

Setting of Idling Adjustments.

1. The quantity of mixture for slow running is determined by means of an adjustable screw on the front carburetter (5, Fig. 13) which limits the closing movement of the synchronised throttles.
2. The strength or quality of the mixture for slow running is set by means of an adjustable screw in the base of each carburetter (11, Fig. 14). The screw operates to raise or lower the jet. Raising the jet causes the taper needle to sink farther into the orifice, so weakening the mixture. Conversely, lowering the jet enriches the mixture.
3. Remove the cap (19, Fig. 14) from the base of each carburetter to expose adjusting screw. With the engine warm and running, manipulate the screws; a coin provides an easy means of turning, so that the engine runs regularly. Any sign of "hunting" is due to too rich a mixture and one or both of the screws should be screwed farther in.

On the other hand, irregular firing, indicated by irregular pulsations from the exhaust pipe, shows the mixture to be weak, and one or both of the adjusting screws should be screwed out a little.

The correct positions having been found, replace the screw caps and sealing washers.

Air Cleaner and Silencer (Standard Type).

A cleaner is provided within the front end of the air silencer to prevent the passage of dust and grit to the engine.

The cleaner comprises a composite steel-wool element through which the air passes on its way to the carburetter. It is removed by unscrewing the wing nut in the centre of the end cover and removing the cover; the element may then be withdrawn.

Every 10,000 miles, unless the car is being operated under particularly dusty conditions, when the cleaning must be carried out at 5,000 miles' intervals or even less, depending upon the dust concentration, the cleaner element should be removed and carefully washed in petrol or paraffin, and afterwards oiled with engine oil. It should be thoroughly drained before refitting.

Air Cleaner and Silencer (Oil Bath Type).

The air cleaner is of the "oil bath type", which operates very efficiently to remove the dust from the air drawn into the carburetter. As this type of cleaner accumulates considerable dust and dirt, it requires regular cleaning every 1,000 miles, or more often according to the prevailing conditions, the frequency being more readily determined by experience in the territory in which the car is operated.

As directed on page 32, the filter element should be removed by unscrewing the long bolt (1, Fig. 15) which passes through the top of the silencer.

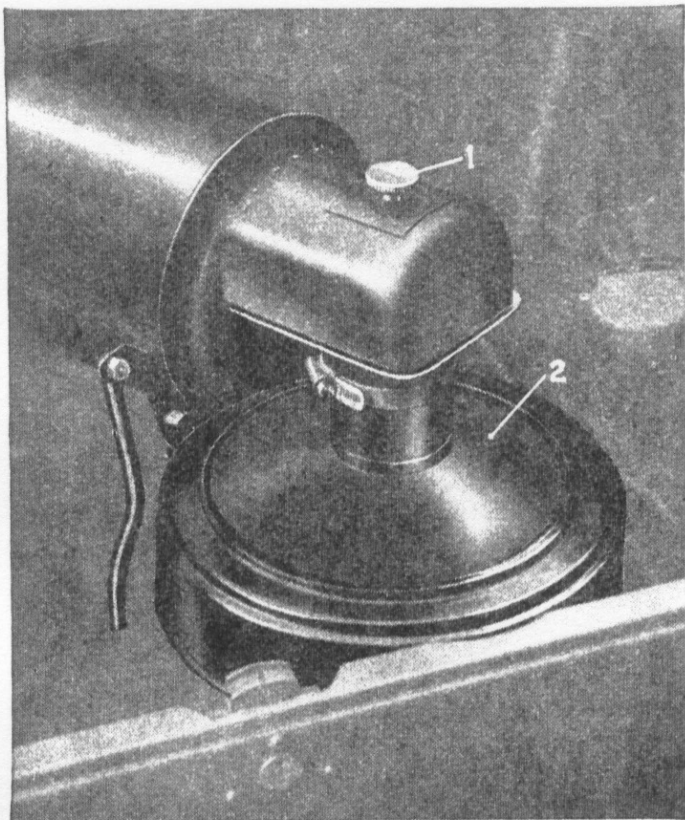


Fig. 15.—OIL BATH AIR CLEANER.

1. Filter bowl retaining bolt. 2. Filter bowl.

Consequently, particular care should be taken always to open the garage doors wide before starting the engine.

