

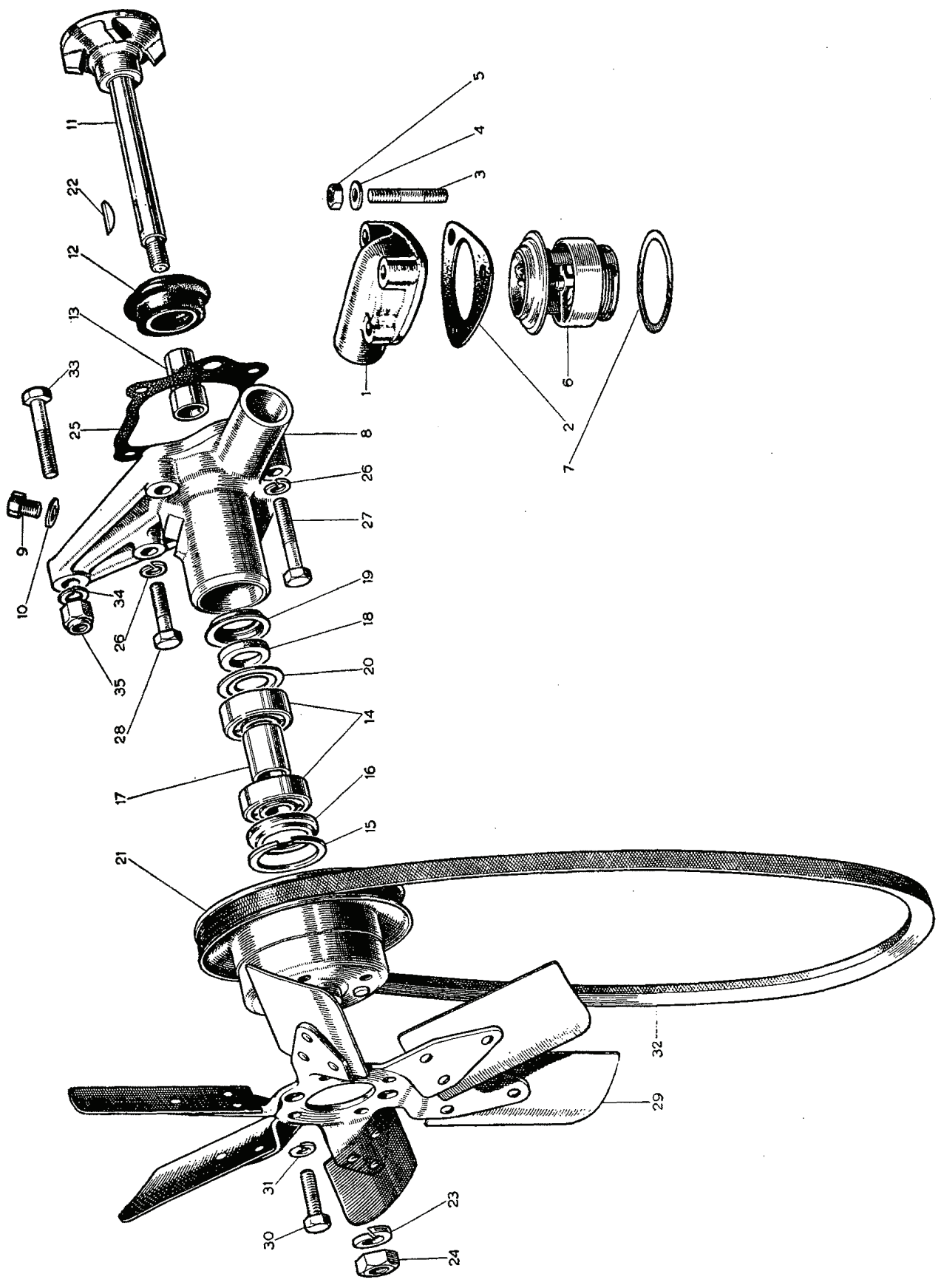
## SECTION C

### THE COOLING SYSTEM

Description.

- Section No. C.1    Removing the filler cap.
- Section No. C.2    Draining the cooling system.
- Section No. C.3    Filling the cooling system.
- Section No. C.4    Removing and replacing the radiator.
- Section No. C.5    Dynamo and fan belt adjustment.
- Section No. C.6    Cold weather precautions.
- Section No. C.7    Removing the water pump.
- Section No. C.8    Dismantling the water pump.
- Section No. C.9    Using special tool 18G60.
- Section No. C.10   Modified water pump.

