

J. M. COMBS.
INNER TUBE AND METHOD OF MAKING SAME.
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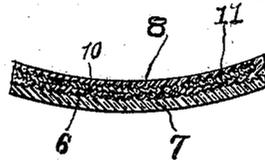
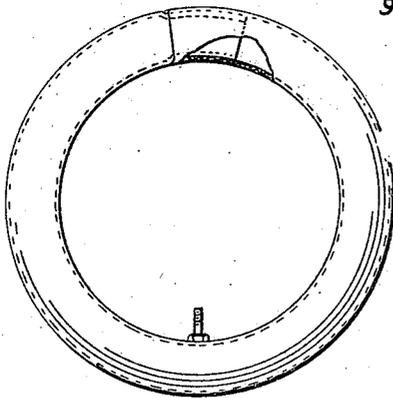
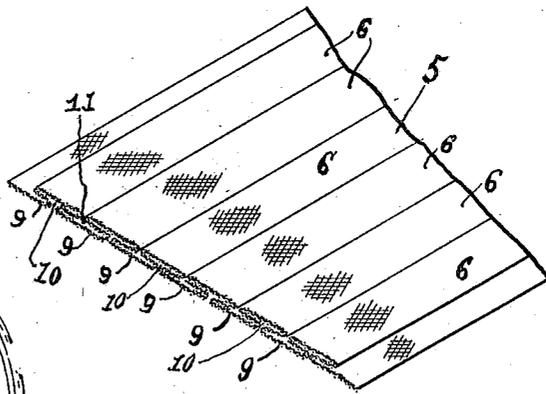
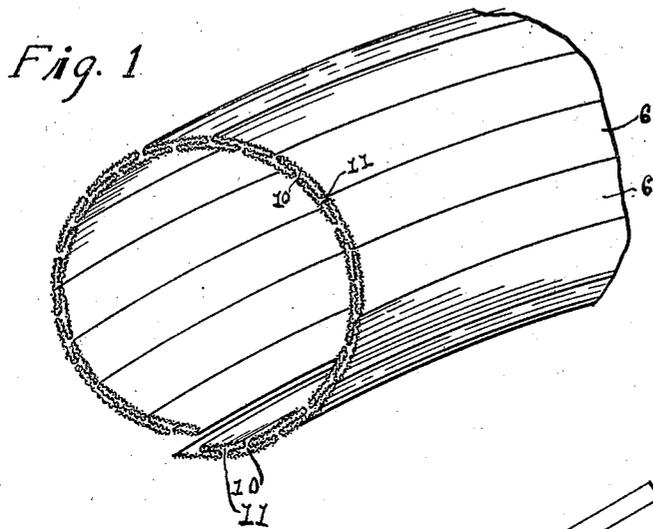


Fig. 3

Fig. 2

Fig. 4

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INNER TUBE AND METHOD OF MAKING SAME.

1,398,940.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, JAMES M. COMBS, a citizen of the United States, residing at Akron, in the county of Summit and State of Ohio, have invented new and useful Improvements in Inner Tubes and Methods of Making Same, of which the following is a specification.

This invention relates to improvements in inner tubes for pneumatic tires and has particular reference to an inner tube which is composed of textile fabric and rubber.

Ordinarily such inner tubes are made entirely of rubber which when inflated are easily punctured, pinched, torn or otherwise injured. Numerous attempts have been made to overcome this objection by reinforcing the inner tube with textile fabric, but as ordinarily constructed, such tubes lack elasticity and are otherwise unsatisfactory.

The main object of this invention is to provide an inner tube for pneumatic tires which will be strong and durable and which will not be easily punctured, torn or otherwise injured.

Another object is to provide a tube composed of textile fabric and rubber which will be substantially as elastic and pliable as a tube constructed entirely of rubber.

A still further object is to provide an inner tube which will accomplish the above objects and in addition, will reinforce the casing so that the same may be used in a relatively weak casing.

I accomplish the above objects and others by the novel construction, combination and arrangement of parts hereinafter described and illustrated in the accompanying drawings which form a part hereof, and wherein I have shown a preferred embodiment of the invention, it being understood that the invention is capable of various adaptations and that changes and variations may be resorted to which come within the spirit of the invention or the scope of the claims hereunto appended.

In the drawings in which similar numerals of reference are employed to indicate corresponding parts throughout the several views,

Figure 1 is a perspective view of a portion of a partly constructed tube showing the manner in which the fabric is joined to form the tube.

Fig. 2 is a fragmentary perspective view of a sheet of rubberized textile fabric show-

ing the manner in which the same is folded preparatory to forming a tube.

