CHAPTER VII

Clutch, Gearbox, Propeller Shaft and Rear Axle

The Clutch—Clutch Pedal Mechanism—Clutch Pedal Adjustment—Gearbox—Universal Joints—Rear Axle.

The Clutch.

The clutch is of the single dry-plate type and requires no special attention.

The clutch shaft is spigoted at its forward end in the crankshaft on a ball bearing. This bearing is filled with grease during erection, and requires no attention between overhauls of the chassis.

The withdrawal thrust ball race, and its associated moving parts, are lubricated from the centralised chassis lubrication system.

Clutch Pedal Mechanism.

It is important that the various joints should be lubricated with the oil-can every 5,000 miles, as directed on page 31.

The fulcrum of the pedal lever is fitted with self-lubricating bearing bushes, and requires no external lubrication.

Clutch Pedal Adjustment.

The only point where any adjustment is provided, or is ever likely to be necessary, is at the coupling (see Fig. **19**), connecting the clutch pedal intermediate lever with the clutch external operating lever.

There must always be 1¼" to 1½" of "free" or idle movement of the pedal before the withdrawal sleeve is felt to be in contact with the toggle levers, as is easily tested by pressing the pedal lightly.

The coupling comprises a jaw (**1**), and a jaw (**2**), united by a turnbuckle (**3**), having a left-hand and a right-hand threaded end, and locked with locknuts (**4**).

To effect an adjustment, release the two locknuts (**4**) and rotate the turnbuckle (**3**) with a spanner, to obtain the correct free movement, the locknuts being subsequently re-tightened.

When testing and setting this adjustment, the aluminium pedal plate must be in position, because it is this part which acts as a stop, limiting upward movement of the pedal under the action of its external spring (**5**).

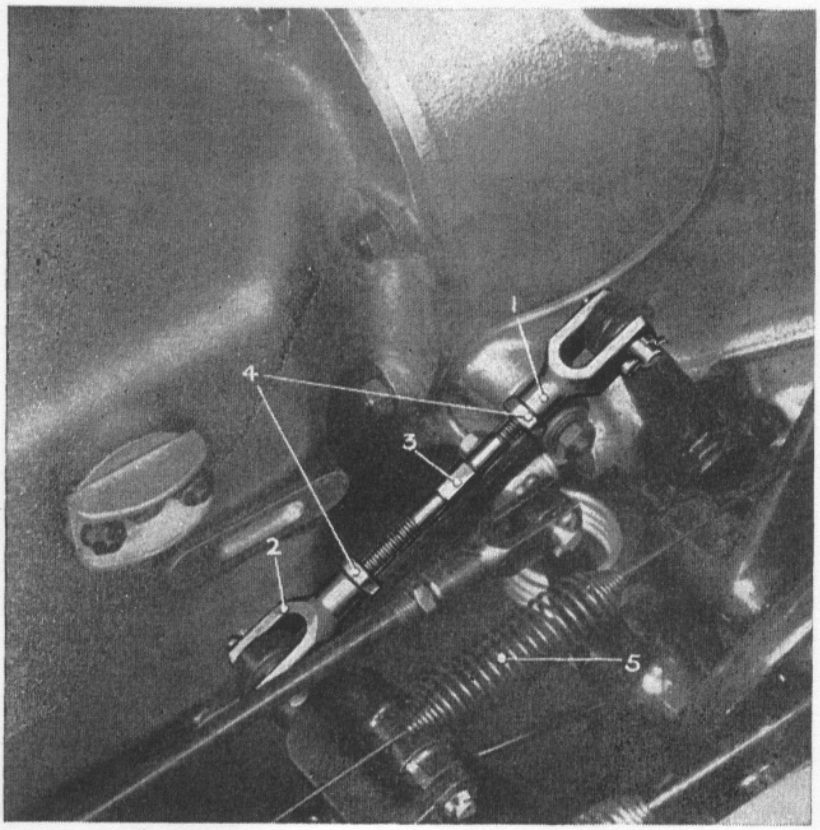

Fig. 19.—ADJUSTMENT CLUTCH PEDAL.

1. Jaw.
2. Jaw.
3. Turnbuckle.
4. Locknuts.
5. Return spring.

Gearbox.

Synchromesh of the "positive" type is provided to facilitate engagement of second, third and fourth speeds.

