SECTION C

COOLING SYSTEM

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Section C.1

DESCRIPTION

The circulation of the cooling water is effected by a centrifugal pump mounted in front of the cylinder block and driven by a belt from the crankshaft pulley. A thermostat is fitted in the water outlet pipe at the front end of the engine.

When filling or topping-up the radiator, do so when the engine is cold, and if possible use rainwater or clean soft water. Fill up to the filler plug orifice.

The capacity of the system is 10 pints (5·68 litres, 12 U.S. pints.)

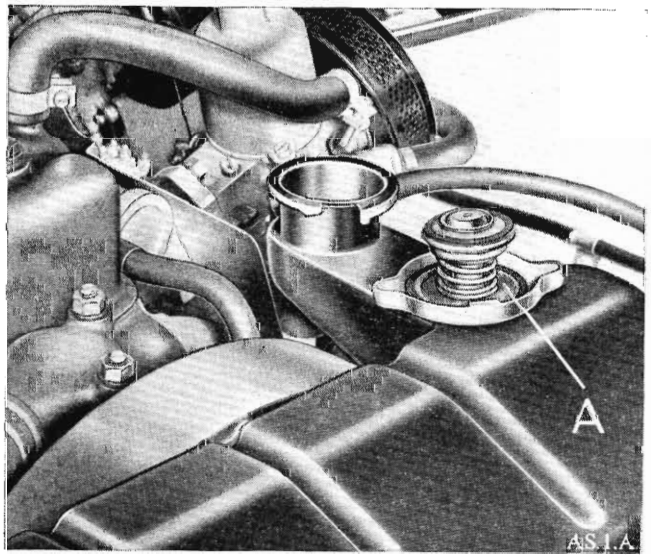


Fig. C.1. Showing the radiator filler with its cap 'A' removed.

Section C.2

ADJUSTMENTS IN VEHICLE

Overheating may be caused by a slack fan belt, excessive carbon deposit in the cylinders, running with the ignition too far retarded, improper carburetter adjustment, a partially chocked radiator causing failure of the water to circulate, or loss of water due to leakage or evaporation.

The belt should be just sufficiently tight to prevent slip yet it should be possible to move it laterally about 1 in. (2·54 cms.). To make an adjustment slacken the bolts 1, 2 and 3, Fig. C.2 which hold the generator in position, then raise or lower the generator until the desired tension of the belt is obtained. Securely lock the generator in position again at securing points 1, 2 and 3, Fig. C.2 when the adjustment has been made.

Section C.3

RADIATOR

To Remove

(1) Drain the cooling system.
(2) Slacken the hose clip, on the upper water hose, at the thermostat housing and with the aid of a screwdriver ease the pipe off the housing extension.
(3) Take off the radiator bottom hose by releasing the clips on the water pump and water outlet pipe if a heater is fitted.
(4) Remove the four nuts (two on each side) which secure the radiator to the mounting flanges and remove the radiator (see Fig. C.3.).
(5) Inspect the radiator core for damage and test it for water leaks. Solder at the points where leakage occurs or renew the core if necessary.
(6) Inspect the drain tap for leaks and renew it if necessary.
(7) Test the filler cap.
(8) Inspect the hose connections for deterioration and renew them if necessary.

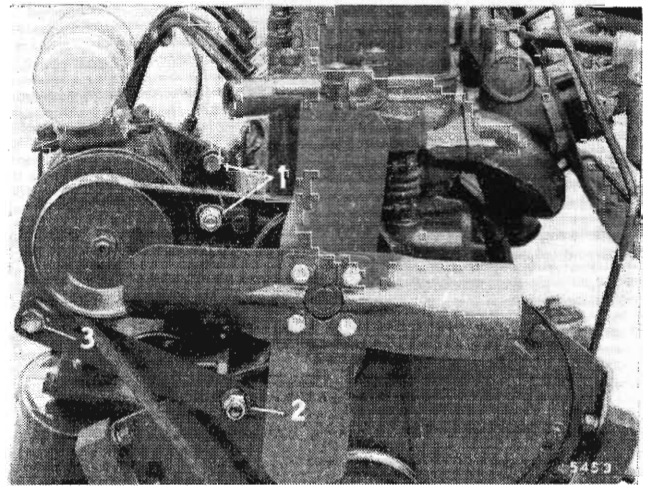


Fig. C.2. Fanbelt adjustment.
1 *and* 3. *Generator securing bolts.* 2. *Swinging link locknut.*

To Replace

Installation is a reversal of the procedure 'To remove.'

