

No. 817,560.

PATENTED APR. 10, 1906.

J. L. HEWARD.
TIRE FOR VEHICLE WHEELS.
APPLICATION FILED JAN. 27, 1904.

Fig. 1.

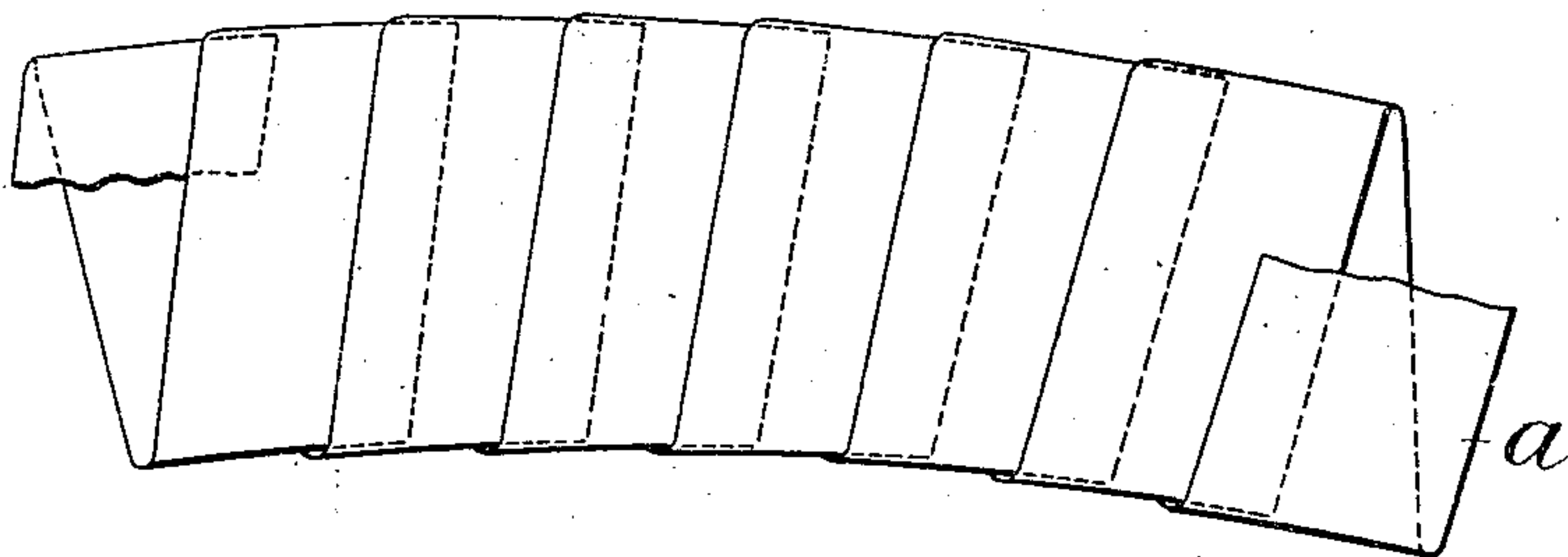


Fig. 2.