# THE WATER PUMP, FAN, AND THERMOSTAT COMPONENTS



## KEY TO THE WATER PUMP, FAN, AND THERMOSTAT

| <i>No.</i> | <i>Description</i>       | <i>No.</i> | <i>Description</i>              |
|------------|--------------------------|------------|---------------------------------|
| 1.         | Elbow—water outlet.      | 19.        | Retainer—felt washer inner.     |
| 2.         | Joint—elbow.             | 20.        | Retainer—felt washer outer.     |
| 3.         | Stud—elbow to cylinder.  | 21.        | Pulley and fan—water pump.      |
| 4.         | Washer—stud.             | 22.        | Key—pulley.                     |
| 5.         | Nut—stud.                | 23.        | Spring washer.                  |
| 6.         | Thermostat.              | 24.        | Nut—pulley to spindle.          |
| 7.         | Joint—thermostat.        | 25.        | Joint—pump to block.            |
| 8.         | Body.                    | 26.        | Spring washer.                  |
| 9.         | Plug.                    | 27.        | Set screw—long—to block.        |
| 10.        | Washer—plug.             | 28.        | Set screw—short—to block.       |
| 11.        | Spindle with vane.       | 29.        | Fan complete.                   |
| 12.        | Seal.                    | 30.        | Set screw—fan to pulley.        |
| 13.        | Distance piece—gland.    | 31.        | Spring washer.                  |
| 14.        | Bearing.                 | 32.        | Belt—wedge type—fan.            |
| 15.        | Spring ring—bearing.     | 33.        | Bolt—dynamo to water pump body. |
| 16.        | Grease retainer—bearing. | 34.        | Spring washer.                  |
| 17.        | Distance piece—bearings. | 35.        | Nut—dynamo bolt.                |
| 18.        | Washer—felt.             |            |                                 |

## DESCRIPTION

The cooling system is sealed, and the water circulation is assisted by a pump attached to the front of the engine and driven by a belt from the crankshaft. The water circulates from the base of the radiator and passes around the cylinders and cylinder head, reaching the header tank of the radiator core via the thermostat and the top water hose. From the header tank it passes down the radiator core to the base tank of the radiator. Air is drawn through the radiator by a fan attached to the water pump pulley.

The thermostat is set to open between 70° C. and 75° C. (158° F. and 167° F.).

**IMPORTANT.**—Never use a muff on the radiator grille to protect the cooling system in cold weather as this would seal the carburetter and heater unit air supply. The radiator must be protected by a blind such as the type available as an optional extra fitting.

## Section C.1

## REMOVING THE FILLER CAP

The cooling system is under appreciable pressure while the engine is hot after a run, and the radiator filler cap must be removed very carefully or left in position until the water has cooled.

If it is necessary to remove the filler cap when the engine is hot it is absolutely essential to remove it gradually, and the filler spout is provided with a specially shaped cam to enable this to be done easily.

Unscrew the cap slowly till the retaining tongues are felt to engage the small lobes on the end of the filler spout cam, and wait until the pressure in the radiator is fully released before finally removing the cap.

It is advisable to protect the hand against escaping steam while removing the cap.

