Service Instruction Manual

Fourth Issue

STANDARD VANGUARD

SERIES I AND II
and
TRIUMPH "RENOWN" MODELS

COOLING SYSTEM

SECTION C

THE STANDARD MOTOR COMPANY LTD., COVENTRY

COOLING SYSTEM

INDEX

ILLUSTRATIONS

Series II Supplement

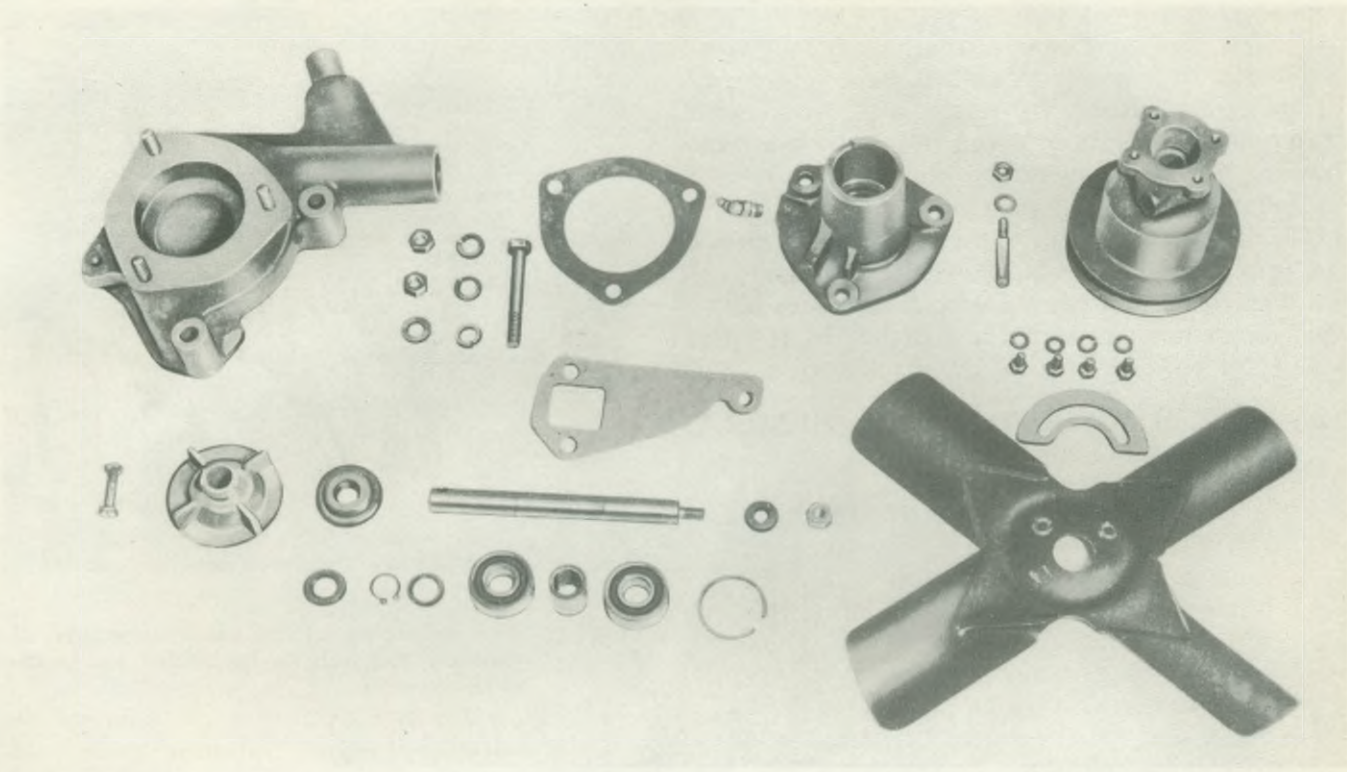

Fig. 1. Exploded view of water pump items—assembly Detail No. 500113 (used on Engine Nos. V46611E and future)

