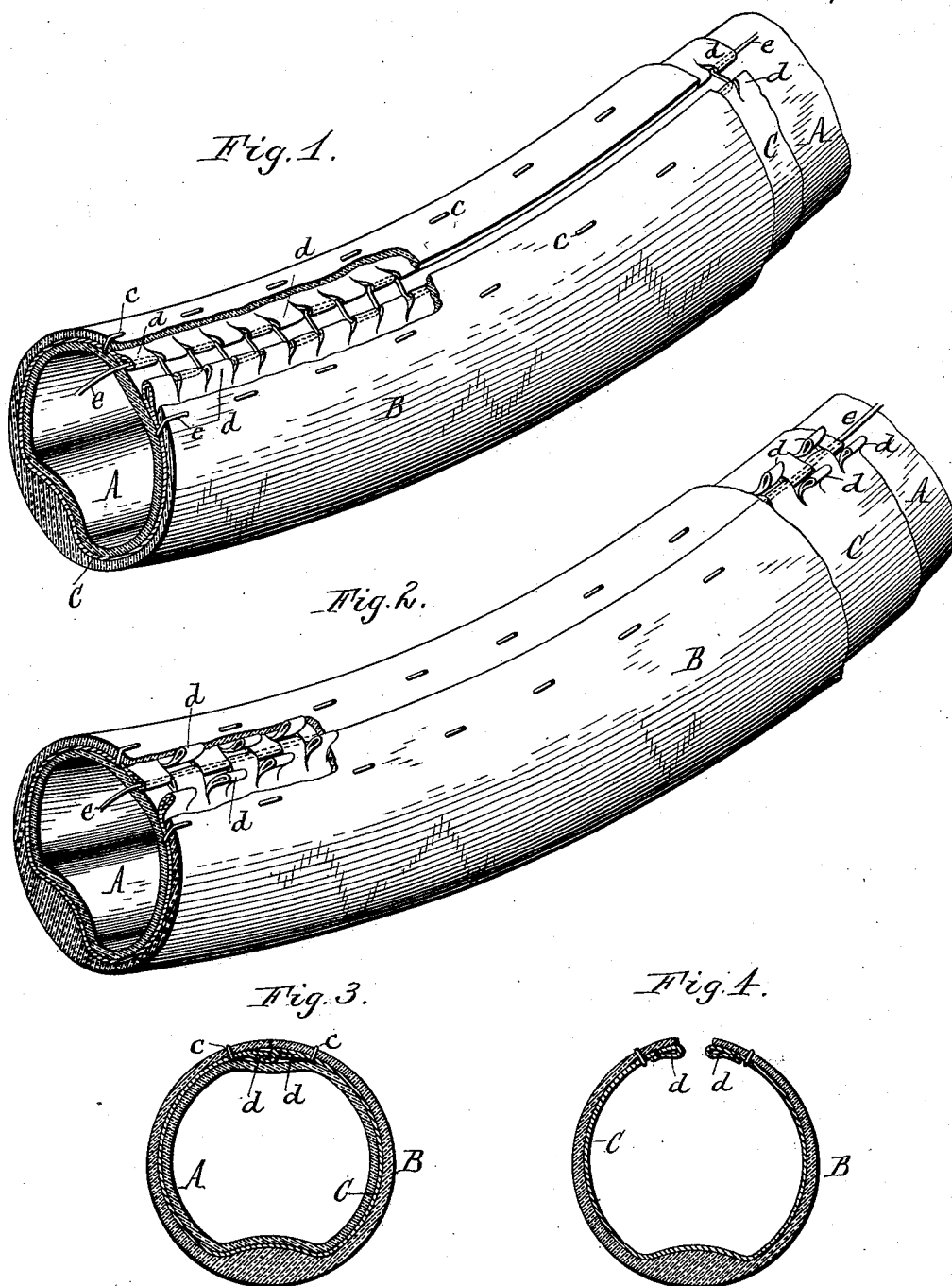


(No Model.)

W. A. WARREN.
PNEUMATIC TIRE.

No. 509,107.

Patented Nov. 21, 1893.



Witnesses:

Emil Neuhart.
Theo. L. Gopp.

Willard A. Warren Inventor.

By Wilhelm O. Gormer. Attorneys.

UNITED STATES PATENT OFFICE.

WILLARD A. WARREN, OF BUFFALO, NEW YORK, ASSIGNOR OF ONE-HALF
TO MELVIN F. WARREN, OF SAME PLACE.

PNEUMATIC TIRE.

SPECIFICATION forming part of Letters Patent No. 509,107, dated November 21, 1893.

Application filed May 20, 1893. Serial No. 474,905. (No model.)

