May 1, 1923. 1,453,949

H. C. PRIVETT

INNER TUBE

Filed April 11, 1921

Fig. 3.

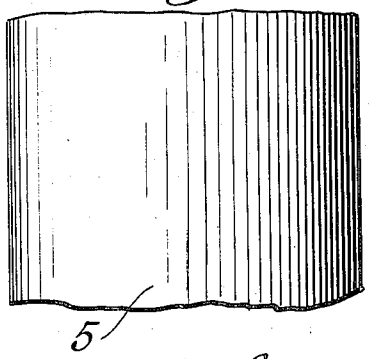


Fig. 4.

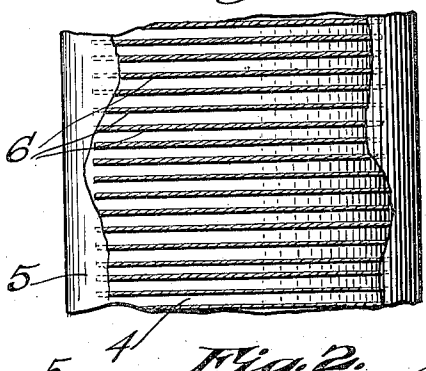


Fig. 1.

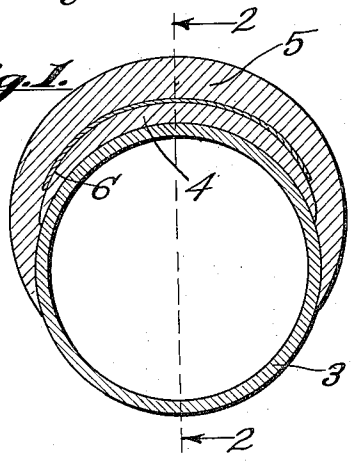


Fig. 2.

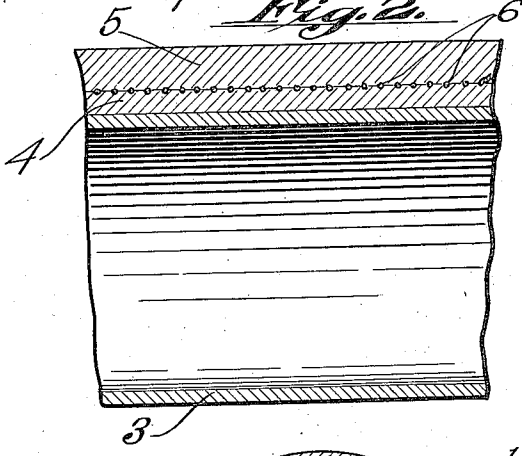
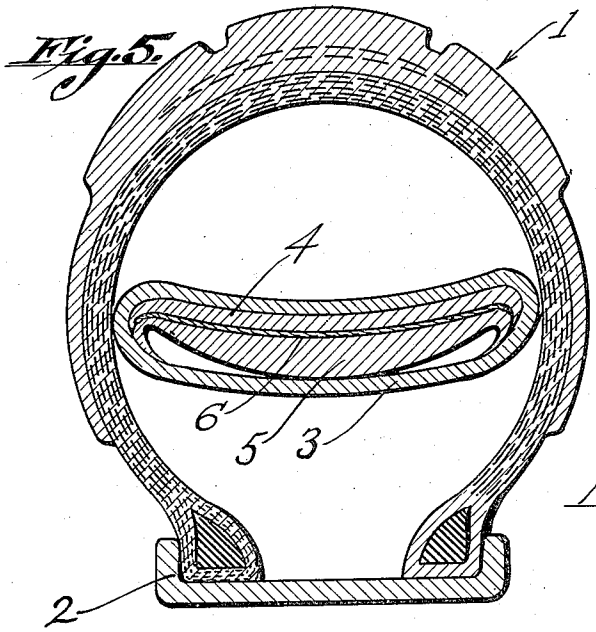


Fig. 5.



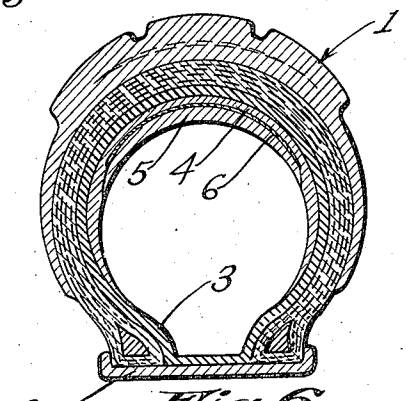


Fig. 6.

Inventor.

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BY

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Patented May 1, 1923. 1,453,949

UNITED STATES PATENT OFFICE.