Section C.4

THERMOSTAT

To Remove

(1) Drain the cooling system (see Section C.7).
(2) Disconnect the outlet hose from the outlet elbow.

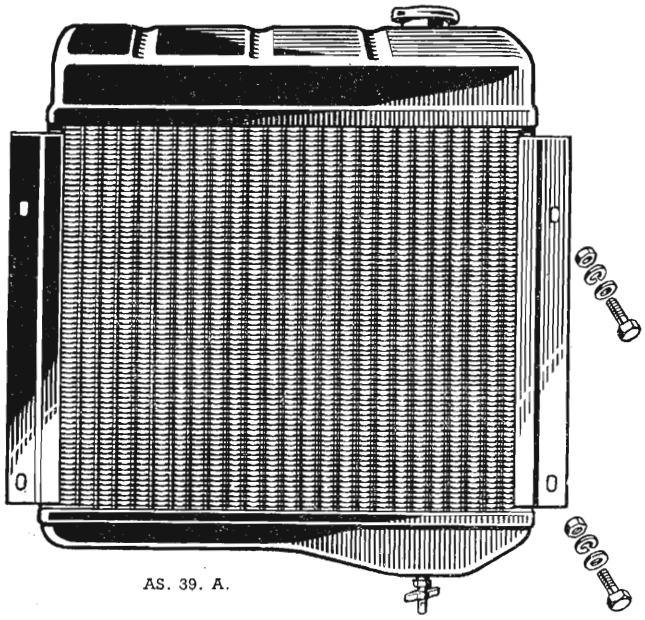


Fig. C.3. Illustrating the positions of the four radiator securing setpins.

(3) Remove the three nuts and spring washers from the thermostat cover and lift the cover off its studs.

(4) Remove the paper joint washer and lift out the thermostat, Fig. C.4.

(5) Test the thermostat opening temperature by immersing it in water at a temperature between 154° and 167°F. (68° and 75°C.). If the thermostat valve does not start to open, or the valve sticks in the fully open position, the thermostat should be renewed. No attempt should be made to repair the thermostat.

(6) Clean the joint faces at the outlet elbow and at the housing in the cylinder head.

To Replace

The installation of the thermostat is a reversal of the procedure 'to remove'. Fit a new paper joint washer between the cover and the cylinder head. In an emergency the engine can be run with the thermostat removed.

Section C.5

TEMPERATURE GAUGE

A temperature gauge unit, consisting of a thermal element and dial indicator is fitted to the vehicle. The thermal element is held in the radiator header tank by a gland nut. The dial indicator is situated in the instrument panel and is connected to the element by a capilliary tube filled with mercury.

Damage to any of the above mentioned parts will necessitate the renewal of the complete temperature gauge unit.

The combined water temperature and oil pressure gauges are of integral construction, and should one of these instruments fail, both will have to be renewed.

Section C.6

FAN AND PUMP ASSEMBLY

To Remove

(1) Remove the radiator (see Section C.3).

(2) Remove the generator (see Section M).

(3) Remove the pump unit from the cylinder block by removing the four securing bolts and spring washers and disconnecting the lower hose, by-pass hose, and interior heater hose if any.

(4) Remove the fan blades if necessary by withdrawing the four set screws from the pulley.

