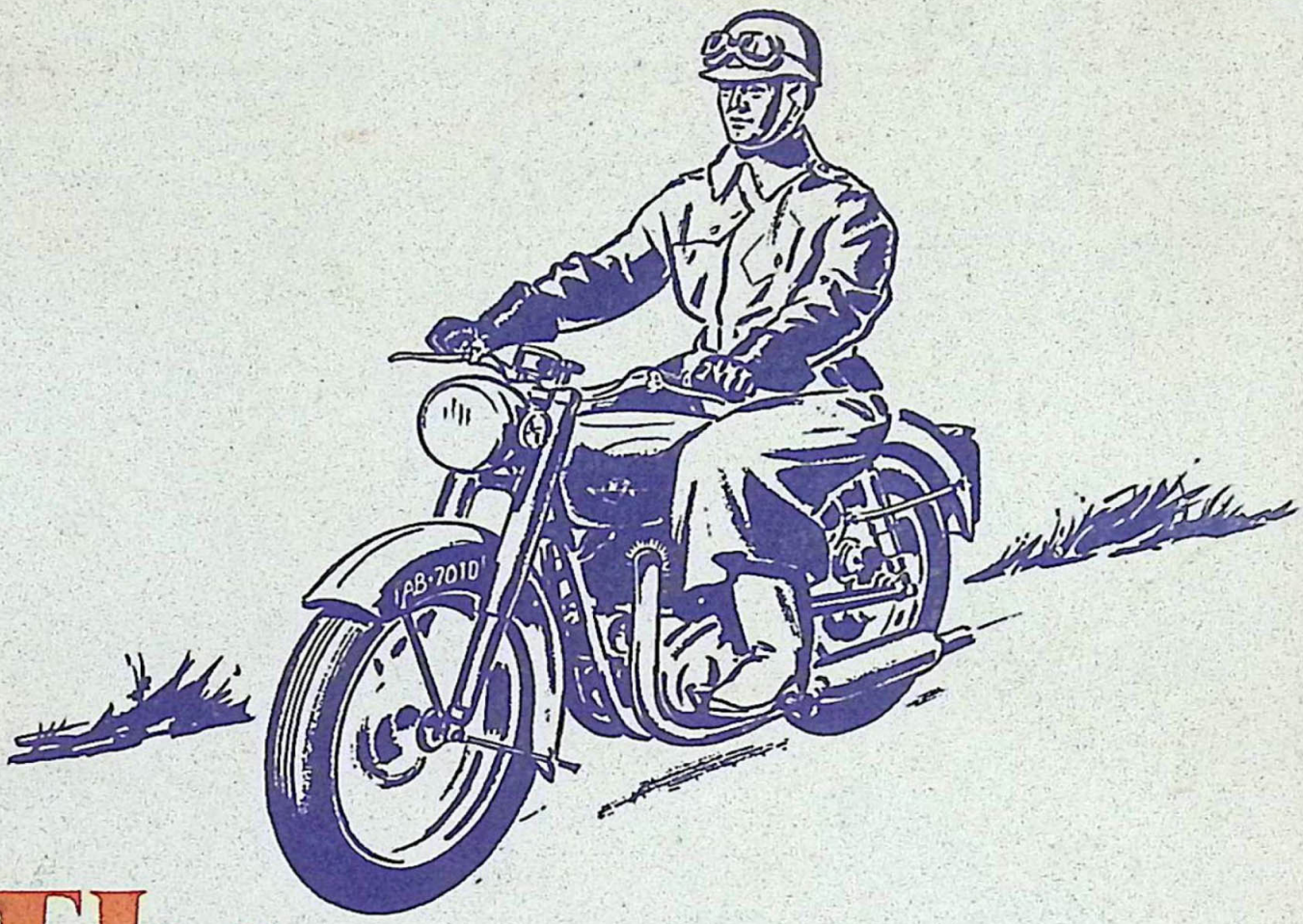

The Motor Cyclist's Tyre Manual

Issued by Tyre Division

THE AVON INDIA RUBBER COMPANY LTD
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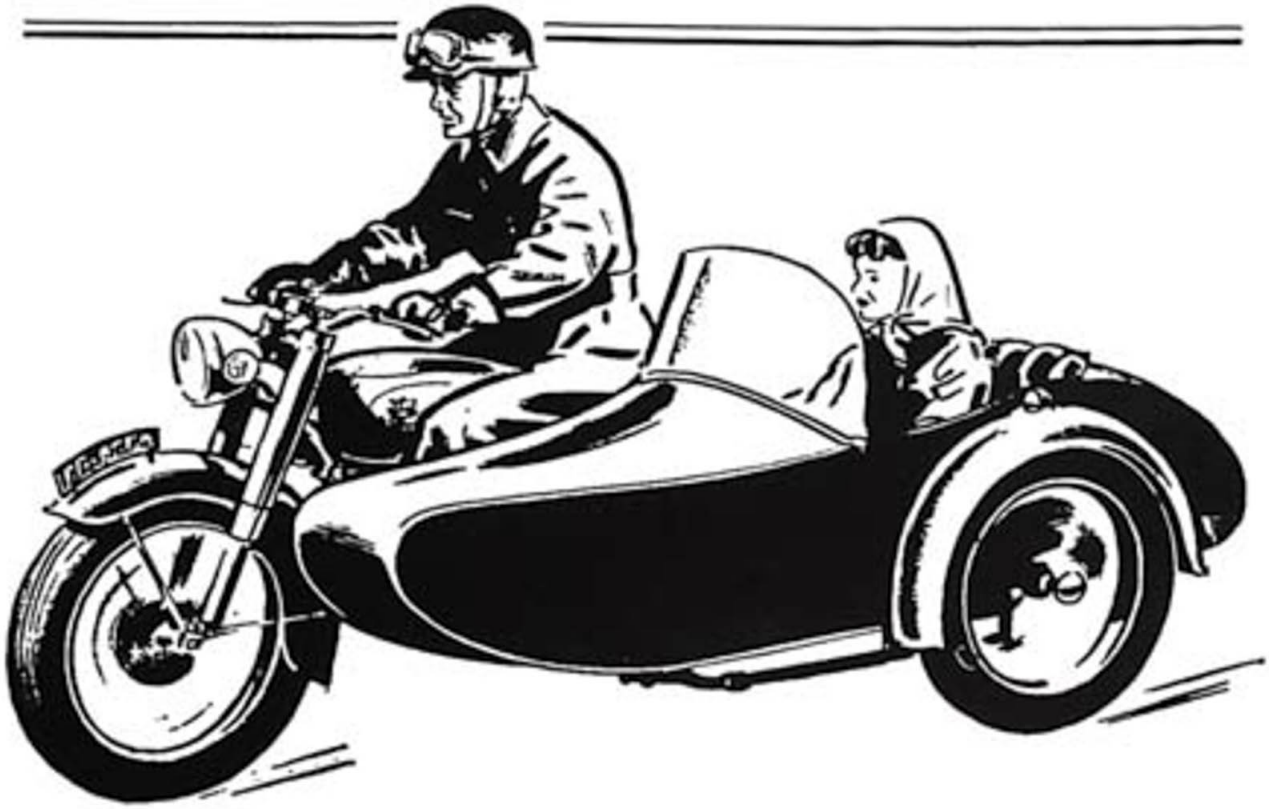
AVON

MOTOR CYCLE TYRES



Individually made by craftsmen, Avon Motor Cycle tyres are built to give safety at speed and satisfaction under all conditions. The Avon factory is equipped with the most modern plant and is backed by high technical skill derived from constant research and long experience. The advice in this book will help you to obtain that high performance of which the tyres are capable.

INDEX

THE MOTOR CYCLIST'S TYRE MANUAL

THE EFFECT OF DIFFERING CONDITIONS ON TYRE PERFORMANCE

Variations in tyre performances are primarily due to different conditions of service, such as speeds, road surfaces, and to the varying degree of care which tyres receive during their life.

It is well known for example, that under very severe conditions, such as racing on an abrasive road surface, tread wear is very rapid indeed.