HENRY CLAUDE PRIVETT, OF LONG BEACH, CALIFORNIA, ASSIGNOR OF ONE-HALF TO CHARLES R. PRIVETT, OF BURBANK, CALIFORNIA, THREE-SIXTEENTHS TO HELEN E. PRIVETT AND ONE-SIXTEENTH TO HOLLIS F. PRIVETT, BOTH OF LONG BEACH, CALIFORNIA.

INNER TUBE.

Application filed April 11, 1921. Serial No. 460,369.

To all whom it may concern:

Be it known that I, HENRY CLAUDE PRIVETT, a citizen of the United States, residing at Long Beach, in the county of Los Angeles and State of California, have invented new and useful Improvements in Inner Tubes, of which the following is a specification.

It is the object of this invention to provide an inner tube for pneumatic tires, of the type which is so constructed as to substantially anchor the side edges of the inner portion of the tread of the tube against transverse expansion when the tube is inflated, so as to compress said portion of the tread and thereby provide for the immediate closing or sealing of any ordinary puncture that may occur.

In the present invention the anchoring of the side edges of the inner portion of the tread of the tube against transverse expansion is accomplished by means of transversely extending nonexpansible members embedded in the tread of the tube, and arranged alongside of one another around the entire periphery of the tube. By such a construction, while said nonexpansible members positively anchor the side edges of the inner portion of the tread of the tube against expansion, for the purpose set forth, said nonexpansible members through their spaced relation alongside one another around the periphery of the tube, will permit of the necessary radial and circumferential expansion of the tube when it is inflated.

The provision of the anchoring means, as thus described, also eliminates meeting edges between the tube stock and the anchoring means, and as a consequence I have eliminated the possibility of the tube stock pulling away from the anchoring means, as is liable to occur when a fabric strip anchoring means, extending around the periphery of the tube, is employed.

The provision of transversely extending anchoring members positioned alongside of one another with slight circumferential spaces between the same, also permits of the tube stock being received between said anchoring elements and completely around the same, so as to entirely embed the anchoring elements within the tube stock, and thereby still further prevent the possibility of said anchoring means pulling away from the tube.

The improved construction also contemplates the provision of a circumferentially extending strip of relatively hard tube stock embedded within the tube which is of relatively soft stock, this strip being positioned between the inner and outer surfaces of the tread of the tube so as to assist, through its relatively slight transverse expansion when the tube is inflated, in the anchoring of the side edges of the inner portion of the tread of the tube against transverse expansion, as previously described, and for the purpose set forth.

If desired the inner portion of the tread of the tire which is adapted to be held against expansion and compressed, as above described, may be of a relatively gummy plastic material instead of the usual relatively soft tube stock forming the tube, in order that said inner portion of the tread of the tube will tend, through the sticky composition of the same, to fill and seal any punctures which may occur in the tube. It will thus be seen that not only the tendency of the inner portion of the tread of the tube to compress, but also the peculiar composition of said portion of the tread of the tube, will cause closing and sealing of any punctures which might occur, and as a consequence an extremely efficient tire tube is provided.

The invention will be readily understood from the following description of the accompanying drawings, in which

Figure 1 is a transverse section through an inner tube constructed in accordance with the invention, and showing the same turned inside out as it is formed upon a mandrel.

Fig. 2 is a longitudinal section on the line 2—2 of Fig. 1.

Fig. 3 is a plan view of a portion of the inner tube when turned inside out.

Fig. 4 is a similar view showing the tube partly broken away to show the anchoring cords embedded therein.

Fig. 5 is a transverse section through a typical tire casing having an inner tube, constructed in accordance with the present invention, received therein and in deflated condition.

Fig. 6 is a similar view showing the inner tube inflated.

In the drawings, I have illustrated a usual tire casing 1 mounted upon a rim 2, the illustration of these parts representing simply a typical construction and not being intended to limit the inner tube forming the subject matter of the present invention to any particular type of tire casing.

The inner tube, as in the usual practice, is constructed upon a mandrel inside out, and the arrangement of the inner tube as thus positioned and as illustrated in Fig. 1 will first be described.

The foundation of the inner tube is shown at 3 as a tube of usual inner tube stock which is relatively soft rubber. A circumferential strip 4 is suitably secured to the tread portion of the tube stock and extends transversely thereof throughout the entire tread portion of the tube. This strip is of relatively hard rubber, such as the stock generally employed for the outer surface of the usual tire casing. The strip 4 is arranged so that its cross sectional configuration is as shown in Fig. 1, with the middle portion of the strip comparatively thick and tapering toward its side edges. As will be readily noted the strip is curved in cross section so as to conform to the cross sectional curvature of the tube stock.

