

## **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 and reassembling the water pump. |

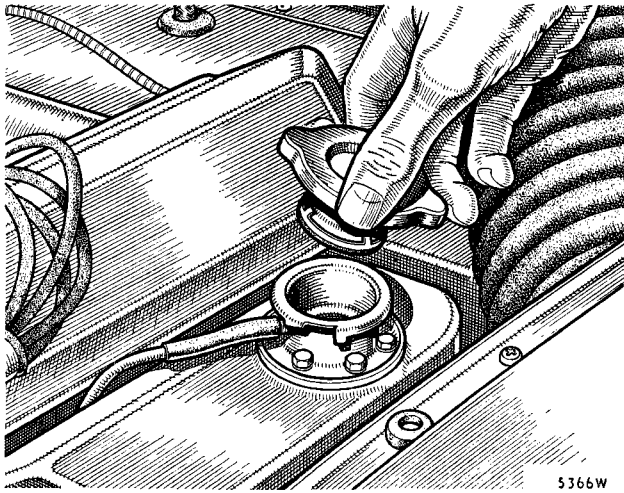


Fig. C.1

*The cooling system header tank is positioned above the exhaust manifold on the left-hand side of the engine. Remove the cap slowly if the engine is hot*

#### 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 cylinder head to the separate header tank mounted above the exhaust manifold before reaching the radiator. The cylinder block is cooled by thermosiphon action. From the header tank the water 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 50 and 55° C.

**IMPORTANT.**—Never use a muff on the radiator grille to protect the cooling system in cold weather as this would seal the carburettor 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 header tank 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

C.2

spout cam, and wait until the pressure in the system is fully released before finally removing the cap.

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

#### Section C.2

##### DRAINING THE COOLING SYSTEM

Remove the header tank filler cap.

Open the two drain taps. One is fitted on the right-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 header tank until the coolant level is approximately  $\frac{1}{4}$  in. (6.3 mm.) below the bottom of the filler neck.

When possible, rain-water should be used in 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. Only anti-freeze mixtures of the ethylene glycol or glycerine type should be employed. (See Section C.6.)

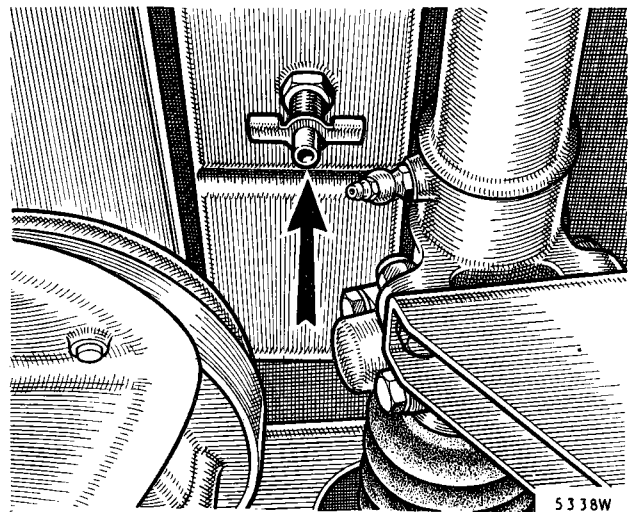


Fig. C.2

*The radiator drain tap is positioned beneath the radiator on the right-hand side*

## Section C.4

### REMOVING AND REPLACING THE RADIATOR

Drain the coolant from the 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, refill the cooling system, 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, and 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 belt tension 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.

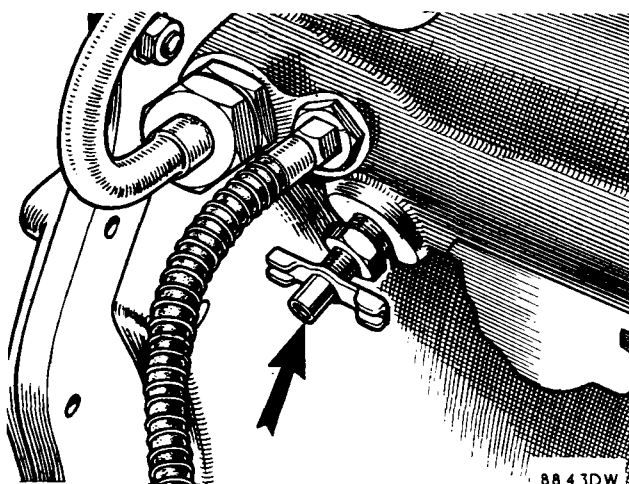


Fig. C.3

The cylinder block drain tap is situated on the right-hand side of the engine. To drain the coolant turn the tap in an anti-clockwise direction