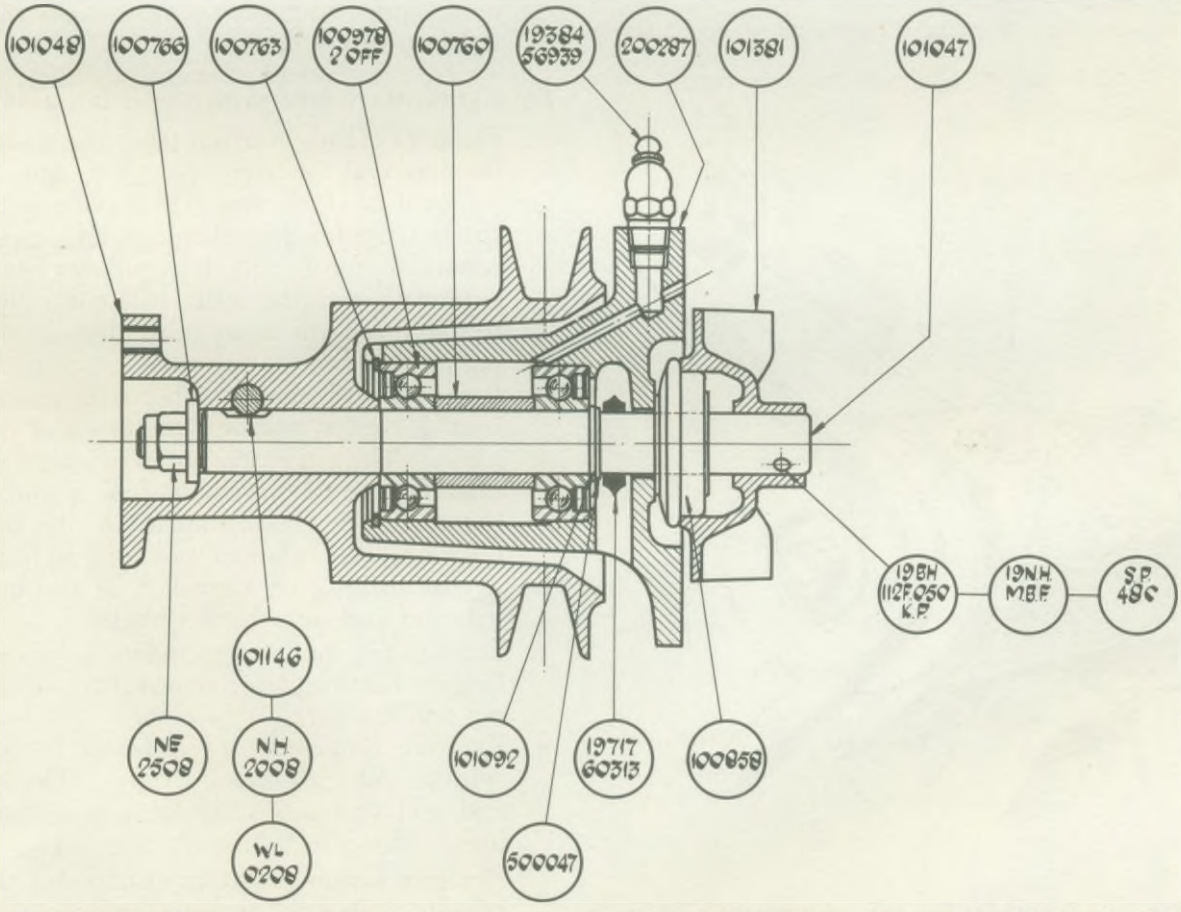

Fig. 2. Fan and Water Pump Bearing Housing Assembly. Detail No. 101049—The assembly, as shown, was introduced at Eng. No. V.46611E, but used from V.42140E and V.46610E with the Seal and Impeller fitted to Water Pump 58910.

COOLING SYSTEM

The cooling system is thermostatically controlled with a pump to circulate the water and a generous system of water jacketting, with careful consideration given to the important points such as sparking plugs, etc., where adequate cooling is important.

The water pump, shown in Figs. 1 and 2 is supplied with a fan blade assembly which is 14" in diameter and provided with four blades being driven in tandem with the dynamo by the fan pulley on the front end of the crankshaft.

WATER PUMP AND FAN ASSEMBLY

To remove.

The following procedure is recommended :—

1. Drain cooling system.
2. Disconnect hose connections.
3. Remove fan belt after slackening this by adjustment of dynamo's position. To adjust position of dynamo and hence of the belt tension, slacken off at points "1", "2", "3" and "4" shown in Fig. 3. The correct belt tension should allow $\frac{3}{4}$"—1" sag in the vertical link with moderate hand pressure. Over-tightening of belt will damage the dynamo bearings (see also page 8).

