

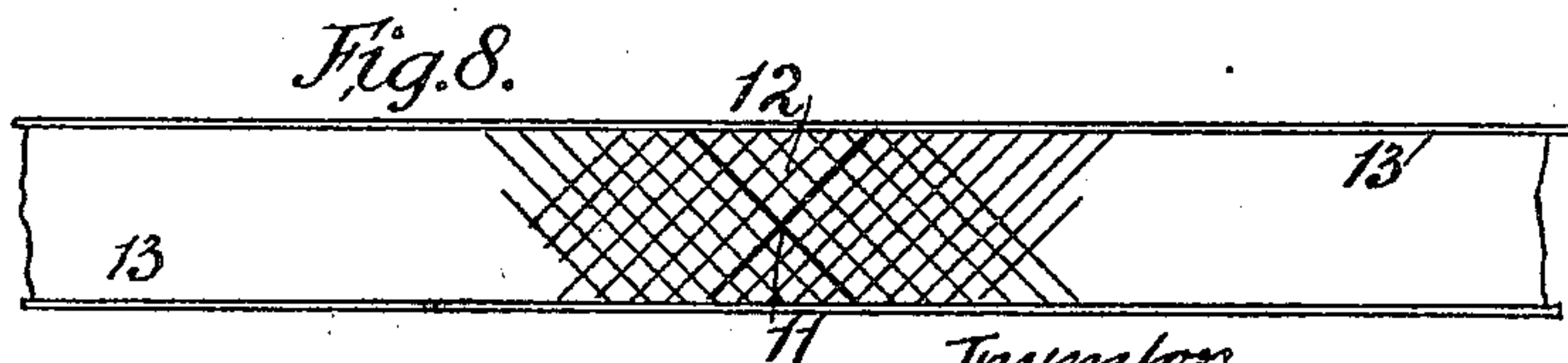