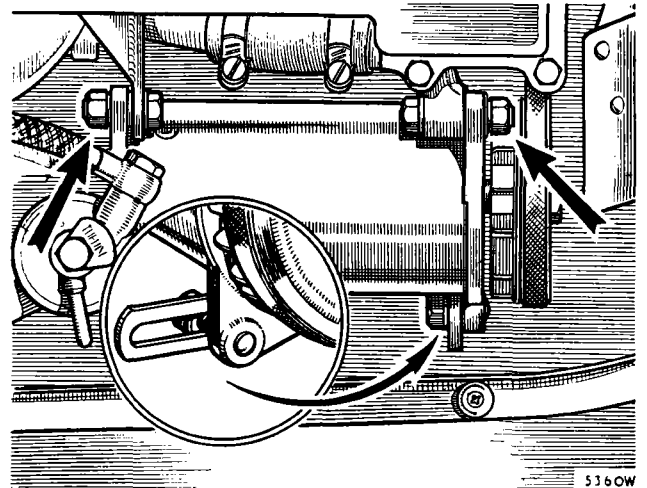


Fig. C.4

The dynamo mounting bolts which must be slackened for belt tension adjustment

## Section C.6

### COLD WEATHER PRECAUTIONS

As the cooling system is sealed, relatively high temperatures are developed in the header 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 in the 'GENERAL DATA' section.

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 neck, 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 watertight and examine all joints, replacing any defective rubber hose with new.

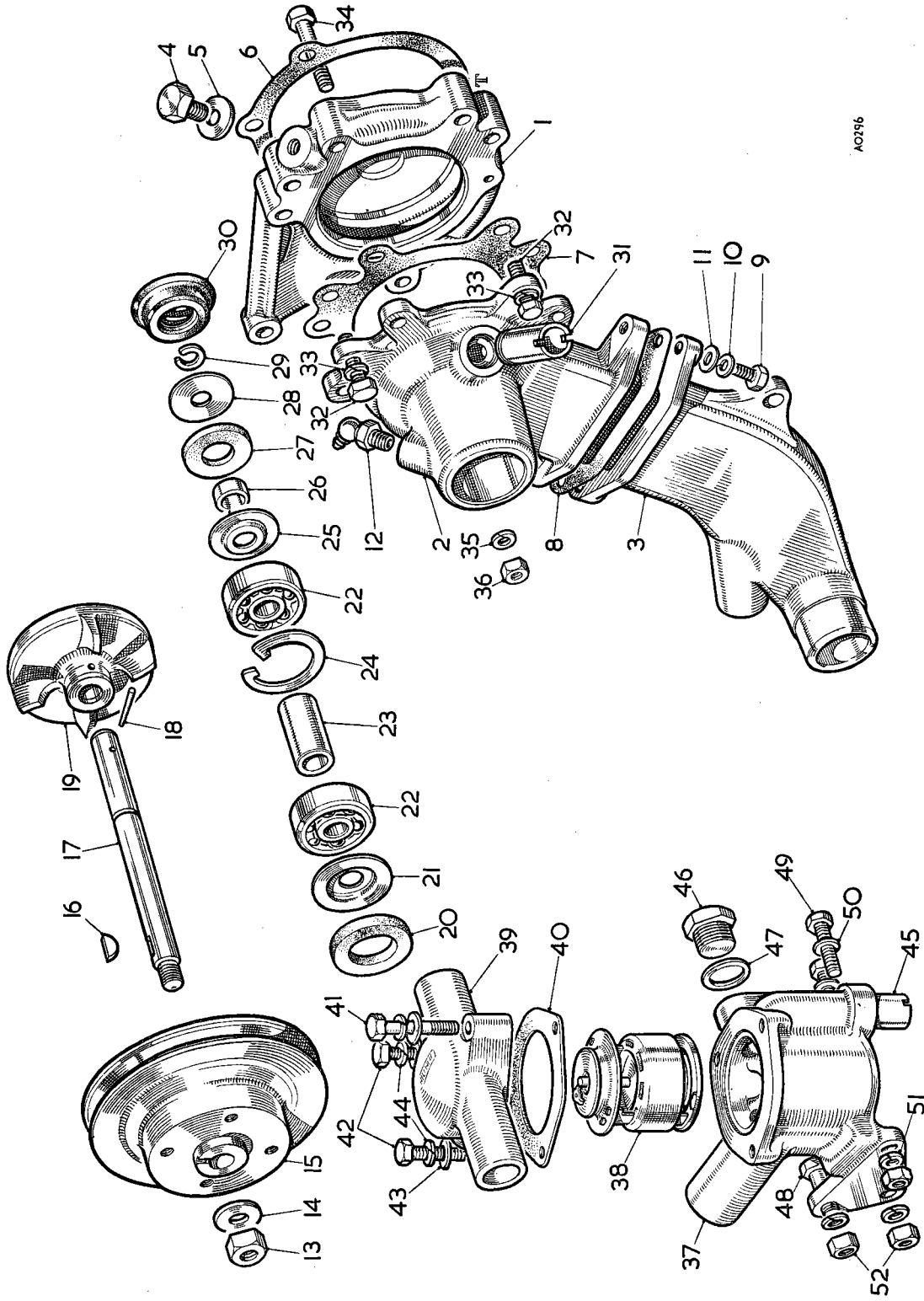
## Section C.7

### REMOVING THE WATER PUMP

The water pump is attached to the front of the timing case by three studs and one bolt around the pump casing. A further bolt secures the cast aluminium inlet pipe.