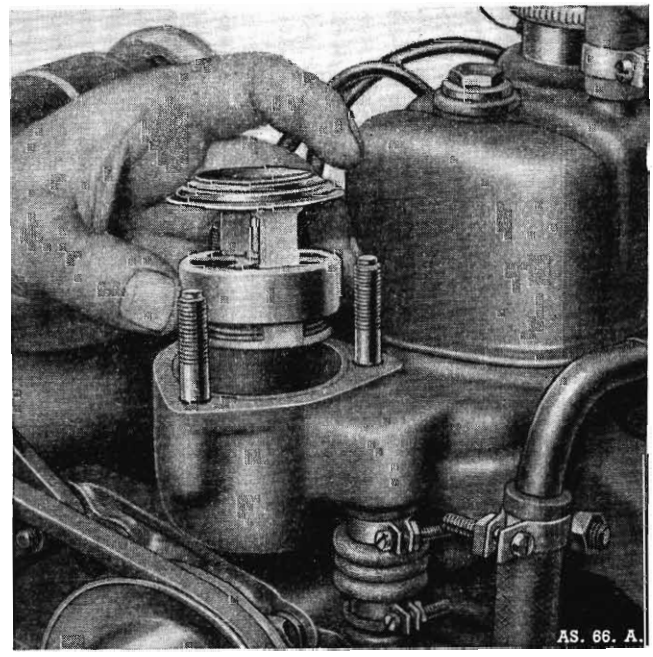


Fig. C.4. Illustrating the removal of the thermostat from its housing

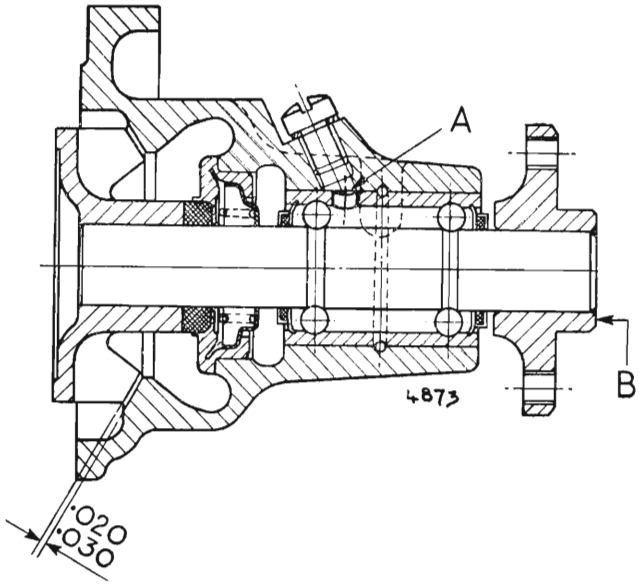


Fig. C.5. A section through the water pump showing the location of the components. When assembled the hole in the bearing must coincide with the lubricating hole in the water pump 'A' and the face of the hub 'B' must be flush with the end of the spindle.

To Dismantle

(1) Unscrew the four set bolts which attach the fan and belt pulley to the hub and remove the fan and pulley.

(2) Remove the fan hub with a suitable extractor.

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

(4) 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.

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

To Reassemble

Reassembly is a reversal of the procedure 'To dismantle'. Attention should be given to the following points:

(1) 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.

(2) When the bearing assembly is assembled into the pump the hole in the bearing must coincide with the lubricating hole in the water pump body (see Fig. C.5.).

(3) Remove the water pump oiling plug (A) on the water pump casing and add a small quantity of S.A E. 140 oil (see Fig. C.6.). The oiling of the pump must be done sparingly, otherwise oil will flow past the bearings on to the face of the carbon sealing ring and impairing its efficiency.

(4) Check to see that the bearings run freely without excessive end play by spinning the fan.

To Replace

The installation of the fan and pump assembly is a reversal of the procedure 'To remove'. Particular note should be made of the following:

(1) Fit a new joint washer between the pump body and the cylinder block.

(2) Inspect the fan belt for uneven wear or frayed fabric, and renew the belt if required.

(3) Adjust the fan belt tension (see Section C.2.).

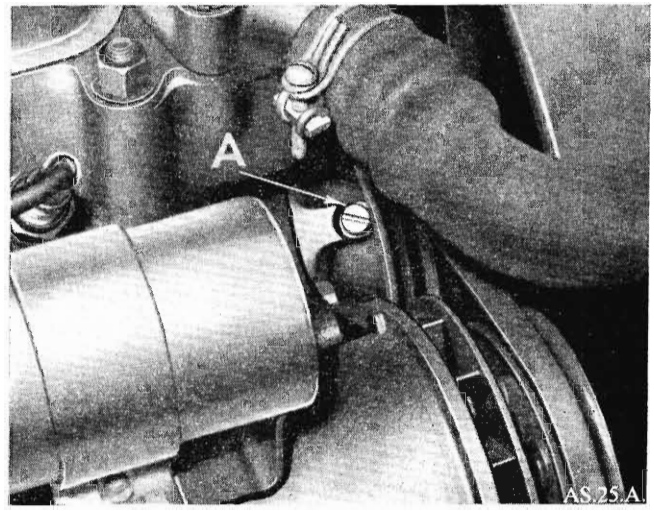


Fig. C.6. Showing location of oiling plug 'A' on the water pump body.

Section C.7

DRAINING AND FLUSHING THE SYSTEM

To Drain the System

When the vehicle is to be stored the entire cooling system should be drained to protect against corrosion, and in certain instances, freezing. To drain the system proceed as follows:

(1) With the vehicle standing on level ground, remove the radiator filler cap.
Caution—As the system is pressurised, do not remove the radiator filler cap while the engine is running and always wait until the water has cooled.