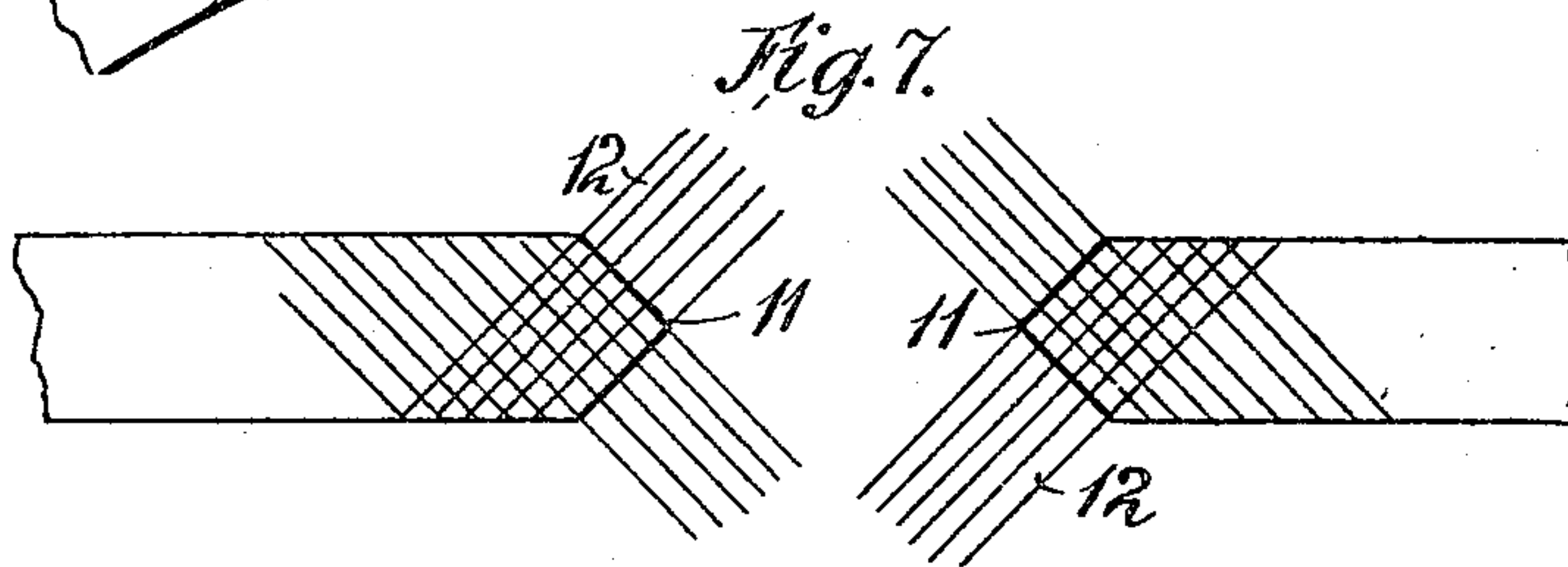
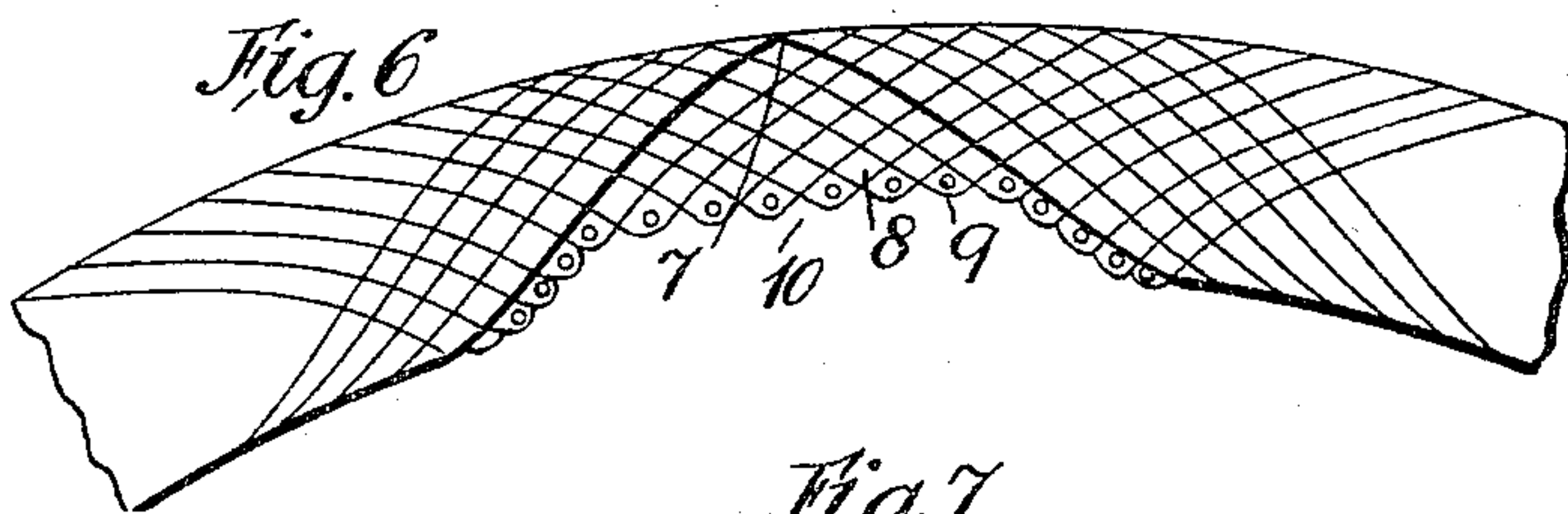
