

(No Model.)

A. A. & H. C. KUPFER.
WHEEL TIRE.

No. 508,173.

Patented Nov. 7, 1893.

Fig. 1.

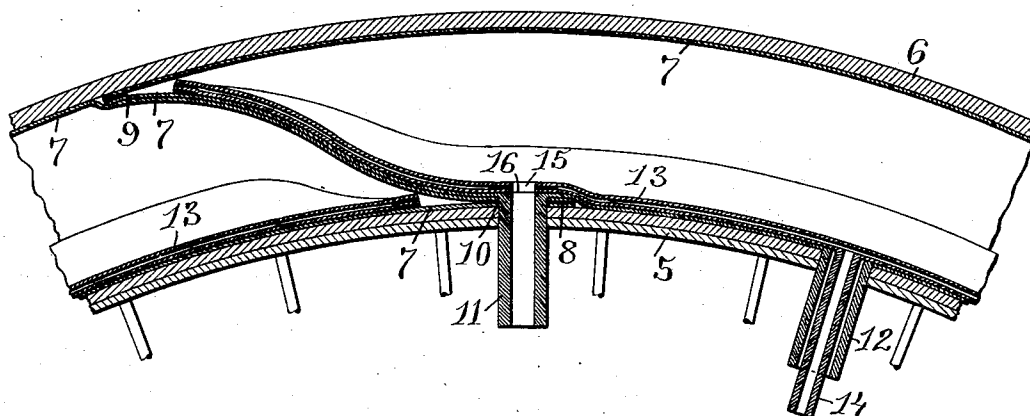


Fig. 2.

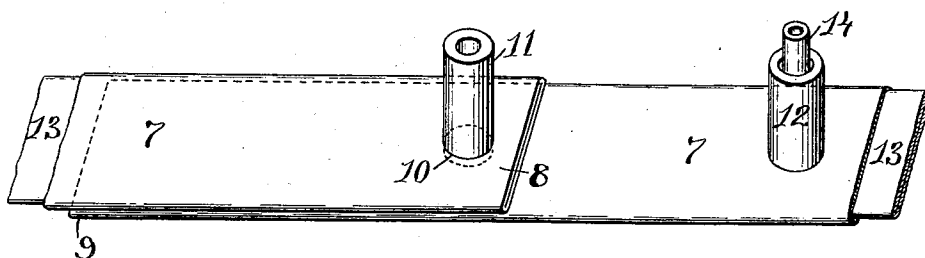
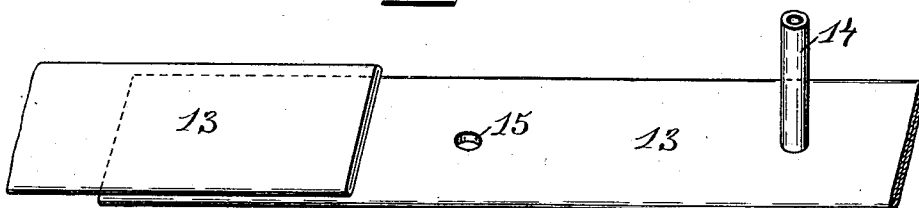


Fig. 3.



WITNESSES:

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UNITED STATES PATENT OFFICE.

ARTHUR A. KUPFER AND HERMAN C. KUPFER, OF PROVIDENCE, RHODE ISLAND.

WHEEL-TIRE.

SPECIFICATION forming part of Letters Patent No. 508,173, dated November 7, 1893.

Application filed June 7, 1893. Serial No. 476,862. (No model.)

To all whom it may concern:

Be it known that we, ARTHUR A. KUPFER and HERMAN C. KUPFER, of Providence, in the county of Providence and State of Rhode Island, have invented certain new and useful Improvements in Wheel-Tires; and we hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming part of this specification.

This invention has reference to improvements in that class of wheel-tires in which an outer casing is distended by an inner tube into which air, or gas, is forced under pressure.

