

It is convenient to note that the jack may be used in other suitable positions, such as under the rear springs or front jacking pad if required.

Wheel Changing.

No difficulty should be experienced in wheel changing, the spare wheel can be put on the rear or front hub with very little effort as follows:—

Rear.—Having jacked up the car, applied the hand brake and removed the rear wheel:—

1. Roll the spare wheel under the hub, the top of the wheel being inclined outwards, then with a foot at the bottom of the wheel, lift by the rim on to the hub extension, as shown in Fig. 27.
2. One of the five wheel studs will be found to be nearly on the horizontal halfway line, either to the front or rear. Rotate and tilt the wheel until this stud protrudes through the nearest stud hole.

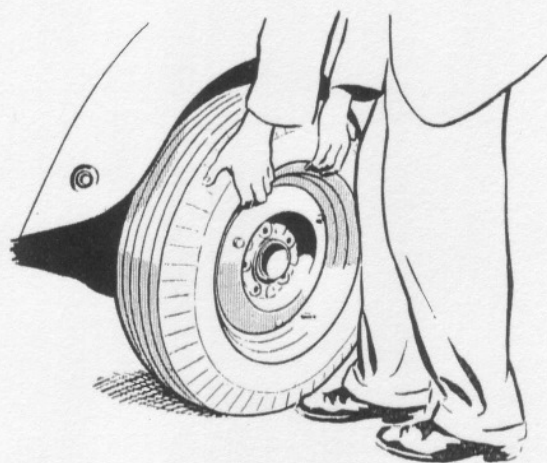


Fig. 27.—MOUNTING REAR WHEEL.

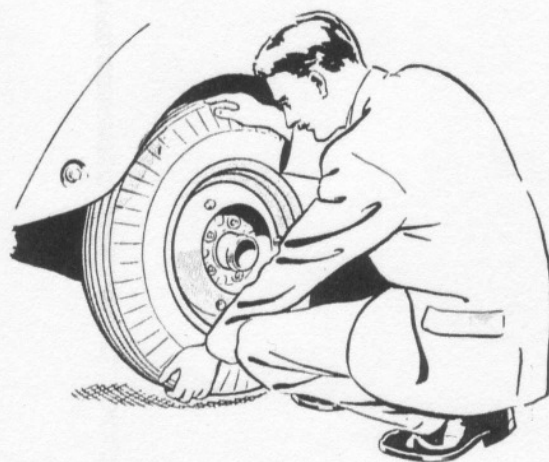


Fig. 28.—POSITIONING REAR WHEEL.

3. Using the one entered stud as a fulcrum, raise the wheel until the other studs enter their respective holes. (See Fig. 28.)

Replace wheel nuts, wheel disc and retaining nut as previously described.

Front.—Position the wheel on the hub extension as described for the rear wheel (1). (See Fig. 27.)

1. Rotate the wheel, which also rotates the hub, until a stud enters at the halfway line. (See Fig. 29.)
2. Rotate the wheel until the entered stud is at the top, when it will be found that the other four will go home. (See Fig. 30.)



Fig. 29.—ROTATING FRONT WHEEL.



Fig. 30.—ENTERED STUD AT TOP.

Replace wheel nuts, wheel disc and retaining nut as previously described.

FITTING AND REMOVING TYRES.

Inextensible steel wires are incorporated in the edges of the tyres. Therefore, do not attempt to stretch the wire edges of the tyre cover over the rim edge.

Force is entirely unnecessary, and may be dangerous, as it merely tends to damage the cover edges and serves no helpful purpose.

Fitting or removing will be quite easy if the wire edges are carefully adjusted into the rim base; if it is not found to be easy, the operation is not being performed correctly.

To Remove the Tyre.

Remove all valve parts, and push both cover edges into the base of the rim at the part diametrically opposite to the valve, then lever the cover edges near the valve over the rim edge.

To Fit Tyre.

Push one edge of the cover over the edge of the rim. It will go quite easily if the part first put on is pushed right down into the wheel base.

A coloured spot on the outer wall indicates its lightest part, and the cover should be fitted so that the coloured spot is at the valve position.