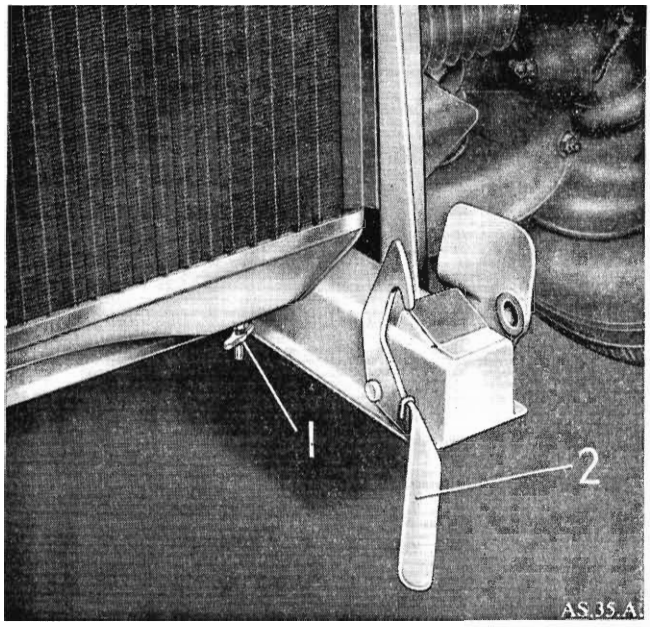


Fig. C.7. Showing location of radiator drain tap.
1. *Radiator drain tap* 2. *Bonnet safety catch.*

If it is necessary to remove the filler cap while the engine is hot it is essential to remove it gradually and the filler neck is provided with a shaped cam to enable this to be done.
Unscrew the cap slowly until the retaining tongues are felt to engage the small lobes at end of the filler neck cam, and wait until the pressure in the radiator is fully released before finally removing the cap.

(2) Open the cylinder block and radiator drain taps. If the system contains anti-freeze mixture it should be drained into clean containers, strained and preserved for re-use.

(3) To prevent the possibility of operating the vehicle with the system drained make sure that a suitable notice is placed on the vehicle or other precautions taken.

To Flush the System

Because there are impurities in the water in certain localities, deposits are left in the system. These deposits tend to clog the system and so impair cooling efficiency. It is therefore desirable to flush the radiator and water passages every 12,000 miles (19200 km.).

(1) Remove the filler cap and drain tap and allow the system to be thoroughly cleansed by flushing clean water through the filler orifice.

(2) Remove the radiator from the vehicle (Section C.3) turn it upside down and reverse flush by feeding clean water through the elbow on the bottom tank and allowing waste water to escape through the filler orifice.

(3) Remove and clean the thermostat (Section C.4).

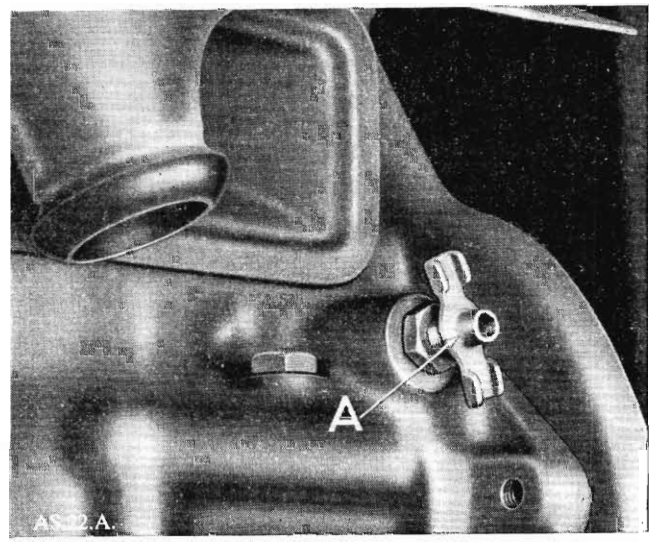


Fig. C.8. Showing cylinder block drain tap 'A' on left side of engine

Section C.8

FROST PRECAUTIONS

Care should be taken to see that the water is drained off completely, for in case of freezing it will do harm by expansion taking place and fracture of the cylinder block may result. There are two drain taps, one of them on to the rear of the engine on the left hand side, and the other at the base of the radiator. Both taps must be opened to drain the system and the vehicle must be on level ground while draining. Freezing may occur first at the bottom of the radiator or in the lower hose connection. Ice in the hose will stop water circulation and may cause boiling.

A muff can be used to advantage but care must be taken not to run with the muff fully closed, or boiling will result.