The object of the invention is to provide the casing with supplemental means of inflation, normally carried in a position where it is not liable to injury.

Another object of the invention is to so construct and arrange the expanding-tube and the supplemental-tube contained therein that the supplemental-tube may be replaced or repaired at will.

The invention consists in the combination with an expanding-tube of a supplemental-tube contained therein and arranged to be forced into that portion of the outer tube farthest removed from the tread when the outer tube is expanded.

The invention also consists in the construction of the outer tube, the ends of which are adapted to be opened, and the peculiar combination therewith of the inner supplemental-tube removably secured to the inner, upper, or wheel-rim, portion of the outer tube.

The invention also consists in the construction of the inner tube whereby air, forced into the outer tube, is allowed to pass through the wall of the inner tube.

The invention further consists in such other novel features of construction and combination of parts as will hereinafter be more fully described and pointed out in the claims.

Figure 1 represents a longitudinal sectional view of portions of the improved tire secured to a wheel-rim, the outer tube and the casing being distended. Fig. 2 represents a view of portions of the outer and inner tubes removed from the casing, Fig. 3 being a view of portions of the inner, or supplemental tube.

Similar numbers of reference designate corresponding parts throughout.

Tires, of the nature herein described, are used on bicycles and other wheels as cushions between the wheel-rims and the roadway. In some styles provision is made for removing the casing when it becomes punctured sufficiently to injure the distending-tube and allow the escape of the air contained therein. In other constructions openings are formed in the wall of the casing through which the distending-tube is inserted and withdrawn for repairs. In either case the repairing causes great annoyance and must generally be done at inconvenient times and places where the necessary tools and material are not ordinarily obtainable, thus requiring that these be constantly carried.

In carrying out our invention into practice we have had for our primary objects, first, to provide a supplemental distending-device normally carried in a position in the tire where it will not be exposed to injury; secondly, to facilitate the repairing of the supplemental distending-device, the inner tube, when the same, under extraordinary circumstances, becomes punctured, and thirdly, to provide for the ready withdrawal of the inner tube when necessary.

In the drawings 5 indicates the wheel-rim, generally concaved, and 6 is the outer casing, of any usual form and construction, adapted to receive a tube and to be distended, or supported, in position thereby. Through the wheel-rim 5, and the casing, if necessary, are formed perforations through which valve-stems may extend.

The distending, or outer tube, 7 is formed of thin material, generally sheet-rubber, in the shape of a tube, somewhat exceeding in length the circumference of the wheel-rim. In the manufacture, the ends of this tube 7 are left open, but in use they are closed by connecting the inner surfaces 8 and 9 together without vulcanizing the same so that they may readily be separated. The end 8 overlaps that marked 9 and has a perforation 10 through which the valve-stem 11 may be placed, or other means for securing these overlapping ends together may be used. The valve-stem 11 is secured in a perforation in the main portion of the tube 7, near the end marked 9, and when air is forced therein the connected ends of the tube are crowded