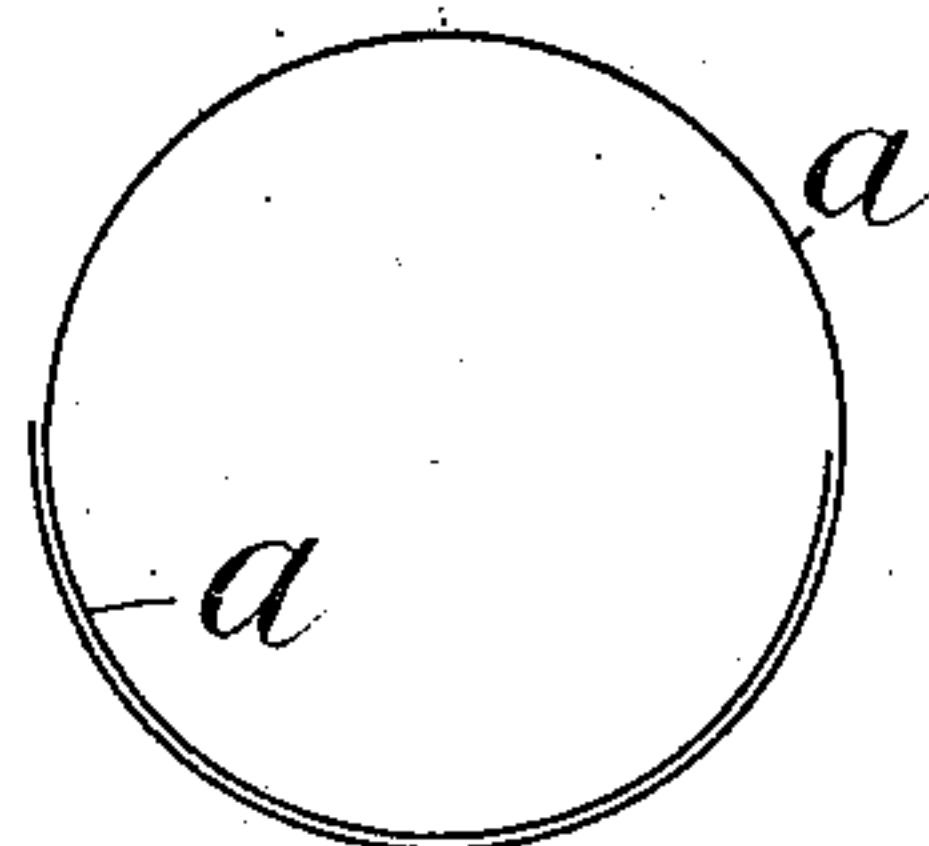


Fig. 3.

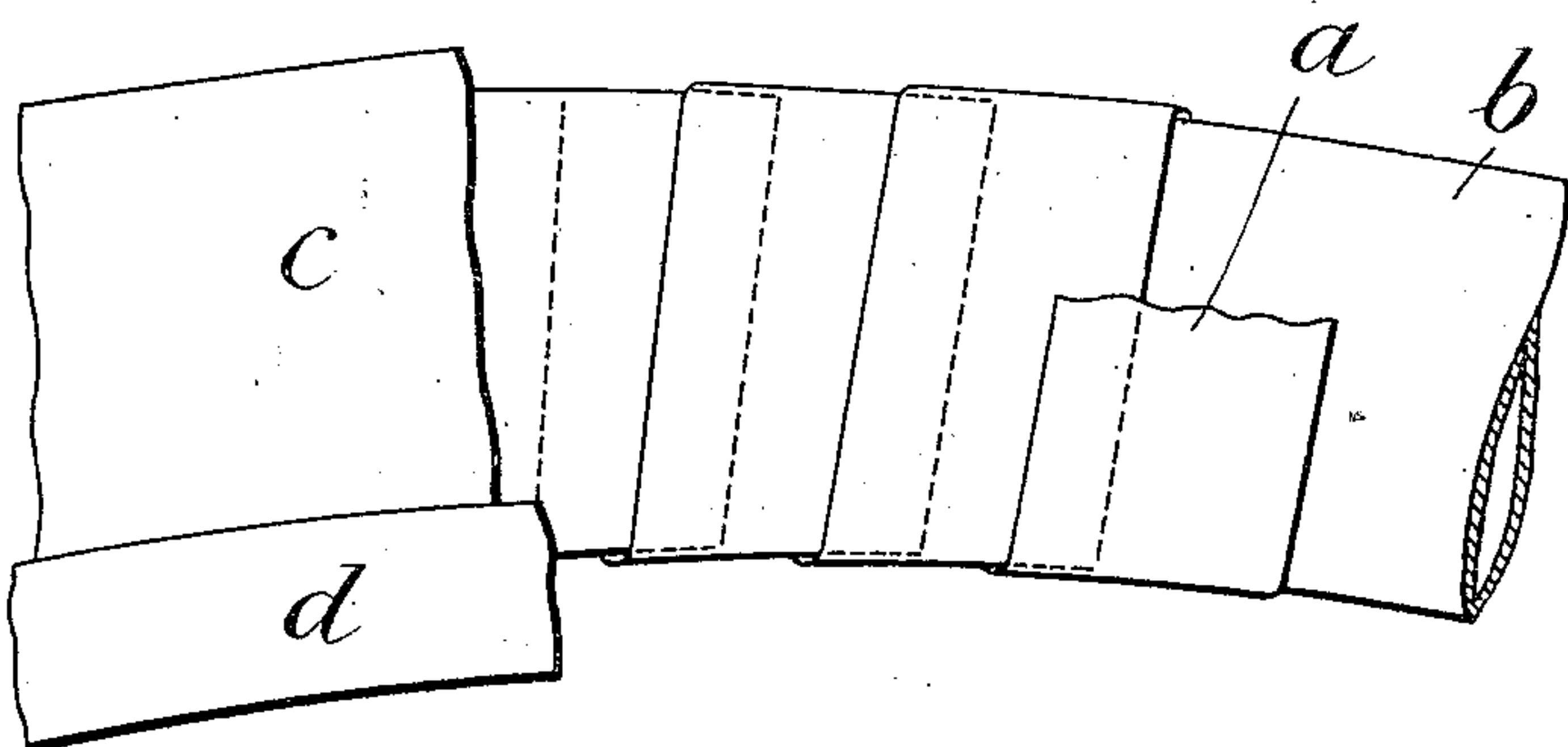


Fig. 4.