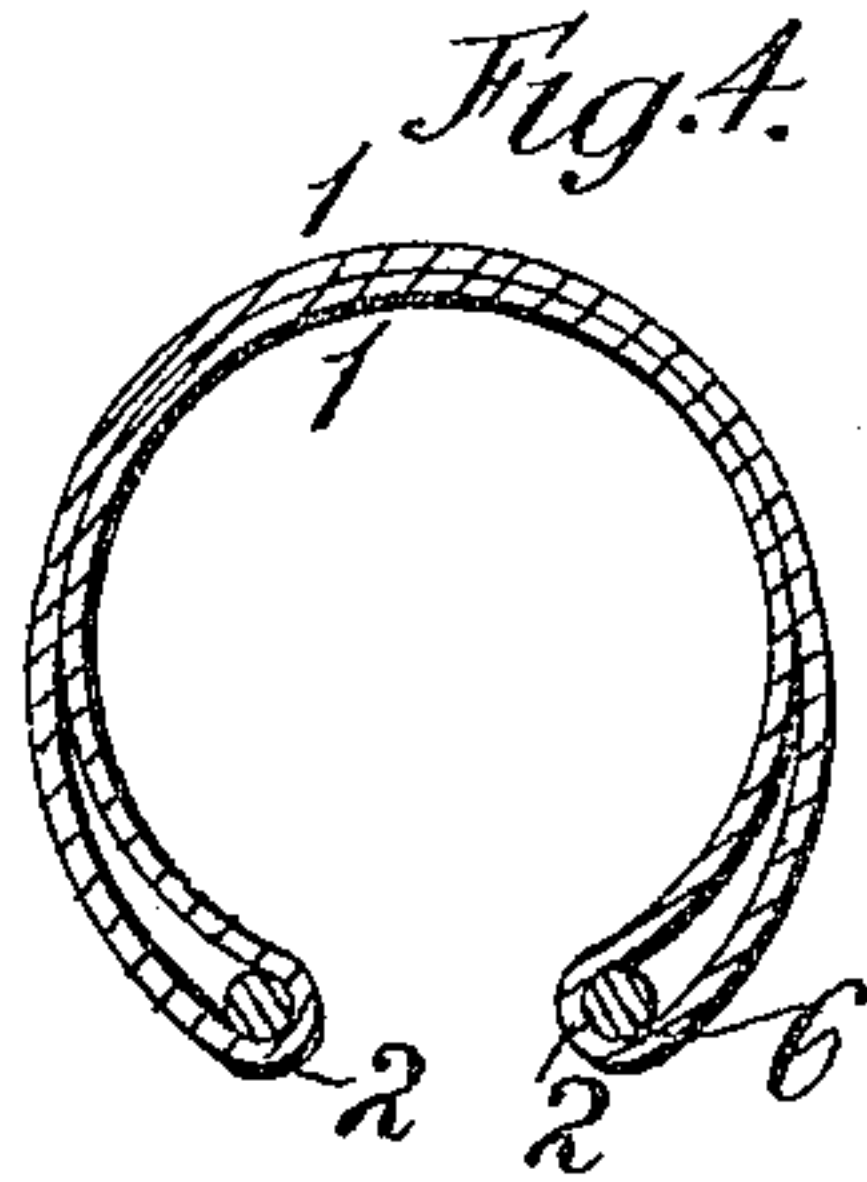
