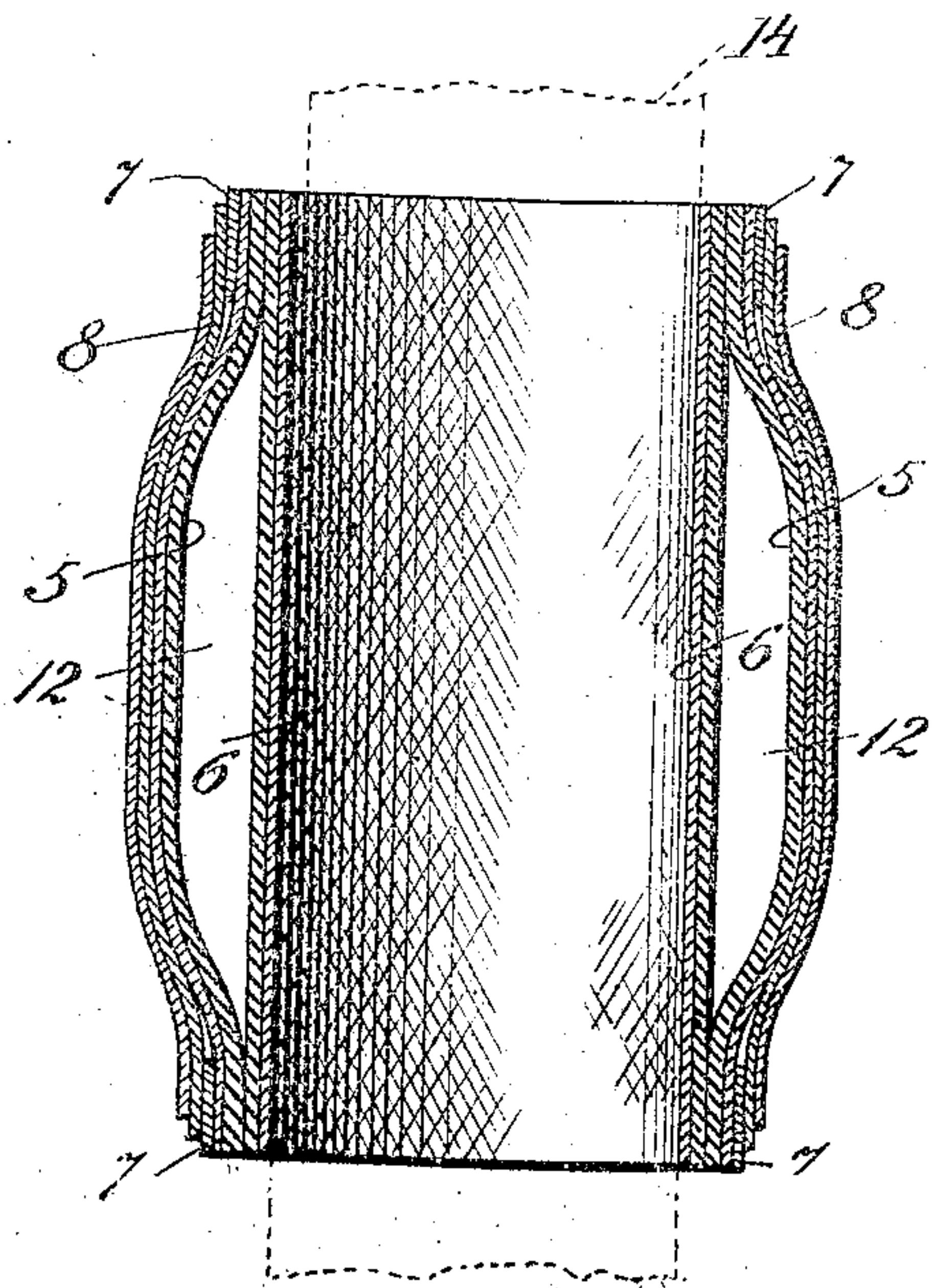
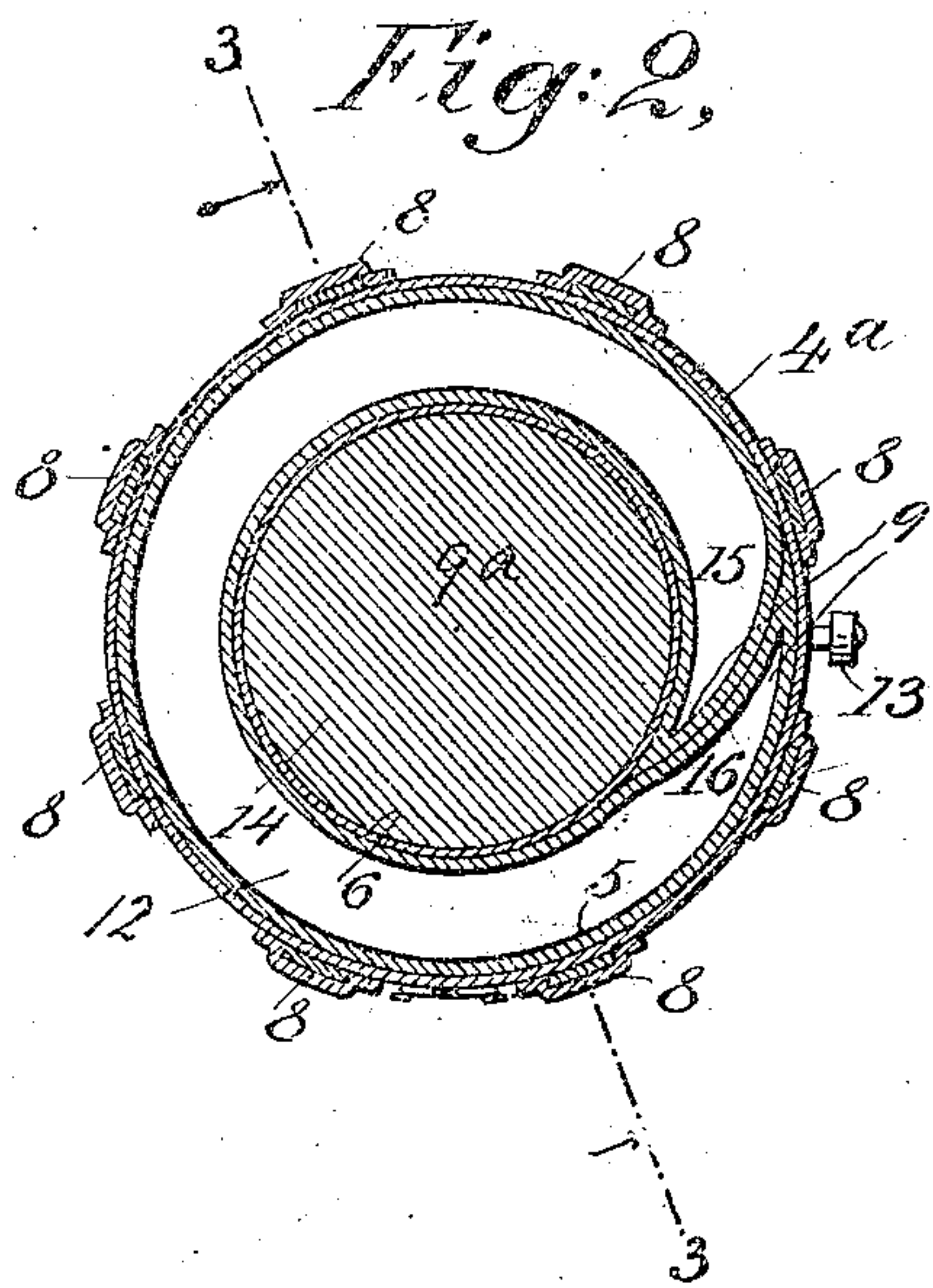