1. Dust evenly with french chalk both the inside of the cover and the outside of the inner tube.
2. Inflate the tube until it begins to round out, then insert into cover.
3. Mount tyre.
4. Before inflating, make sure that the tyre beads are clear of the well of the rim all the way round.

5. Inflate slowly until the beads are fully seated.
6. Remove valve and deflate the tube completely.
7. Refit valve and inflate the tyre to the correct working pressure.

N.B.—This procedure must be followed whenever the tube is refitted.

Inflation of Tyres.

The pressures recommended for the 6.50" by 16" India tyres are:—

Front	25 lbs.	}	Cold.
Rear	30 lbs.		

Tyre pressures will increase slightly after continued running at high speeds or in hot weather. It is not considered advisable to reduce pressures under such conditions, as this would tend to cause further heating, due to excessive flexing when the tyre cools.

The pressures being comparatively low, it is important that they should be carefully maintained if maximum tyre life is to be secured. It is, therefore, recommended that the pressure be tested weekly by means of a gauge applied to the valve stem orifice.

Balancing the Road Wheels.

It is most important, in view of the high speeds attainable, that the front road wheels should be properly balanced. Therefore, it is necessary to have all the wheels balanced, and to re-balance a wheel after changing its tyre.

An out-of-balance effect is usually present in the complete wheel and tyre due to:—

- (a) The valve and its patch on the inner tube: and
- (b) unavoidable irregularities in the outer cover, due to movement of the material during vulcanizing.

A coloured spot on the outer wall indicates its lightest part, and the cover should be fitted so that this spot is at the valve position.

To correct such out-of-balance, four steel weights are spaced at intervals around the wheel as necessary.

The method of balancing the wheel is as follows:—

- (i) Remove the wheel.

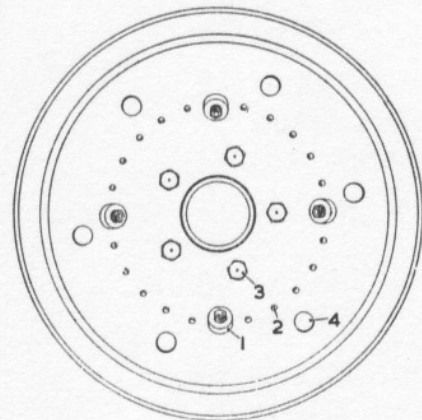


Fig. 31.—WHEEL BALANCE WEIGHTS.

1. Balance weight.
2. Balance weight adjustment holes.
3. Wheel securing nuts.
4. Wheel disc rubber.

- (ii) If a hub on a bench is not available, make sure that the front hub on the car is quite free to rotate and not restricted by too close adjustment of the brakes.
- (iii) Remove all balance weights, bolts and nuts.
- (iv) Reverse the bolts in the wheel, this will allow the operation of balancing to be performed more easily, as the balance weights may then be fitted externally.