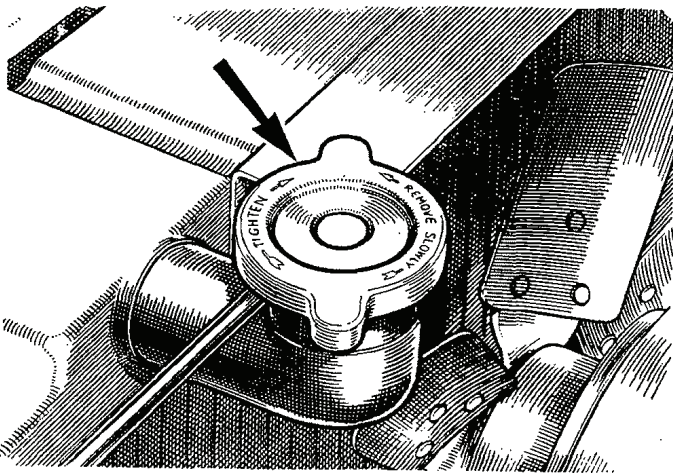


Fig. C.1

Showing the radiator filler cap retaining cam

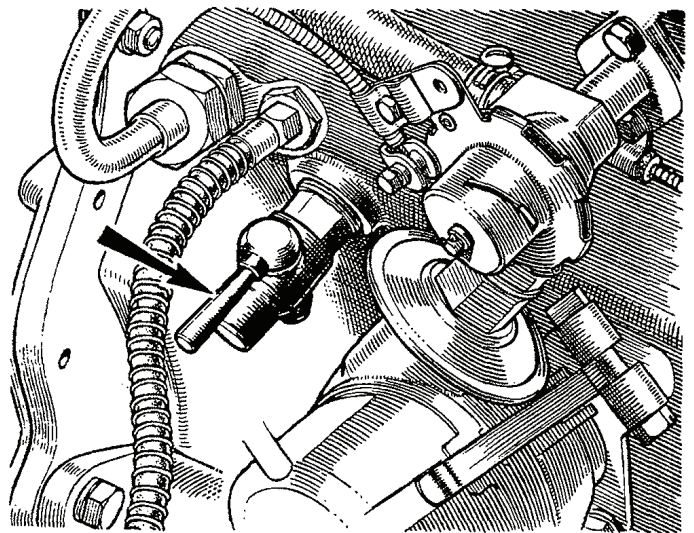


Fig. C.2

The engine drain tap on the right-hand side of the engine

## Section C.2

## DRAINING THE COOLING SYSTEM

Remove the radiator header tank filler cap.

Open the two drain taps. One is fitted on the left-hand side of the base of the radiator and the other at the rear of the cylinder block on the right-hand side.

**NOTE.**—If anti-freeze mixture is being used it should be drained into a suitable container and carefully preserved for replacement.

## Section C.3

## FILLING THE COOLING SYSTEM

Close the radiator and cylinder block drain taps.

Ensure that the water hose clips are tightened.

Fill up the system through the filler in the radiator header tank until approximately 1 in. (2.5 cm.) of water is visible in the filler neck.

When possible, rain-water should be used for filling the system.

Avoid overfilling to prevent loss of anti-freeze due to expansion.

Screw the filler cap firmly into position.

The cooling system is unsuitable for use with anti-freeze mixtures having an alcohol base owing to the high temperatures attained in the top tank. Only anti-freeze mixtures of the ethylene glycol or glycerine type should be employed.

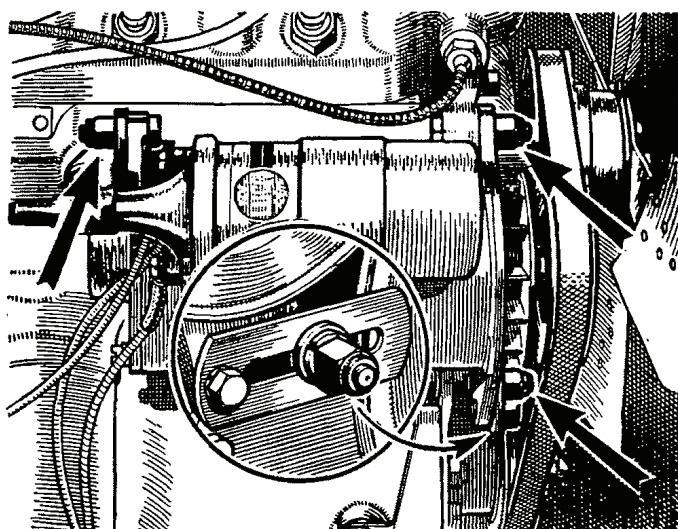


Fig. C.3

*Dynamo mounting bolts which must be slackened for fan belt tension adjustment*

## Section C.4

### REMOVING AND REPLACING THE RADIATOR

Drain the water from the cooling system as in Section C.2.

Release the clips on the top and bottom water hoses and detach the hoses from their connections.

Remove the three bolts securing each side of the radiator to the body and lift out the radiator.

Replace the radiator core by reversing the above procedure, noting that there is a packing strip between the radiator flanges and the body.

Close the drain taps and refill the cooling system with clean water and check for leaks.