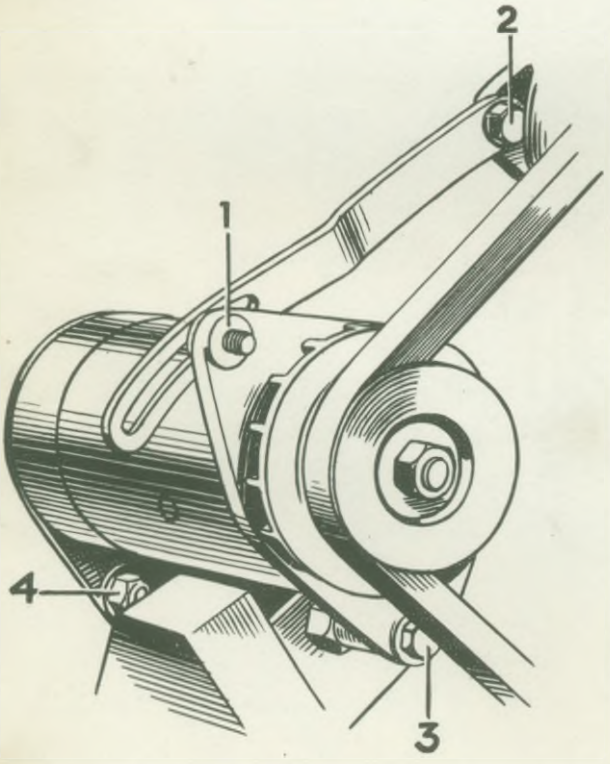

Fig. 3. Points for fan belt adjustment

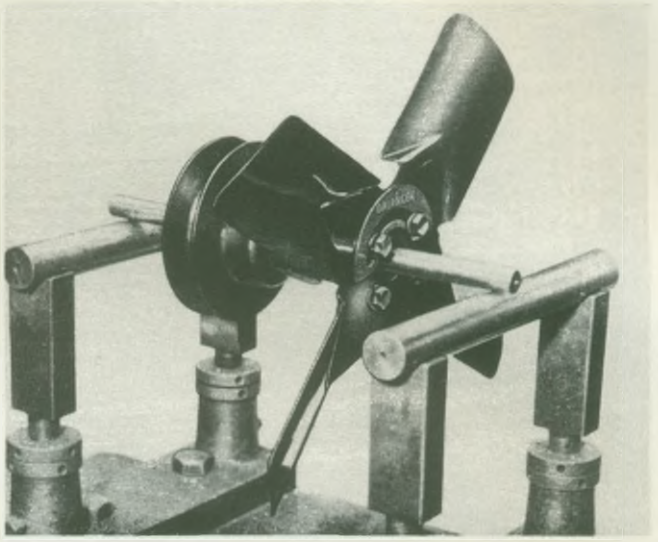

Fig. 4. The balancing of fan blade assembly, also showing the hole to be drilled for location of balancer

4. The water pump can now be removed after withdrawal of the bottom bolt on each side, then unscrewing as far as possible of the second bolt from the bottom on the right-hand side and the removal of the top dynamo link setscrew.

To dismantle water pump and fan assembly.

1. Detach bearing housing from the main body by removal of two $\frac{9}{16}$" A/F nuts. The removal of these nuts will leave one bolt in the bearing housing flange, which cannot be removed until the fan pulley has been extracted, and this bolt will naturally have to be fitted on reassembly before the fan pulley.
2. Remove fan blade assembly after removal of four $\frac{1}{4}$" bolts, spring washers and balance piece. The fan extension is balanced during manufacture as shown in Fig. 4 and must, therefore, be reassembled in its original position, the balancer position is indicated by the drilling of a small hole through the balancer and into the fan blades.
3. Extract fan pulley extension as shown in Engine Section, after removal of Simmonds nut and washer.
4. Remove bolt securing impeller to bearing spindle and withdraw impeller. The spring, seal and carbon gland are a self-contained unit. (See also "Note", page 3.)
5. Remove bearing retainer circlip and tap out spindle with two bearings, spacer, distance

washer, small circlip and synthetic rubber spinner. Note position of seals on bearing facing outwards for re-assembly.

Fig. 5. Fitting fan extension bracket to bearing housing

6. Tap spindle out of ball bearing, thus freeing distance piece, and remove washer circlip and rubber spinner.

Reassembly of water pump and fan assembly.

1. First ensure the condition of the bearings, the water seal and the machined face against which the carbon ring bears, proceed to assemble the Unit as indicated below.
2. Fit small circlip and hardened washer on spindle.
3. Thread synthetic rubber spinner on to rear end of spindle and position against small circlip.
4. Assemble rear spindle bearing, distance sleeve and forward race onto spindle. Place bearings with grease seals outwards.
5. Pack bearings with grease and fit spindle and bearings into housing. Little more than hand pressure should be required to the outer rings of these bearings.
6. Fit bearing retaining circlip into the recess.
7. Centralize the spring in the rubber seal and fit this assembly into impellor.
8. Having tapped the impellor on to the end of the spindle, this is secured thereto with the small bolt, fitting lead linger under head and spring washer. The end of the spindle and the outer face of the impellor end should then be soldered with low melting point solder (minimum 150°C.) to provide a seal against water seepage down the spindle. Care should be taken to avoid overheating. This new method of water sealing for the spindle was introduced in Production at Engine Nos. V.181626E and TDC.1870E, respectively, for the Vanguard and Triumph Models. (See note *re* fitting of " press type impellor now in use ".
9. Having fitted loose bolt in housing flange, match cotter pin hole, in fan extension bracket, with flat on spindle, tap assembly into position and secure with cotter pin and $\frac{1}{2}$" A/F nut. Fit Simmonds Nut and plain washer to spindle.
10. Position fan blades and any balancing pieces on fan extension bracket, matching holes in balancing piece with that drilled in the bracket, with a $\frac{1}{8}$" dowel. Secure assembly to bracket with four $\frac{7}{16}$" A/F headed set-screws and spring washers.
11. This completes the assembly of the water pump bearing and fan assembly which must now be fitted to the water housing.