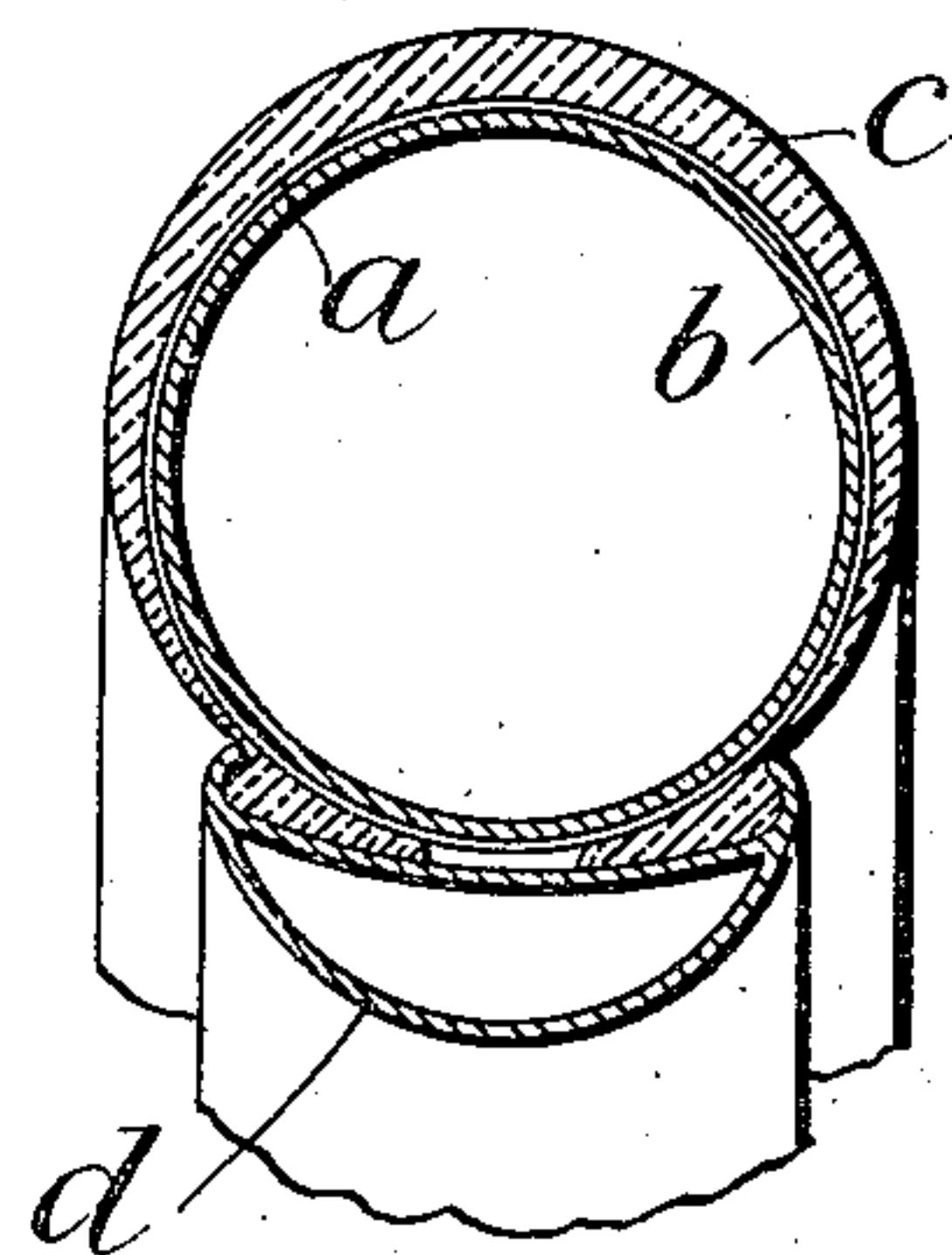
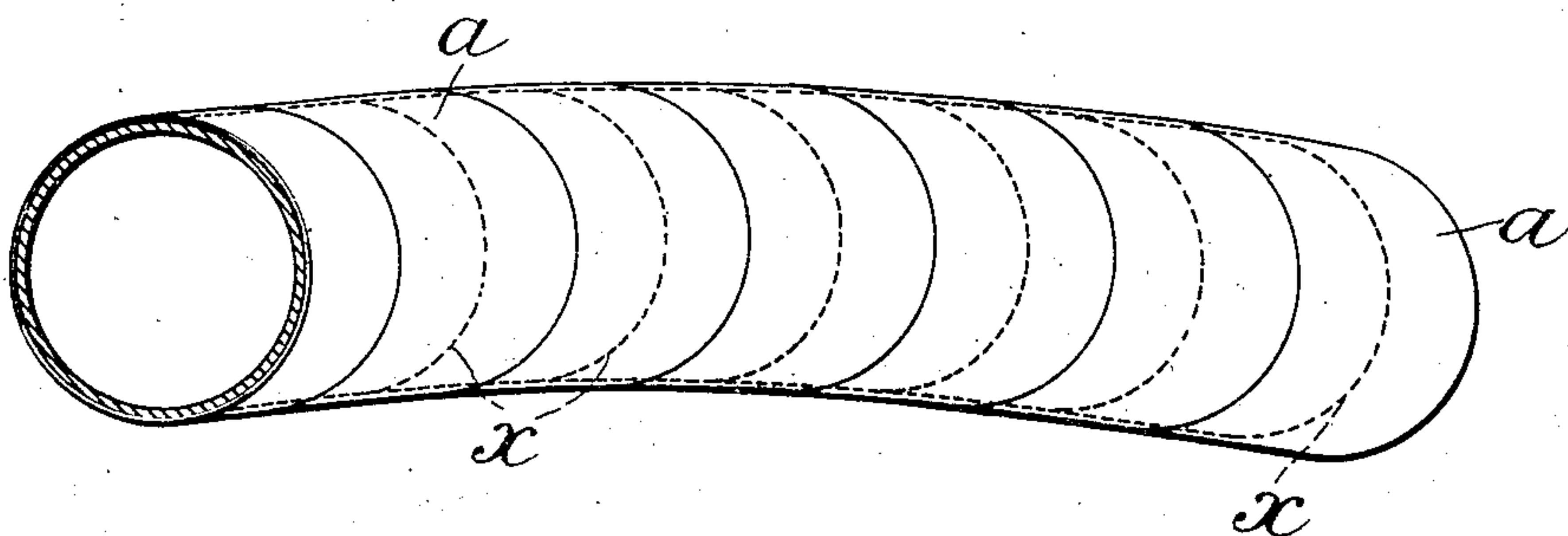