The outer tread strip 5 is received against strip 4 so as to extend around the tube. This strip preferably extends transversely of the tube somewhat beyond the ends of strip 4, as clearly shown in Fig. 1, and is curved to conform to said tube with its middle portion relatively thick and its side edges tapering away at their junction with the tube stock 3. This strip, which is the portion of the tube which is compressed when the tube is inflated, is preferably of a somewhat sticky plastic composition which is relatively soft so as to be readily compressed and which will tend to positively seal a puncture in the tube, due to its sticky composition, as well as the compression under which it is maintained when the tube is inflated.

Anchoring means are provided between strips 4 and 5 and are embedded in said strips, it being understood that the finished tube has the various portions thereof firmly united so as to form a substantially integral structure, as by vulcanizing, or any other suitable process. The anchoring means comprises a plurality of cords 6 extending transversely of the tube and spaced circumferentially one beyond another. These cords extend across the tread portion of the tube and preferably terminate short of the side edges of strip 4, as clearly shown in Fig. 1.

It will be noted that by embedding the cords in the tube structure and at the same time circumferentially spacing the same, that said cords will be completely surrounded by the material forming the tube and will thus be firmly embedded against displacement. It will also be noted that the employment of cords as the anchoring means, does away with the meeting edges between the anchoring means and the tube structure, so that there is no possibility of the tube cracking or splitting by the anchoring means pulling away from the same. The cords forming the anchoring means being of relatively inexpansible material, will thus provide means for positively anchoring the side edges of the tube relative to one another while permitting of the necessary radial and circumferential expansion of the tube when the latter is inflated.

The tube having been formed as thus described, it is removed from the mandrel and turned inside out in the usual manner, and the ends of the tube are then sealed together to form the finished annular tube, such as is shown in transverse section in Figs. 5 and 6.

As illustrated in Fig. 5, when the tube is placed in the tire casing and is in its deflated condition, the tread of the tube will be of uniform density throughout. It will be noted that the inner portion 5 of the tube is so positioned that its inner surface is of less extent than when the tube is inflated, and it will be further observed that the anchoring cords 6 maintain the side portions of the tube stock in fixed relation to the portion 5 of the tube, so that when the tube is inflated to the position shown in Fig. 6, the inner portion 5 of the tube is held against transverse expansion and must therefore compress as it is forced radially outwardly to conform to the tire casing.

This inflation of the tube also causes the inner portion of the tread to materially decrease in area, and as a consequence the compression of the inner portion 5 of the tube is accompanied by an increase in density thereof. As a result the compressed gummy stock 5 will tend to close any puncture which may occur in the tube, and since this portion of the tube is under lateral compression, it will offer considerable resistance to any article tending to puncture the tube. It will be further noted that the provision of relatively hard strip 4 will tend to prevent puncturing of the tube, and through its relative nonexpansion with relation to the readily expandible and compressible stock 5 will assist in the compression of the inner portion of the tread of the tube as above set forth.

In the event of a puncture in the tube, the withdrawal of the puncturing object will not leave an opening in the tube, since the sticky material forming the inner portion of the tread of the tube will immediately close and tightly seal the opening, due to both its compressive action and the

sticky plastic material of which it is formed. It will thus be seen that I have provided an inner tube structure wherein the provision of anchoring means in the tread of the tube will cause compression of the inner portion of the tube so as to quickly close any puncture that may occur, said sealing of a puncture being further accomplished by the plastic sticky composition of the inner portion of the tread of the tube.

The arrangement of the anchoring means as circumferentially spaced transversely extending cords, also provides means for positively embedding said anchoring means so as to prevent pulling away of the same from the tube structure, and such an arrangement also permits of the radial and circumferential expansion of the tube, while maintaining the same against transverse expansion so as to produce a desired compressive action in the inner portion of the tread of the tube.

Various changes may be made without departing from the spirit of the invention as claimed.

What is claimed is:

1. An inner tube for tires comprising an annular strip of substantially inelastic material arranged in the tread portion of the tube between the inner and outer surfaces thereof, and inelastic anchoring members arranged transversely at intervals within the tread portion and at the inner side of the inelastic material, the ends of said members terminating short of the edges of the inelastic material for the purpose described.

2. An inner tube for tires having inelastic members arranged transversely of and embedded within the tread portion of the tube, and a strip of relatively hard rubber embodied in the tread portion and associated with the members to prevent the tearing away of the terminals of the members when the tube is inflated.

3. An inner tube for tires comprising a compressible strip on the inner side of the tread portion, inelastic anchoring members arranged transversely at intervals within the tread portion and operating to effect compression of the strip when the tube is inflated, and a strip of relatively hard rubber interposed between the outer surface of the tread and the inelastic members so that its edges extend beyond the ends of the members.

4. An inner tube for tires having inelastic members arranged transversely of and embedded within the tread portion of the tube, and inelastic material embedded in the tread portion and associated with the members to prevent the tearing away of the terminals of the members when the tube is inflated.

In testimony whereof I have signed my name to this specification.

HENRY CLAUDE PRIVETT.