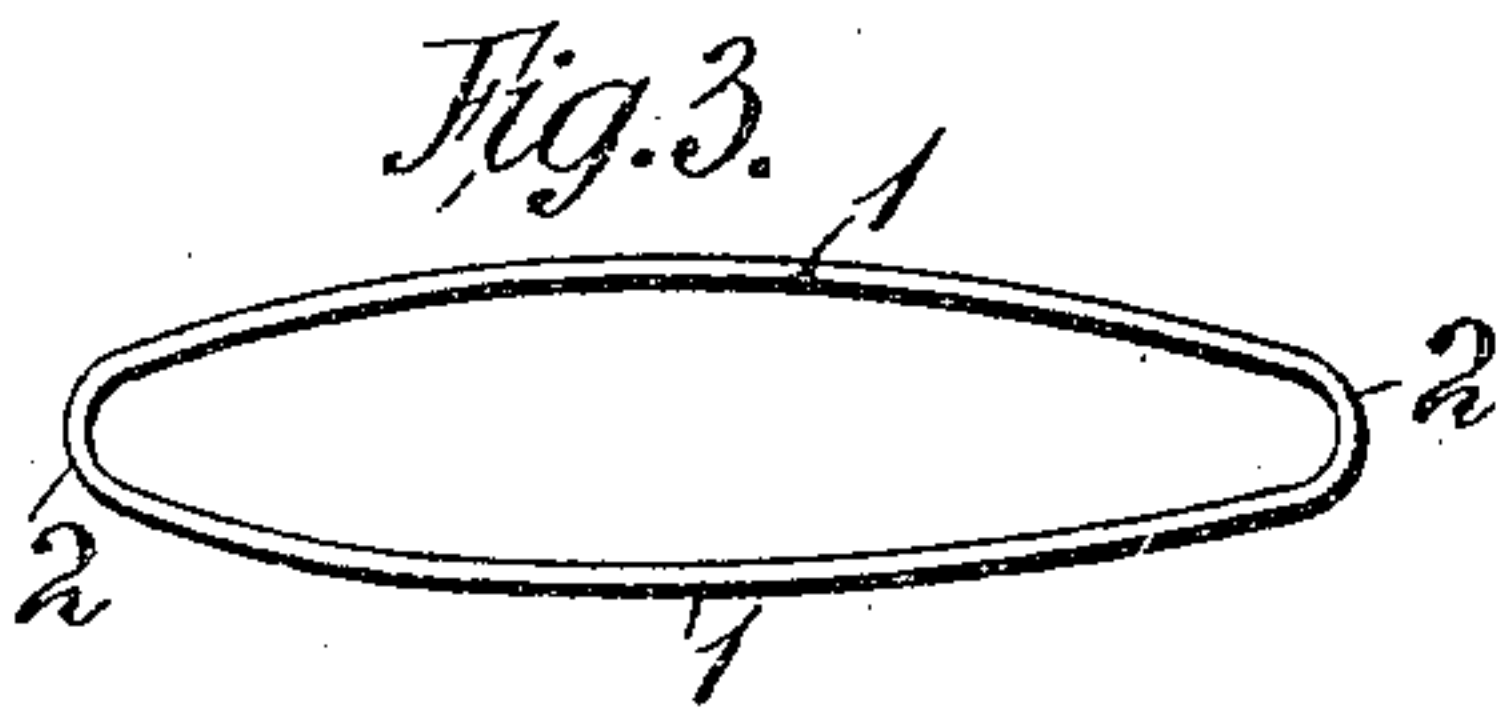
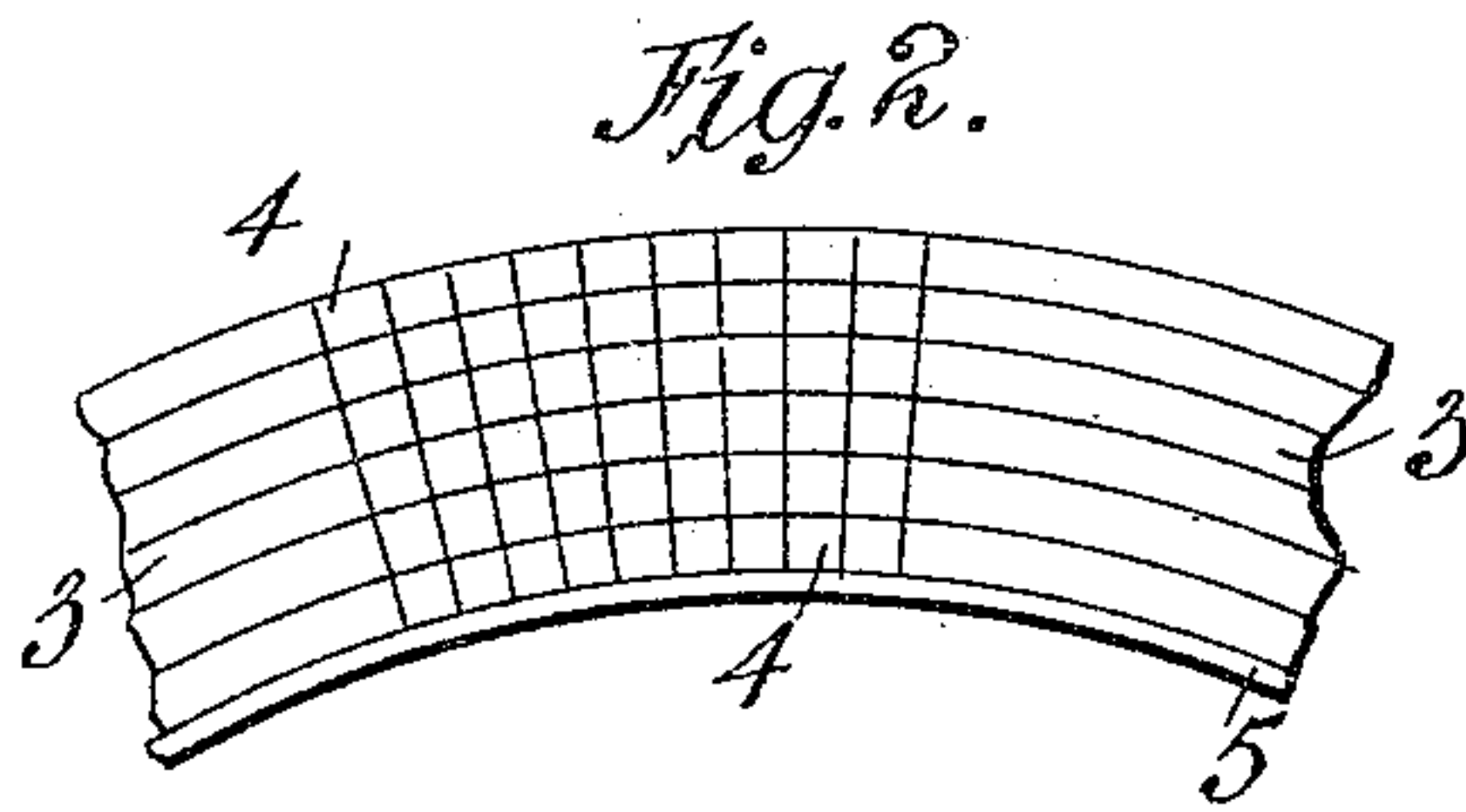
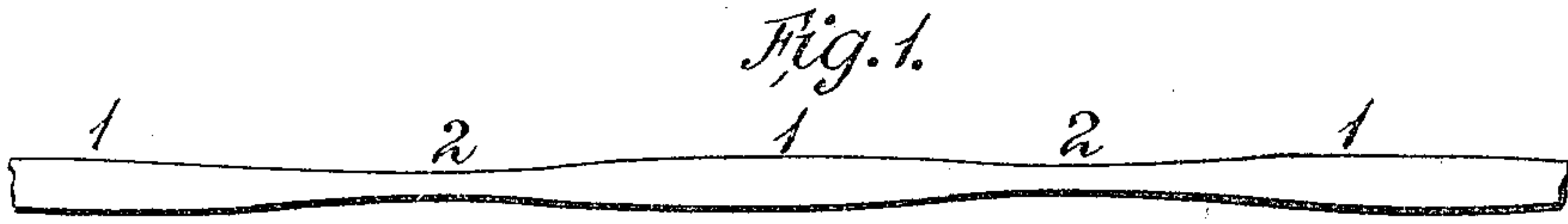
No. 801,359.

