

a pressure of oil in a system of piping. This pressure is variable, and is controlled through a relief valve, operated by the aforementioned lever.

The pump is charged with oil from the gearbox. It must be observed that oil is not actually pumped into the dampers, and there should be no wastage of oil from the pump unit or pipe line. Such wastage or leakage will impair the functioning of the control.

As it is of such importance that the shock dampers, and also the pump and pipe line, should be maintained full of oil, evidence of undue leakage should be at once reported to Messrs. Bentley Motors (1931) Ltd., or one of their "Special Retailers". (See page 16.)

Rear Road Springs.

The forward ends of the rear springs are pivoted to the frame by means of steel bushes. The shackle pins at the front and rear ends are of the threaded type, and both bushes and shackle pins are lubricated from the centralised chassis system.

The advantage of threaded bearing pins is that they do not develop end-play as the result of wear.

The springs themselves are encased in leather gaiters, and by means of a special arrangement of oil holes and grooves in the leaves, the ends of the three longest leaves of each spring are lubricated by surplus oil from the eye of the master leaf.

Owing to this arrangement, in combination with absorbent material inside the gaiter, the springs are entirely self-lubricating and remain free from squeaks.

Wheels.

All wheels are of heavy gauge pressed steel, with 16" by 5" well-base rims, and are secured with five nuts.

The securing nuts for the "off-side" or R.H. wheels have right-hand threads, and those for the "near-side" or L.H. have left-hand threads.

The nuts must be tightened, with the wheel-brace provided, evenly and securely, and the threads must be kept clean and greased.

If any difficulty is experienced in removing the nuts with the wheel-brace, extra leverage can be applied by using the $\frac{1}{2}$ " spanner, provided in the tool kit, on the squared section of the wheel-brace spanner head.

Wheel Discs.

When fitting the wheel discs, care must be taken to get the valve centred in the hole provided.

The outer nuts, having right-hand threads for both "off-side and near-side" wheels, are necessary only to retain the disc, and should therefore not be overtightened.

The correct tension is attained by giving the nut **one complete turn** with the special spanner provided after the disc has been felt to be in light contact with the rubber stops on the wheel centre.

There should be a small gap, approximately $\cdot 100''$, between the edge of the disc and the wheel. Overtightening distorts and brings the disc in contact with the wheel, thus causing creaks and rattles.

Lubrication of Wheel Bearings.

The wheel bearings are correctly packed with ball-bearing grease in the first instance, and should need no attention between general overhauls of the chassis.

Tyres.

The tyres fitted are India Super Silent Rayon, size 6.50" by 16".

When ordering new covers, the above should be specified. With regard to the inner tubes, it is necessary to state the size and mention "well-base".

Tubes for flat base rims should not be used.

The Jacking System.

A portable jack is provided in the tool kit and is operated as shown in Figs. 25 and 26.

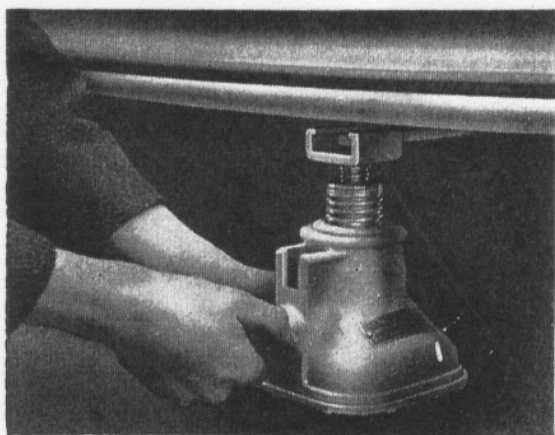


Fig. 25.—FITTING JACK TO SLIDE.



Fig. 26.—OPERATING JACK.

The jack is fitted on to a slide arranged on the side frame member near the centre body pillar, and is used either side of the car as required.

To operate, push the jack **right home** on the slide, spin the body of the jack to the ground, insert handle and use as shown in Fig. 26.

It is important, before operating the jack, that the handbrake is pulled well on.

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.

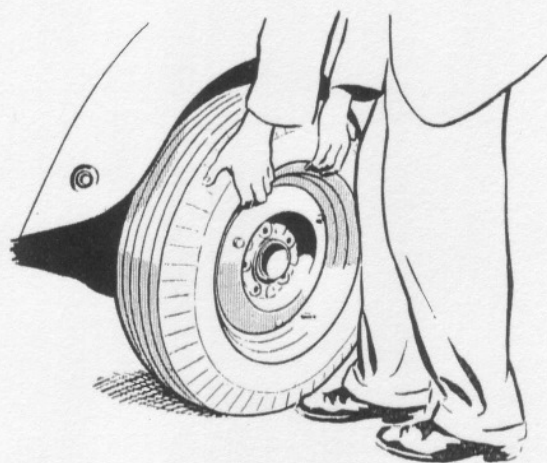


Fig. 27.—MOUNTING REAR WHEEL.