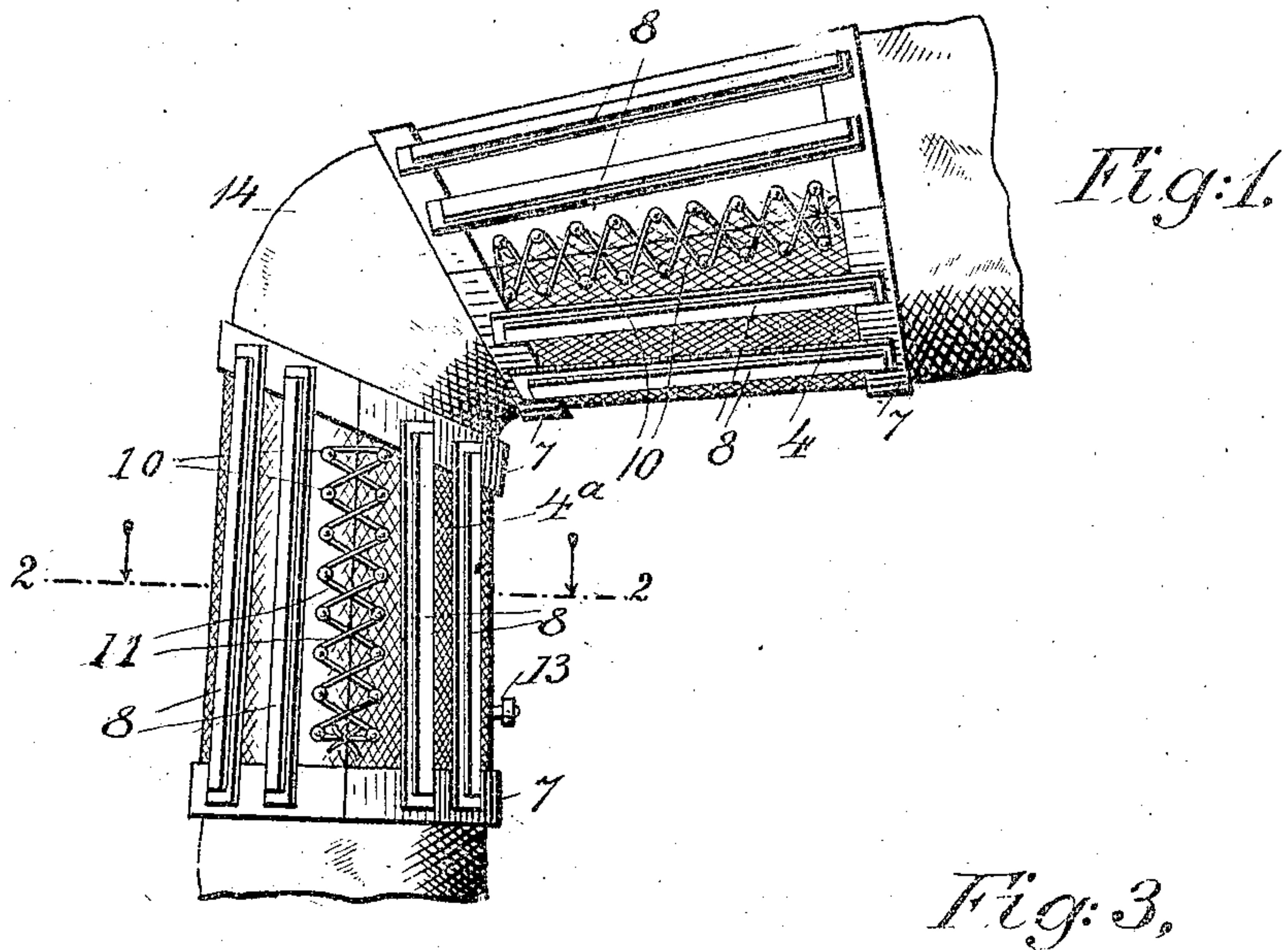