Note:—After Eng. Nos. V.200,970E (Series II) V.184788E—V.200,000 (Series I), and TDC. 2057E, a new impellor and spindle, 105981/2, were introduced with which arrangement the impellor is a press fit on the spindle. When refitting a "press on" type impellor, solder should be used to the end of the spindle to ensure sealing.

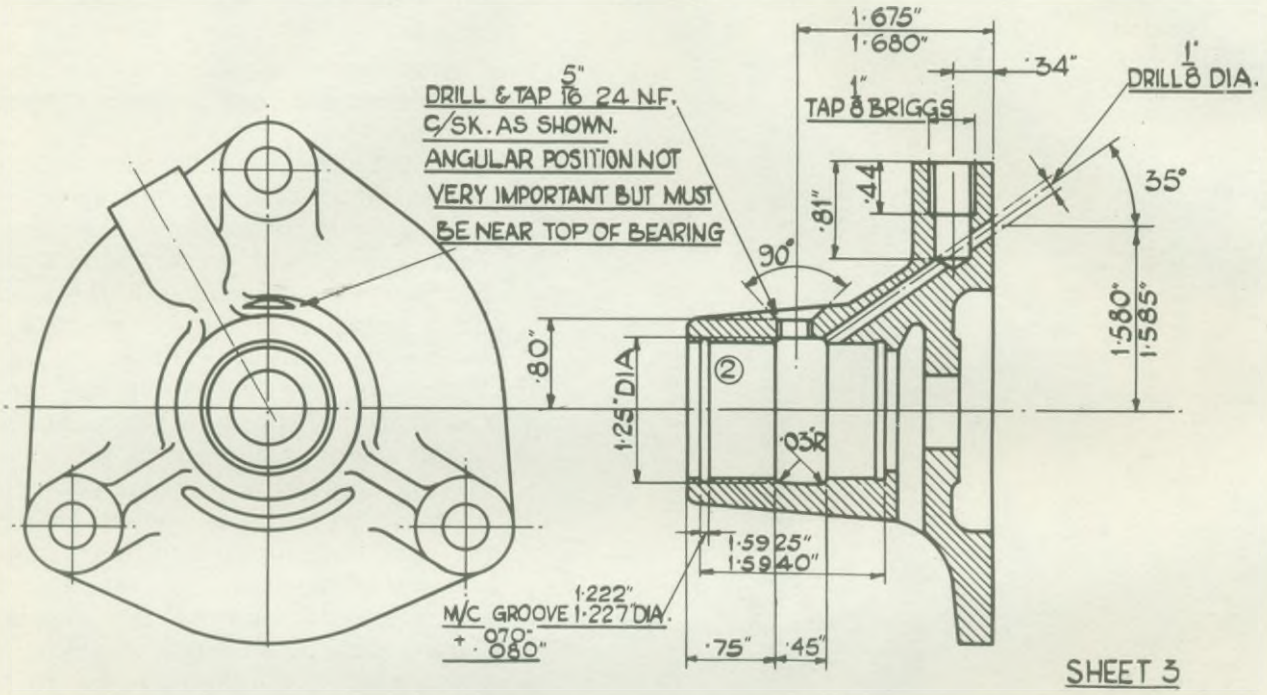

Fig. 6. Service mod. to water pump bearing housing Standard and Triumph 2-litre model

SERVICING WATER PUMP DETAIL No.58910

When dealing with the reapair, or overhaul, of this type of pump, certain modifications are recommended, which are outlined below.

This pump assembly was fitted with the 2-litre cars, on the engine numbers, for the models as quoted :—

Standard Models—Engine No. V1.E to V.42139E (inclusive).

Triumph Saloons—Engine No. TDA.1E to TDA.1938E (inclusive).

2-Litre Triumph Roadster—All engines.

When servicing this water pump the procedure set out below should be adopted :—

1. Remove fan belt.
2. Remove water pump bearing housing with fan extension bracket. Note the position of the bolt which comes away with the assembly for refitting.
3. Dismantle assembly by removal of :—
   (a) Impeller and seal.
   (b) Fan extension bracket.
   (c) Circlip and/or vent plug.
   (d) Bearing assembly.
4. Drill, countersink, tap, turn undercut and circlip groove (if necessary). For dimensions and details see Fig. 8.
5. Clean and blow through holes.
6. Fit bearing assembly and circlip, hole in bearing must line up with hole in housing.
7. Fit grease nipple Detail No. 56939 and screw vent plug Detail No. 100446 into position "centre popping" opposite slot to locate. Where a vent plug is already fitted it will be necessary to machine, or file, a flat on the small diameter of this plug to allow for the passage of grease into the bearing assembly.
8. The existing water seal and impeller assembly should be replaced by the latest assembly Detail No. 101390.

Precautions to be observed during assembly.

When assembling the impellor on to the bearing spindle, it is important to seal the impellor and spindle against water seepage, as described in operation 8 on page 3. The importance of avoiding excessive heat, which would be injurious to the rubber seal, is emphasized.