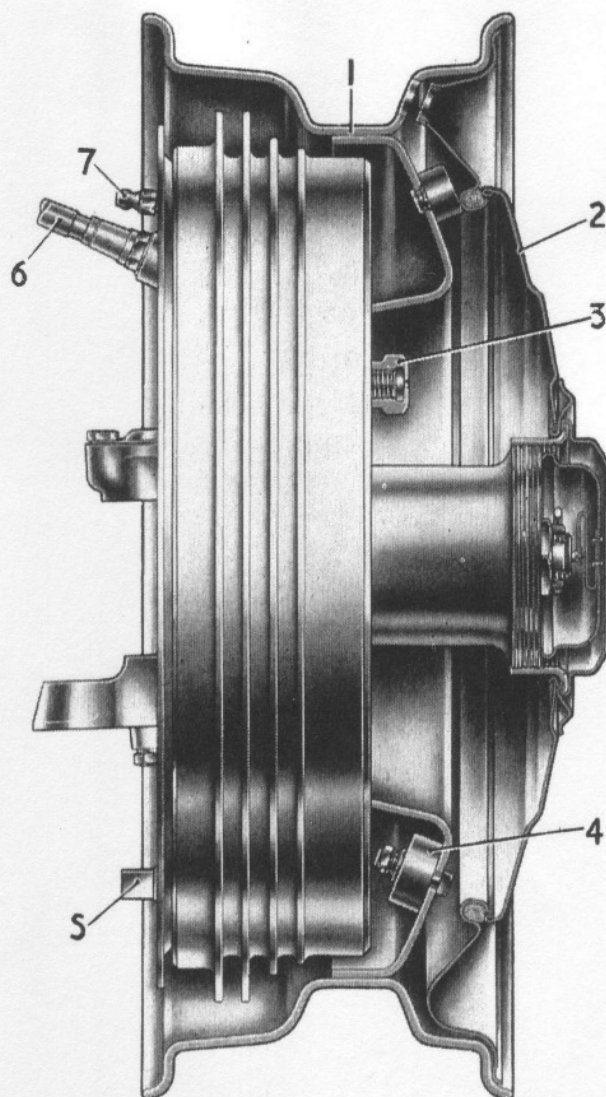


Fig. 32.—SECTION OF FRONT HUB AND WHEEL.

- | | |
|------------------------|------------------------|
| 1. Well base rim. | 5. Brake adjuster. |
| 2. Wheel disc. | 6. Hydraulic pipe. |
| 3. Wheel securing nut. | 7. Bleeder connection. |
| 4. Balance weight. | |

- (v) Re-fit the wheel to the hub. Allow to swing and note the light point. Put one weight here. Allow the wheel to swing again. If the wheel is in balance, space the other 3 weights evenly round the wheel.

- (vi) If the light point is unchanged in position, add a second weight, using one of the adjacent holes. If this corrects the balance, add the other 2 weights opposite each other.
- (vii) If 2 weights together are too much, try moving them away from each other. Go one hole at a time and move each weight alternatively. When balance has been achieved, add the 2 weights opposite each other.

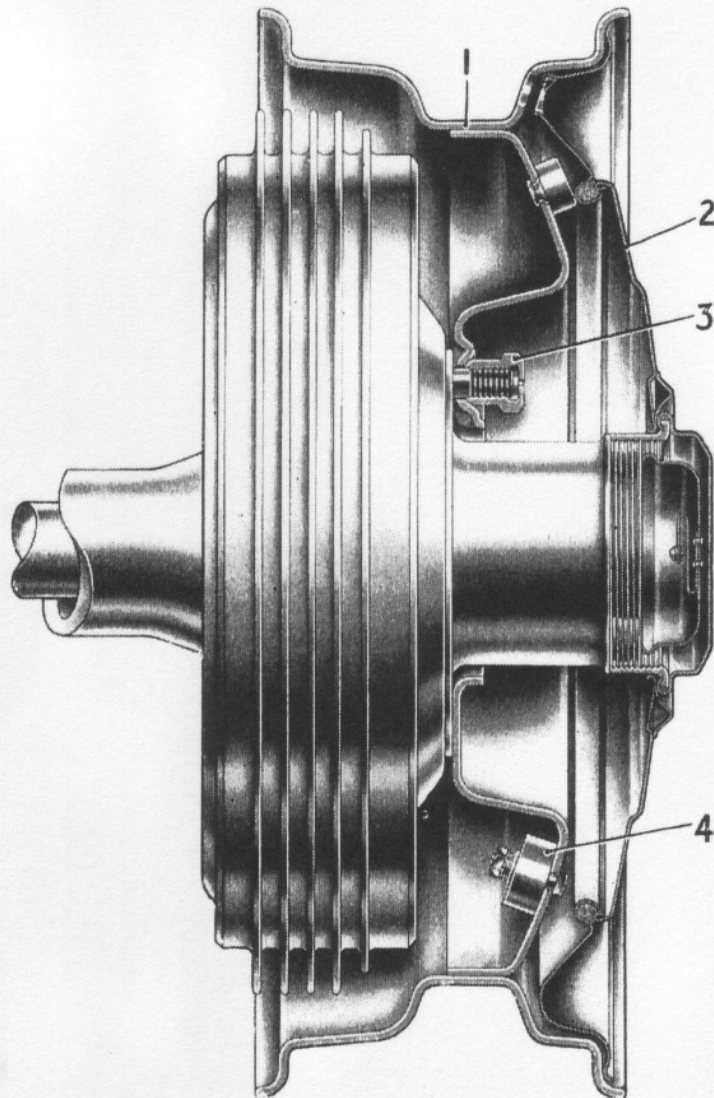


Fig. 32a.—SECTION OF REAR HUB AND WHEEL.