## Section C.5

### DYNAMO AND FAN BELT ADJUSTMENT

The adjustment of the dynamo and fan belt tension is effected by slackening slightly the two bolts on which the dynamo pivots, releasing the bolt securing it to the slotted link, and the nut securing the slotted link to the engine. Raise the dynamo bodily until the belt tension is correct. Tighten up the bolts with the dynamo in this position.

**NOTE.**—A gentle hand pull only must be exerted on the dynamo, or the belt tension will be excessive and undue strain thrown on the dynamo bearings.

To check the tension for correctness rotate the fan blades. If the dynamo pulley slips inside the fan belt, the tension is insufficient. When the tension is correct, it should be possible to move the belt from side to side to the extent of 1 in. (2.5 cm.) at the centre of the longest belt run.

## Section C.6

### COLD WEATHER PRECAUTIONS

As the cooling system is sealed, relatively high temperatures are developed in the radiator upper tank. For this reason anti-freeze solutions having an alcohol base are unsuitable owing to their high evaporation rate producing rapid loss of coolant and a consequent interruption of the circulation of coolant.

Only anti-freeze of the ethylene glycol or glycerine type is suitable for use in the cooling system.

The correct quantities of anti-freeze for different degrees of frost resistance are given on page 7.

Before introducing anti-freeze mixture to the radiator it is advisable to clean out the cooling system thoroughly by swilling out the passages with a hose inserted in the filler cap, keeping the drain taps open. Only top up when the cooling system is at its normal running temperature, in order to avoid losing anti-freeze due to expansion.

Make sure that the cooling system is water-tight and examine all joints, replacing any defective rubber hose with new.

The capacity of the cooling system is 10 pints (5.7 litres, 12 U.S. pints).

## Section C.7

### REMOVING THE WATER PUMP

The water pump and fan assembly is attached to the front of the cylinder block by four bolts.

To remove the water pump it is first necessary to drain the water from the cooling system by opening the two drain taps as described in Section C.2, at the same time remembering to collect the water for re-use if it contains anti-freeze mixture.

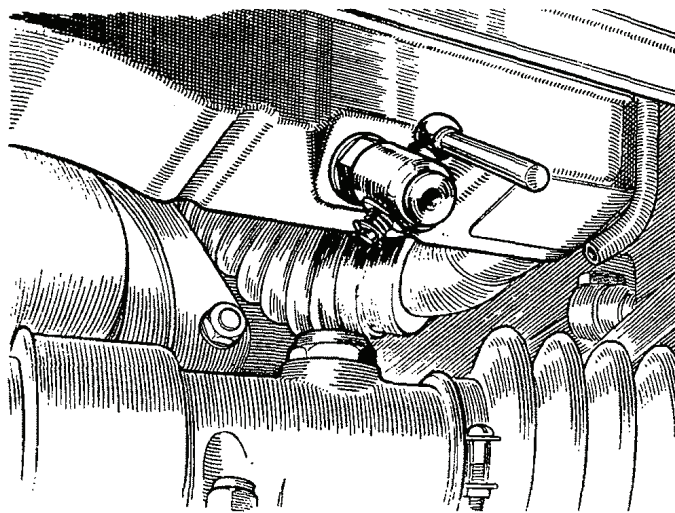


Fig. C.4

*The location of the radiator drain tap*

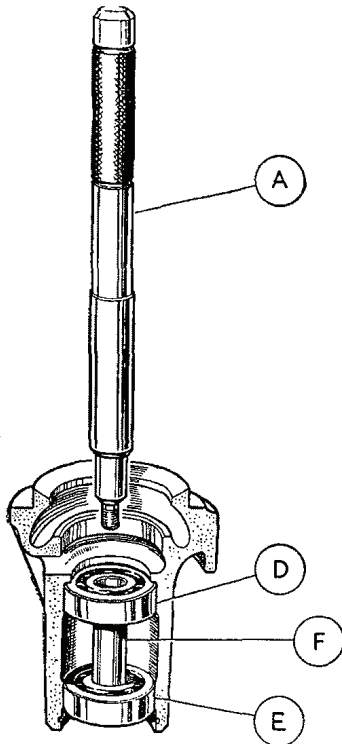


Fig. C.5

*This cut-away view of the water pump shows the special driver about to enter the rear bearing for removal. The rear bearing felt and retainers are not shown here*