It must be noted that in the case of a car fitted with a heater no provision is made for draining the heater unit. Draining the radiator and cylinder block is not, therefore, a sufficient safeguard against freezing. An anti-freeze mixture must be used (see GENERAL INFORMATION page 9).

When frost is expected or when the vehicle is to be used in very low temperatures, make sure that the strength of the solution is, in fact, up to the strength recommended by the manufacturers, for conditions likely to be encountered.

The strength of the solution must be maintained by topping-up with anti-freeze solution as necessary. Excessive topping-up with water will reduce the degree of protection afforded.

If the cooling system has to be emptied run the mixture into a clean container and use it again.

Section C.9

HEATER UNIT

Description

The Smith's heating and ventilating system is designed to provide heated fresh air to the car interior at floor level and to the windscreen for demisting and defrosting.

Air for the heater is drawn from a forward-facing intake via an auxiliary blower which should only be needed at speeds below about 25 m.p.h. A shut-off valve is incorporated in the heater intake to prevent fumes from entering the car in traffic. The valve must always be open when heating is required. A water tap is fitted at the rear end of the engine. In summer conditions this tap may be shut off and the system may then be used for cool air ventilation.

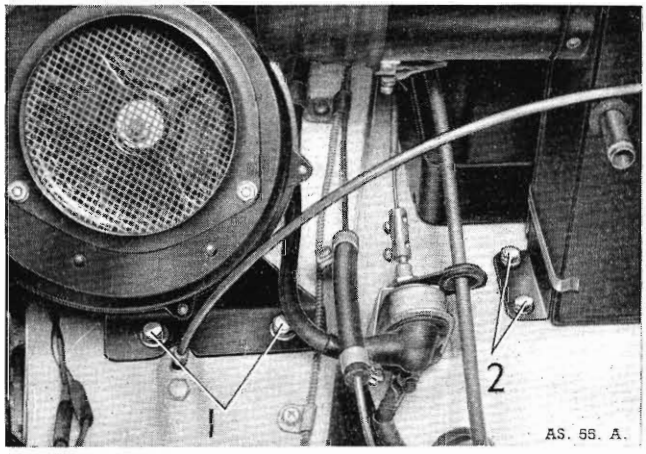


Fig. C.9. Heater mounting points.
1. *Heater blower bracket mounting setscrews.*
2. *Two of the four heater unit mounting setscrews.*

Controls

The heating and ventilating system is operated by a single control located on the fascia panel. This control takes the form of a knob marked 'Air—Push and Turn'. For heating and demisting, push in the air control knob. The blower may be switched on if required by turning the knob in a clockwise direction. The knob MUST be pushed in before the blower can be switched on. Two doors located forward at either side of the gearbox tunnel control distribution of air between screen and car interior. For heating, open the doors. For defrosting (i.e., boosting flow of hot air to screen) close the doors.

Heater Removal

(1) Drain the cooling system as described in Section C.7.
(2) Disconnect the butterfly valve control wire situated at the right-hand side of the heater unit.
(3) Detach the heater inlet and outlet pipes at their heater connections.
(4) Remove the four setpins securing the heater unit to the engine bulkhead (Fig. C.10).
(5) Withdraw the heater and at the same time slip it off the air intake pipe.

Heater Replacement

Installation of the heater unit is a reversal of the removal procedure.

Section C.10

MODIFIED ENGINE DRAIN TAP

From Engine No. 9C/U/H 6359 a cylinder block drain tap (Part No. 3H576) of improved design is fitted. This tap is introduced to overcome any difficulty of operation and has a plain British Standard Pipe thread in place of the taper thread previously used. A fibre washer must, therefore, be fitted between the cylinder block and the tap.

The new tap is interchangeable with that previously used.

Section C.11 FAULT DIAGNOSIS

Symptom	No.	Possible Fault
(a) Internal Water Leakage	1	Cracked cylinder wall
	2	Loose cylinder head nuts
	3	Cracked cylinder head
	4	Faulty gasket
	5	Cracked tappet chest wall
(b) Poor Circulation	1	Radiator core blockage
	2	Water jacket restriction
	3	Low water level
	4	Loose fan belt
	5	Defective thermostat
	6	Perished or collapsed radiator bottom hose
(c) Corrosion	1	Impurities in water
	2	Infrequent draining and flushing
(d) Overheating		In (b) check 4, 5 and 6
	1	Sludge in crankcase
	2	Faulty ignition timing
	3	Low oil level in sump
	4	Tight engine
	5	Choked exhaust system
	6	Binding brakes
	7	Slipping clutch
	8	Valve timing incorrect
	9	Retarded ignition
	10	Mixture too weak