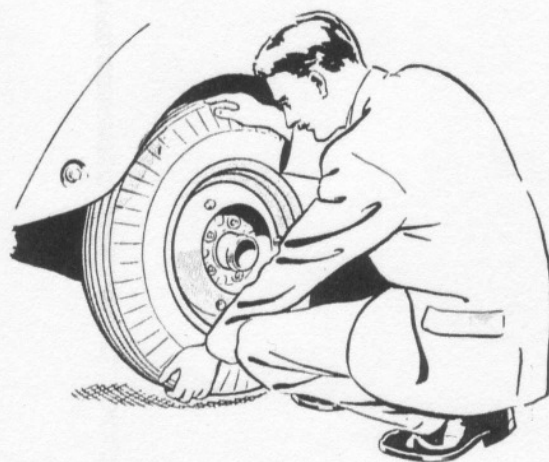


Fig. 28.—POSITIONING REAR WHEEL.

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.

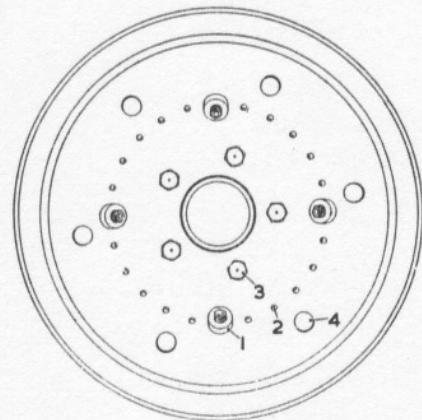


Fig. 31.—WHEEL BALANCE WEIGHTS.

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.

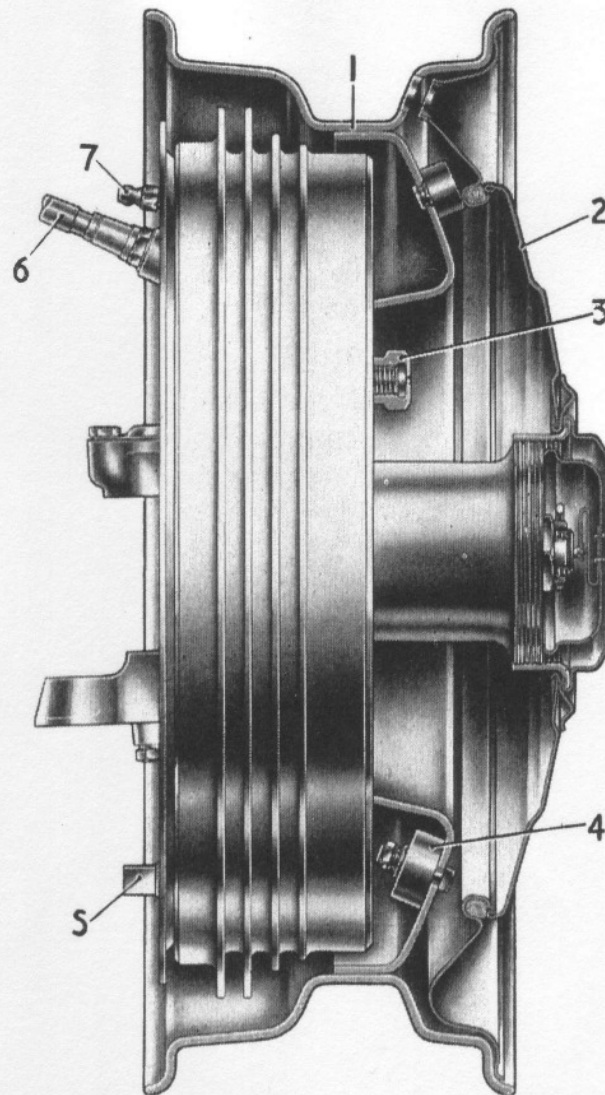


Fig. 32.—SECTION OF FRONT HUB AND WHEEL.

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|------------------------|------------------------|
| 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.