The oil container should be emptied and carefully cleaned, the filter element being thoroughly washed in petrol and allowed to dry.

Replace the element and refill the oil container with engine oil to the indicated level, and refix in position.

Warning.

On no account should the engine be kept running for any appreciable period with the car in a closed garage. There is a grave danger of people in the garage being asphyxiated, owing to the presence of poisonous gases in the exhaust.

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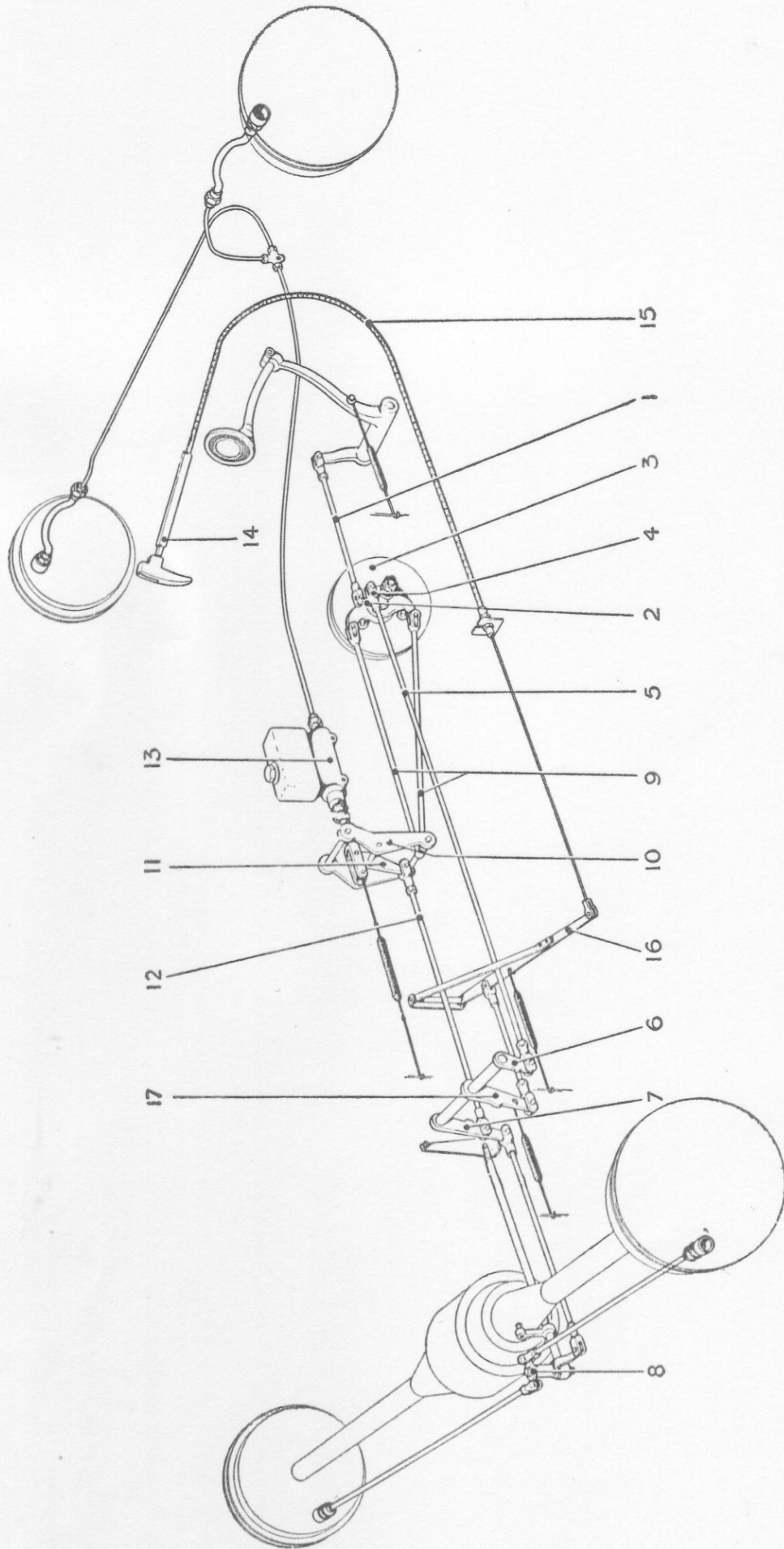


Fig. 16.—DIAGRAM OF BENTLEY BRAKING SYSTEM.—RIGHT-HAND MODEL.