The first and third motion shafts of the gearbox are supported in three bearings, thus contributing to the permanent silence of the gears, and in the case of the third motion shaft, relieving the spigot bearing of much of its load.

Oil is inserted into the gearbox by removing the dipstick shown at (**2**, Fig. **20**). Recommended oils are given on page 27.

Oil should be poured in until the level reaches the mark on the dipstick, taking care that the box is not over-filled.

The oil level should be inspected every 5,000 miles as directed on page 30.

Every 20,000 miles, all oil should be drained from the gearbox, by removing the drain plug, with the special spanner provided, and fresh oil inserted, as directed on page 33.

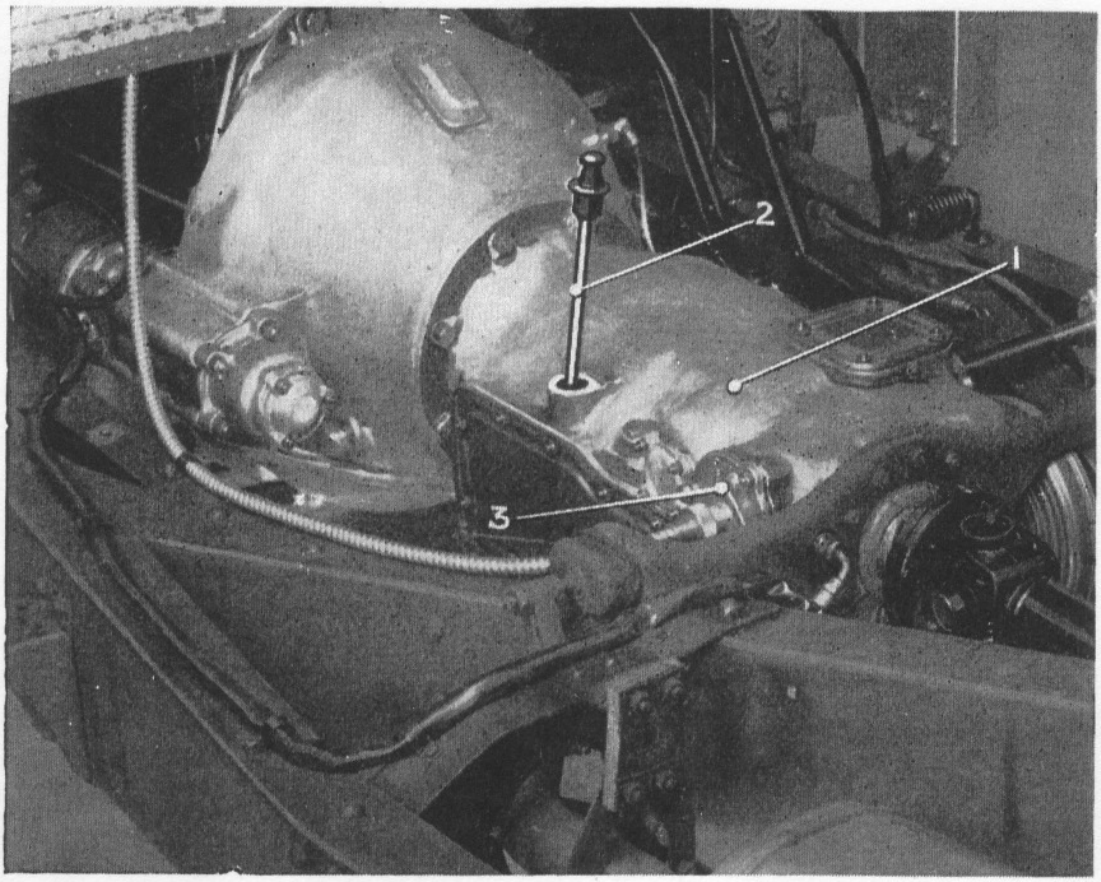

Fig. 20.—GEARBOX.
1. Gearbox. 2. Dipstick. 3. Speedometer connection.

A worm-driven connection is provided on the gearbox for the speedometer, the drive ratio being suitable for the speedometer which is supplied.