To all whom it may concern:

Be it known that I, WILLARD A. WARREN, a citizen of the United States, residing at the city of Buffalo, in the county of Erie and State of New York, have invented a new and useful Improvement in Pneumatic Tires, of which the following is a specification.

This invention has reference to that class of pneumatic tires in which the air tube is protected by an inclosing envelope or covering having its longitudinal edges fastened together by a cord. Heretofore such coverings have been provided near their edges with eyelet holes for the passage of a lacing cord, or with hooks around which the cord was passed. In such constructions, when the opposing edges of the covering are tightly drawn together, the cord passes in zig zag form through the eyelet holes and the many angles thus formed in the cord restrain its longitudinal movement so that the strain received by the covering is not distributed equally over the cord but is exerted upon a comparatively small portion thereof.

The object of my invention is to produce an efficient fastening of this character which permits ready access to the inclosed air tube for repairing the same and in which the strain on the cord and the edges of the covering is practically equalized.

In the accompanying drawings: Figure 1 is a perspective view of a portion of my improved tire showing the edges of the envelope or sheath united, but not drawn together. Fig. 2 is a similar view showing the edges tightly drawn together, with a portion of the envelope broken away to expose the loops. Fig. 3 is a cross section of the tire showing the envelope closed. Fig. 4 is a similar view showing a modified construction of the envelope, the latter being shown open.

Like letters of reference refer to like parts in the several figures.

A represents the inner air tube of the tire which may be constructed of rubber in the ordinary manner, and B is the sheath or protecting envelope which incloses the air tube and which is also preferably constructed of rubber.

C is the usual lining of canvas or other flexible fabric applied to the inner surface of the envelope and secured to the latter by metallic staples *c*, or by any other means.

The envelope is split lengthwise on its inner side to permit the insertion and removal of the air tube and is provided along both of its opposing edges with a series of loops *d* which are adapted to receive a connecting cord or wire *e*, whereby the edges of the envelope are drawn together for confining the inclosed air tube. These loops extend entirely around the tire and their bights or openings are arranged circumferentially of the wheel rim. They are preferably formed on the canvas lining by weaving a narrow pocket along each edge thereof and then slitting these pockets transversely at suitable intervals to form the loops. Instead of weaving the loops integrally with the canvas lining, they may be formed by doubling or hemming the edges of the lining and then slitting such hemmed edges, as shown in Fig. 4. To prevent fraying of the edges of the loops a coating of cement is preferably applied to the surface of such pockets and allowed to dry before slitting the pockets. The connecting cord *e* is passed alternately through the loops of the opposing envelope edges, the same passing first through a loop on one edge of the envelope, thence through a diagonally opposite loop on the other edge, thence through a diagonally opposite loop on the first mentioned edge and so on around the entire envelope. The cord thus passes only through alternate loops on each envelope edge, the remaining intervening loops being unused. Upon seizing the ends of the cord and pulling the cord taut, the opposing edges of the tire are tightly drawn together, whereby the envelope is closed around the air tube, and the ends of the cord are then tied together. In thus closing the envelope, the cord is drawn practically straight or concentric with the tire, the used loops of each edge of the envelope crowding aside the opposing unused loops of the other edge, so that the used loops of both edges stand in line and permit the cord to pass through these without angles or bends. The cord is thus free to slide in the loops to

a certain extent around the whole circumference of the tire in responding to the strains received by the envelope, thereby equalizing the strain upon all portions of the cord and
5 lessening the liability of its breaking.

When it is desired to repair a rent or puncture in the air tube, access is readily gained to the latter by untying the ends of the cord and pulling apart the edges of the envelope
10 in the vicinity of the puncture, or by cutting the cord adjacent to the puncture and afterward tying an additional piece thereto for again closing the envelope.

In the drawings the cord is represented in
15 one continuous piece, but if preferred, it may consist of a number of separate lengths or sections, in which case the adjacent ends of the sections are tied together.

If desired, the set of idle loops may be used
20 when those of the other set are worn out.

The cord is readily threaded through the loops by the use of a blunt needle.

I claim as my invention—

In a pneumatic tire, the combination with an inner air tube, of a sheath or envelope provided along each of its opposing edges with
25 a longitudinal pocket, slitted transversely at intervals, forming a continuous row of loops on each edge, and a connecting cord passing only through alternate loops of each edge of
30 the sheath, whereby the intermediate unused loops form a reserve set which may be used when the other set is worn out, substantially as set forth.

Witness my hand this 13th day of May, 1893. 35

WILLARD A. WARREN.

Witnesses:

CARL F. GEYER,

JNO. J. BONNER.