CHAPTER VI

The Braking System

General Description—Right-hand Model—Left-hand Model—Possible Variations—Adjustments—Adjustment of Hand Brake—Adjustment of Servo—Lubrication—Bleeding the Hydraulic System—Hydraulic Master Cylinder.

General Description.

The Bentley four-wheel braking system is of the servo-assisted type, and comprises a mechanically driven servo motor of the dry disc-brake type, which is equally effective for either forward or backward movement of the car. Further, even should the servo be out of action, the rod operated rear brakes are still directly coupled to the pedal.

Pressure on the pedal applies the rear brakes direct in the usual manner and also engages the servo, but the front brakes, which are of the hydraulically operated type, are actuated entirely by the servo acting through the medium of a balance lever and hydraulic master cylinder.

The servo effect is distributed between the front and rear brakes, being added therefore to the direct pedal effect in the case of the rear brakes. With the leverages provided, this results in about 55 per cent. of the total braking being imposed on the front wheels, which allows for the fact that greater weight is thrown upon the front wheels during braking.

The proportioning of the servo pull to the front and rear brakes respectively is effected by a balancing lever. A separate equaliser is provided for the two rear brakes, which, with the hydraulic operation of the front brakes, ensures even braking on either side of the car.

The hand brake lever operates the rear brakes only and uses the same linkage as the foot pedal.

Diagrammatic representations of the braking systems for both the right-hand and left-hand models are shown in Figs. 16 and 17.

Right-hand Model.

A pull rod (1, Fig. 16), operated by the pedal, is coupled to a lever (2), on the servo motor shaft, the motor itself (3) being mounted on the off-side of the gearbox, and driven at approximately one-tenth of the propeller shaft speed.

The lever (2) has inclined cams formed on the face of its boss, these cams engaging, through the medium of steel balls, similar cams formed on the boss of another lever (4). From the latter a rod (5) directly actuates the rear brakes through the medium of the levers (6) and (7), which are pivoted on a bracket bolted to the "X" member of the frame, and finally, through the rear equaliser (8) mounted on a bracket suspended from the axle.

The output from the servo is taken by one of the two rods (9), according to whether the car is moving forwards or backwards, to the lever (10). This lever carries, in turn, a balance lever (11), the lower end of which is connected by the rod (12) to the rear brake lever (7), thus augmenting the direct pedal effort, while its upper end is coupled to the master cylinder (13), which actuates the front brakes.

The dashboard hand brake (14) is mounted under the facia board, convenient to the driver's right hand. The ratchet release is so arranged that should it be inadvertently knocked or pressed, the brakes will not be released. In order to release the brakes, the trigger must be fully depressed and held in this position. The hand brake is then pulled, as if applying the brakes, and this action frees the ratchet permitting the brakes to be released, provided that the trigger is still held. This device is particularly useful in preventing accidental release of the brakes when the car is parked.

To obtain this action, the trigger is not directly connected to the ratchet pawl, but compresses a spring. This spring, in turn, operates the pawl, but is only strong enough to move it out of engagement when the load has been removed by pulling on the hand brake.

The hand brake is connected by an enclosed cable (15), to a horizontal lever (16), mounted on the "X" section of the frame which provides the required leverage, and is in turn coupled to the rear brakes, through the levers (7) and (17) and the rear equaliser. The same rear brake-shoes are used, therefore, as for the pedal operation, and the application and release of the hand brake can be lightened accordingly by simultaneous application of the foot brake.

Left-hand Model.

A pull rod (1, Fig. 17), operated by the pedal, is coupled via the cross rod (2), and the rod (3), to a lever (4) on the servo motor shaft, the motor itself (5) being mounted on the right-hand side of the gearbox, and driven at approximately one-tenth of the propeller shaft speed.

The lever (4) has inclined cams formed on the face of its boss, these cams engaging through the medium of steel balls similar cams formed on the boss of another lever (6). Through the latter a rod (7) directly actuates the rear brakes through the medium of levers (8) and (9), which are pivoted on a bracket bolted to the "X" member of the frame, and, finally, through the rear equaliser (10) mounted on a bracket suspended from the axle.