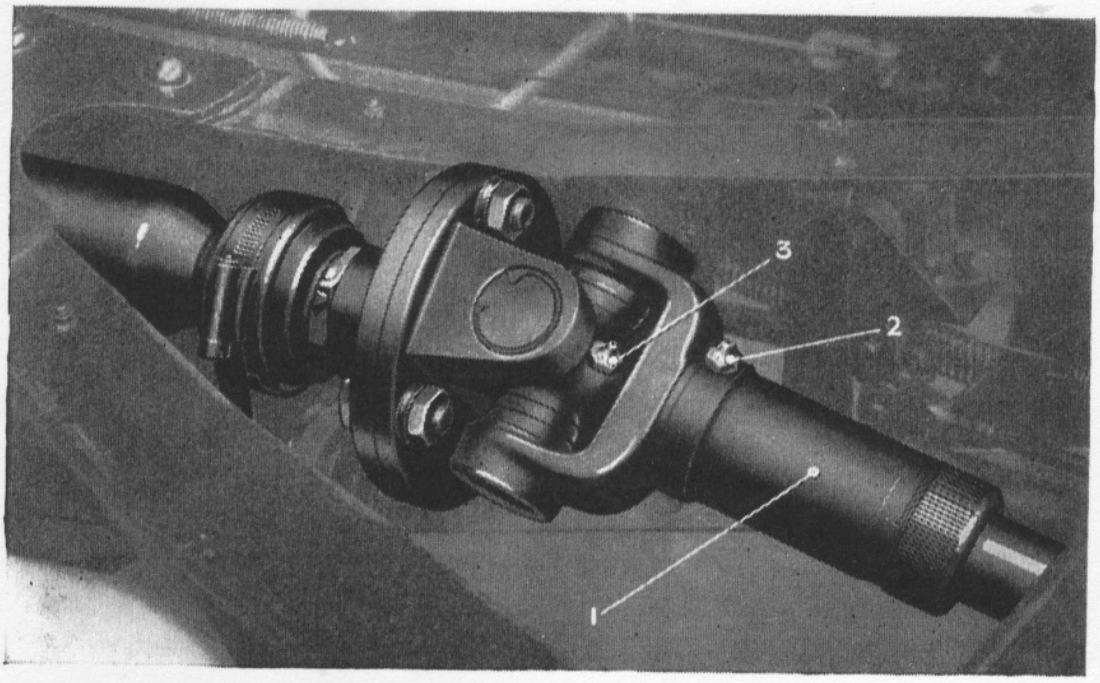

Fig. 21.—PROPELLER SHAFT.
1. Sliding joint. 2. Grease nipple sliding joint. 3. Grease nipple universal joint.

Universal Joints.

The propeller shaft universal joints are fitted with needle roller bearings, and each joint is provided with a grease-gun lubricator (**3**, Fig. **21**), located at the centre of the cross-piece.

The driven portion of the centre joint is provided with serrations which engage similar serrations within the propeller shaft to permit the necessary degree of telescoping movement.

This sliding joint is also lubricated by means of a grease-gun lubricator, shown at (**2**, Fig. **21**). Every 10,000 miles, as directed on page 31, the correct grease should be injected by means of the grease-gun into all the four lubricators.

Rear Axle.

The rear axle is of the semi-floating type.

The final drive is by offset hypoid bevel gears, which possess the advantages of being silent in running, and, owing to the offset disposition of the pinion, of enabling a lower body position to be obtained without decreasing the ground clearance.

