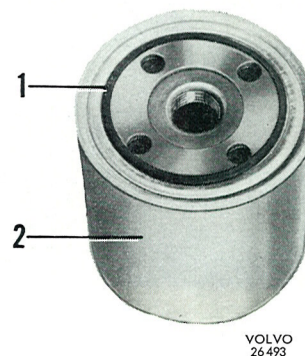
Together with the element and relief valve, the oil filter (see Fig. 2-53) is screwed as a complete unit on to a nipple fitted in the cylinder block.

The filter should be replaced every 10 000 km (6 000 miles), when the old filter is discarded. With a new or reconditioned engine, the filter should also be changed the first time after 5 000 km (3 000 miles).

1. Remove the old filter with the help of chain tongs, see Fig. 2-55.
2. Coat the rubber gasket (1, Fig. 2-54) of the new filter with oil and make sure that the contact surface for the oil filter is free from dirt. By smearing it with oil, the gasket slides into better contact with the sealing surface. Screw on the filter by hand until it just touches the cylinder block.

the engine and check that there is no leakage at the joint. Fill up with oil if necessary.

3. Screw on the oil filter a further half turn by hand. **Chain tongs must not be used when fitting.** Start



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Fig. 2-54. Oil filter ready for fitting

- |                   |           |
|-------------------|-----------|
| 1. Gasket (oiled) | 2. Filter |
|-------------------|-----------|

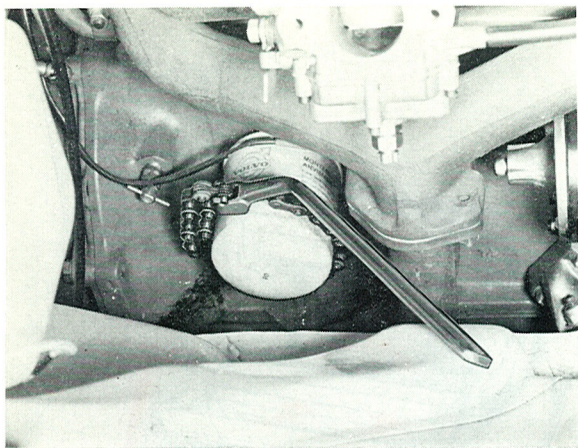


Fig. 2-55. Removing the oil filter

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## OIL PUMP AND RELIEF VALVE

After the pump has been dismantled and cleaned, check that all the parts are in good condition. Test the relief valve spring (2, Fig. 2-56), see "Specifications" for the values concerned.

Check that the tooth flank clearance is 0.15—0.35 mm (0.006—0.014"), see Fig. 2-57.

Measure the end float, 0.02—0.10 mm (0.0008—0.0040"), with a feeler gauge and a new cover or the old one if not noticeably worn. If the bushes or shaft are worn, replace them with new ones. Note that the driving shaft with gear is replaced as a single unit. The new bushes should be reamed after pressing in with a reamer provided with a pilot guide.

The sealing rings at the ends of the delivery pipe are made of special rubber and are manufactured to very close tolerances, see Fig. 2-59. Use only genuine Volvo spare parts. The delivery pipe must be clamped in its correct position first in the oil pump and then the oil pump and pipe together clamped against the block. The pump connecting flange should lie flush against the block before being tightened. Before being fitted, the rubber rings on the pipe can be coated with soapy water since this enables the pipe to take up its position more easily. Tap lightly on the pipe with a soft mallet if necessary.