When assembling the bearing assembly into its housing, care should be taken to apply pressure on the outer ring of the bearing only whilst supporting the base of the housing. This precaution is necessary to avoid damaging the bearings.

The use of a $\frac{5}{8}$" reamer through the fan hub is recommended, as this will greatly assist the fitting of this extension. If such a reamer is not available for this operation, it will be necessary

to support the other end of the spindle on a hard piece of wood, whilst tapping the bracket home.

For the purpose of these instructions, it is naturally assumed that the water pump assembly is as originally assembled and fitted in this factory when the car was manufactured.

REMOVAL OF RADIATOR

Drain the radiator by means of the drain tap shown in Fig. 12. Raise the bonnet and disconnect the top and bottom water hoses from the radiator block.

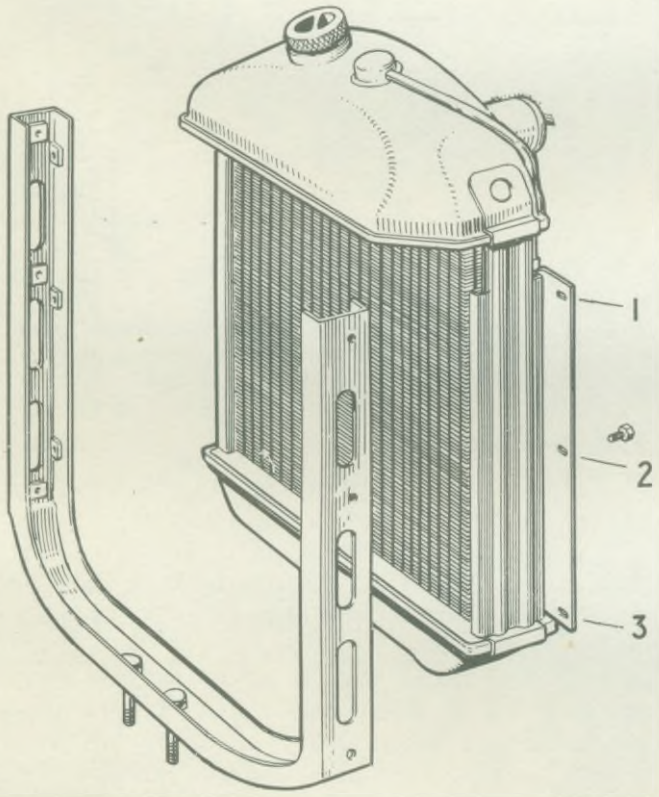

Fig. 7. Showing points of attachment for radiator block

Remove the six $\frac{5}{16}$" setscrews—there are three to each of the two radiator side brackets, as can be seen in Fig. 7 A $\frac{1}{2}$" A/F spanner is required for this purpose.

THE THERMOSTAT

(Models up to V.85,000).

With the Two Litre Standard Models up to approximately V.85,000, and for Triumph Cars equipped with this engine up to Commission No. TDB.1962, a thermostat was used, with which the element was an integral portion of the housing. With later Models a " plant in " type of element was introduced, which was used in conjunction with a separate housing.

Arrangements have also been made to cater for sub-zero weather conditions with both types of thermostats.

The normal element setting permits this to start to open at 75° ± 2°C. and to fully open at + 12°C. The element for use under sub-zero conditions starts to open at 83°—87°C. and is fully open at 97°C. It is important that, when using a sub-zero type of element, *a revision is made to the normal setting when temperate weather returns.*

With Standard Cars, up to V.42897 and on all Triumph Models up to the introduction of the "Renown," the thermometer capillary tube union fits into a special adaptor which is screwed into the Thermostat body. With later Models, this union screws directly into the housing. It is important, therefore, when ordering replacement thermometers to service these cars, that the correct item is ordered.

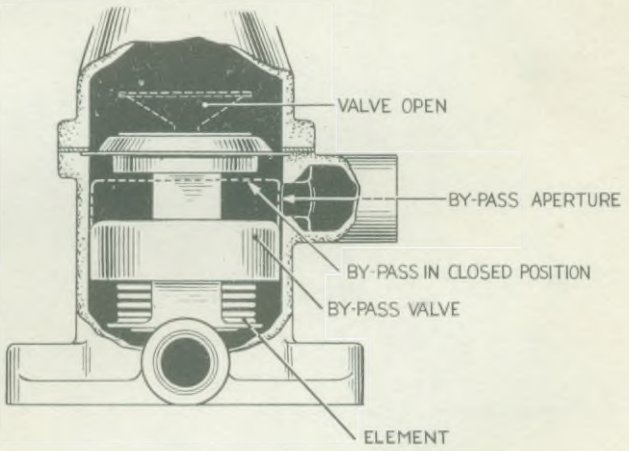

Fig. 8. Sectional view of thermostat

Description. (**Fig.** 8).

The thermostat is fitted in the cooling system to control the flow of water until the engine reaches its normal working temperature.