PATENTED OCT. 10, 1905.

H. W. C. B. CAVE.

PNEUMATIC TIRE.

APPLICATION FILED OCT. 1, 1904.



Witnesses.
Alfred Nutting
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UNITED STATES PATENT OFFICE.

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PNEUMATIC TIRE.

No. 801,359.

Specification of Letters Patent.

Patented Oct. 10, 1905.

Application filed October 1, 1904. Serial No. 226,876.

To all whom it may concern:

Be it known that I, HENRY WILMOT CAVE BROWNE CAVE, surgeon, a subject of the King of Great Britain, residing at the Junior Athlæum Club, 116 Piccadilly, London, England, have invented certain new and useful Improvements in Pneumatic Tires, of which the following is a specification.

This invention has reference to pneumatic tires of the kind in which the outer cover or casing is made up of strands or strips of metal or other suitable material braided, plaited, or interlaced into an annular band or tube to form a puncture-resisting cover or casing for the air-tube; and the invention has for its object to construct covers or casings of the kind referred to in such wise that when the cover or casing is in position the strands or strips shall form a close mesh without apertures or openings between adjacent strands or strips through which the air-tube may be punctured.

According to the present invention the strands or strips are woven or interlaced, so as to cross one another either diagonally or at right angles, some running across the tread and some parallel therewith, each strand or strip having those portions of it that will be adjacent to the rim when the cover or casing is in position of less width than the portions of the strands or strips that will form the tread portion of the cover or casing, the arrangement being such that when the cover or casing is bent into an annulus the strands or strips will remain closed at their broader parts and form a casing that is puncture-proof and is without openings or apertures between the edges of adjacent strands or strips. Flat or rounded spring steel or nickel or canvas and rubber is suitable for the strands or strips; but other resistant and resilient material may be employed—such, for instance, as leather, hide, celluloid, or gut, either used separately or in combination or with steel. The cover or casing may be woven or interlaced on the flat or as a circular tube, or the cover or casing may be woven or interlaced as an oval-shaped tube, one of the parts of the oval tube at the major axis being then pressed inward toward the other, so as to form a cover or casing of double thickness and with the narrow parts of the strips or strands so arranged as to come at the minor axis of the said oval tube, so that when the cover or casing is shaped as described the narrow parts of the strands or

strips will form the edges of the cover or casing. When the cover or casing is made on the flat and then bent to shape or as a tube, or when made of arch-shape in the first instance, the portion that will form the tread may be made of a thickness greater than that of the side walls of the cover or casing. This may be done where canvas and rubber or leather are used for the main part of the cover by plaiting or braiding short pieces of nickel, steel, or othersuitable metal having a shape corresponding to the broader part of the shaped strips used in making the braided cover into a band to cover the tread of the tire, the ends of each short strip being riveted to the main cover by means of strong rivets preferably having large prominent heads that serve to prevent side slip when the vehicle skids, but do not touch the road when running straight. If desired, moreover, the cover or casing may be made of two or more layers of material, so that in the event of a nail or the like being forced between the edges of adjacent strands or strips of the outer layer it will encounter the inner layer and its further progress be arrested. The cover or casing may be covered with a layer of rubber, and between the air-tube and the inner walls of the cover or casing there may be placed suitable material to protect the air-tube, such as felt, hide, or leather either woven or interlaced like the cover or plain or molded to shape or otherwise. The edges of the strands or strips may be beveled on one or both sides of each edge. The ends of the cover or casing may be secured together in any convenient manner, as by riveting, splicing, welding, or brazing, so as to form an annular cover. In cases where the strands or strips are woven or interlaced as a tube the strands or strips are so arranged as to end at that side of the cover or casing which will be next the rim and the ends of the strands or strips so connected, as by eyelets or eyelets and hooks, that an opening will be left in the wall of the cover or casing that will be next the rim, through which the air-tube can be got at. By this means joints on the tread of the cover or casing are dispensed with.

A convenient method is to braid the strands or strips so that all the ends when the tire is finished come to the under or rim side in the tubular tire or to the wire in the wired-on tire. In the wired-on tire when the plaiting has been carried round to the starting-place the opposite ends are plaited together, as fol-

lows: Having braided each end to a point, the two points are brought together and then plaited crosswise, so as to bring all the ends to the wire, where when finished they are
 5 suitably fastened. The cover may be secured to the rim by wires or by bolts and nuts, and a steel band on the cover may be provided to engage with the bolt-heads or otherwise. A section or portion of one flange of the rim may
 10 be removably secured, so as to facilitate the placing of the cover on the rim.

In the event of damage or breakage to one or more strips or strands repair thereto may be effected by the interlacing or weaving of a
 15 portion of a strip or strand into the cover or casing while the tire is deflated.

The accompanying drawings illustrate the mode of constructing tire-covers according to this invention.

20 Figure 1 represents a strip of varying breadth of the kind used when the strips composing the cover are braided or interlaced diagonally. Fig. 2 shows diagrammatically the manner in which the strips are interlaced when
 25 arranged longitudinally and transversely in relation to the tread. Fig. 3 is a transverse section of a tubular cover that when woven is of oval section. Fig. 4 shows the manner in which such cover is folded so as to form a
 30 cover of double thickness. Fig. 5 shows a strip of varying breadth suitable for riveting to the tread of the cover to strengthen the same or for use as a transverse strip in the construction shown in Fig. 2. Fig. 6 is a dia-
 35 grammatic view of the end portions of a tubular cover, illustrating the mode of joining these portions together; and Figs. 7 and 8 are diagrammatic views of the ends of a cover woven on the flat, showing said end portions,
 40 respectively, before and after the joining of the same together.