Tyres on any machine will have reduced life if submitted to the worst of all tyre evils, ' under-inflation.'

Through technical progress and by the application of scientific control at each stage of construction, AVON has reduced the possibility of variations in the quality of tyres.

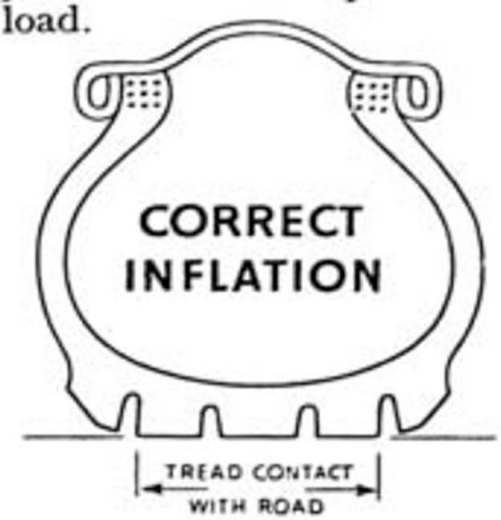
In this booklet we provide information for the Motor Cyclist which will assist him to obtain the utmost satisfaction under any given conditions of service.

THE IMPORTANCE OF CORRECT INFLATION

Tyre pressures govern tyre life. They also have a profound effect on stability and anti-skid properties. The compressed air within the Inner Tube carries the load.

Correct Inflation

The correct pressure ensures maximum mileage with satisfactory cushioning, stability and road holding properties.



Under-inflation

Insufficient air pressure hastens tread wear, throws undue strain on the tyre casing and absorbs undue power.

Over-inflation

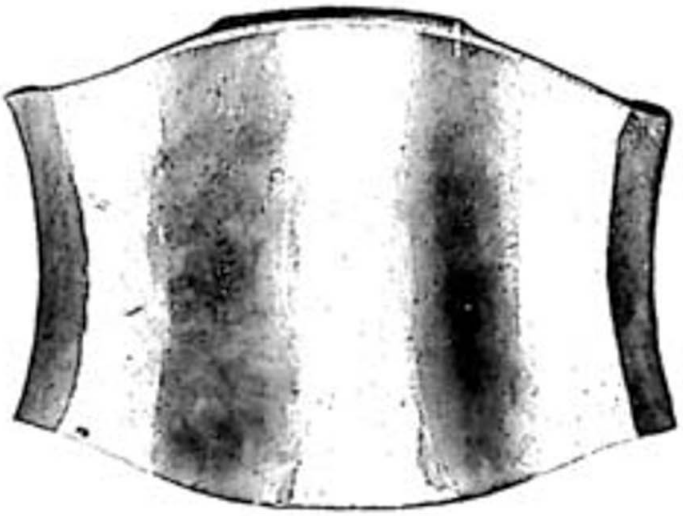
Excessively high pressure causes rapid wear in the centre of the tread. There is also a greater danger of casing fracture and tread cutting.