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PATENTED JUNE 16, 1908.

P. MITCHELL.  
INFLATABLE BANDAGE.  
APPLICATION FILED MAY 8, 1907.

2 SHEETS—SHEET 1.



Witnesses:  
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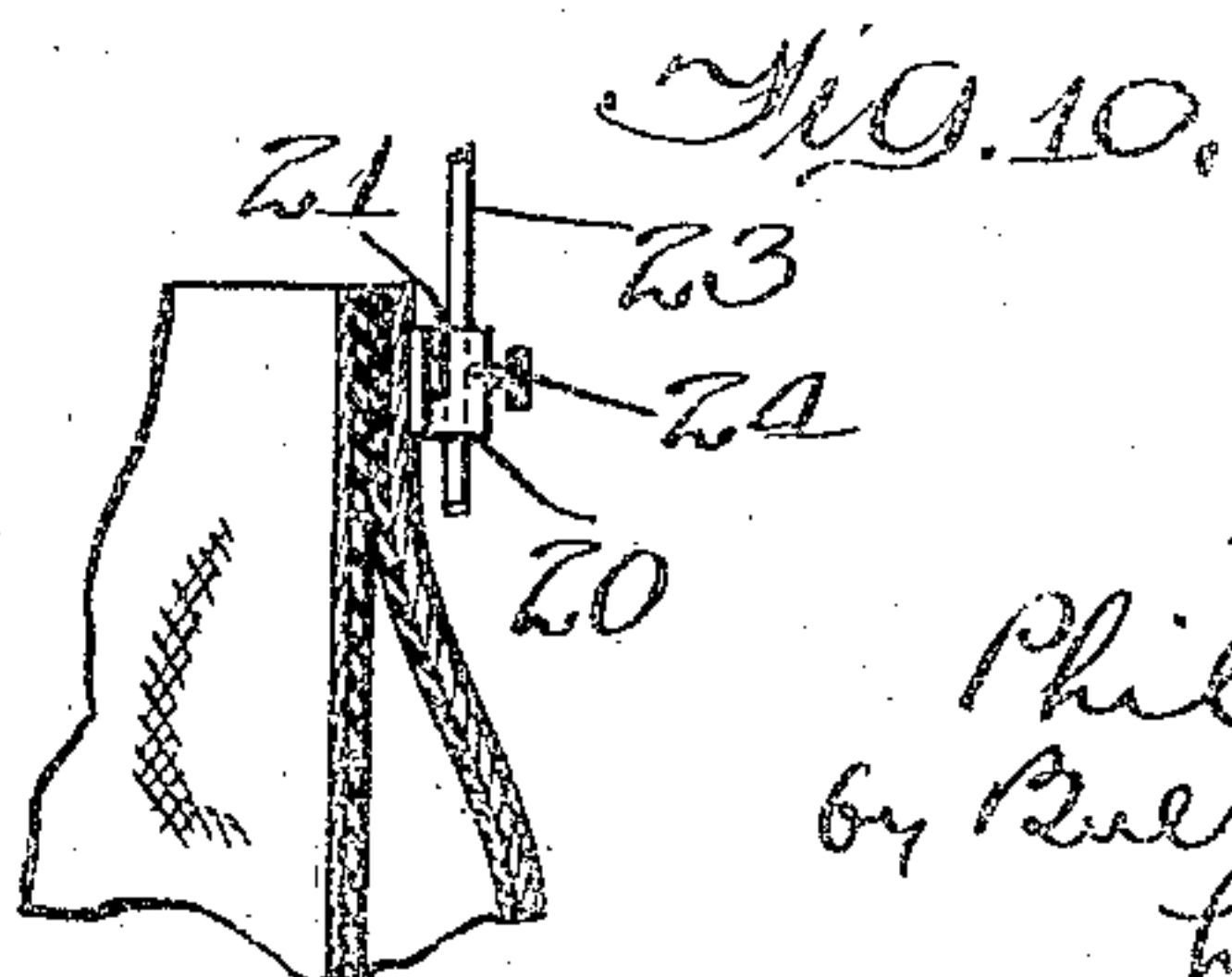
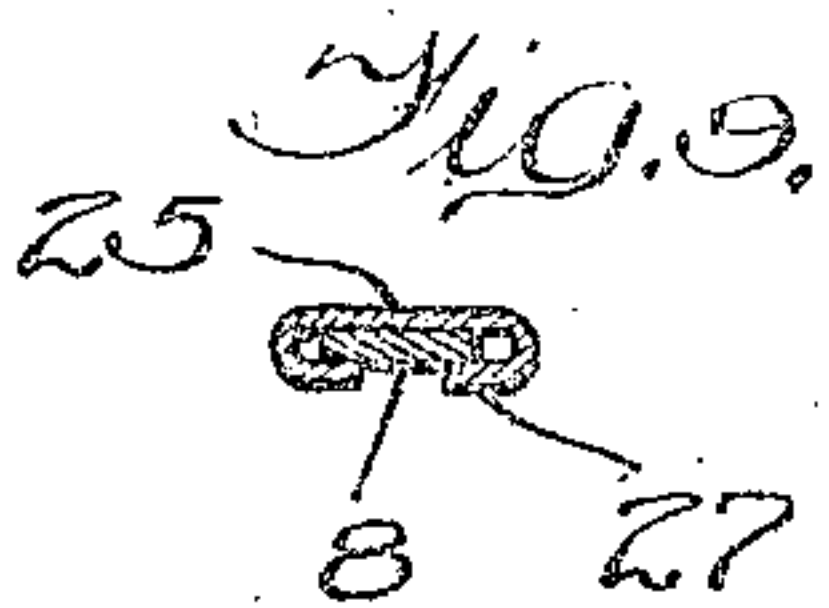