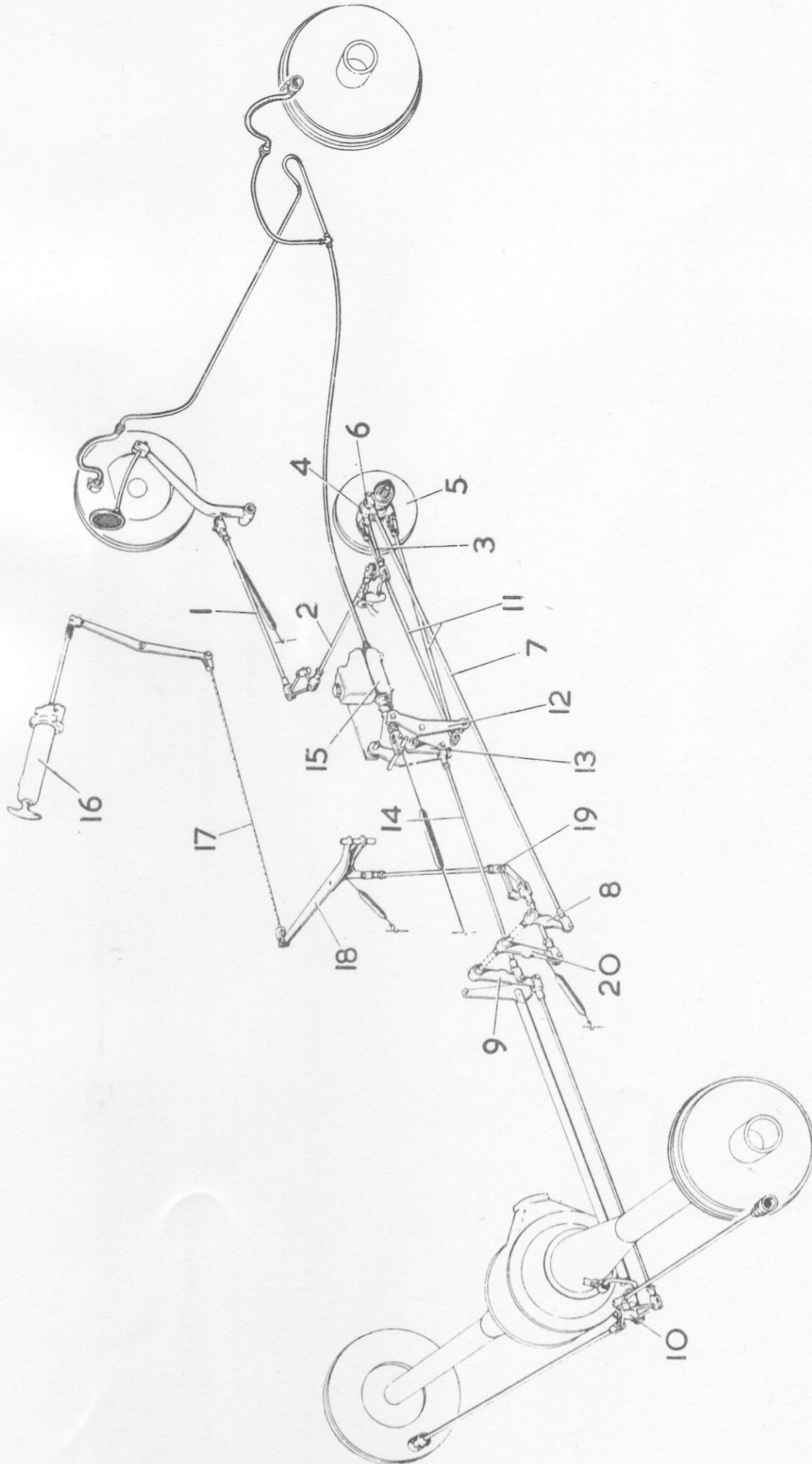


Fig. 17.—DIAGRAM OF BENTLEY BRAKING SYSTEM—LEFT-HAND MODEL.

The output from the servo is taken by one of the two rods (11), according to whether the car is moving forwards or backwards, to the lever (12). This lever carries, in turn, a balance lever (13), the lower end of which is connected by the rod (14) to the rear brake lever (9), thus augmenting the direct pedal effort, while its upper end is coupled to the master cylinder (15) which actuates the front brakes.