- | | |
|-------------------|------------------------|
| 1. Well base rim. | 3. Wheel securing nut. |
| 2. Wheel disc. | 4. Balance weight. |

- (viii) If 2 weights together are insufficient, add a third, using an adjacent hole. If this balances the wheel, remove the centre weight and refit it 4 holes to one side. Fit the 4th weight 4 holes to the other side.
- (ix) If 3 weights are insufficient, add the 4th, and if this is too much, start separating the outer 2 weights as in (vi) above.

- (x) Remove the wheel and reverse the bolts so as to return the balance weights to their correct position, on the inside of the wheel.
- (xi) Refit the wheel and the wheel disc assembly. The correct tension on the disc is attained by giving the nut one complete turn by the special spanner provided after the disc has been felt to be in contact with the rubber stops on the wheel centre.

CHAPTER IX

Engine Cooling System

Coolant—Coolant Pump and Fan—Fan Belt Adjustment—Overheating—Radiator Thermostat—Radiator Mounting—Coolant Level—Frost and Anti-freeze Mixtures—Car Heater.

Coolant.

The cooling system is filled with a 25 per cent. mixture of inhibited ethylene glycol and water before the car leaves the factory, and it is strongly recommended that this, or a similar anti-freeze mixture, is used all the year round, both summer and winter.

The purpose of this is not only to provide protection against frost during the cold weather, but also to prevent any corrosion of the coolant passages and subsequent deterioration in the standard of cooling.

If there is any abnormal loss of coolant, the cause should be ascertained and rectified, and the system topped up with the correct anti-freeze mixture to maintain the level at approximately one inch below the bottom of the filling orifice.

If either of the recommended compounds (see page 80) are not available, plain, preferably soft, water may be used when there is no danger of frost.

It is very important that a glycerine base compound should not be mixed with a glycol base compound.

Coolant Pump and Fan.

The centrifugal coolant circulating pump is mounted in tandem with the fan, on the front part of the cylinder block, and is driven by a "V" belt, which also drives the dynamo, from the front end of the crankshaft.

It is improbable that any leakage or any other trouble will be experienced over long periods of running, and no attention should be necessary between general overhauls of the chassis.

If, for any cause, the engine has to be run with the fan removed, it is essential that the fan retaining set-screws, with suitable distance-pieces to allow for the thickness of the fan, are refitted in position.

Fan Belt Adjustment.

Normally the belt should not require adjustment. An adjustment is provided, however, and is effected by releasing the three nuts (3, 4 and 5, Fig. 33), and moving the dynamo outwards on the special slotted link.