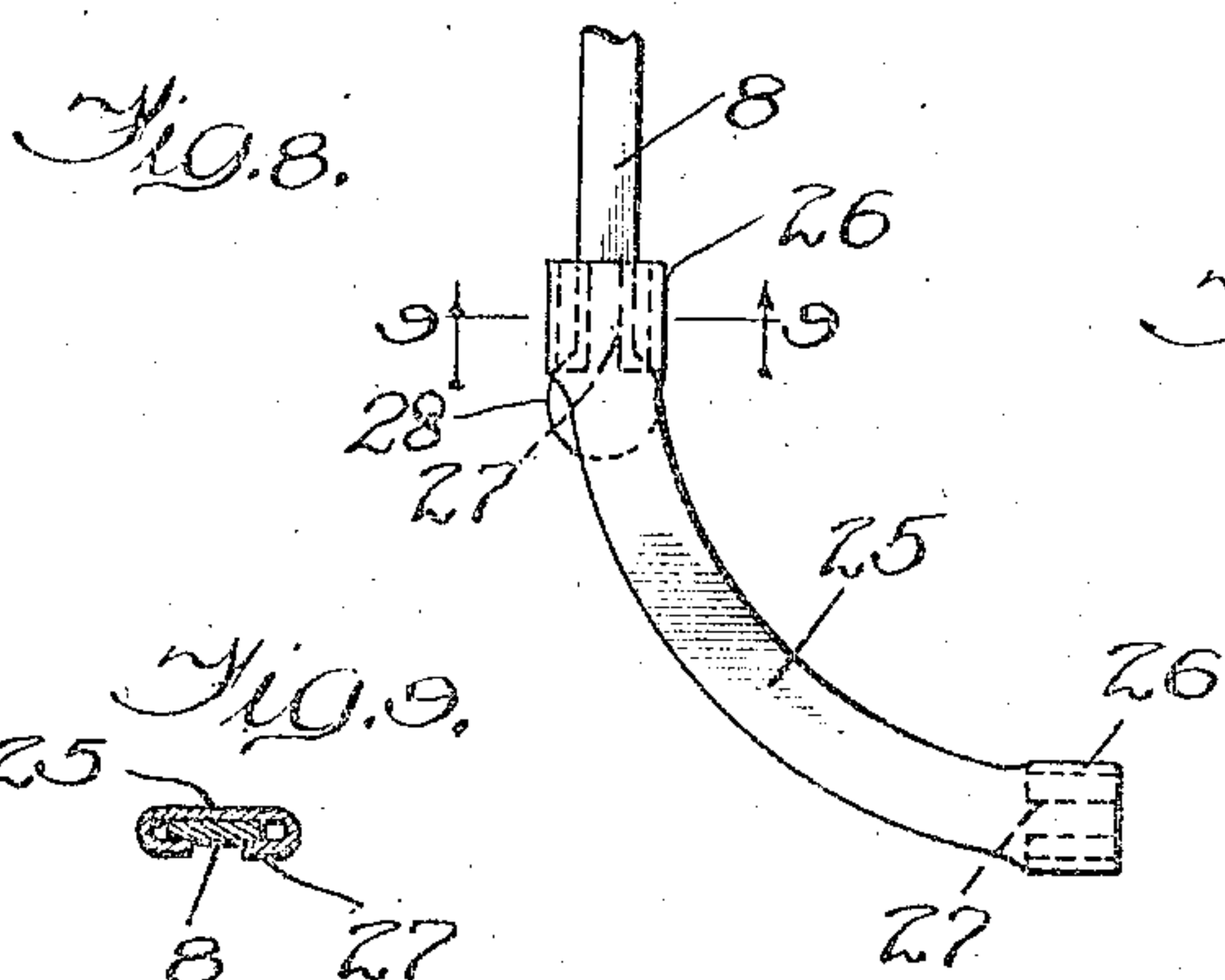
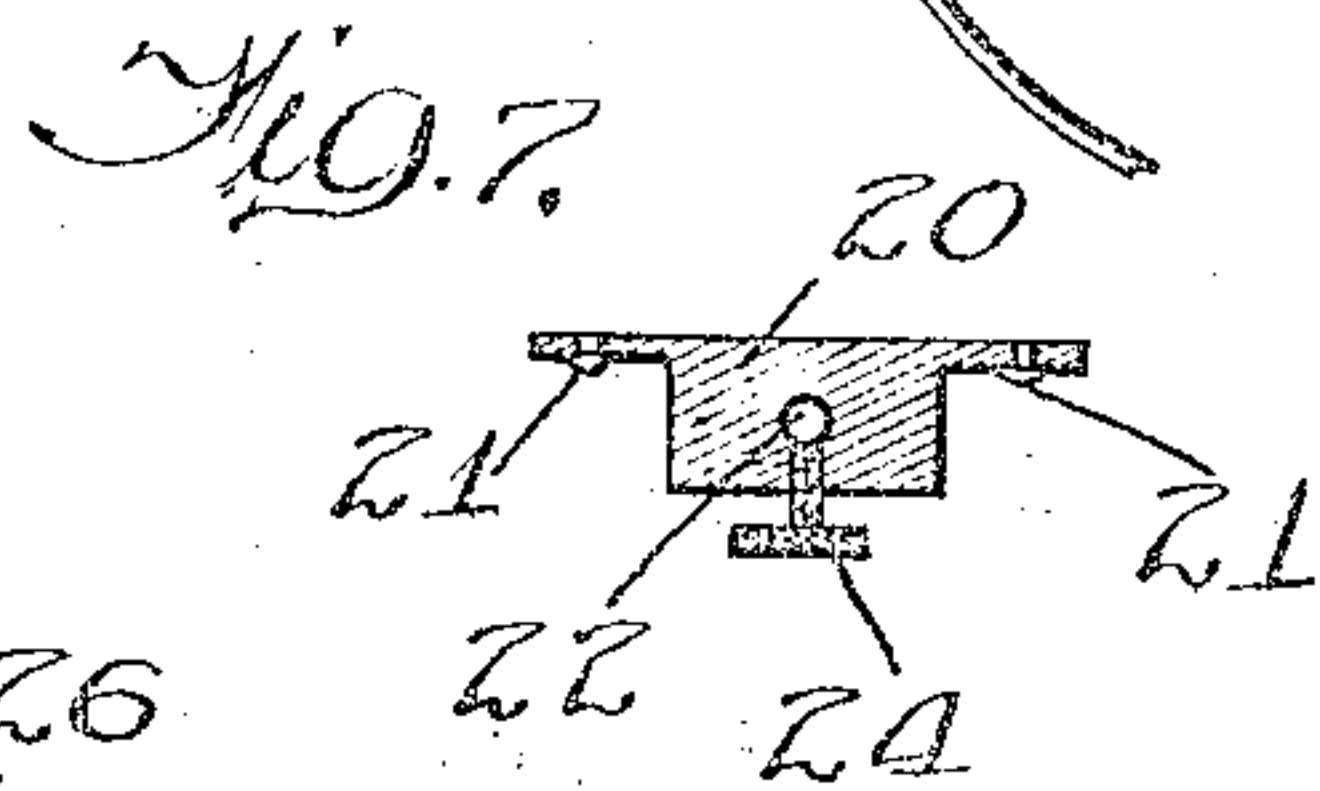
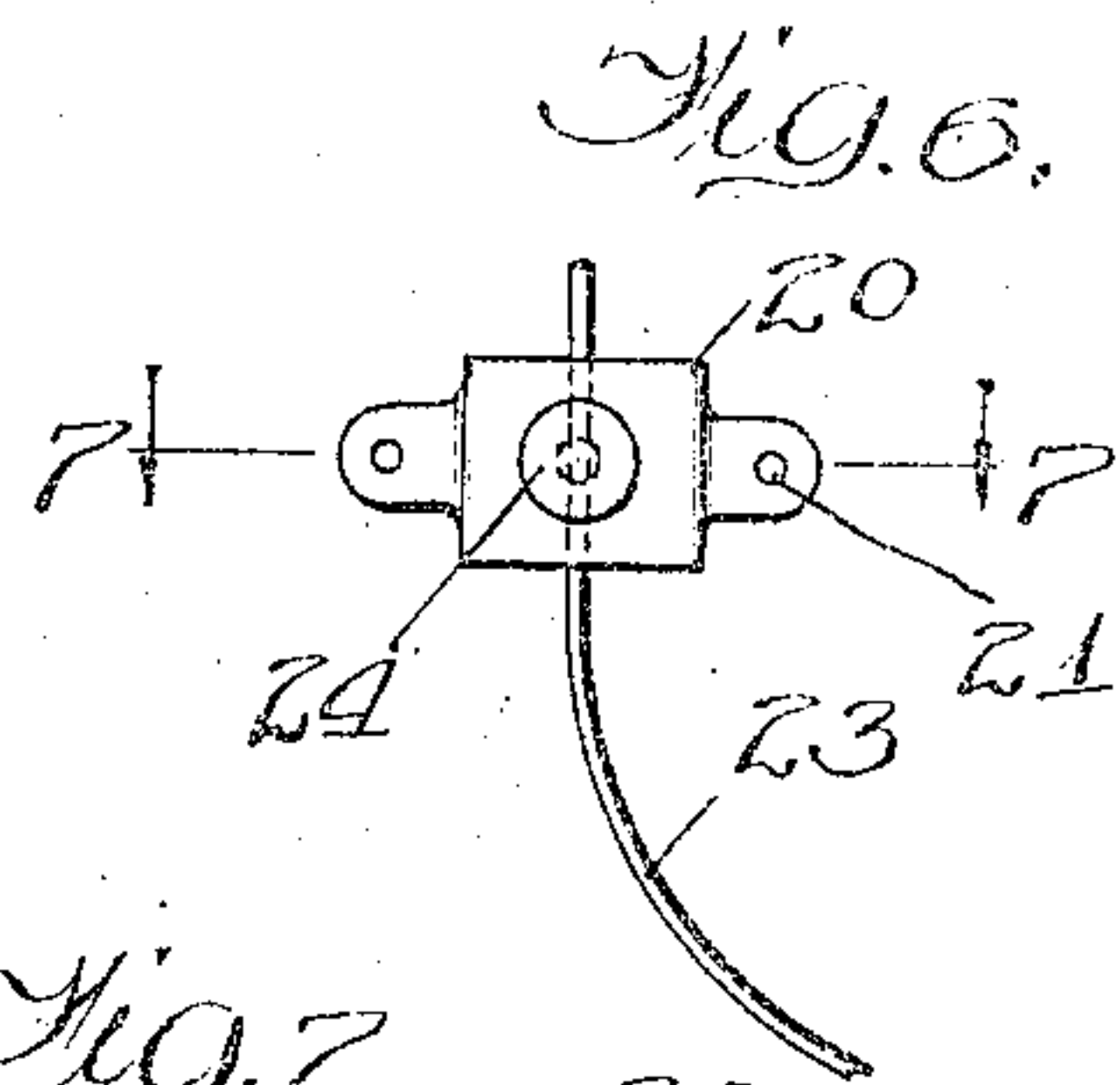