Fig. 3 is a side view of a tube constructed in accordance with this invention having portions broken away to more clearly illustrate one method of joining the ends thereof.

Fig. 4 is an enlarged fragmentary view of a portion of a tube showing in transverse section the arrangement of parts in the finished tube.

In constructing a tube in accordance with this invention, textile fabric is first heavily coated on both sides with unvulcanized rubber gum, the fabric is then cut in bias strips of the desired width. If necessary these strips are spliced end to end to secure a strip of fabric of sufficient length to form a tube as herein set forth. The fabric is then folded backward and forward upon itself to form a plurality of longitudinally extending closely spaced parallel plaits as shown in Fig. 2. Each plait comprises a flat surface under which the material is folded so as to provide a plurality of plaits each having two lateral edges. The plaits are formed in said fabric so that the lateral edges thereof are in approximate contact with the lateral edges of the adjacent plait through out the width of the material. The lateral edges of the fabric are then brought together and overlapped as shown in Fig. 1. While the tube may be thus formed and vulcanized in any convenient manner, I prefer to form the tube by placing the plaited fabric around a mandrel and then introducing it into a vulcanizing chamber or otherwise subjecting it to vulcanization. The tube is removed from the mandrel after vulcanization, the surface of the tube adjacent the ends are buffed, a coat of cement is applied to the buffed surface and the ends are brought together with one end within the other. During vulcanization, the rubber on the outer surface of the tube is formed into an integral layer 7 and the rubber on the inner surface of the fabric is formed into a similar layer 8. The method of folding the fabric above described provides a plurality of circumferentially extending, closely spaced, parallel plaits on the inside as well as on the outside of the fabric. The numeral 6 is used to denote the plaits on the outside of the fabric and the numeral 9, the plaits which are formed on the inside of the fabric. Each plait 6 is arranged shingle-like directly over the adjacent lateral

edges of two of the plaits 9 and each plait 9 is similarly arranged directly under two of the plaits 6 to provide a plurality of parallel, circumferentially extending dovetail grooves 10 into which portions of the inner layer of rubber 8 extends. The spacing of the plaits 6 likewise form a plurality of parallel circumferentially extending grooves of dovetail cross section 11 into which the outer layer 7 of rubber extends.

It will be noted that the elasticity of the rubber in the grooves or creases 10 and 11 will permit a free expansion of the tube.

While I have shown and described a particular form of fold or plait, it is to be understood that the invention is not confined to the identical form of fold or plait shown. It is also to be understood that an additional layer of rubber may be placed, if desired, on the inner or outer surface of the tube before vulcanization. The tube is provided with an ordinary inflating stem 12 which is secured thereto in a similar manner as is employed in the manufacture of ordinary inner tubes.

Having thus described my invention, what I claim as new and desire to secure by Letters-Patent is:—

1. In an inner tube for pneumatic tires, an outer and an inner layer of rubber, and an intermediate layer comprising textile fabric arranged therebetween with a plurality of plait-like folds which extend in spaced relation, longitudinally thereof.

2. An inner tube for pneumatic tires comprising an inner and an outer layer of rubber and a layer of textile fabric interposed therebetween in a series of longitudinally extending folds.

3. An inner tube for pneumatic tires comprising an inner and an outer layer of rubber and an intermediate layer of textile

fabric interposed therebetween in a series of longitudinally extending folds, said layers of rubber integrally united to said layer of fabric by vulcanization.

4. An inner tube for pneumatic tires comprising an inner and an outer layer of rubber and a layer of textile fabric interposed therebetween in a series of longitudinally extending, closely spaced, parallel folds, said layers of rubber united to said fabric by vulcanization and having portions extending between the folds of said fabric.

5. A reinforcing element for articles of rubber comprising rubberized bias textile fabric folded backward and forward upon itself in a series of closely spaced, parallel folds.

6. That method of manufacturing tubular articles comprising, coating textile fabric on both sides with unvulcanized rubber gum, then folding the fabric backward and forward upon itself so as to form a plurality of closely spaced plait-like folds, then joining the lateral edges of the fabric in the form of a tube and subjecting the same to vulcanization.

7. That method of manufacturing an inner tube for pneumatic tires which comprises: coating textile fabric on both sides with rubber, then cutting the fabric into bias strips, then folding the strips into a series of closely spaced, longitudinally extending, parallel folds, then placing the fabric upon a mandrel and joining the lateral edges of the fabric so that it will extend therearound in the form of a tube; subjecting the tube thus formed to vulcanization and securing one end of the tube within the other end in the form of an annulus, substantially as herein set forth.

In testimony whereof I have hereunto set my hand.

JAMES M. COMBS.