SECTION O

THE WHEELS AND TYRES

(TUBELESS TYRES)

Section O.1

TYRE MAINTENANCE

Even tyre wear is promoted by changing the positions of the wheels on the car periodically. The spare wheel should be brought into use with the others.

The positional changing of the road wheels must only be carried out if all tyres are of the same construction. See Section O.7 if any radial ply tyres have been fitted.

Attention should be paid to the following points with a view to obtaining the maximum mileage from the tyre equipment of the vehicle.

Test the pressures of the tyres daily by means of a suitable gauge and restore any air lost. It is not sufficient to make a visual inspection of the tyre for correct inflation. Inflate the spare wheel tyre to the correct front wheel pressure.

Keep the treads free from grit and stones and carry out any necessary repairs. Clean the wheel rims and keep them free from rust. Paint the wheels if necessary.

Keep the clutch and brakes adjusted correctly and in good order. Fierceness or uneven action in either of these units has a destructive effect upon the tyres.

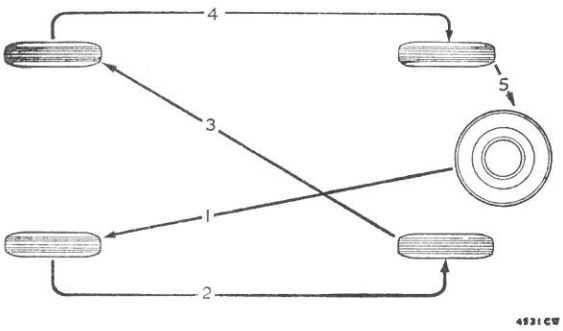

Fig. O.1

Interchange the road wheels diagonally in the order shown above, bringing the spare wheel into use

Misalignment is a very costly error. Suspect it if rapid wear of the front tyres is noticed and correct the fault at once. See Section J.4 for details on front wheel alignment.

Should the tyres get oily, fuel should be applied sparingly and wiped off at once.

Avoid under- and over-inflation.

Avoid kerbing and other causes of severe impact.

Have any damage repaired immediately.

Section O.2

VALVES

A mushroom-headed rubber valve is used with tubeless tyres. The valve is secured in the wheel by a small stepped flange on the rubber valve and by the pressure of air inside the tyre.

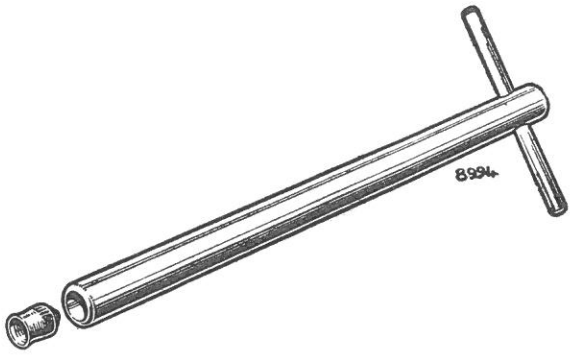

Fig. O.2

A simple tool for fitting tubeless tyre valves

A simple but effective tool (Fig. O.2) for fitting the valve can be made up from a 7 in. (177 mm.) length of $\frac{1}{2}$ in. (12 mm.) steel bar or 13 S.W.G. steel tubing. Using a letter 'S' (8·83 mm.) drill, in one end drill a hole to a depth of approximately $\frac{5}{8}$ in. (16 mm.).

Obtain a brass valve dust cap and solder the cap in the drilled hole.

The opposite end of the tool requires a hole drilling about $\frac{1}{2}$ in. (12 mm.) from the end to accept a short piece of $\frac{1}{4}$ in. (6 mm.) diameter rod to provide a handle.

To fit the valve with the aid of the tool first liberally coat the rubber valve and the perimeter of the valve hole in the wheel with soapy water. Insert the valve into the hole and screw on the special tool. A sharp pull will seat the valve correctly.

The valves may be tested for air-tightness by rotating the wheel until the valve is at the top and inserting the end of the valve in a small container of water. If bubbles appear the seating is faulty and the valve interior should be replaced with a new one. Valve caps, in addition to preventing dirt entering the valve, form a secondary air seal and should always be fitted.