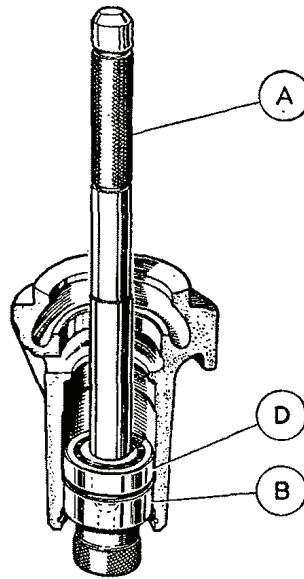


Fig. C.6

*Here the dummy front bearing is in position and the driver is screwed into it. This is the method of removing the rear bearing*

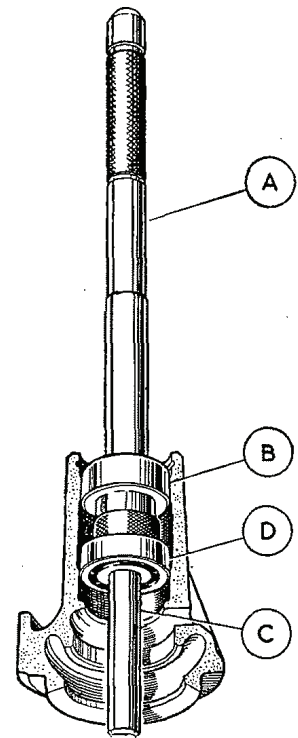


Fig. C.7

*When reassembling the pump use the tool assembled as shown and thread the rear bearing onto the pilot with the felt ring and retainers. (Felt and retainers not shown here)*

Release the clips on the top and bottom water hoses and detach the hoses from their connections.

Remove the three bolts at each side securing the radiator core to the body and lift out the radiator.

Disconnect the dynamo leads, remove the dynamo attachment bolts and take off the dynamo.

Take out the four bolts securing the fan and pump assembly to the front of the cylinder block and withdraw the assembly.

Replacement of the fan and pump assembly is a reversal of this procedure, but care must be taken to see that the joint gasket between the pump body and the cylinder block is in good condition. It is always advisable to fit a new gasket.

## Section C.8

### DISMANTLING THE WATER PUMP

When the fan and water pump assembly has been removed from the engine, as indicated in Section C.6, the water pump may be dismantled for attention in the following way:

Unscrew the four set bolts which attach the fan and belt pulley to the hub and remove the fan blades and pulley.

C.6

Unscrew the nut and spring washer from the end of the pump spindle and pull off the fan hub with a suitable extractor.

Remove the Woodruff key from the spindle and remove any burrs from the keyway. Withdraw the dished oil seal washer after removing its circlip.

Gently tap the pump spindle rearwards out of the pump body. Withdraw the sealing gland.

Should it be necessary to withdraw the ball races, the front one can be withdrawn with an extractor.

When the front bearing is removed it releases the distance tube between the bearings and gives access to the rear bearing.

When the rear bearing is extracted it permits the withdrawal of the felt washer along with its inner and outer retainers. The rear distance piece now remains in the pump body and may be removed if required.

Reassembly is a reversal of the dismantling procedure, but care must be taken to see that the seal assembly is in good condition before proceeding. If it shows signs of damage, a new seal must be fitted.

Renew the felt oil seal washer for the rear ball race if it shows signs of damage.

Repack with grease to Ref. C.

**Section C.9**

**USING SPECIAL TOOL 18G60**

This tool comprises three parts: the driver, dummy front bearing, and pilot (see the illustration on page Q.5). It is designed to remove and replace the water pump bearings without damage to the pump body.

After removing the water pump spindle and water seal, and the front bearing seal and retaining clip as detailed in Section C.8, support the pump body with the front end downwards.

Insert the driver (A) (Fig. C.5) into the rear bearing (D) and tap downwards until the front bearing (E) and the distance piece (F) are released.

Position the dummy front bearing (B) in the pump body and screw the driver into it (Fig. C.6). The rear bearing is now aligned with the housing bore and may be tapped out and the felt washer and retainers removed.

**Replacing bearings**

Support the body with the rear end downwards.

Assemble the driver, dummy front bearing, and pilot (C). Position the rear bearing, the felt ring inner retainer, the felt ring and outer retainer, in that order, on the pilot and press them into the pump body (Fig. C.7).

Position the distance tube and front bearing on the pilot and press the bearing into the pump body.