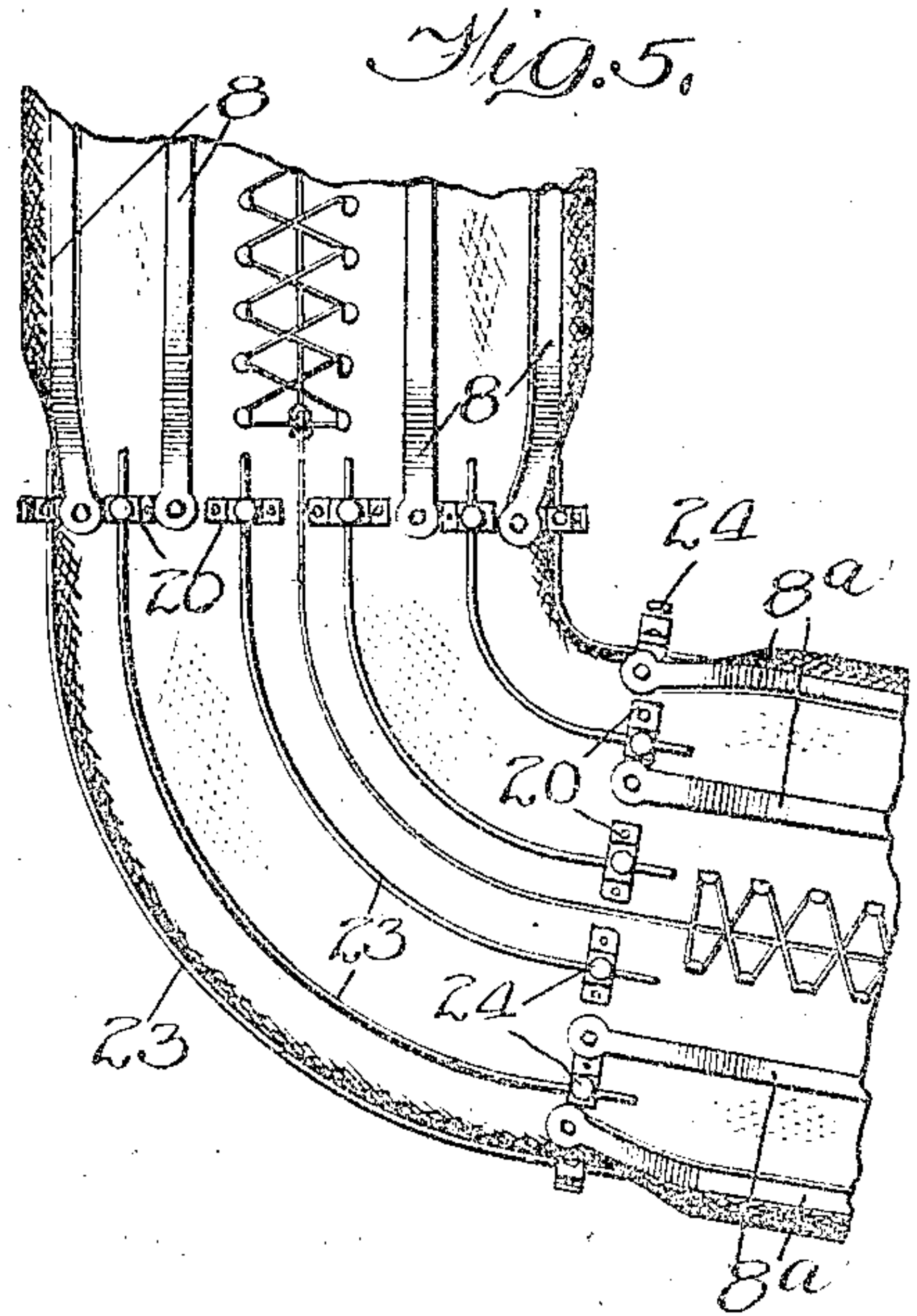
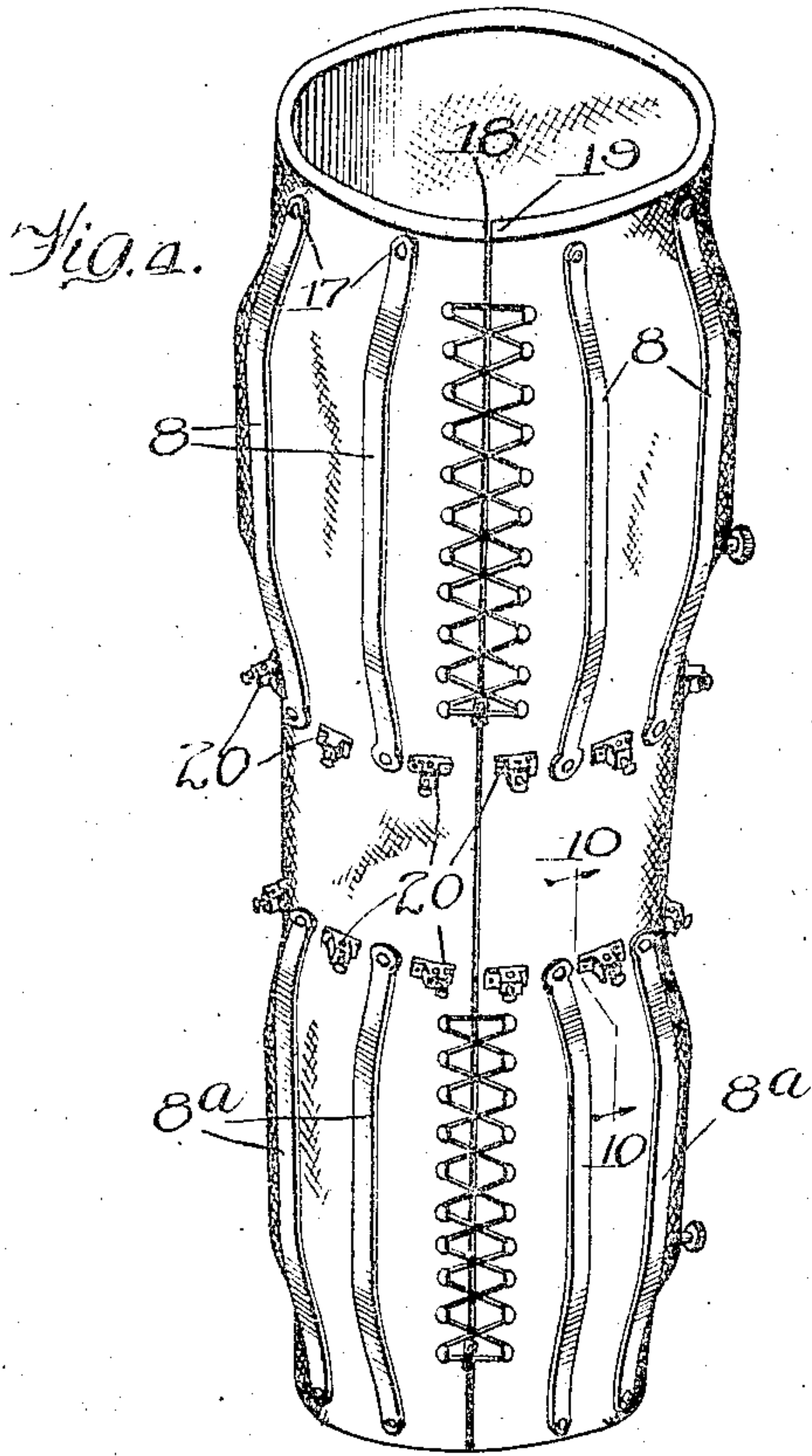
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2 SHEETS—SHEET 2.