Section O.3

REMOVING A ROAD WHEEL

To remove the hub cover insert the flattened end of the wheelbrace between the edge of the cover and road wheel and lever the cover away from the wheel, using the tyre as a fulcrum for the wheelbrace at a point diametrically opposite the tyre valve.

To refit the cover the outer rim should be placed over two of the protrusions on the wheel centre and the outer face given a sharp blow with the fist over the third protrusion.

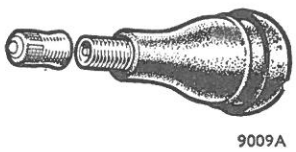

Fig. O.3

Valve for a tubeless tyre

Apply the hand brake, slacken the four nuts securing the road wheel to the hub, and raise the car with the jack. Remove the nuts and take off the wheel. If wheel-changing is being undertaken on a hill it is advisable to scotch both front and rear wheels on the opposite side to prevent any possible movement when the car is on the jack and the wheel removed.

When refitting ensure that the wheel nuts are replaced with their chamfer against the wheel and are tightened in the order 1, 3, 4, 2 in rotation. Do not overtighten; the correct torque figure as given in **'GENERAL DATA'** must not be exceeded.

Section O.4

TYRE REMOVAL

Remove the valve interior to completely deflate the tyre.

Using spoon-shaped tyre levers, which must be in good condition, separate the beads from the rim flange in the manner shown in Fig. O.4 until both beads are in the base of the rim. As inextensible wires are incorporated in the edges of the tyres, no attempt should be made to stretch the edges over the rim as the beads must **IN NO WAY BE DAMAGED.**

Owing to the construction of the wheel the tyres must be removed over the narrow bead seat of the wheel only. **Tyres cannot be removed or refitted over the wide flange.**

Push both cover edges into the well-base of the wheel and lubricate the tyre beads and the fitting levers with Dunlop Tyre Bead Lubricant or a thin vegetable oil soap solution. Commence at a point diametrically opposite

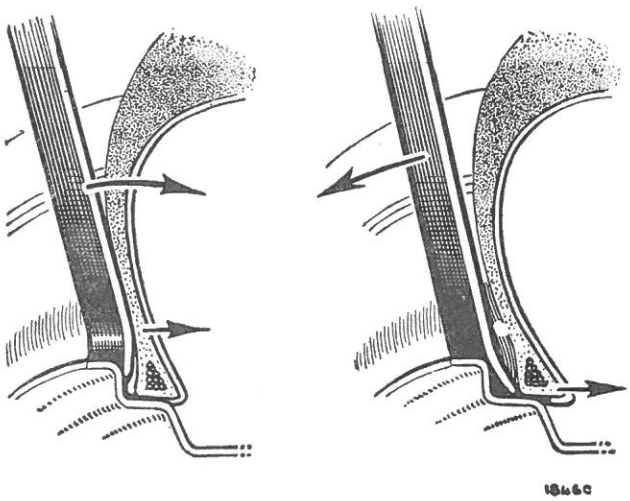

Fig. O.4

The tyres have wired edges and no attempt must be made to stretch them. If the cover fits tightly on the rim seating it should be freed by using the tyre levers as indicated

1. Insert lever between bead and rim, with curved end against tyre. Press lever towards tyre.
2. Insert second lever in space between lever and rim, with curved end outwards, and pull lever away from tyre. Repeat at intervals round tyre until bead is free. Several circuits of tyre may be necessary.

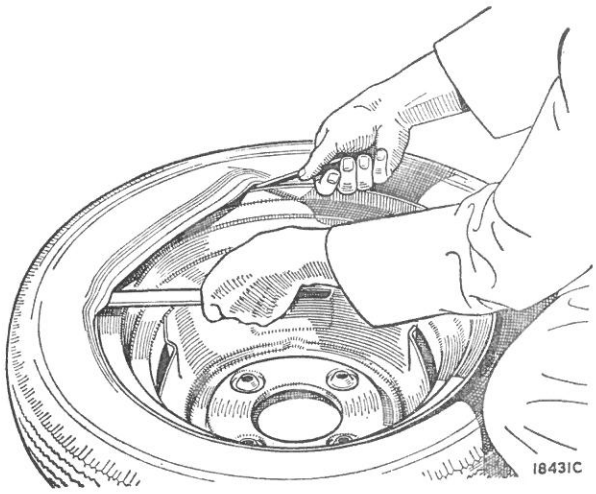

Fig. O.5

Lever the cover over the rim, using tyre levers in good condition to avoid damaging the sealing edge of the tyre

and lever the cover edge over the rim of the wheel, using two levers at intervals of 6 in. (15 cm.) apart. Continue working round the wheel until the cover on one side is completely free.