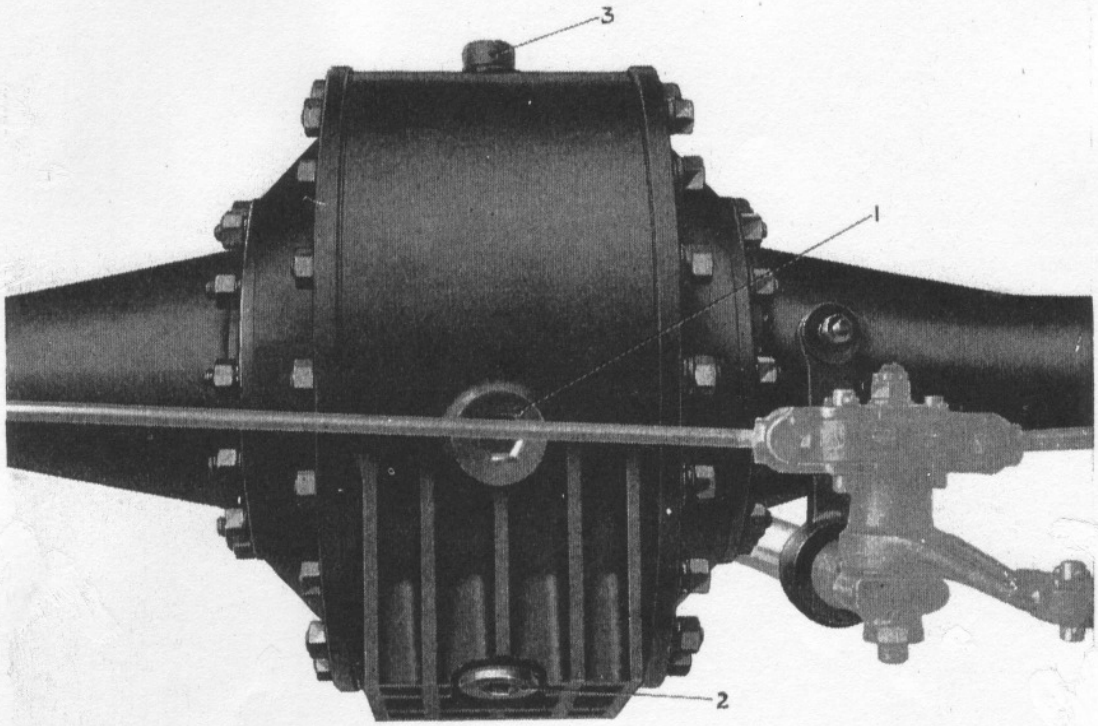

Fig. 22.—REAR AXLE CASING.

1. Filler and level plug.
2. Drain plug.
3. Breather.

It is important that no other oil than that recommended should be used in the rear axle. (See page 27.)

Every 5,000 miles, as directed on page 30, the level of the oil should be inspected, and topped-up if necessary.

Every 20,000 miles, as directed on page 33, the casing must be drained, and refilled with fresh oil to the correct level.

The drain plug (**2**, Fig. **22**) should be removed, with the special spanner provided, preferably when the casing is warm; and all the oil allowed to drain out.

Plug (**1**) may then be removed for filling purposes. One-and-three-quarter ($1\frac{3}{4}$) pints of fresh oil should be inserted, using a syringe. This quantity should just cause oil to overflow from the filling orifice.

Care must be taken to see that the washer is in position when replacing the plug.

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CHAPTER VIII

Steering, Shock Dampers, Road Springs, Wheels and Tyres

Steering Box and Column—Steering—Front Suspension—Warning, Front Suspension Springs—Steering Arms and Joints—Front Stabiliser—Rear Hydraulic Shock Dampers—Rear Road Springs—Wheels—Wheel Discs—Lubrication of Wheel Bearings—Tyres—The Jacking System—Wheel Changing—Fitting and Removing Tyres—Inflation of Tyres—Balancing Road Wheels.

Steering Box and Column.

The steering mechanism is of the cam-and-roller type, and requires no attention beyond inspection of the oil level.

The cover of the box is provided with a filling plug. Every 5,000 miles, as directed on page 30, this plug should be removed, preferably when the box is warm, and the level of the oil inspected. If necessary oil should be poured in until it is on the point of overflowing from the plug orifice.

For correct oils, see page 28.

With the steering wheel in its normal central position, a hole will be found in its boss, adjacent to the upper arm, into which the nozzle of the oil-can should be inserted to reach an oil hole provided in the control carrier. This operation should be included when lubricating the controls every 5,000 miles, as directed on page 30.

Steering.

Experience has shown that too much importance cannot be attached to proper balance of the front wheels and tyres.

As it is only possible to balance the wheels and tyres statically, this does not eliminate the effect of slight out-of-balance forces which can only be detected dynamically. Such a condition may be caused by the normal wear of the tyres on the front wheels; as is inevitable with independent front suspension, tyre wear will be slightly less regular than on the rear wheels.

Therefore, it is recommended that the front wheels should be periodically changed to the rear wheels and vice versa to even out the wear on the tyres.

Front Suspension.

Each wheel is independently sprung, the suspension consisting of the two upper and two lower radius arms of different lengths set at a leading angle, between which a vertical yoke is carried, and on this the stub axles are pivoted.