THE EFFECTS OF UNDER-INFLATION

Under-inflation is a common cause of premature tyre failure and irregular tread wear. Tyres should be maintained at the pressures specified by the machine manufacturer in his Maintenance Manual. In the event of recommendations being unobtainable, refer to Pressure Tables on Page 12.

Under-inflation

This photograph shows the darkening of the inside of the tyre casing and is clear evidence of serious Under-inflation. If the condition of Under-inflation persists, the casing will eventually fracture.



Complete Destruction due to Under-inflation

Here is a tyre completely ruined through being run deflated. This has caused the complete separation of the cords of the casing, as shown in the photograph.

TWO COMMON CAUSES OF DAMAGE

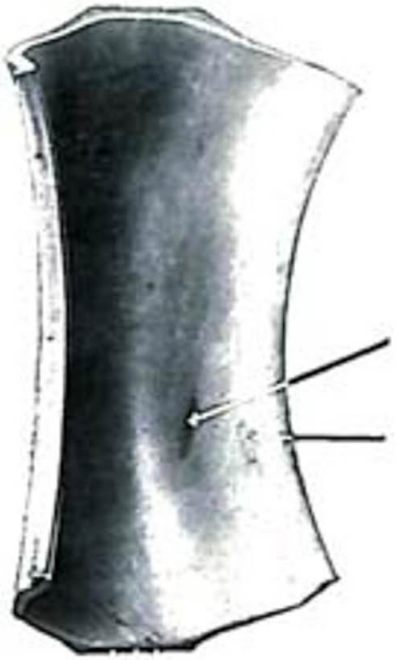
Below are described two common causes of accidental damage.

Concussion Fracture

This illustration shows a characteristic Concussion Fracture of the tyre casing due to a severe blow from a road obstruction. Frequently in such a case the tread is undamaged, there is no outward sign of trouble, and failure occurs some time after the impact.

Over-inflation makes tyres more susceptible to concussion fractures.

Double Fracture



In this case the blow has been so severe as to crush the cover wall between the rim and a road obstruction; a double fracture of the casing has resulted.

In failures of this type there is frequently a condition of Under-inflation. Keep your tyres inflated to the correct pressure and the risk of such damage will be minimised.

MECHANICAL IRREGULARITIES

Periodical examination of the machine should include those parts likely to affect tyre wear.

Brakes

High spots on brake drums or distorted drums produce rapid wear at one or more particular places on the circumference of the tread. The illustration shows a typical case ; note the localized wear.

Wheel Alignment

Unless a wheel runs exactly true under all conditions, a ' scuffing ' action between the tread of the tyre and the road is bound to take place, resulting in very rapid tread wea . Make sure that the wheels are correctly aligned.

Buckled Wheels

Even a slight buckle will make the tyre wear unevenly at that point.

Suspension

It is most important that the suspension be maintained in perfect condition. Imperfect suspension will cause rapid and irregular tread wear.

Illustration shows excessive wear through high spots in brake drum

WHEEL ALIGNMENT

Rapid tread wear will result if the wheels are incorrectly aligned. In the case of combinations, alignment should be in accordance with the sidecar manufacturers recommendations.

To Check Wheel Alignment

Solo :—

Place a straight-edge alongside the wheels such that it contacts the sidewall of the rear tyre at two points. With the front wheel in the " straight ahead " position measure the distance between the straight-edge and the sidewall of the front tyre at the bottom of the wheel. Repeat procedure on opposite side of machine. If wheels are correctly aligned these two dimensions will be equal.

Combination :—

With outfit on a level floor check front and rear wheel alignment as for solo machine. Next, by means of the straight-edge against rear and sidecar tyres determine dimension " x " (see diagram 1) at most rearward point of rear tyre. Similarly determine dimension " y " at most forward point of front tyre. The difference of these two dimensions i.e. x-y is known as the " Toe-in."