The dashboard hand brake (16) is mounted under the fascia board convenient to the driver's left hand, and is connected by a cable (17) to a horizontal lever (18) mounted on the "X" section of the frame, which provides the required leverage, which in turn is coupled to the rear brakes through the rod and bell crank (19) to the levers (20) and (9), and so to the rear equaliser. The same rear brake shoes are used, therefore, as for the pedal operation.

The hand brake is applied by a direct pull, and released by twisting the handle in a clockwise direction, the application and release can therefore be lightened accordingly by simultaneous application of the foot brake.

Possible Variations.

As already mentioned, the leverages are so proportioned that the total braking effort is distributed in a predetermined ratio between the front and rear brakes.

This distribution will be upset if the servo brakes are allowed to become badly out of adjustment, or if the servo, for any reason, fails to give its correct output. A less likely cause would be oil or grease on the brake linings.

The need for adjustment of the rear brakes will be indicated by excessive travel of the hand brake lever, whereas the front brakes, which are operated by the servo motor only, will not affect the hand brake or pedal travel.

It is unlikely, however, that the front brakes will wear more rapidly than the rear brakes, so, provided that they are adjusted whenever adjustment of the rear brakes is required, no trouble in this respect need be expected.

Low or inconsistent output from the servo would be indicated by heavy or non-progressive brake pedal action, together with insufficient front braking, in which case the servo would have to be dismantled to ascertain the cause of the trouble. As this is a delicate operation, it is recommended that Messrs. Bentley Motors (1931) Ltd., or one of their "Special Retailers" be entrusted with this work.

A light pedal action, accompanied by defective front braking, resulting in the rear wheels locking, would indicate a fault in the front braking system. An excess of front braking would indicate a fault in the rear brakes.

In the unlikely event of oil reaching either of the rear brakes, the self-seal bearing on the rear axle half shaft will be at fault. Grease catchers are provided for the front hubs, and provided that the recommended grease be used and the quantity limited to $1\frac{1}{2}$ ozs. in each hub, this should not be able to reach the brake linings.

Adjustments.

A separate adjustment is provided on each brake carrier plate to compensate for wear of the brake shoe linings, and is the only adjustment provided on the whole system.

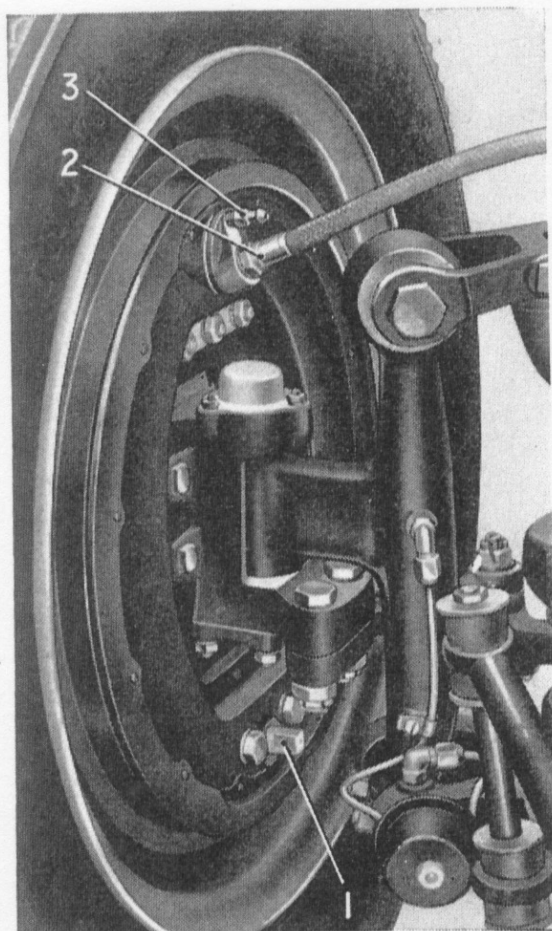


Fig. 18.—FRONT BRAKE ADJUSTMENT.