The upper radius arms are connected to and operate the special Bentley shock damper, which effectively dampens excessive spring action.

The main helical coil spring is mounted between the forward lower radius arm and a seat formed as an integral part of the chassis frame.

The ball joints and the steering pivot bearings are lubricated from the central chassis system. (See Fig. 4.)

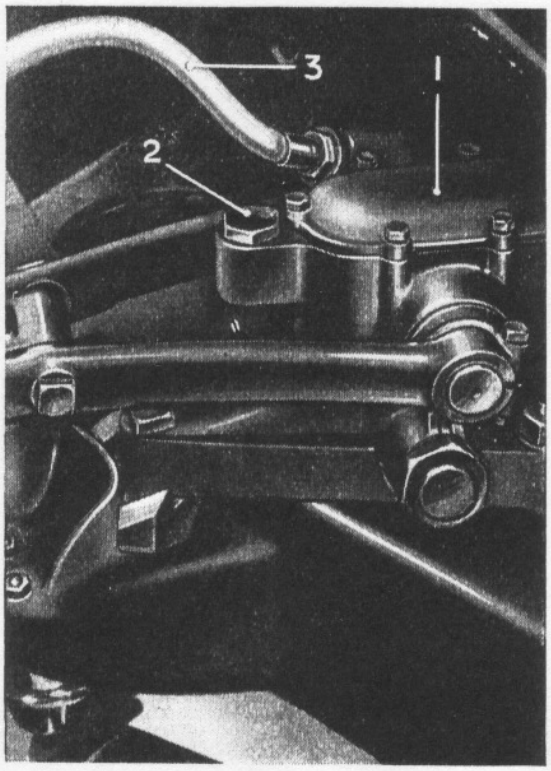

Fig. 23.—FRONT SHOCK DAMPER.
1. Shock Damper.
2. Filler Plug.
3. Hydraulic Brake Pipe.

The shock damper consists of two pistons operating in cylinders full of oil, the oil being displaced from one cylinder to the other through drilled passages, the degree of damping being controlled by spring-loaded valves.

Until it is obvious that the effectiveness of the shock damper has become reduced, or undue leakage is apparent, no attention whatever will be necessary for 10,000 miles, when the level of the oil in the shock damper should be inspected, as directed on page 31.

It is of vital importance that only perfectly clean oil of the correct grade should be used, and this should be strained through a fine gauze before using.

Straining is facilitated if the oil be first warmed to about 75°C.

The importance of the above cannot be over-emphasised, as a very small particle of foreign matter in the oil may lodge under one of the valves and impair the effectiveness of the shock damper.

WARNING.

Front Suspension Springs.

No attempt must be made to remove the coil springs of the front suspension.

Special appliances are required because the powerful springs are compressed even when in the rebound position.

Any necessary dismantling or adjustment of the suspension must be effected by Messrs. Bentley Motors (1931) Ltd., or one of their "Special Retailers". (See page 16.)

Steering Arms and Joints.

The steering gear should be examined occasionally to see that all bolts are tight and joints well lubricated.

If any of the nuts are found loose, and only retained by their split pins, the latter should be removed, the nuts screwed up tightly and new split pins fitted.

The ball joints of the cross and side steering tubes are lubricated from the centralised chassis system, as illustrated in Fig. **4**.

The bearing pads of all joints are spring-loaded, being self-adjusting for wear. They should not normally require attention except when the car is undergoing a general overhaul.

Front Stabiliser.

In order to reduce the tendency of the car to "roll" on corners, a steel torsion-rod stabiliser is provided at the front end of the chassis.

The stabiliser is carried in rubber bearings, and is coupled to the wheel mountings by links with rubber pads.

No attention is necessary.

Rear Hydraulic Shock Dampers.

Hydraulic shock dampers of Bentley design and manufacture are fitted to the rear axle, one of the dampers being shown in Fig. **24**.

Unless it is obvious that the effectiveness of the shock damper has become reduced, or undue leakage of oil is apparent, no attention will be necessary for 10,000 miles of running.

After 10,000 miles, it is necessary to inspect the oil level in the shock dampers as directed on page 31.

For this purpose a filling plug (**1**, Fig. **24**) is provided, arranged at such a height in the casing as to control the maximum oil level.