When the engine is started up from cold, the water is forced into the cylinder block by the water pump, through matched apertures in the pump housing and cylinder block. The water circulates round the cylinder block and combustion head, leaving the latter through the thermostat. The thermostat valve remains closed until a certain temperature is reached and thus a by-pass is provided connecting the thermostat body to the water pump to complete the water circulation, until the thermostat valve opens. The circulation of the water, when warming up, may be appreciated by reference to Fig. 9. (Fig. 10 shows normal circulation.)

As the cooling water temperature rises, the valve in the thermostat opens correspondingly, until when normal running temperature is reached, the valve is fully open and free passage of water through the outlet hose to the radiator is permitted. The thermostat valve is so set as to commence to open at 75 °C. ± 2°C. and the opening operation is complete 12°C. after commencement, for normal climates. For sub-zero conditions an alternative thermostat is available.

With this thermostat, provision is made for the by-pass to be sealed off when the valve is fully open, which will be appreciated by reference to Fig. 10. This sealing of the by-pass avoids loss of cooling capacity when this is most required, *i.e.*, when the engine is very hot.

To test thermostat for valve opening.

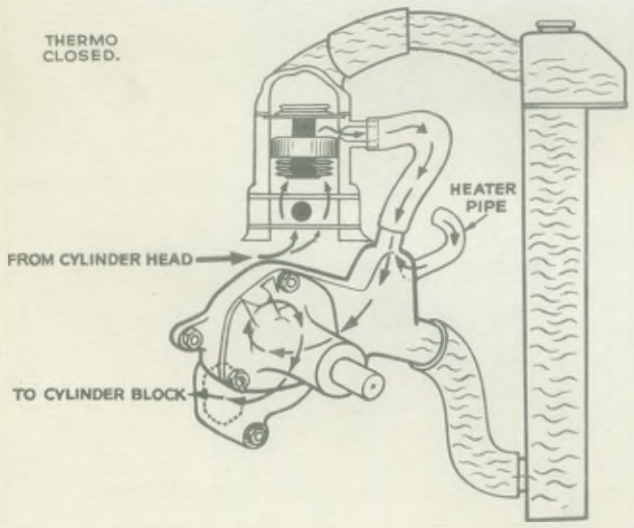

Fig. 9. Water circulation with thermostat closed

If doubt exists as to the correct operation it can quite easily be tested after removal from the combustion head.

Having removed the thermostat unit from the engine, it should be tested in a bowl of water, at a suitable temperature, employing an accurate thermometer to ascertain that the valve does commence to open at the correct temperature. There is no need to check the temperature at which the valve is fully open as this will automatically follow if this opening operation commencement figure falls within the prescribed limits.

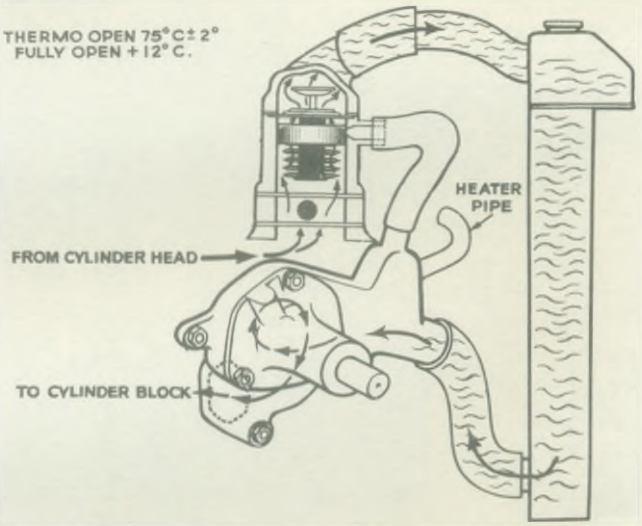

Fig. 10. Water circulation with thermostat open. Sub-Zero thermostat starts to open at 83° C. —87°C. and is fully open at 97°C.

Radiator thermometer.

This is illustrated in Fig. 11 the capillary being connected to the thermostat.

Where doubt exists as to the correctness of the gauge readings, the instrument can be checked by inserting the element in a container of hot water, and the reading of the gauge compared with that shown on an accurate thermometer. The thermometer assembly is non-adjustable and where a test discloses incorrect readings, a new assembly should be fitted.

When ordering a replacement thermometer the Commission Number of the Car should be stated. (See remarks under " Thermostat " above).

ANTI-FREEZE PRECAUTIONS

During frosty weather some precautions must be taken to protect the engine from damage.