1. Adjuster screw.
2. Hydraulic pipe.
3. Bleeder connection.

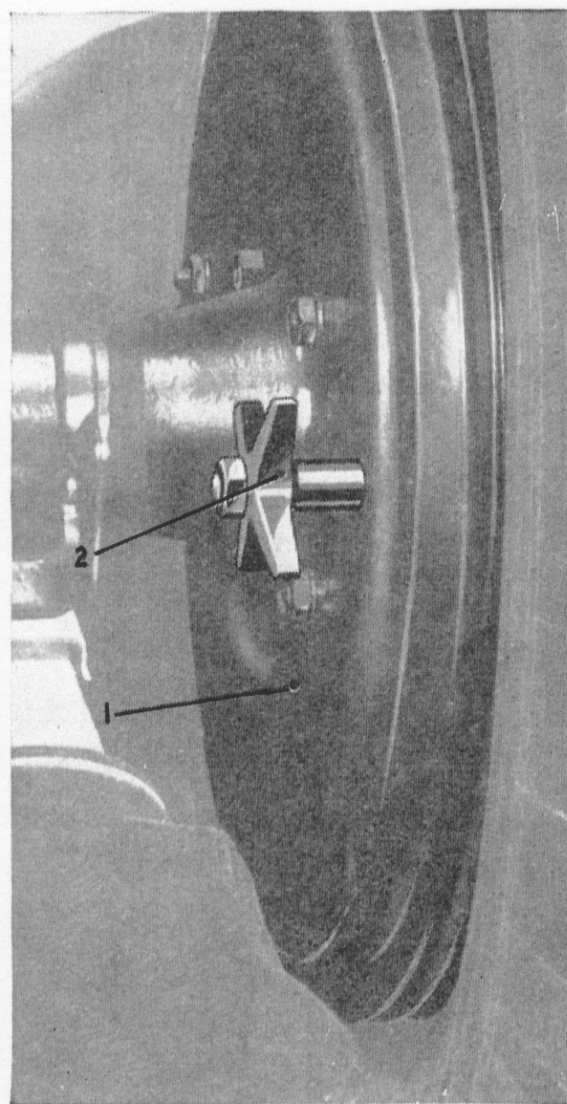


Fig. 19.—REAR BRAKE ADJUSTMENT.

1. Brake drum.
2. Adjuster screw.

It is important to note that in no circumstances should adjustments be attempted at any other point, for instance, by altering the lengths of the brake rods. These are all carefully determined during erection

of the chassis, with a view to synchronisation of the front and rear safety stops, which ensure that in the event of failure of any part of the system, at least one pair of brakes will remain available.

The method of adjustment is the same for both front and rear brakes, with the exception that a hand wheel is provided on the rear brake adjusters, while a $\frac{1}{4}$ " B.S.F. open-ended spanner must be used on the squared end of the front brake adjusters. The rear adjusters (2, Fig. 19) are located forward of the axle tubes, and the front adjusters (1, Fig. 18) directly below the steering pivot pins.

For each complete turn of the adjusters, four "clicks" will be felt, and between each "click" the brake shoes are expanded towards the drum, approximately .014", and then moved back .010", giving an incremental adjustment of .004", and a running clearance of .010".

To adjust the brakes, rotate the adjusters in a clockwise direction until solid resistance is felt, the resistance being equal for all four brakes, then turn back the adjuster two "clicks". This will give the correct brake adjustment.

It is not necessary to jack up the car to adjust the brakes, as the adjusters are so designed to give the correct shoe clearances automatically.

If, after long service, the brake linings require renewal, this will be apparent by the adjusters coming to the end of their travel, and will have a solid feel quite distinct from the resistance felt when the brake shoes are correctly adjusted.

Adjustment of Hand Brake.

Adjustment of the rear brakes takes up both the pedal and hand brake clearance in the same operation. No other adjustment is required.

Adjustment of the Servo.

The servo is of the dry disc-brake type, and is shown in Figs. 16 and 17. An adjustment is provided for the initial setting and wear of the friction surfaces, but once correctly set, should require no further attention for a considerable period, as very little wear occurs. As the operation is of a delicate nature it is advised that this adjustment should be effected by Messrs. Bentley Motors (1931) Ltd., or one of their "Special Retailers".

Lubrication.

The need for hand lubrication of various parts of the mechanism has been reduced to a minimum, by the use of self-lubricating bearing bushes at the fulcrum of practically all levers.