

WHEELS AND TYRES

SECTION L

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WHEELS AND TYRES

MAINTENANCE

Maintenance checks will be required at regular intervals as given in the "Owner's Handbook" and "Owner's Service Book" and will include the following:

- (i) Checking tyre pressures.
- (ii) Checking the security of the wheel nuts.
- (iii) Checking for loose spokes (Wire wheels only).
- (iv) Checking the wheels and tyres for damage and abnormal tread wear.
- (v) Changing the position of the roadwheels.

Inflation pressures

Tyres must be examined at least once a week for loss of pressure. Pressures must be checked when the tyres are cold, such as after standing overnight, and not when they have attained normal running temperatures. Do not over-inflate, and do not reduce pressures which have increased owing to increased temperature.

The correct inflation pressures are given in the General Data Section.

Repositioning wheels and tyres (Fig. 1)

Wheels and tyres must be interchanged at regular intervals.

Diagonal interchanging between left-hand front and right-hand rear and between right-hand front and left-hand rear provides the most satisfactory first change because it reverses the directions of rotation. Subsequent interchanging of front and rear tyres should be as indicated by their appearance with the object of keeping the wear on all the treads even and uniform.

Jacking up the car

When removing the roadwheels it is recommended that the jack supplied with the car is used. At the front or rear, the extension of the jack is fitted into the square sectioned recess just beneath either bumper.

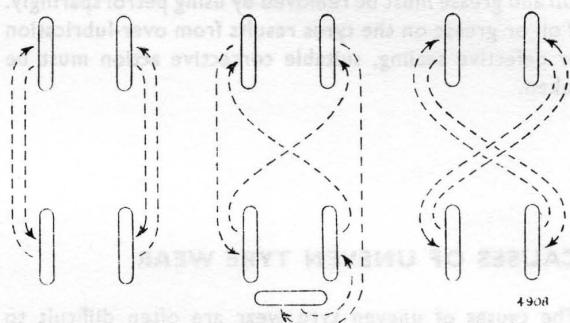


Fig. 1. Three different methods of interchanging the wheels and tyres to even up tyre wear.

When a trolley jack is used, jack up the rear of the car by positioning the jack head beneath the rear axle casing.

Jack up the front of the car by positioning the jack head and a 2 ft. (61 cm) long wooden beam across the car beneath the front suspension cross member.

Uneven tyre wear

All tyres must be examined for uneven wear, the cause determined and eliminated.

Tyre damage

Tyres must be examined for small objects embedded in the tread rubber, such as flints and nails; also for cuts and penetrations, and for damage due to impacts with kerbs, etc.

Minor injuries confined to tread rubber, such as from small pieces of glass or road dressing material, require no attention other than the removal of the objects.

More severe tread injuries and wall rubber damage require vulcanised repairs.

Injuries which extend into or through the fabric, except clean nail holes, seriously weaken the tyre. Satisfactory repair necessitates new fabric being built in and vulcanised. This requires expensive plant equipment and should be undertaken by a tyre repair specialist or by the tyre manufacturer.

Oil and grease

Oil and grease must be removed by using petrol sparingly. If oil or grease on the tyres results from over-lubrication or defective sealing, suitable corrective action must be taken.

CAUSES OF UNEVEN TYRE WEAR

The causes of uneven tyre wear are often difficult to diagnose individually; it is advisable, in such cases, to check all the following points:—

- (a) Tyre pressures (see "General Data Section").
- (b) Brake freedom and balance, brake pad and shoe settings, disc and drum condition (see Section K).
- (c) Front wheel alignment (see Section F).
- (d) Front wheel camber angles (see Section F).
- (e) Endfloat in hub bearings (see Section F).
- (f) Wear in steering joints (see Sections F and J).
- (g) Wheel lift and wobble. On a truly mounted and revolving wheel the difference between the high and low points measured at any location on either tyre seat (Fig. 2 at "A") should not exceed .050 in. (1.0 mm.). The lateral variation measured on the vertical inside face of the flange (Fig. 2 at "B") should not exceed .050 in. (1.0 mm.). The positions "C" and "D" may be used when the tyre is mounted on the rim.
- (h) Balance of the wheel and tyre assemblies. The wheels and tyres must be checked for both static and dynamic balance (see under "Tyre and Wheel Balance").
- (i) Condition of road springs and shock absorbers (see Sections F and H).
- (j) Irregular wear may be caused, in addition, by the local road conditions, such as from a combination of steep camber, abrasive surfaces and frequent hills and bends. Driving methods may also be involved; thus with all the above points properly checked, uneven wear may still be experienced. The only

solution in such cases is to regularly reposition the wheels and tyres as described under "Repositioning wheels and tyres".

WEAR CHARACTERISTICS

Certain faults which cause uneven tyre wear produce easily recognisable wear characteristics. With knowledge of these characteristics, the fault may often be quickly diagnosed and the rectification procedure considerably reduced.

Incorrect tyre pressure

Tyre distortion due to persistent under-inflation causes rapid wear on the shoulders and leaves the centre standing proud. Over-inflation has the opposite effect, i.e., excessive wear on the centre tread leaving the shoulders standing proud.