To remove the water pump it is first necessary to drain the water from the cooling system by opening the two

# THE WATER PUMP AND THERMOSTAT COMPONENTS



AO256

## KEY TO THE WATER PUMP AND THERMOSTAT COMPONENTS

<i>No.</i>	<i>Description</i>	<i>No.</i>	<i>Description</i>	<i>No.</i>	<i>Description</i>
1.	Scroll.	19.	Vane.	37.	Thermostat housing.
2.	Body.	20.	Felt washer.	38.	Thermostat.
3.	Inlet pipe.	21.	Dust cover.	39.	Housing cover.
4.	Scroll vent plug.	22.	Bearing.	40.	Joint for cover.
5.	Washer for vent plug.	23.	Bearing distance tube.	41.	Bolt—cover to housing.
6.	Joint—scroll to timing case.	24.	Circlip—bearing.	42.	Set screw —cover to housing.
7.	Joint—scroll to water pump body.	25.	Dust cover.	43.	Plain washer.
8.	Joint—water inlet pipe to pump.	26.	Collar.	44.	Spring washer.
9.	Set screw—inlet pipe to pump.	27.	Felt washer.	45.	Thermostat by-pass pipe.
10.	Spring washer.	28.	Dust cover.	46.	Plug—heater take-off.
11.	Plain washer.	29.	Circlip—spindle.	47.	Washer for plug.
12.	Bearing grease nipple.	30.	Seal.	48.	Bolt—thermostat housing and timing case to front plate.
13.	Nut for spindle.	31.	Hose connection—thermostat by-pass.	49.	Set screw—thermostat housing and timing case to front plate.
14.	Lock washer.	32.	Set screw—pump body to scroll.	50.	Plain washer.
15.	Fan pulley.	33.	Spring washer.	51.	Spring washer.
16.	Spindle key.	34.	Bolt—water pump and scroll to front plate.	52.	Nut.
17.	Spindle.	35.	Spring washer.		
18.	Vane taper pin.	36.	Nut.		

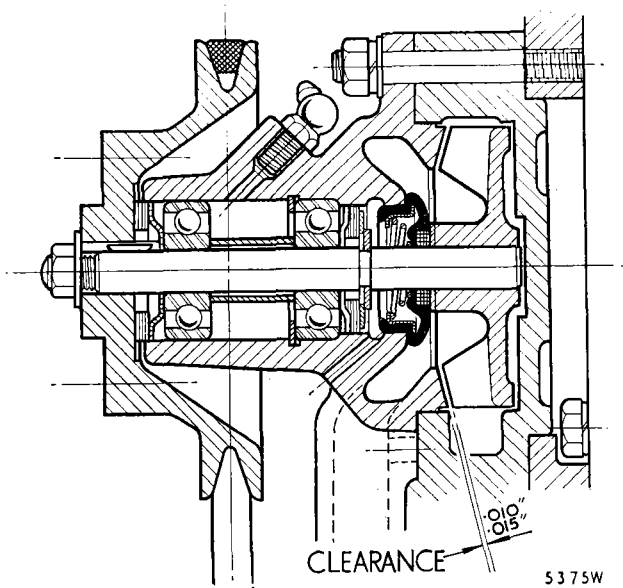


Fig. C.5

*A sectioned view of the water pump showing the clearance between the body and the pump vane*

drain taps as described in Section C.2, at the same time remembering to keep the coolant liquid for re-use if it contains anti-freeze mixture.

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 and fan belt.

Remove the bolt and the three nuts from the studs securing the pump body to the timing case, also the bolt holding the aluminium inlet pipe. Release the clips on the water outlet and by-pass hoses. The pump and fan assembly together with the inlet pipe can then be withdrawn.

Replacement of the assembly is a reversal of the above procedure, but care must be taken to see that the joint gasket between the pump body and the timing case is in good condition.

## Section C.8

### DISMANTLING AND REASSEMBLING THE WATER PUMP

When the fan and water pump assembly has been removed as indicated in Section C.7 the water pump may be dismantled in the following manner.

Unscrew the four set bolts and remove the fan blades from the hub. Unscrew the nut and spring washer from the end of the pump spindle and pull off the fan hub with a suitable extractor. Release the two bolts securing the aluminium inlet pipe to the pump body and remove the pipe.

Remove the felt seal and the Woodruff key from the spindle, taking care to remove any burrs from the keyway. Withdraw the dished oil seal washer.

Remove the four bolts securing the pump body to the scroll casing and separate the two parts. Gently tap the spindle rearwards out of the pump body and remove the flat sealing washer, the felt seal, and the dished sealing washer. The rubber sealing gland is withdrawn from the spindle after removing the felt seal locating circlip.

Should it be necessary to remove 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 retaining circlip. Remove the circlip and withdraw the rear bearing if required.

Reassembly is a reversal of the dismantling procedure, but care must be taken to see that the seal is in good condition before proceeding.

Before assembling the pump body to the scroll casing ensure that a running clearance exists between the body and the pump vane as indicated in Fig. C.5. No adjustment is provided for varying the designed clearance, which should always be present.

Renew the pump body gasket and the felt seals if necessary.

Repack with grease to Ref. C.