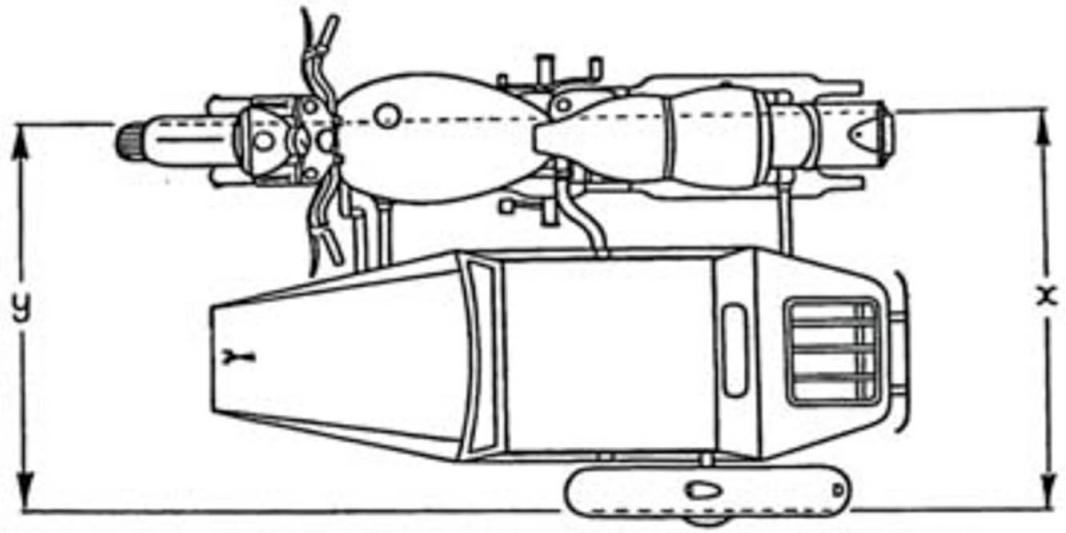


DIAGRAM ①

Dimension " z " (diagram 2) is known as the " lean-out " and is measured near the top of the steering head. It is a measurement of the motor cycle's outward lean from the vertical, and can be determined as follows. With the front wheel in the " straight ahead " position mark a straight line on the floor in line with the wheel track and passing under the centre of the tyre treads where they contact the floor. Suspend a plumb-line or length of weighted string from the nearside of the handle-bars a short distance from their central position, such that the plumb-line hangs vertically down and almost touches the floor. Measure dimension " a " (see diagram 3) between plumb-line and centre of steering head at top. Now measure distance " b " between lower end of plumb-line and the line drawn on the floor. The difference of these two dimensions i.e. a-b gives the " Lean-out."

Both Toe-in and Lean-out vary with different types of outfits, and you should always follow your sidecar manufacturer's recommendations. If these are not available the following approximate figures will serve for your guidance.

Toe-in approx. $\frac{1}{2}$"

Lean-out approx. 1".

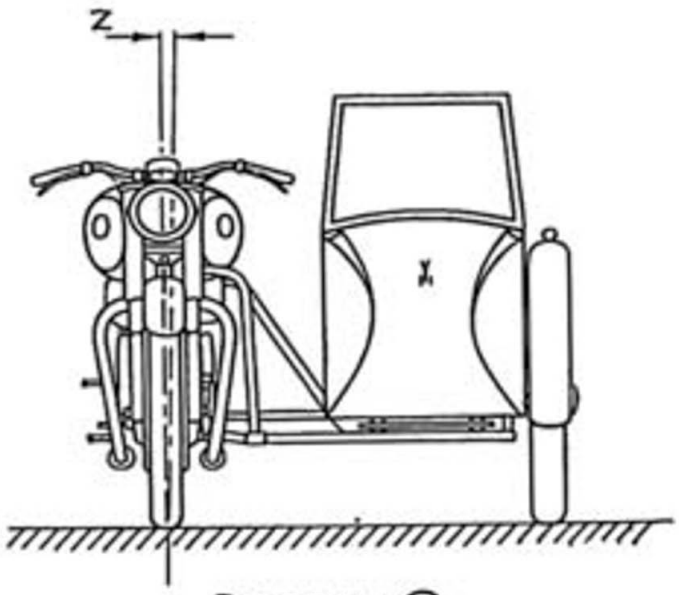


DIAGRAM ②

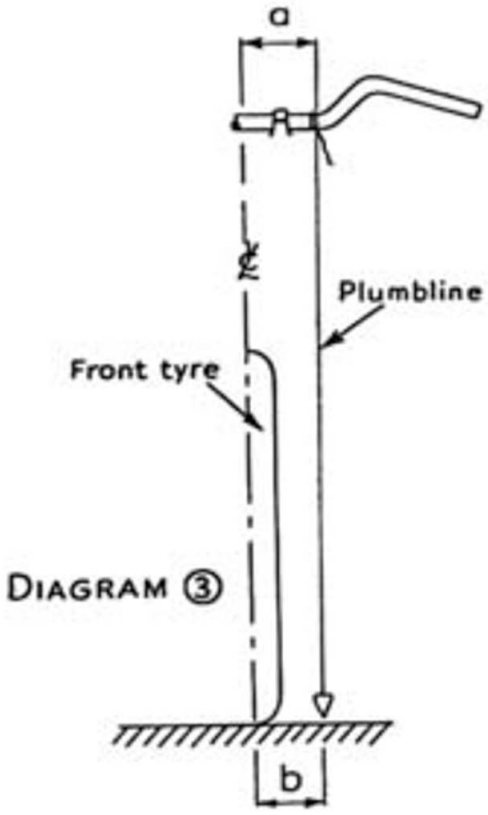


DIAGRAM ③

CONDITIONS AFFECTING TREAD WEAR

A summary of the different factors that can cause abnormal wear is given below.

Under-inflation or Over-loading

These conditions cause undue tread distortion, resulting in irregular wear.