Front wheel alignment

Front wheel alignment has a marked effect on tyre wear and in extreme instances can cause "feathering" on the edge of each pattern rib.

On right-hand drive cars, "feathering" on the inside edges of the pattern ribs, nearest to the car centre line and in particular on the left-hand side tyre, indicates excessive toe-in. "Feathers" on the outside edges of the pattern ribs, furthest from the car centre line and in particular the right-hand side tyre indicates excessive toe-out.

On left-hand drive cars, the condition is reversed. "Feathers" on the inside edges of the pattern rib, nearest the car centre line and in particular the right-hand side wheel indicates excessive toe-in. "Feathers" on the outside of the pattern tread, furthest from the car centre line and in particular the left-hand side tyre, indicates excessive toe-out.

Excessive wheel camber

Excessive wheel and road camber causes rapid and one side tread wear. When a check of the mechanical factors reveals nothing abnormal, interchange the front wheels diagonally with the rear wheels, see under "Repositioning wheels and tyres".

PRESSED STEEL DISC WHEELS**Wheel lift and wobble (Fig. 2)**

On a freely mounted and revolving wheel the difference between the high and low points (lift) measured on either tyre seat "A" must not exceed .050 in. (1.0 mm.). The lateral variation (wobble) measured on the vertical inside face of the flange "B" must not exceed .050 in. (1.0 mm.). The positions "C" and "D" can be used when the tyre is mounted, but in this instance consideration must be given to any varying paint thicknesses.

Lift and wobble greater than that specified will produce persistent unbalance and irregular tyre wear.

It is impractical to correct lift and wobble when found in pressed steel wheels.

Wheel nuts

All wheel nuts of the pressed steel wheel have right-hand threads and must be free on their studs with the conical face of the nut mating with the seat in the wheel disc.

Initially "nip" up the nuts and fully tighten by diagonal or alternate selection with the weight of the car on the roadwheels.

Wheel discs having damaged or elongated stud holes, which result from slack wheel nuts, must be renewed.

WIRE WHEELS (Centre lock)**To remove and refit**

- Slacken off the right-hand wheel nuts clockwise and the left-hand wheel nuts anti-clockwise by knocking the lugs with a mallet; alternatively, by applying the special spanner to the wheel nut and knocking the special spanner with a mallet.
- Jack up the car and remove the slackened-off hub cap.
- Draw the wheel off the hub by gripping the tyre with both hands.
- Clean the hub of all dirt and corrosion.

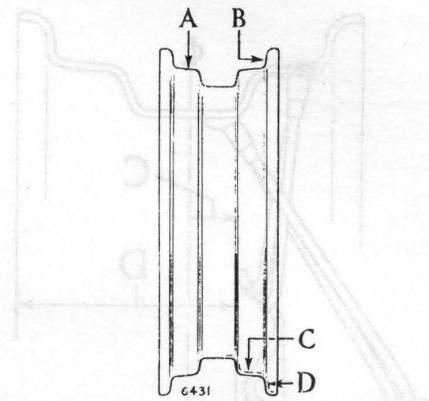


Fig. 2. Rim lift and wobble. "A" and "B" indicate the check points to be used on the rim but points "C" and "D" can be used when the tyre is mounted.

5. Refitting is the reverse of the removal sequence but particular attention must be given to the following:—

- Clean the inside of the hub shell of all dirt and corrosion.
- Ensure that the rubber ring at the small end of the taper is in good condition.
- Smear the taper and splines of both the hub and hub shell with Shell Retinax "A" Grease.
- The right-hand wheel nuts have a left-hand thread and the left-hand wheel nuts have a right-hand thread, fully tighten the wheel nut with the weight of the car on the roadwheels.
- Check the security of the wheel nuts after a short mileage as slack wheel nuts will ruin the splines of the hub and hub shell.

Wheel nuts

Two types of wheel nuts are used:—

- The lug or winged type.
- The plain type with eight flats and a special spanner is supplied with the car.

The thread of the wheel nut is handed and the outside face is marked to indicate the rotation necessary to remove the wheel nut.

It is imperative that the wheel nuts are fully tightened otherwise the splines of the hub and hub shell will sustain irreparable damage.

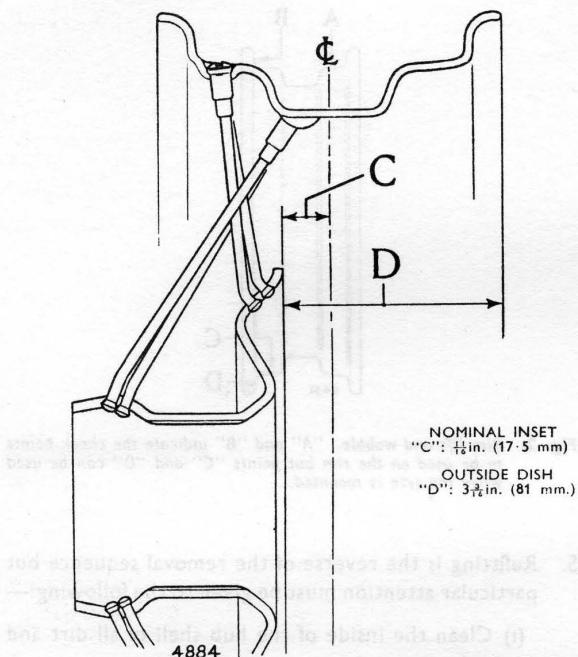


Fig. 3 Wire wheel alignment—rim to hub

Hubs

The hub for the wire wheel has a tapered face, parallel splines, and a handed thread for the wheel nut and at the small end of the taper is a groove to accommodate a rubber ring which prevents the ingress of corrosion to the splined and threaded section of the hub.