Repeat with the other side of the cover.

Section O.5

TYRE FITTING

The tubeless tyre relies primarily on a good air seal between the tyre bead and the rim, and also between the rim and the valve. Great care is therefore necessary to avoid the slightest damage to the tyre bead. If the narrow bead seat is on the inside of the wheel the tyre must be mounted over the inner rim flange. The following instructions are of great importance.

Rim preparation

(1) Remove any visible dents in the flange by careful hammering.

(2) Clean the flange and rim seat with steel wool, emery, or other cleaning medium and remove all foreign matter, rust, rubber, etc. Paint need not be removed but irregularities in the surface should be smoothed out. In extreme cases of rusting it may be necessary to use a wire brush or a file.

(3) File or buff away any high-spot at the butt-weld joint.

(4) Wipe the flange and bead seat with a water-moistened cloth.

Before fitting moisten the beads of the tyre, the rim flange, and the tyre levers with Dunlop Tyre Bead Lubricant or a thin vegetable oil soap solution; **do not use fuel.** Mount the tyre on the rim with the narrow bead seat and push one edge of the cover over the edge of the rim; continue working round the tyre towards the valve position. The portion of the tyre first fitted should be kept pushed into the well-base of the the wheel rim and

then no difficulty will be encountered in fitting the last portion of the cover. Do not forget that the white or coloured balance spot on the tyre must be in line with the valve position.

Before inflation bounce the crown of the tyre on the ground at various points to snap home the beads of the tyre against the rim of the wheel and provide a partial seal. Refit the valve interior.

With the wheel in an upright position inflate the tyre. If a seal cannot be obtained at the first rush of air bounce the tyre again with the air-line attached. In cases of difficulty apply a tourniquet of strong cord around the circumference of the tyre and tighten. Inflate to a maximum of 40 lb./sq. in. (2·8 kg./cm.²) until the beads are fully seated against both rim flanges. Do not inflate to a greater pressure than stated, and do not stand over the tyre during inflation.

If a pressure of 40 lb./sq. in. (2·8 kg./cm.²) will not seat the beads properly, deflate, lubricate the beads and rim with Tyre Bead Lubricant, centralize the tyre, and re-inflate. If the second attempt is unsuccessful the wheel rim circumference is suspect and should be checked with a rim gauge if available, or replaced with a new wheel.

Allow the tyre to stand for a few minutes so that any free air trapped between the flange and the bead clinch can escape. Test the complete assembly in a water tank, paying special attention to the areas at the beads, valve, and wheel rivets.

After the beads have seated properly and the leak test is satisfactory, deflate the tyre to its correct running pressure.

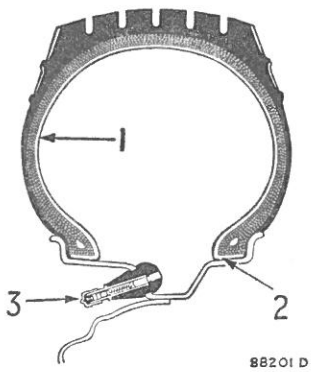

Fig. O.6

A section through a tubeless tyre

1. Air-retaining liner. 2. Rubber air seal.
3. Rubber-sealed valve.

Sealing leaks located during testing

Loss of air may occur at any or all of the following points:

(1) The area of the bead seat, showing as a leak at the top of the flange. This is usually due to a high-spot on the rim and can usually be cured by holding the bead away from the rim to allow further cleaning.

(2) The wheel rivets. In this case, and in extreme cases of leakage in the area of the bead seat (paragraph 1), it is necessary to remove the tyre. Before doing so mark the position of the leak on the tyre and rim.

Loss of air at the rivets can be cured by peening over the rivet heads.

(3) The base of the valve or the valve interior. Provided the valve is correctly fitted, this may be due to dirt under the valve seat. Clean the valve seat and fit a new valve interior.

Inflate the tyre to the correct pressure before fitting the wheel assembly to the vehicle and driving.