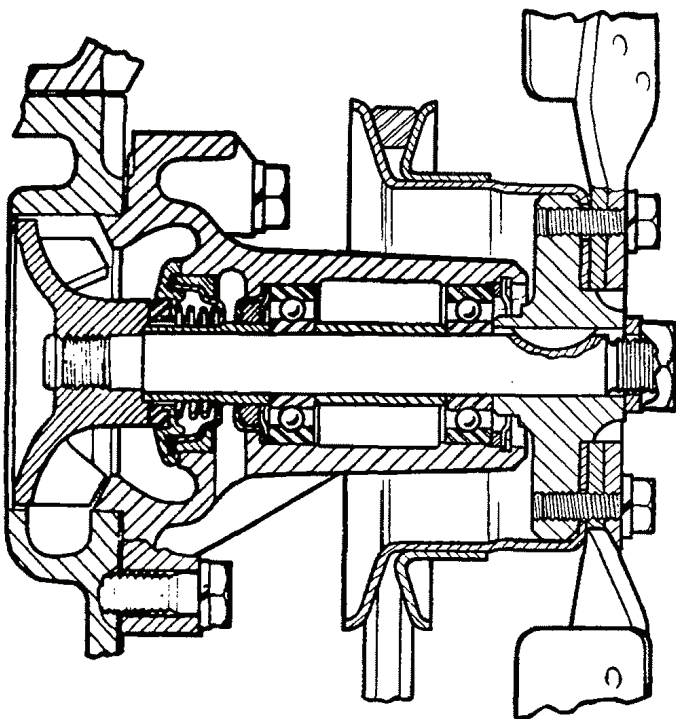


Fig. C.8

*A section through the water pump showing the location of the components*

**Section C.10**

**MODIFIED WATER PUMP**

A new water pump (Part No. 1H1149) which incorporates a one-piece bearing is fitted from engines numbered 15GB/U/H39365 to 15GB/U/H39400 inclusive, and 15GB/U/H39526 onwards. The pump is interchangeable with the original, but only as a complete unit.

**Removing**

Remove the radiator as detailed in Section C.4.

Remove the dynamo attachment bolts and take off the dynamo.

Unscrew the four bolts attaching the pump assembly to the front of the cylinder block and remove the fan and pump assembly.

Replacement of the fan and pump assembly is a reversal of the above procedure.

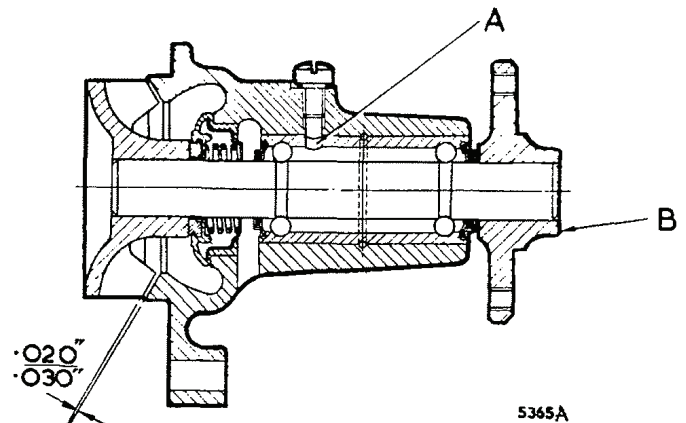


Fig. C.9

*A section through the later-type water pump. When assembled, the hole in the bearing (A) must coincide with the lubricating hole in the water pump, and the face of the hub (B) must be flush with the end of the spindle*

**Dismantling**

Unscrew the four set bolts which attach the fan and pulley to the hub and remove the fan and pulley.

Remove the fan hub with a suitable extractor.

Pull out the bearing locating wire through the hole in the top of the pump body.

Gently tap the pump bearing assembly rearwards out of the pump body. This will release the combined bearing and spindle assembly together with the seal and vane.

Remove the vane from the bearing assembly with a suitable extractor and remove the pump seal assembly.

Reassembly is a reversal of this procedure, but care must be taken to see that the seal assembly is in good condition. If there is any sign of damage the seal should

be replaced by a new component. When the bearing assembly is fitted into the pump the hole in the bearing (A) must coincide with the lubricating hole in the water pump body. Should the interference fit of the fan hub have been impaired when the hub was withdrawn from the spindle, a new hub should be fitted.