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# UNITED STATES PATENT OFFICE.

PHIL MITCHELL, OF ROCK ISLAND, ILLINOIS.

## INFLATABLE BANDAGE.

No. 891,181.

Specification of Letters Patent.

Patented June 16, 1908.

Application filed May 8, 1907. Serial No. 372,484.

*To all whom it may concern:*

Be it known that I, PHIL MITCHELL, a citizen of the United States of America, and resident of Rock Island, Rock Island county, Illinois, have invented a certain new and useful Improvement in Inflatable Bandages, of which the following is a specification.

My invention relates to improvements in surgical bandages, and more especially to those used to protect a limb after a fracture.

A further object is to provide an appliance by means of which a constant pressure may be exerted on all parts of the limb and at the same time prevent any displacement thereof.

A further object is the production of an inflatable bandage that can be readily laced or fastened in place, and one that can be as readily removed at times when it is desired to inspect the limb.

A further object is the production of a device which can be cheaply constructed, and yet one that will efficiently serve the purpose for which it is desired.

These and such other objects as may hereinafter appear are attained by my device, embodiments of which are illustrated in the accompanying drawings, in which—

Figure 1 represents a plan view showing a double bandage applied to a compound fracture of the arm. Fig. 2 is a cross section on the line 2—2 of Fig. 1, looking in the direction indicated by the arrows. Fig. 3 is a sectional view on the line 3—3 of Fig. 2, looking in the direction indicated by the arrows. Fig. 4 is a perspective view of another form of my device inflated and laced apart from a limb. Fig. 5 shows a portion of the device illustrated in Fig. 4, arranged in position on a limb. Fig. 6 shows a plan view of a form of clamp. Fig. 7 is a vertical sectional view of Fig. 6. Fig. 8 shows a modified form of supporting rods secured in place. Fig. 9 is a vertical sectional view on the line 9—9 of Fig. 8, looking in the direction indicated by the arrows. Fig. 10 is a vertical sectional view on the line 10—10 of Fig. 4, looking in the direction indicated by the arrows.

Like letters of reference indicate like parts in the several figures of the drawing.

Referring by numerals to the accompanying drawings, 4—4<sup>a</sup> represent the two sections of an inflatable bandage comprising outer folds; 5 represents the outer folds; 6 represents the inner folds, of flexible air tight material. These folds are firmly secured at their ends to reinforcing strips 7—7. Ex-

tending lengthwise of the sections are stiffening splints or strips 8—8<sup>a</sup> preferably of whalebone or some flexible material secured to the reinforcing strips 7—7. The bandages terminate in reduced end portions 9—9, adapted to fit closely one over the other when the bandage is placed about the limb 9<sup>a</sup>. Suitable fastening means, such as hooks, 10 are secured to the opposite ends of said bandage, and an ordinary lacing string 11 is used to secure the ends of the bandage together. It will be noted that there is a space 12 between the inner and outer folds, access to which space is had through an ordinary tube or valve 13.

In the device as shown in Fig. 1 the portions 4—4<sup>a</sup> are connected together by means of a connecting strip 14, this form of bandage being designed to accommodate a compound fracture occurring above and below the elbow or knee. In the event of a simple fracture, or a compound fracture of any one bone, only one section of the bandage is used. When the bandage is securely laced in place and air forced through the valve 13, the entire space between the folds is inflated. At the point of connection of the ends of the bandage pockets 15—16 oppositely disposed, but separated by the folds of the bandage, are also inflated, thus forming a continuous pneumatic cushion around the entire member.

In Figs. 4, *et seq.*, I have shown a bandage in which the reinforcing strips 7 are dispensed with, and the stiffening strips 8—8<sup>a</sup> are secured directly to the outer fold of the bandage, as shown at 17. It is not intended to make the portion between the strips 8—8<sup>a</sup> inflatable. The ends 18—19 of the bandage are laced closely together, so as to make practically a continuous air cushion about the limb, the same as accomplished by the form shown in Fig. 2. Secured to the bandage between the lower ends of the strips 8 and the upper ends of the strips 8<sup>a</sup> are a series of supports 20, best shown in Figs. 6 and 7. These supports or clamps are secured to the bandage in any ordinary manner, as by sewing or by rivets 21. These clamps are provided with sockets 22 of any desired shape to accommodate the reception of the ends of the supporting rods 23, and also provided with clamping screws 24. A series of clamping rods 24<sup>a</sup>, of any desired shape, are adapted to be secured in said supports, as shown in Fig. 5. I have shown, in Figs. 8 and 9, a



form of supporting rod 25 with flattened ends 26, having inwardly turned flanges 27. In the use of this form, I make the ends of the strips 8—8<sup>a</sup> slightly enlarged, so that the ends of the rods 28 may be held in place, thus doing away with the supports 20.

In the ordinary cases of broken arms, a certain angle of repose is generally recommended and the curvature, length and shape of the rods may be designed to conform to this angle, while in other and extraordinary cases different rods or degrees of curvature, or of no curvature at all, may be required. In cases of an ordinary practitioner, a few shapes would be needed, while a busy surgeon would require quite an assortment.

In the ordinary treatment of fractures of the limbs, it has been the custom to either bandage the limb tightly and inclose it in stiff splints, or to embed the member in a plaster cast. In the event that splints are used it is quite a difficult matter to remove the bandage in order to inspect the limb, while in the case of the plaster cast it can only be removed by breaking. After fracture and the replacement of the bones in place, the limb is considerably swollen and inflamed. This being the case, after the bandage or plaster cast is in place, great discomfort and pain results from the pressure exerted by the bandage or cast, especially as it is necessary to have the bandage tightly wound about the limb so that when the inflammation is reduced the limb may be tightly confined within the bandage. In nearly all cases, and especially where joints are involved, there is considerable inequality between the different parts of the limb, and as the fracture heals and the inflamed and swollen parts resume their normal size, cavities are apt to occur between the bandages or casts and the limb with a consequent danger of chafing. After the bandage is first put on, the patient is apt to suffer great pain for a considerable time, owing to the tightness of the bandage, and no relief can be afforded in this event. Later, after the inflammation has subsided and the swelling gone down, the bandage or cast fails to perform the function for which it was intended, in that it does not snugly confine the limb. By the use of my improved device, however, the pressure by which the bandage is held against the limb may be varied to suit the exigencies of the case. In operation, say for instance a fracture of the arm below the elbow as shown in Fig. 1, the bandage 4<sup>a</sup> is placed about the arm and laced snugly in place, the reinforcing strips 7 being forced snugly against the arm. Air is then introduced into the cavity 12 through the valve 13, either by the ordinary method of inflating a foot ball by blowing it up, or by use of a bicycle pump, or like apparatus. The air may be introduced in such quantity as de-