Fig. 5.



WITNESSES:

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UNITED STATES PATENT OFFICE.

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TIRE FOR VEHICLE-WHEELS.

No. 817,560.

Specification of Letters Patent.

Patented April 10, 1906.

Application filed January 27, 1904. Serial No. 190,763.

To all whom it may concern:

Be it known that I, JAMES LOCKWOOD HEWARD, engineer, a subject of the King of Great Britain and Ireland, residing at 9 Beda road, Canton, Cardiff, in the county of Glamorgan, England, have invented certain new and useful Improvements in Tires for the Wheels of Cycles, Motors-Cars, and other Vehicles, of which the following is a specification.

10 This invention relates to pneumatic tires, and has for its object to render such tires impenetrable—i. e., so as to prevent puncture thereof—and for this purpose, according to my present invention, I employ a very thin

15 spring-steel or other suitable metal band or ribbon, coiled spirally around and throughout the length of the inner tube, so as to completely sheath or inclose the latter within the hollow annular flexible but puncture-proof

20 covering thus formed by said spirally-wound very thin spring-metal band or ribbon, which for the sake of brevity I will hereinafter refer to as the "metal ribbon." In carrying my invention into practice I advantageously

25 form said metal ribbon of very thin and flexible flat spring-steel in form of a ribbon of, say, about one and one-quarter inches in width and, say, about a five-thousandth of an inch in thickness, or more or less, as de-

30 sired. Such very thin metal ribbon is advantageously given a spiral form or tendency in any suitable manner—as, for instance, in manufacturing same by winding same while hot spirally on a mandrel and at same time