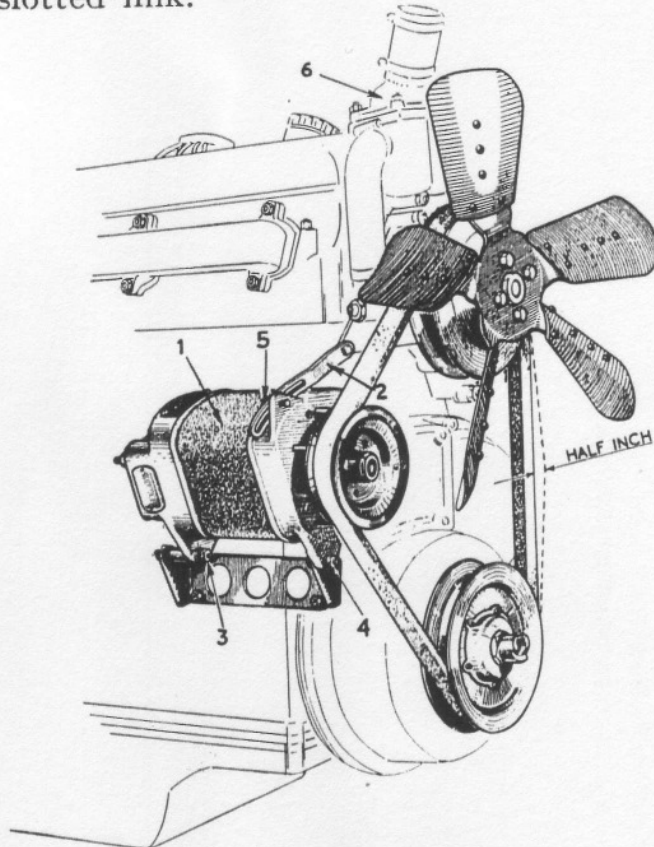


Fig. 33.—THE FAN BELT ADJUSTMENT.

- | | |
|-------------------------|------------------|
| 1. Dynamo. | 2. Slotted link. |
| 3, 4, 5. Securing nuts. | 6. Thermostat. |

The tension should be such that the fan belt can be moved transversely, with the fingers, at a point equidistant from the crankshaft pulley and the fan pulley through a total distance of one inch.

If it should be necessary to remove the belt for any reason, it must not be strained over the pulley. The three nuts (3, 4 and 5), should be released and the dynamo moved upwards to the full extent of the slot, when it will be found that the belt can be easily replaced without straining.

The fan must not be forcibly turned by hand as this will cause bending of the blades and may result in a damaged radiator.

Overheating.

Overheating may be due to one or more of the following causes:—

- (a) The thermostat may have failed.
- (b) The fan belt may need adjustment.
- (c) The continued ascent of a long steep gradient, under adverse circumstances at full throttle and too high a gear.
- (d) There may be a shortage of coolant in the system.

Radiator Thermostat.

The thermostat which controls the flow through the radiator to suit the engine cooling requirements, is contained within a casing (6, Fig. 33).

It is arranged to maintain a minimum coolant temperature of approximately 78°C.

Reference to the instrument-board thermometer will indicate that the thermostat is operating correctly and that there is no shortage of coolant.

An unusually and consistently low temperature, after the engine has been well warmed up, indicates failure of the thermostat.

A by-pass pipe acts to short circuit the radiator when the thermostat valve is closed or only partly open. This arrangement ensures a quick supply of heat to the induction pipes after starting from cold as well as a rapid warming up of the engine coolant jacket.

Radiator Mounting.

The radiator comprises two main units, namely, the outer shell and the matrix itself, the complete assembly being mounted on a single central rubber support. The shell is diagonally braced and is bolted to the wings and valance plates. The radiator matrix is secured in the shell at three points, which are arranged to provide freedom for expansion under heat.

The object of this special construction is to avoid sideways movement of the radiator assembly due to road shocks, and to isolate the matrix from such shocks.

No lubrication or attention is necessary in connection with the mounting.

Coolant Level.

The radiator filler is located under the left-hand side of the bonnet. A warning notice is embossed on the cap to the effect that it must not be removed when the engine is running. Hot coolant is likely to be forced out in such circumstances.

The correct level is approximately one inch below the bottom of the filling orifice, at which point it will stabilise itself. Filling above this level merely wastes coolant.

It is safe to run as long as the coolant is visible in the top tank when cold.

A drain tap is situated on the pipe connecting the pump with the bottom of the radiator. It is in the "off" position when the handle is pointing downwards.

On no account must any strong alkaline compound be used to clean out the coolant system. Several such compounds are available, but their use must be carefully avoided, owing to the fact that they have a detrimental chemical action on aluminium

Frost and Anti-Freeze Mixtures.

As long as the original coolant is maintained in the system, no precautions need be taken against frost.

If, for any reason, the original coolant has been replaced with water, then the system must be drained if the car is to be left exposed to temperatures below 32° F.