It is of vital importance that only perfectly clean oil of the correct grade should be used. The following precautions must be observed:—

1. Before attempting to remove the plug (**1**), both the plug and the shock damper casing adjacent to it must be cleaned very carefully with a brush dipped in paraffin, in order to avoid the possibility of dirt entering the hole when the plug is removed.
2. Only a recommended oil must be used (see page 28), and before inserting this, it must be strained through a fine gauze. Straining is greatly facilitated if the oil be first warmed to about 75°C.

The importance of such cleanliness cannot be over-emphasised. A small particle of foreign matter may lodge under a valve and impair the effectiveness of the shock damper.

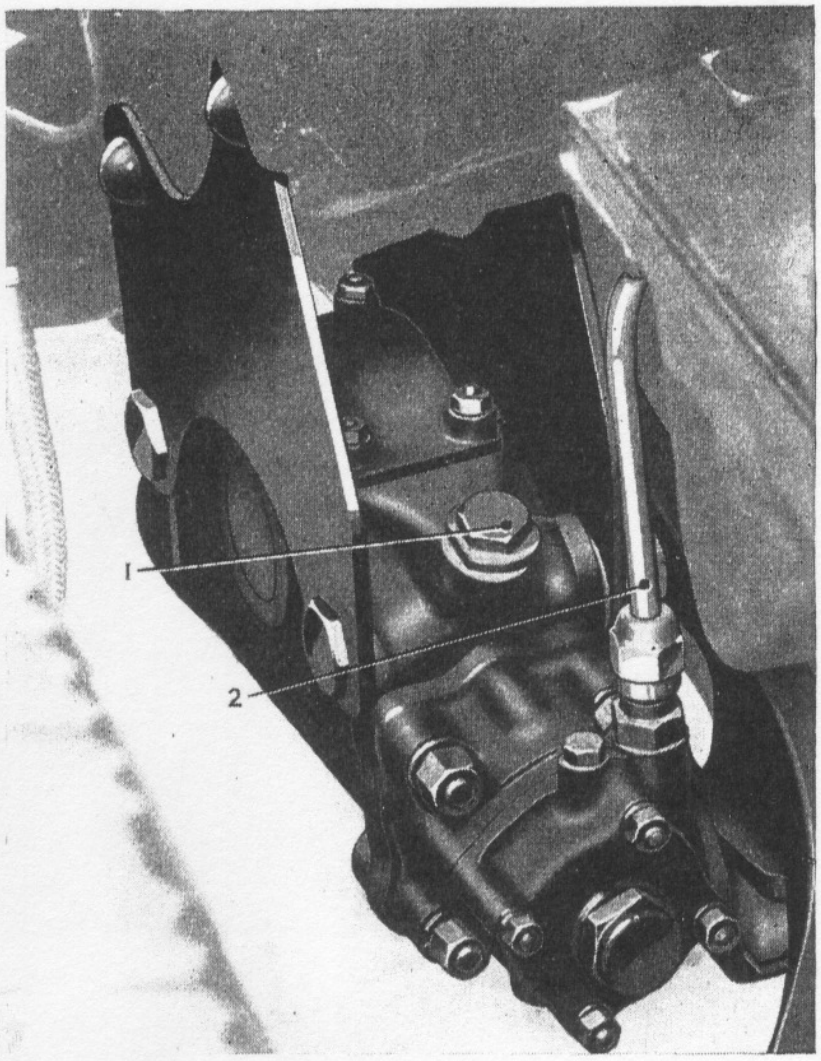

Fig. 24.—REAR HYDRAULIC SHOCK DAMPER.

1. Filler plug. 2. "Ride Control" oil pipe.

The plug (**1**) can then be removed with a box-spanner, and the oil level restored, if necessary, to the bottom of the plug hole, the oil being poured in very slowly to avoid entrapping bubbles of air. It will be found most convenient to add oil by means of small syringe provided in the tool kit. When replacing the plug, care must be taken that its washer is in position.

The shock damper consists of a piston assembly operating in a cylinder which is maintained full of oil, the latter being displaced from one end of the cylinder to the other, past spring-loaded valves.

The loading of these valves, and hence the degree of damping is controllable through the **"Ride Control"** lever, by means of a small pump carried in a casing bolted to the gearbox, which maintains