35 giving it the "pitch" or spiral required, for example, so that the windings overlap each other about one-third of the width of the ribbon itself, and thus produce "lapped" winding or "lapped-joint" winding when in position

40 around the inner air-tube. The mandrel used for the preliminary winding of the resilient metal ribbon is of the same cross-section and radius as the tire, so that after the operation has been completed and the ribbon thus formed has been hardened and

45 tempered said ribbon assumes and permanently retains the shape of the tire upon which it is intended to be used. The result of this molding of the metal ribbon while hot on the mandrel is that the said ribbon has a

50 slight transverse curvature imparted thereto; but to be more accurate this curvature is at a slight forward angle with respect to the cross-section of the ribbon, because of the spiral

55 winding of the latter, so that the ribbon conforms closely to the peripheral curvature of

the inner tube, while the side edges of the ribbon are bent inwardly toward the latter and are thus prevented from acting as cutting edges, which would injure the outer tube or 60 covering, or the pitch or spiral of the metal ribbon may be such that when in position on the inner air-tube the windings will not overlap, as aforesaid, or overlap at all, in which event I then employ a second and separate 65 metal ribbon, (similar to the first ribbon or suitable for the purpose,) which is wound spirally over the first ribbon in a similar manner to the first ribbon—i. e., without overlapping—or otherwise, but always so that the 70 outer ribbon "breaks joint" with the inner ribbon, and thus prevents the inner air-tube from being punctured, or more than two windings may be employed, if desired, and when more than a single winding is employed 75 the same may, if desired, be made of still thinner metal ribbons.

The metal ribbon employed is tempered in any usual or suitable way, but always so that the same is very resilient not only in itself, 80 but also when overlapping in its spirally-wound form in the tire.

Referring to the accompanying drawings, Figure 1 shows a length of the metal ribbon in its spirally-wound form overlapping itself 85 about one-third of the width of the ribbon. Fig. 2 is a cross-sectional view thereof. Fig. 3 is a view of a length of a complete tire on rim, suitable for cycles, parts of such tire being broken away to show, respectively, the 90 metal ribbon and the inner tube. Fig. 4 is a cross-sectional view of said tire, and Fig. 5 is a perspective view of the inner air-tube with two spirally-wound ribbons placed around the same. 95

Similar letters of reference indicate corresponding parts in the different figures of the drawings.

a is the spirally-wound thin metal ribbon. *b* is the inner air-tube, completely covered and 100 protected by said metal ribbon.

c is the outer cover of the tire; *d*, ordinary rim of wheel. The construction of the outer cover *c* and rim *d*, and the means employed for securing said cover to its rim may be of 105 any character suitable for use in conjunction with my invention. For example, the well-known clencher attachment or beaded edges, as shown in Fig. 4, may be employed.

In Fig. 5 I have illustrated the application 110 of two metal ribbons spirally coiled and the outer ribbon breaking joint with the inner

ribbon, the windings of the latter being indicated by the dotted lines *x*, and when employing this break-joint plan I may use means to keep the position of the coils invariable to one another—as, for example, I may employ studs or rivets or fasteners like the well-known split form of paper-fasteners, which would be quite sufficient for my purpose.

10 The windings of the metal ribbon *a* upon or around the inner air-tube *b* may be effected either after the latter has been made and finished or before said air-tube has been formed into the ring and thereafter the inner tube
15 made up into ring form, and in either event suitable means are provided, such as the ordinary or any suitable valve and air-pump, by which the inner tube *b* is inflated, the winding of the metal ribbon *a* being arranged so
20 as to clear the valve in any suitable manner.

The two ends of the spirally-wound metal ribbon *a* may be brought together and caused to overlap and, if desired, may be secured to-

gether in any suitable manner—as, for example, by brazing or riveting same together. 25

The compressed air in the tube *b* acts as an elastic backing to the metal ribbon, which coiled spirally, as aforesaid, is elastic to outward pressure and the surface is impenetrable to puncture—i. e., will not puncture from
30 any ordinary cause.

Having now described my invention, what I claim as new, and desire to secure by Letters Patent of the United States, is—

A sheath for the inner tubes of pneumatic
35 tires, comprising a thin resilient metallic ribbon spirally wound in the shape of a hollow ring, said ribbon being bent transversely to conform to the peripheral contour of the tire to which it is applied. 40

In witness whereof I have hereunto set my hand in presence of two witnesses.

JAMES LOCKWOOD HEWARD.

Witnesses:

ERNEST L. PHILLIPS,
ALBERT S. PHILLIPS.