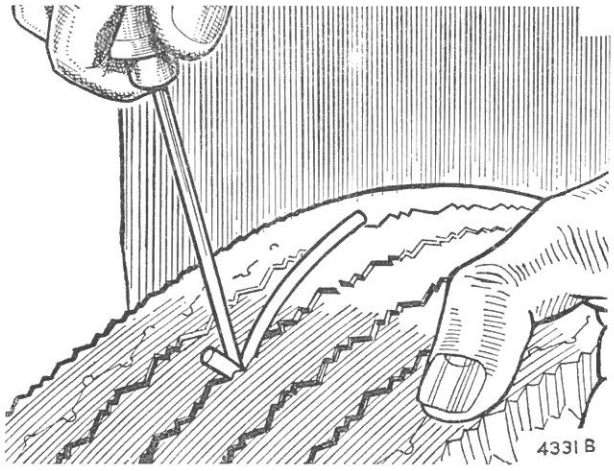

Fig. O.7

Inserting the plug and needle through a hole in the tyre

Section O.6

REPAIRING TYRES

Penetrations

Normally a tubeless tyre will not leak as the result of penetration by a nail or other puncturing object, provided that it is left in the tyre. It is necessary to examine the tyres periodically and to withdraw such objects at a time when loss of air pressure will cause least inconvenience.

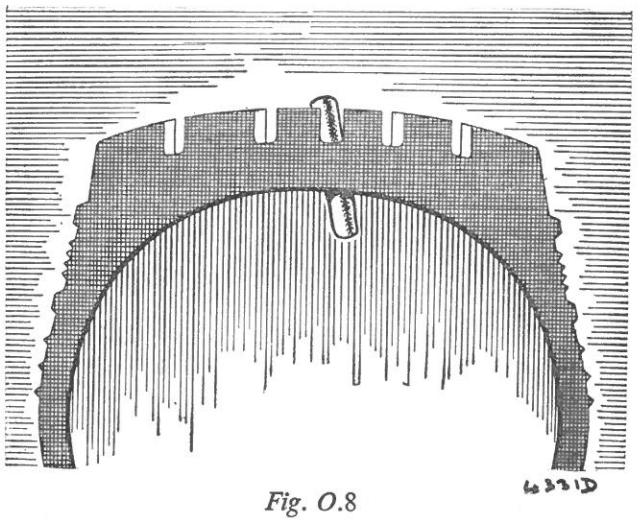

Fig. O.8

The plug inserted in the tyre and cut off to the correct length

Use of plugging kit—location and preparation

If a hole fails to seal mark the spot and extract the puncturing object, taking note of the direction of penetration. If the tyre is leaking and the puncturing object cannot be located by sight it is necessary to immerse the inflated tyre in water.

Dip the plugging kit needle into the flask of solution and insert it into the hole in the tyre, following the same direction as the penetration.

Repeat the operation until the hole is well lubricated with solution.

Repair

Select a plug about twice the diameter of the puncturing object, stretch it, and roll it into the eye of the needle $\frac{1}{4}$ in. (6 mm.) from the end. After dipping the plug into the solution insert the needle into the hole and push the plug through the tyre (Fig. O.7).

Withdraw the needle and cut off surplus plug about $\frac{1}{8}$ in. (3 mm.) from the surface of the tread (Fig. O.8). The tyre can now be inflated and used immediately. More severe injuries which are outside the scope of simple puncture repair methods are dealt with in nearly the same way as similar injuries to conventional covers.

If the tyre deflates on the road following an unusually large penetration a tube can be fitted to enable the owner to remain on the road until it is convenient for the necessary repairs to be carried out. (The valve used for the tubeless tyre must be removed before the fitting of the tube.)

Section O.7

RADIAL PLY TYRES

Tyre replacement

Tyres of radial ply construction (e.g. Dunlop SP41) should only be fitted in sets of four, although in certain circumstances it is permissible to fit them on the rear wheels only. The front wheels must never be fitted with radial ply tyres with conventional tyres fitted to the rear, and tyres of different construction must not be used on the same axle.

The positional changing of the road wheels to promote even tyre wear must not be undertaken if radial ply tyres are fitted to the rear wheels only. Inflate the tyres to the correct pressures (see **'GENERAL DATA'**).