The draining of the radiator and cylinder block at the points shown in Fig. 12, although protecting the car against frost in the garage, the use of anti-freeze mixture is strongly recom-

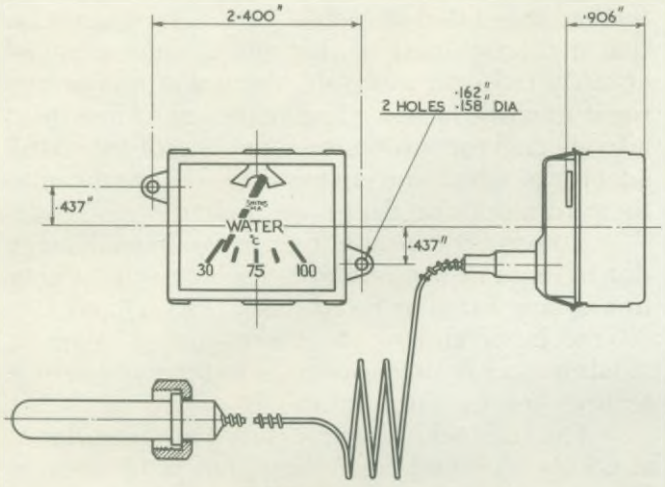

Fig. 11. Radiator thermometer

mended. It is quite possible, under extreme conditions, for the radiator to freeze either when starting with the thermostat valve closed, or when in use on the road.

Bluecol, in common with some other anti-freeze preparations, has a small proportion of a corrosion inhibitor added which is naturally of benefit to the cooling system.

Recommended Bluecol proportions for protection from various degrees of frost are as follows :—

Degrees of Frost (Fahrenheit)	15	25	35
Proportion (Per Cent)	10	15	20
Amount of Bluecol (Pints)	2	3	4
Water Cooling Capacity	18 pints		

Before adding anti-freeze compound, take steps to ensure that all the water hose clips are secure and that the cylinder head nuts are tight. If, owing to a leaky gasket, the solution finds its way into the engine, it may be burnt into a tacky substance which will cause damage to the engine.

The anti-freeze preparation will not itself evaporate, thus apart from loss by leakage, it is only necessary to top up with water as the radiator level drops.

It is a wise precaution, when using anti-freeze mixture, to employ some method of indicating the fact for the enlightenment of other repairers, who may be called upon to carry out adjustments for the customer.

DEFECTS IN COOLING SYSTEM

Engine overheating.

This difficulty may arise owing to a variety of causes, which are as follows :—

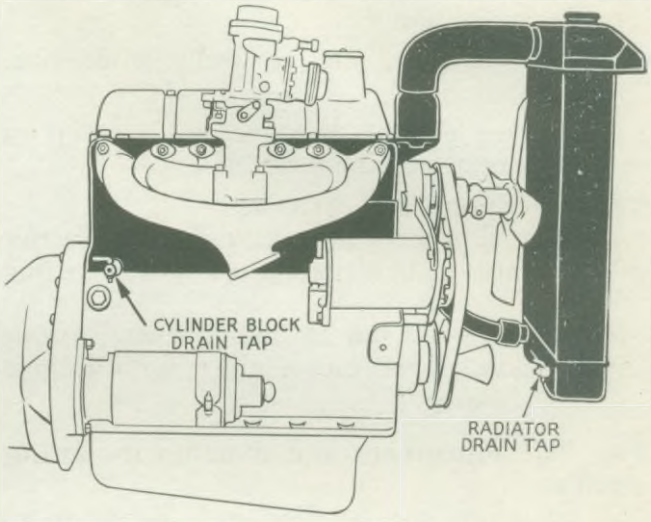

Fig. 12. Showing draining points for cooling system

1. Ignition timing too late or automatic advance and retard mechanism not operating properly.
2. Fan belt slipping or incorrectly adjusted.
3. Insufficient water in the cooling system due to loss or improper filling.
4. Radiator and/or cylinder block restricted by accumulations of sludge, dirt or other foreign matter. The cooling system should as a matter of routine be properly flushed out once every year.
5. Thermostat not opening at the proper temperature (see notes on " Thermostat ").
6. Pre-ignition which may arise due to a variety of reasons.
7. Weak carburettor mixture caused by incorrect carburettor jet setting or air leaks to the induction system.
8. Cylinder head gasket not fitted properly.
9. High internal resistance in engine caused by :—
   (a) Initial tightness after an overhaul or insufficient clearances.
   (b) Use of incorrect grade of lubricant.
   (c) Inadequate oil level or improper circulation.
10. Dragging brakes or tight wheel bearings.
11. Slipping clutch.
12. Use of certain brands of anti-freeze, which have a lowering effect upon the boiling point of the cooling system, during summer months. " Bluecol " actually slightly raises the boiling point of water.

Loss of water from cooling system.

1. Radiator leaking.
2. Loss of water due to badly made hose connections.
3. Leakage due to defective water pump or thermostat packing washers.
4. Water pump seal defective.
5. Internal or external leakage due to defective combustion head gasket, or loose securing nuts.
6. Loss of water due to boiling owing to one or more of the causes given for " Engine Overheating."

Fan belt adjustment and dynamo mounting details.

To adjust the fan belt it is necessary to partially slacken the three set screws and nut at points 1, 2, 3 and 4 respectively, as shown in Fig. 3.