Speed

High speed means rapid tread wear, not only because of the speed itself but because of the extra braking entailed.

Climatic Conditions

Tread wear is usually more rapid in summer than in winter because of the higher road temperatures, and drier conditions of the roads.

Oil and Grease

Tread rubber rapidly absorbs oil and grease, and its resistance to wear deteriorates in consequence.

Stopping and Starting

Fierce acceleration and hard braking subject the tread to severe strains ; rapid wear results.

Road Surfaces

Abrasive road surfaces mean cut treads and lower mileages.

Mechanical Irregularities

Mechanical defects which cause severe tread wear are wheel misalignment, buckled wheels, snatching brakes and faulty suspension.

Unbalanced Wheels

Any unbalanced rotating weight such as heavy spots on the rims, and the use of security bolts, etc., etc., can cause uneven tread wear.

HOW TO GET THE BEST RESULTS FROM YOUR TYRES

1. Always keep tyres inflated to the pressures recommended by the manufacturer of your machine.

2. Test tyre pressures at least once a week with a Schrader Pressure Gauge.

3. See that your wheels are correctly aligned.

4. Remove any stones etc., which may become embedded in the tread of the tyre.

5. Remove any oil or grease from your tyres with a cloth slightly damped with petrol.

6. Drive at reasonable speeds, with consequent moderate acceleration and braking.

7. If front tyre develops uneven wear, reverse its direction of rotation on the rim.

8. Unbalanced wheels can be balanced by wrapping the outer end of the spoke adjacent to the light spot with lead wire, until the wheel can be freely rotated on its bearings to any position, and shows no tendency for one particular section (the heavy spot) to swing to the bottom-most point. Bind lead wire with adhesive tape to prevent it moving.

Balancing Spot

A small yellow spot on the sidewall of an Avon Motor Cycle cover indicates that the cover has been tested for balance. The cover should be fitted with this spot adjacent to the heaviest point on the rim (usually near the valve) ; this will minimise the overall out-of-balance weight.

TABLE OF RIM FITMENTS

Rim Designation	Internal Rim Width (inches)	Recommended Tyre Sizes
WM0-19	1.500	2.375-19, 2.50-19
WM0-21	1.500	2.375-21
WM1-19	1.600	2.375-19, 2.50-19 2.75-19, 3.00-19
WM1-20	1.600	3.00-20
WM1-21	1.600	2.375-21, 2.75-21, 3.00-21
WM2-18	1.850	3.25-18
WM2-19	1.850	2.75-19, 3.00-19 3.25-19, 3.50-19
WM2-20	1.850	3.00-20, 3.25-20
WM2-21	1.850	2.75-21, 3.00-21, 3.50-21
WM3-18	2.156	3.25-18, 3.50-18, 4.00-18
WM3-19	2.156	3.25-19, 3.50-19, 4.00-19
WM3-21	2.156	3.50-21
3.00D-16	3.00	4.50-16, 4.75-16, 5.00-16

LOAD AND PRESSURE TABLE

Inflation Pressure lbs./sq. in.	Nominal Tyre Section (inches)						
	2.25	2.375 2.50	2.75	3.00	3.25	3.50	4.00
	Maximum load per tyre in lbs.						
16	80	120	140	160	200	280	360
18	100	140	160	180	240	320	400
20	120	160	180	200	280	350	430
24	145	185	210	240	350	400	500
28	170	210	250	300	400	450	—
32	200	240	280	350	440	500	—

Check Pressures when tyres are cold.

N.B. The above Load and Pressure Table is given for guidance only. The pressure figures given by the manufacturer of your machine should be adhered to.

TO REMOVE AND FIT TYRES

The following hints will help you in the fitting and removal of Tyres.

It is important to avoid undue force with levers as this will damage the inextensible wire beads.

When the tyre is in position and fully inflated the beads rest on the shoulders of the rim. The base of the Motor Cycle Rim facilitates fitting as it allows part of the circumference of the bead to be dropped into the well while the part diametrically opposite is pushed over the flange.

Smearing a little soap solution or French Chalk on the beads will help in fitting and removing.