When the cover is woven as a continuous tube of circular or approximately circular cross-section from diagonally-interlaced
 45 strips of the form shown in Fig. 1, the broader portions 1 of these strips are brought to the tread and the narrower portions 2 to the part of the cover adjacent to the rim of the wheel, so that when the cover is bent to the curva-
 50 ture of the wheel-rim its component strips are laid closely against each other throughout their entire length.

When the cover is composed of strips interlaced as shown in Fig. 2, the strips 3, which
 55 run in the circumferential direction, are of uniform breadth, while the transverse strips 4 will be of the form shown in Fig. 5, their broad central portions coming to the tread. A cover thus constructed may have at its
 60 edges wires 5, to which the ends of the strips 4 are attached.

A tubular cover woven, as illustrated in Figs. 3 and 4, of strips such as shown in Fig. 1 has its component strips diagonally inter-
 65 laced, the broad portions 1 and the narrow

portions 2 of the strips coming into the positions respectively marked 1 and 2 in Figs. 3 and 4, so that when the cover is folded, as shown in Fig. 4, the strips are laid closely together over its entire periphery. In the
 70 folds 2, Fig. 4, there may be inserted wires 6 for holding on the cover.

When the strands or strips shown in Fig. 1 are diagonally interlaced to form a tube, the ends of this tube may be joined together in
 75 the manner illustrated in Fig. 6 by carrying the interlacing of each end to a point 7, bringing those points into contact at the tread, continuing the interlacing of the ends 8 of the strips, and joining these ends in pairs at 9, as
 80 by an eyelet, so as to leave in the wall of the cover an opening 10, through which the air-tube can be got at.

When the cover is plaited on the flat, as illustrated in Figs. 7 and 8, each end portion
 85 is in like manner interlaced to a point 11. These points are brought together, Fig. 8, and the ends 12 interlaced and joined at their edges, as by connecting them to a wire 13.

Although in Figs. 6 to 8 the component
 90 strips are diagrammatically indicated as of uniform breadth, it is to be remembered that their actual breadth is variable, as already set forth. In some instances a portion of the rim
 95 may be made detachable and adapted to be bolted onto the remainder of the rim to facilitate attachment and removal of the cover and tire.

What I claim, and desire to secure by Letters Patent of the United States, is— 100

1. A pneumatic-tire cover composed of strips that are so interlaced with one another as to lie obliquely with respect to the periphery of said cover; and that have their breadths
 105 so increased at intervals dependent to the transverse section of said cover, as, when the cover is in position on the tire to cause the said strips to form at their crossings a close mesh.

2. A pneumatic-tire cover composed of
 110 strips of nickel-steel that are so interlaced with one another as to lie obliquely with respect to the periphery of said cover; and that have their breadths so increased at intervals dependent to the transverse section of said
 115 cover, as, when the cover is in position on the tire to cause the said strips to form at their crossings a close mesh.

3. A pneumatic-tire cover composed of strips that are so interlaced with one another
 120 as to lie obliquely with respect to the periphery of said cover; and that have their breadths so increased at intervals dependent to the transverse section of said cover, as, when the cover is in position on the tire to cause the
 125 said strips to form at their crossings a close mesh; the ends of said cover being braided to points and brought together and the strips then plaited crosswise and secured to the wires.

4. A pneumatic-tire cover composed of strips of nickel-steel that are so interlaced with one another as to lie obliquely with respect to the periphery of said cover; and that
5 have their breadths so increased at intervals dependent to the transverse section of said cover, as, when the cover is in position on the tire to cause the said strips to form at their crossings a close mesh; the ends of said cover
10 being braided to points and brought together,

and the strips then plaited crosswise and secured to the wires.

In testimony whereof I have hereunto set my hand, in presence of two subscribing witnesses, this 23d day of September, 1904.

HENRY WILMOT CAVE BROWNE CAVE.

Witnesses:

R. WESTACOTT,
ALFRED NUTTING.