Wheel lift and wobble (Fig 2)

On a freely mounted and revolving wheel the difference between the high and low points (lift) measured on either tyre seat "A" must not exceed .050 in. (1.0 mm.).

The lateral variation (wobble) measured on the vertical inside face of the flange "B" must not exceed .050 in. (1.0 mm.). The position "C" and "D" can be used when the tyre is mounted, but in this instance consideration must be given to any varying paint thicknesses.

Lift and wobble greater than that specified will produce persistent unbalance and irregular tyre wear.

Lift and wobble can be corrected by retrueing the wire wheel but this work must be effected by a competent mechanic who specialises in wheel building.

Spokes (Fig. 3)

The spokes are tightened to a predetermined tension and provides the desired amount of flexibility which is an inherent feature of the wire wheel and it is important that this spoke tension is maintained.

Slack or damaged spokes must be tightened or renewed but care must be taken to ensure that the hub inset and the dishing of the rim remains unaltered.

Spoke tightening is best effected with the tyre and tube removed from the rim, so that any protruding spoke can be filed off flush to its nipple.

When the condition of the wire wheel is in doubt or when extensive spoke tightening or respoking is required, it is recommended that the work is effected by a competent mechanic who specialises in wheel building.

CHECKING WHEEL AND TYRE RUN-OUT

When preparing the car for a suspension or steering check, the wheels and tyres must be checked first for "run-out".

During the suspension or steering checks, the points of "run-out" are positioned well away from the contact points of any gauges that may be in use.

1. Jack up the wheel to be checked for "run-out".
2. Spin the wheel while holding a piece of chalk close to the wall of the tyre.
3. Move the chalk progressively nearer the tyre until it makes contact with any "run-out".
4. Mark the centres of the "run-out" with a cross.
5. Lower the car to the ground but before making any suspension or steering checks, roll the car forwards and backwards to position the wheels in their normal running attitude.

CHOICE OF TYRES

Only the tyres fitted as original equipment must be used as replacements.

However, should it become necessary to fit special purpose tyres because the car is being used for specific work, such as high speed or cross country motoring, careful thought concerning their choice cannot be over-emphasized.

As these tyres sometimes alter the ride and the characteristics of the car, it is recommended that the Technical Department of the tyre manufacturer is consulted to ensure that the most suitable tyres are chosen.

NYLON TYRES

Nylon tyres may develop temporary flatting after standing for some time and cooling off, following a long run during which high temperatures have been reached.

These flat spots can be run out quite quickly but it may be necessary to approach the speeds and temperatures which have led to the flatting. For example, flats on tyres which have developed after a long fast run may be difficult to remove if the car is then used for local "pottering" especially if the weather has become colder and wetter. Before balancing nylon tyres it is desirable to ensure that these flats have been fully run out, otherwise a false balance may be obtained.

WHEEL AND TYRE BALANCE

In the interests of smooth riding, precise steering and high stability, all tyres are balance checked to predetermined limits. Coloured spots may be found on one bead indicating the lightest part of the tyre, which must be fitted near to the valve.

Where balance weights have been fitted to the wheels, it is advisable to detach them before tyre removal to avoid the possibility of their inadvertently falling inside the tyre. When the same tyre is to be refitted, the positions and amounts of these balance weights as well as the position of the tyre on the wheel should be marked with chalk on the wheel, so that their subsequent replacement may restore the original balance as far as possible.

The original degree of balance is not necessarily maintained in service, as it may be affected by uneven tread wear, by repairs, or by tyre removal and replacement. Normal wear of moving parts may also render the car more sensitive to unbalance.

Rebalancing of tyre and wheel assemblies should be carried out with the aid of approved equipment capable of measuring both static and dynamic balance.

When cars are fitted with Dunlop "SP" or radial ply tyres, the roadwheels must be rebalanced every 10,000 miles (16,000 kms.) or every 5,000 miles (8,000 kms.) when operated for continuous high speed driving.

Bead indicator

A bead indicator is moulded into the wall of the tyre adjacent to the wire beads to facilitate the centring of the tyre on to the rim.

WHEEL TRIM DISCS

A wheel trim disc is fitted to each of the four roadwheels and therefore must be removed from one wheel before the spare wheel is fitted. The wheel trim disc has a hole for the tyre valve and is held in position by the nave plate.

To remove and refit

1. Remove the nave plate from the roadwheel.
2. Ease the wheel trim disc from the nave plate studs.
3. Refitting is the reverse of the removal.