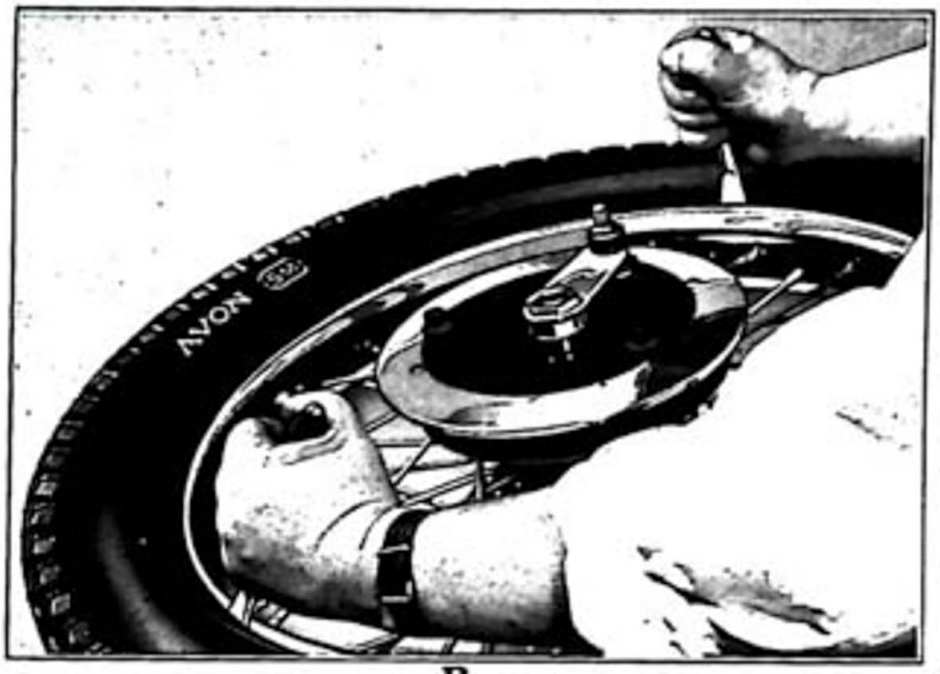
To Remove Tyre

1. Remove dust cap, valve core and rim nut, and allow tube to deflate.

2. Push each bead off the shoulder of the rim.

A

3. At a point diametrically opposite the valve, ease the edge of the cover down into the wellbase of the rim, then push the valve stem in as far as it will go and insert a small tyre lever at the side of the valve and lift up the cover. (illus. A)



B

4. Hold down the lever with one hand, and with the other insert a second lever a short distance away. Lift top bead of the cover over the rim with the lever. (illus. **B**)

5. Repeat this in easy stages until the bead is free of the rim. Withdraw the tube, starting from the side opposite the valve.

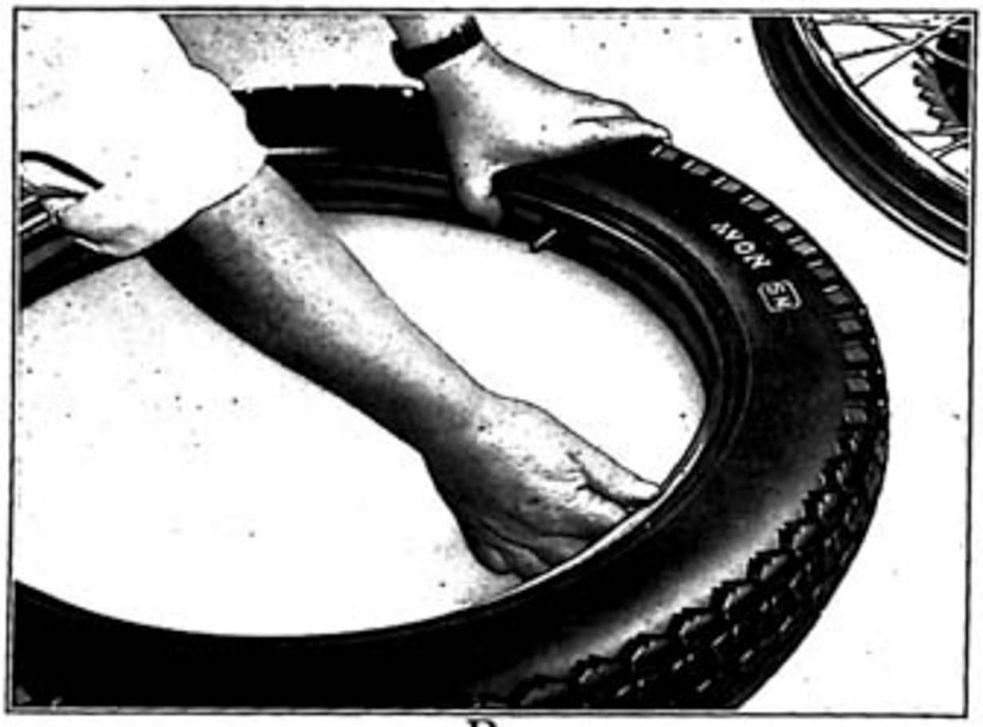
C

6. Finally, lever the second bead from rim in similar manner to first. (illus. **C**)

To Fit Tyre

1. Remember to use small tyre levers, and not to use undue force.

2. Make sure that no wrapping paper or labels are left inside the cover, as they might damage the tube. Fitting is easier if the tube is dusted lightly with French Chalk.