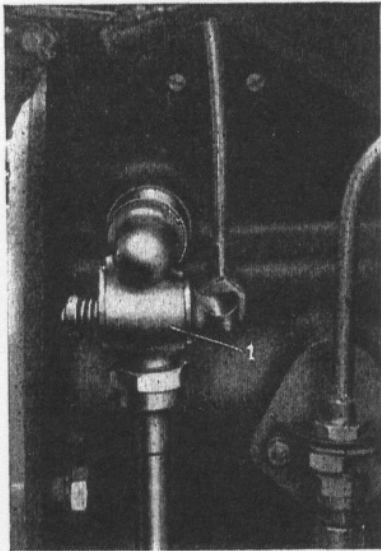


Fig. 34.—CYLINDER JACKET DRAIN TAP.

1. Drain tap.

Draining is accomplished by opening three drain taps, one situated on the pump inlet pipe, one on the right-hand side of the cylinder block, (1, Fig. 34), and one on the car heater return pipe. The filler cap must also be released a few turns.

Also, before attempting to turn the crankshaft for starting after exposure to frost, *hot water should be poured over the coolant pump* to thaw any particles of ice which may be present in the casing, and which would probably damage the impeller.

A suitable anti-freeze mixture is made by mixing soft water with either Inhibited Ethylene Glycol or "Bluecol", in proportions dependent on the degree of frost likely to be encountered.

The following table gives an approximate indication of the amount of frost protection ensured by different strengths of mixture.

Freezing point	22° F.	12° F.	2° F.	-3° F.
Degrees of frost	10° F.	20° F.	30° F.	35° F.
1. Inhibited Ethylene Glycol ...	4½ pts.	6¾ pts.	10 pts.	11 pts.
2. "Bluecol"	4½ pts.	6¾ pts.	10 pts.	11 pts.

When changing from water to anti-freeze, the radiator system must be drained. New anti-freeze of the required amount should be mixed with an equal quantity of soft water before being poured into the radiator, the radiator being finally topped up with soft water.

The engine should then be run until normal operating temperature is reached, to ensure uniform distribution of the anti-freeze throughout the system.

The rubber connections must be carefully examined and replaced if unsound, as any leakage will necessitate replenishment with anti-freeze mixture.

When using an anti-freeze mixture as described, a similar mixture should be used for topping-up purposes.

Car Heater.

A hot water heater is fitted under the front passenger's seat, warm air being circulated by an electric fan which is integral with the heater.

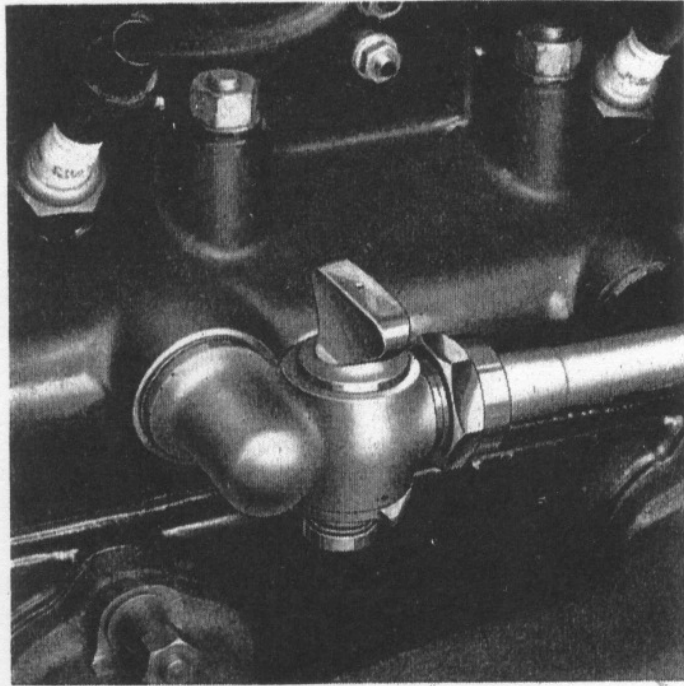


Fig. 35.—CAR HEATER CONNECTION AND ISOLATING TAP.

Hot coolant is circulated through the heater from the engine cooling system, the coolant being taken from the cylinder block through a tap (see Fig. 35), the latter being used to isolate the heater when not required.

The switch for the heater fan incorporates a rheostat, and is mounted on the instrument board, as shown in Fig. 1, thus giving a variable control of the interior temperature.

DIAGRAM
ELECTRICAL WIRING