sired in order to attain any desired pressure against the limb. The inner folds 6 will conform to the inequalities of the limb and press tightly against all parts thereof with an equal pressure. In the first stages of the healing process, when the patient suffers considerable pain, the air pressure may be reduced at times in order to in a sense relieve the sufferer, while at the same time the pressure can be maintained at as great a degree as desired. By the use of the stiffening strips 8—8<sup>a</sup> any desired longitudinal rigidity of the bandage may be attained without sacrificing any of the flexibility thereof. However, it may be practical to do away with the stiffening and reinforcing strips and make the outer fold of the bandage of sufficient rigidity to serve the same purpose.

While the device is especially applicable in the case of fractures of the limbs, it may be easily adapted to fractures of the ribs or other parts of the body, and many modifications of details of arrangement and construction may be used without in any sense departing from the spirit of my invention.

I claim:

1. A surgical appliance comprising an inflatable bandage, stiffening means secured to the outer surface thereof means adapted to secure said bandage in place about a member, the ends of said bandage meeting whereby the member is entirely surrounded by the inflatable portion of said bandage, and means for inflating said bandage.

2. A surgical appliance comprising an inflatable bandage, reinforcing strips secured to the sides thereof, means for securing said bandage in place, and means for inflating said bandage.

3. A surgical appliance comprising an inflatable bandage, reinforcing strips secured to the sides thereof, stiffening strips extending transversely of said bandage, means for securing said bandage in place, and means for inflating said bandage.

4. A surgical appliance comprising an inflatable bandage, reinforcing strips secured to the sides thereof, stiffening strips extending transversely thereof and secured to said reinforcing strips, means for securing said bandage in place, and means for inflating said bandage.

5. An inflatable bandage comprising a plurality of thicknesses of air tight flexible material, reinforcing strips securing said material together, stiffening strips adapted to hold said material in any desired shape, means for securing said material in place on the body, and means for admitting air between the separate thickness or folds thereof.

6. An inflatable bandage comprising a plurality of folds, of air tight flexible material, reinforcing strips of like material firmly securing the edges of said material together, a series of flexible stiffening strips connecting



opposite reinforcing strips, fastening means for securing said bandage in place about a member, and means for inflating said member.

5 7. An inflatable bandage comprising a plurality of folds, of air tight flexible material, reinforcing strips of like material firmly securing the edges of said material together, a series of flexible stiffening strips connecting  
10 opposite reinforcing strips, fastening means for securing said bandage in place about a member, and means for inflating said member, said bandage being so arranged that every portion of the circumference of the  
15 member is protected by a pneumatic cushion.

8. An inflatable bandage comprising a plurality of folds, of air tight flexible material, reinforcing strips of like material firmly securing the edges of said material together, a  
20 series of flexible stiffening strips connecting opposite reinforcing strips, a series of lacing for securing said bandage in place about a member, and means for inflating said member, said bandage being so arranged that  
25 every portion of the circumference of the member is protected by a pneumatic cushion.

9. A surgical appliance comprising the combination of a bandage adapted to surround a member and inflatable throughout  
30 its entire length, with stiffening means secured to the outer surface thereof.

10. A surgical appliance comprising the combination of an inflatable bandage with stiffening means secured to the outer surface  
35 thereof, and extending lengthwise thereof, whereby the inflatable member is positioned between that portion of the body under treatment and the stiffening means.

11. A surgical appliance comprising the combination of an inflatable bandage with stiffening means secured to the outer surface  
40 thereof, and extending lengthwise thereof, whereby the inflatable member is positioned between that portion of the body under treatment and the stiffening means, together  
45 with means for inflating said bandage.

12. A surgical appliance comprising a bandage, means for inflating portions thereof, means for securing said bandage in position, and means whereby said portions may  
50 be retained in any desired angular relation to each other.

13. A surgical appliance comprising a

bandage, means for inflating portions thereof, means for securing said bandage in position, and means whereby said portions may  
55 be retained in any desired angular relation to each other, said means comprising supporting rods connecting the adjacent ends of said portions. 60

14. A surgical appliance comprising a bandage, means for inflating portions thereof, means for securing said bandage in position, and means whereby said portions may  
65 be retained in any desired angular relation to each other, said means comprising adjustable supporting rods connecting the adjacent ends of said portions.

15. A surgical appliance comprising a bandage, means for inflating portions thereof, means for securing said bandage in position, and means whereby said portions may  
70 be retained in any desired angular relation to each other, said means comprising adjustable curved supporting rods connecting the adjacent ends of said portions. 75

16. A surgical appliance comprising a bandage, means for inflating portions thereof, means for securing said bandage in position, means whereby said portions may be  
80 retained in any desired angular relation to each other, said means comprising a series of oppositely disposed pairs of clamping members secured to adjacent ends of said portions, and a series of rods engaging said  
85 opposite clamping members.

17. A surgical appliance comprising a bandage, portions of which are adapted to be inflated, means for inflating said portions, stiffening strips secured to said bandage, a  
90 series of supports secured to the adjoining ends of said stiffening strips, and means for securing said bandage in place.

18. A surgical appliance comprising a bandage, portions of which are adapted to be  
95 inflated, means for inflating said portions, stiffening strips secured to said bandage, a series of curved supports secured to the adjoining ends of said stiffening strips, and means for securing said bandage in place. 100

Signed by me at Rock Island, Ill., this 18th day of April, 1907.

PHIL MITCHELL.

Witnesses:

C. W. BLOMBERG,

C. F. CHARMONY.