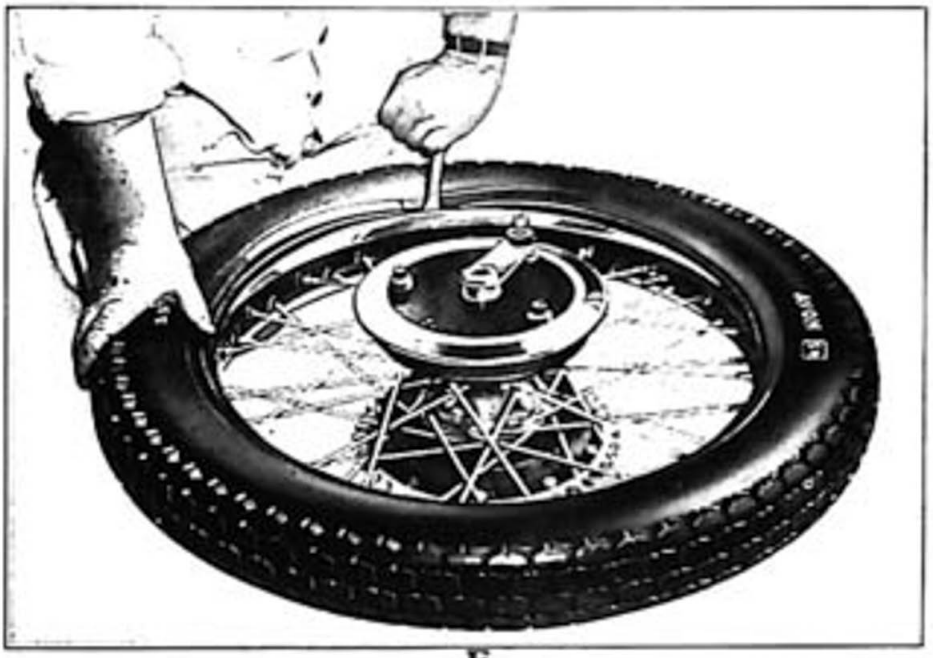
D

3. Slightly inflate tube and slip it into the cover, making sure that the tube is not creased or twisted. (illus. **D**)

4. Place the cover, with the tube inside, on top of the wheel with the valve in line with the valve hole in the rim.

E

5. Thread the valve through the valve hole. (illus. **E**). Allow the under bead to sink into the centre base of the rim and the upper bead to spring outside.

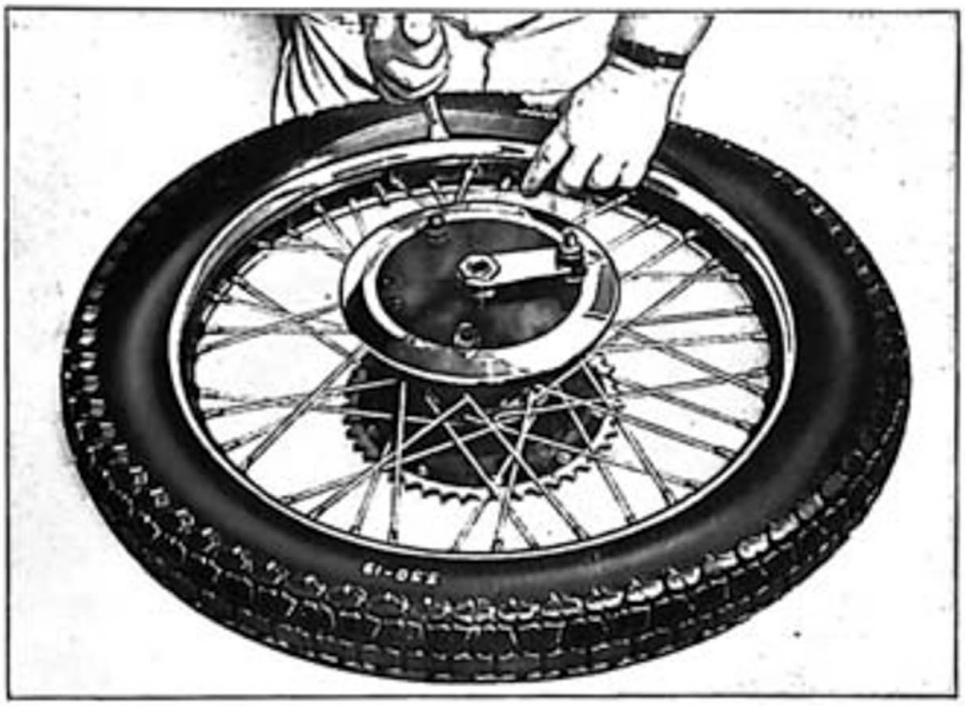


F

6. Working from each side of the valve and using both hands, press the remainder of the under edge of the cover over the rim. A lever may be used to complete the operation. (illus. **F**). It is important to ensure that the bead area diametrically opposite the fitting point is always in the base of the rim.

G

7. To fit the second or top bead, the method is similar to that described for the first or under bead, except that it is important to start from a point diametrically opposite the valve. (illus. **G**). As before, see that the edge of the cover is down in the well of the rim and then work round in both directions until only a small portion of the cover by the valve remains. This last piece may be gently levered over the rim. (illus. **H**).



H

7. (*contd.*) If considerable force is required it means that the opposite edge of the covers is *not* down in the well-base of the rim and the fault should be corrected. Unnecessary force tends to damage the tyre and may break the wire beads.

8. Push valve inwards to make sure that the tube near the valve is not trapped under the bead. Pull valve finally back into position.

9. Make sure that the cover is evenly fitted all round, and that the valve protrudes squarely through the valve hole.

10. Inflate to approximately 30-lbs/in^2.

11. Deflate and check valve for looseness in valve hole. Fit rim nut.

12. Inflate to recommended pressure, check that fitting lines on cover run true with rim, tighten rim nut and fit dust cap.