Having slackened at these points the dynamo can be moved as necessary to provide a $\frac{3}{4}$"—1" hand pressure sag in the vertical portion of the fan belt.

Until recently an ordinary nut and spring washer was fitted at point " 4 ". It was found that if the tightness of this nut was not checked at fairly frequent intervals, there was a tendency for it to work loose. This tendency to looseness also affected the nut on the inner end of the barrel adaptor to which the lower portion of the dynamo forward mounting flange was bolted.

To protect the mounting flange from damage due to loose or lost mounting bolts, a self-locking nut is now fitted at point " 4 " (Fig. 3) and also on the inner end of the barrel-shaped adaptor. A tab washer is also now fitted to set screw which secures link to water pump.

The self-locking Nyloc nuts were introduced at points " 3 " and " 4 " (Fig. 3) in production at Eng. Nos. V.159056 and TDC.453 respectively, for the Standard and Triumph 2-litre models.

The introduction of these Nyloc self-locking nuts requiring the following change of details:—

Nut Detail NH.2001 and Washer No. WL.0211 for point " 3 " is replaced by Nyloc self-locking nut NT.3211.

For point " 4 " bolt No. BH.0807, nut No. NH.2008, and washer No. WL.0208, are replaced by bolt No. BH.0808 and Nyloc nut No. NT.3208.

COOLING SYSTEM

SUPPLEMENT

ANTI-FREEZE PRECAUTIONS

The same recommendations are made for the protection of the Engine from the effects of frost as for Series I Models. With the Series II Cars a smaller cooling capacity is required owing to the pressurized system.

The "Bluecol" proportions, which are calculated on the basis that a heater is fitted, required are as follows :—

Degrees of Frost (Fahrenheit)	15	25	35
Proportion (per cent) ..	10	15	20
Amount of "Bluecol" (pints)	2	2½	3½
Water Cooling Capacity	15½ pints (14½ pints without Heater)		

PRESSURIZED RADIATOR CAP

The pressurized radiator cap was introduced on the inception of Series II Model Standard, Two Litre Saloons, but will not be used on Estate Cars, Pick-up Utility Trucks or Vans until after approximately 7,000 cars.

The pressurized radiator cap is shown in sectional form in Fig. 1 and the new Radiator in Fig. 2.

The operation of this radiator cap is simple. The pressure release valve is set to operate under a pressure of 4 lbs. and surplus water or steam is released via the overflow pipe.

Apart from the main pressure relief valve a small auxiliary valve working in the opposite direction is provided to release vacuum which would otherwise occur, to the detriment of the system, when a very hot engine was switched off.

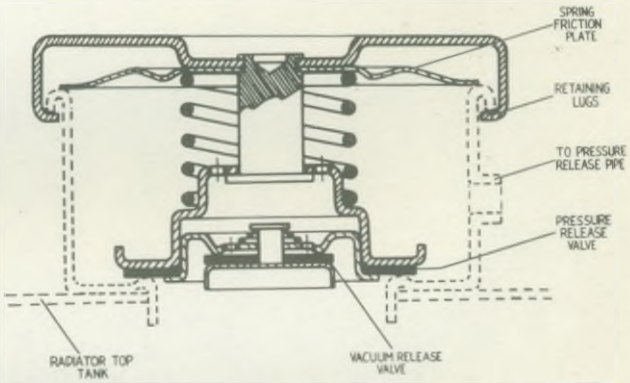

Fig. 1. Pressurized radiator cap

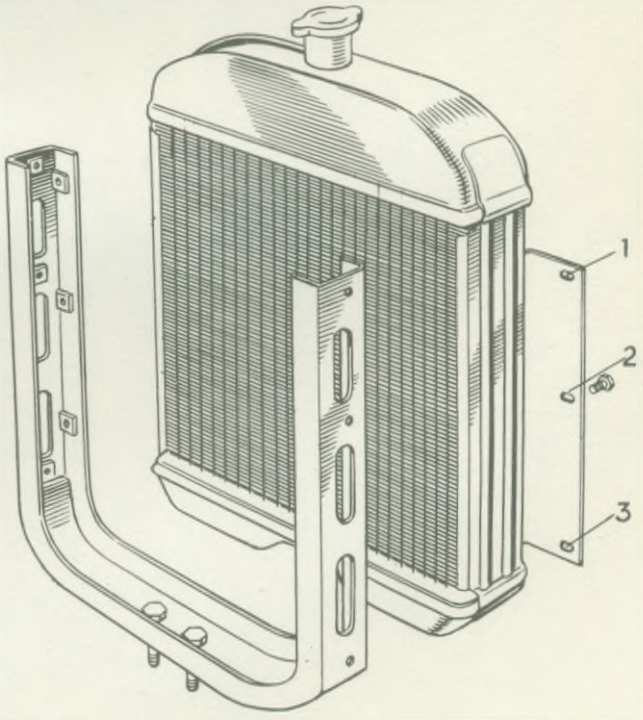

Fig. 2. Showing radiator used on Series II model