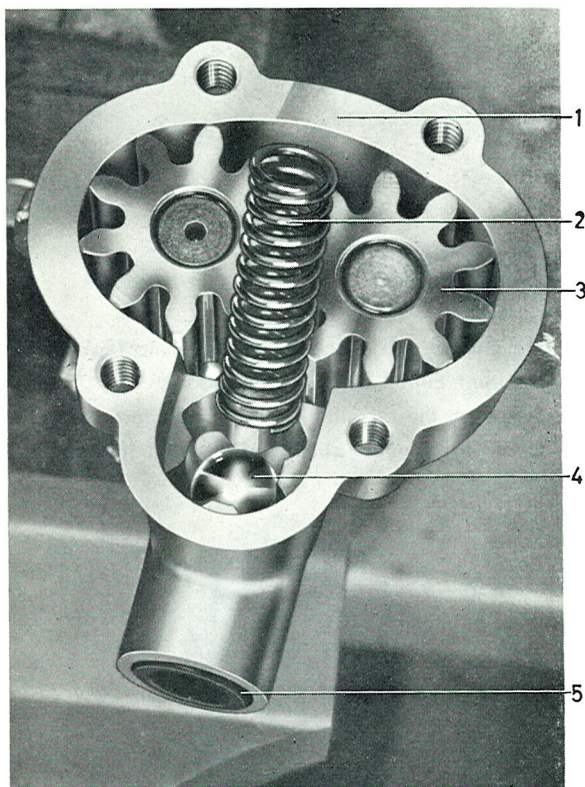


Fig. 2-56. Oil pump

- |                            |                      |
|----------------------------|----------------------|
| 1. Pump body               | 3. Gear              |
| 2. Spring for relief valve | 4. Valve ball        |
|                            | 5. Hole for oil pipe |

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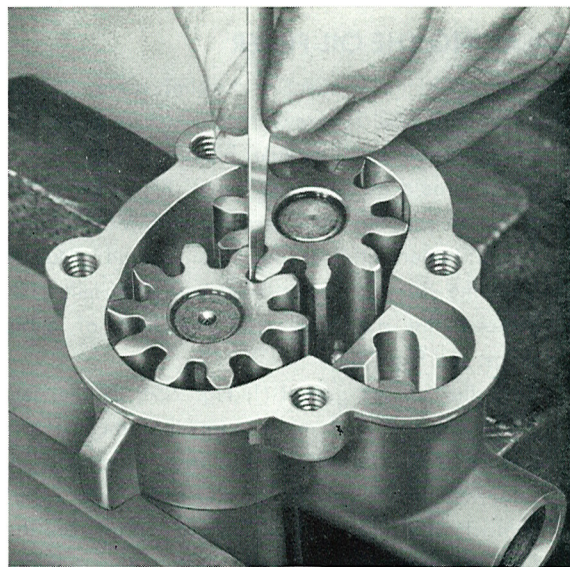


Fig. 2-57. Measuring tooth flank clearance

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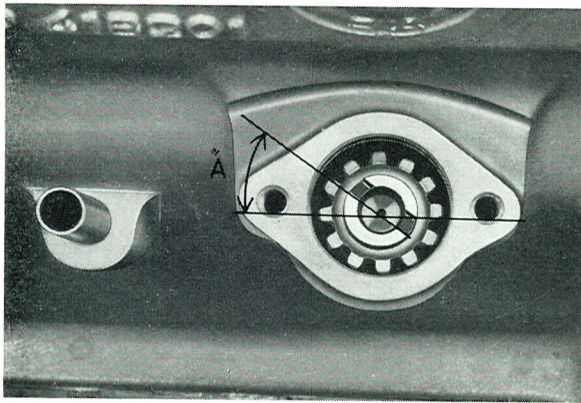


Fig. 2-58. Distributor drive position  
A = approx. 35°

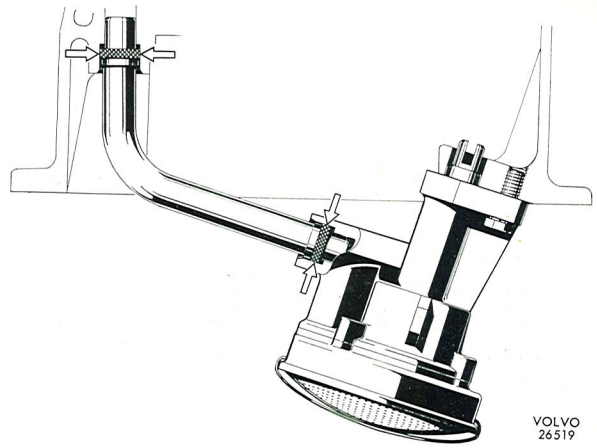


Fig. 2-59. Delivery pipe sealing rings

## OILWAYS

Before being fitted, all the oilways must be cleaned very thoroughly to avoid damage to the bearings, bearing journals and other components.

To clean the cylinder block oilways, remove the sealing plugs. After cleaning and drying with compressed air, fit new plugs.

## FITTING THE OIL PUMP

When No. 1 cylinder is at top dead centre, fit the oil pump drive and distributor. The small part at the groove is turned obliquely upwards-backwards and the groove set at an angle of 35° to the longitudinal axis of the engine, see Fig. 2-58 (A). Make sure that the shaft goes down into its groove in the pump shaft.

(N.B. When the timing gear marks are opposite each other, then the piston for No. 4 cylinder is in the top dead center position, firing position.)