against opposite sides of the casing, the one serving to hold the other so that no great internal pressure is brought to bear on the cemented ends to force the same open. At 5 a short distance from the valve-stem 11, a second stem 12, which, in some cases, may also be used as a valve-stem is secured through a perforation in the wall of the tube 7. The inner supplemental-tube 13 is also formed of 10 elastic material being of such a size that when fully distended it will fill the interior of the tube 7 and force the same against the casing 6 thus expanding the casing; the ends of the inner tube are permanently connected and 15 through the wall is secured the valve-stem 14 which is of a diameter to readily pass through the bore of the stem 12. At a distance from the valve-stem 14, equal to the distance between the stems 11 and 12 of the outer tube, 20 an opening 15 is made through the walls of the tube 13, the edges of the opposite sides being brought together and secured, so located that when this tube is placed within the tube 7 the opening 15 will be brought directly opposite the opening of the valve-stem 11 and 25 air forced through the valve-stem into the tube 7 will pass through the opening 15 and will not tend to force the tube 13 away from the upper part of the tube 7 to which it is secured at intervals by unvulcanized cement, 30 as, for instance, at the base of the valve-stem 11, the heavy black lines 16—16 between the tubes indicating this cement. As the tube 13 is secured to the upper, inner part of the tube 7 and the inward passage of the air is 35 not obstructed by the tube 13, it will be apparent that the first expansive pressure of the air will be exerted against the inner surface of the lower wall portion of the tube 7 and the outer surface of the tube 13, the 40 tendency thus being to separate the same and to press the tube 13 against the upper portion of the tube 7. Should the tube 7 become punctured, the tube 13 may be inflated 45 to distend the casing, but should this tube in turn become injured, repairs thereto will be necessary. To accomplish this the tubes are first removed from the sheath, or casing, one or both ends of the tube 7 are opened and 50 the tube 13 is drawn therefrom. As the points are reached where the tube 13 is secured to the tube 7 these are readily separated. Should the inner tube be punctured near 55 either end, only this portion is withdrawn from the outer tube, and, after the mending patch has been put in place, the outer tube is again drawn back over the inner tube to which it is cemented at its upper portion at intervals, as before stated, the ends of the tube 7 being 60 also secured in like manner. When the inner tube becomes so injured that a new tube is required, the inner tube is drawn entirely out of the outer tube, the valve stem 14 slipping through the stem 12 and the valve-stem of the new tube being inserted in its place. It 65 is obvious that, when in use, the stem 12 must be secured in such a manner as to prevent

the egress of air therethrough. For this purpose it may be secured about the base of the valve fastened to the stem 14. When the air 70 is withdrawn from the tube 7, it may pass through the opening 15, instead of pressing the tube 13 against the base of the valve-stem and closing the same as would be the case if the tube 13 were not provided with this opening. 75 The perforation 10 in the end 8 of the tube 7 permits this tube to be secured on the wheel-rim independently of the casing and held until the casing may be placed in position. 80

Having thus described our invention, we claim as new and desire to secure by Letters Patent—

1. In a wheel-tire, the combination with a casing, of an inflating-tube, contained therein, having overlapping ends temporarily secured by unvulcanized cement, a valve-stem secured through the wall of the tube, one of said ends being furnished with a perforation through which the valve-stem on the main 90 portion may be passed to secure the end to the main body.

2. In a wheel-tire, the combination with a casing, a tube for expanding the casing, a tubular stem 14 extending from a perforation in the tube and a valve-stem through 95 which air may be forced into the tube, of a supplemental tube contained within the first mentioned tube and temporarily secured to the upper portion thereof, and a valve-stem 100 extending through the tubular stem and temporarily secured about the base to the inner surface of the outertube and connecting with the inner tube.

3. In a wheel-tire, the combination with a casing, a tube for expanding the casing, the ends of which are secured as described, and the stems 11 and 12 secured in the tube, of a supplemental tube, contained within the first 110 mentioned tube, temporarily secured in the upper portion thereof, having a valve-stem extending through the stem 12 of the outer tube, and an air-passage through the walls of the tube located opposite the valve-stem 11, as described. 115

4. The combination with a wheel-rim, a casing adapted to be secured to the wheel-rim, the tube 7 contained within the casing and having the overlapping-ends 8 and 9 temporarily closed, and the stems 11 and 12 secured in the tube and extending through the 120 wheel-rim, of the supplemental-tube 13 contained within the tube 7 temporarily secured in the upper portion thereof, having the opening 15 opposite the stem 11, and the valve-stem 125 14 extending through the stem 12, as and for the purpose described.

In witness whereof we have hereunto set our hands.

ARTHUR A. KUPFER.
HERMAN C. KUPFER.

Witnesses:

HENRY J. MILLER,
M. F. BLIGH.