FOR WHEELS FITTED WITH SECURITY BOLTS

To Remove Tyre

1. Proceed as for normal tyre removal, and deflate tyre.

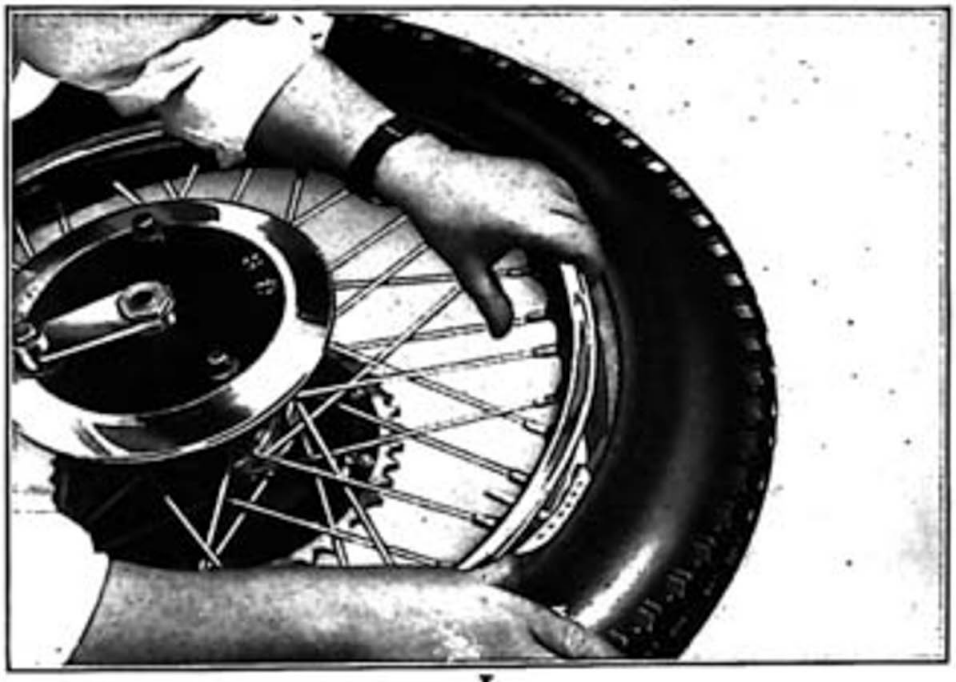
2. Remove security bolt nut and push bolt inside the cover. Where more than one security bolt is fitted deal with each simultaneously.

3. Remove first bead, remove security bolt(s) from inside cover.

4. Remove tube from cover and cover from rim, as already described.

To Fit Tyre

1. Insert tube into cover, and fit first bead as previously described.

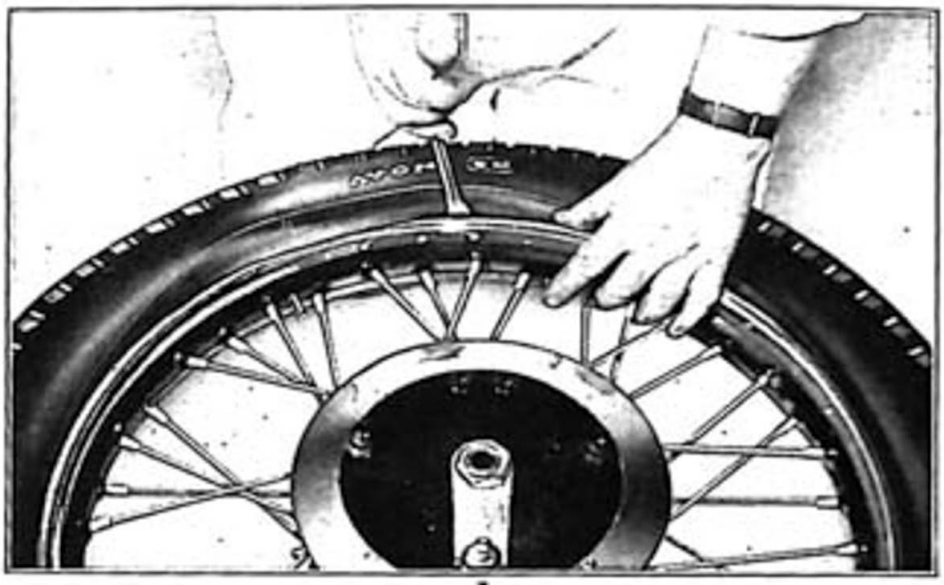


I

2. Lift top bead by hand and fit security bolt(s) into cover, threading stem(s) through hole(s) and taking care not to damage the tube. N.B. When one bolt only is fitted this is usually positioned approximately 9" ahead of the valve, and leads the valve when the wheel is rotated in its normal forward direction. (illus. **I**).

3. Make sure that the tube sits on the security bolt flap, and depress the bolt into the cover to ensure that it is not trapped under the first bead.

4. Complete fitting as before, taking care when pushing over that section of the second bead near the security bolt to push the bolt well into the cover, and to make sure that the tube is resting on the flap of the security bolt (illus. **J**).



J

5. See that valve and security bolt(s) are 'loose' on rim by depressing into cover.

6. Inflate to approximately 30 lbs./sq. in.

7. Deflate, and check valve and bolt(s) for 'looseness.'

8. Inflate to recommended pressure, check that fitting lines on cover run true with rim, tighten nuts and fit dust cap.