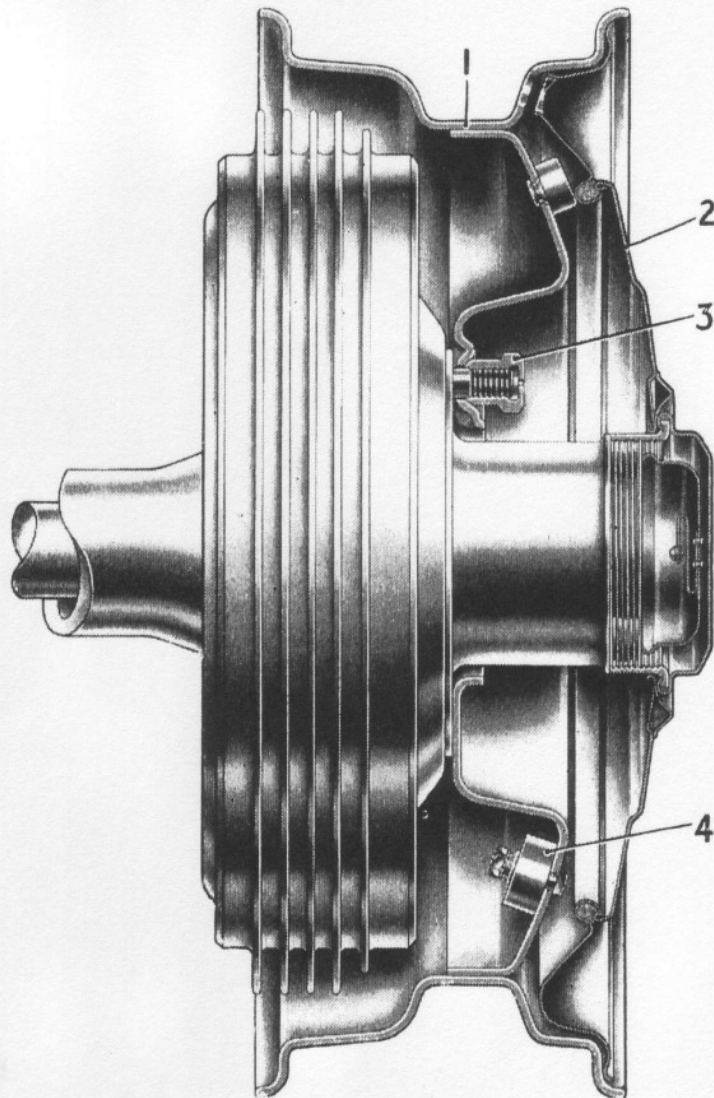


Fig. 32a.—SECTION OF REAR HUB AND WHEEL.

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|-------------------|------------------------|
| 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.

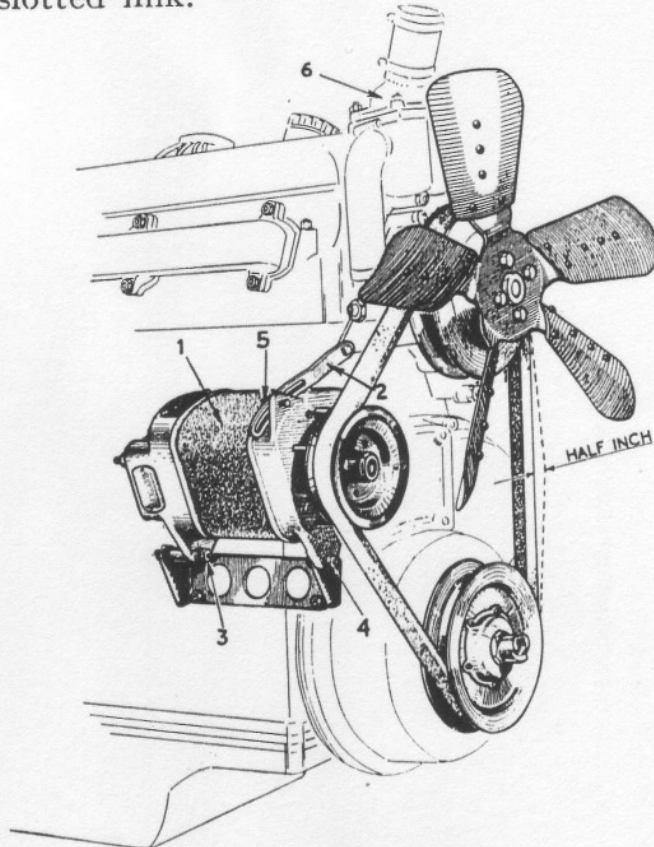


Fig. 33.—THE FAN BELT ADJUSTMENT.

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|-------------------------|------------------|
| 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.