

J. B. ROGERS.
TRACHEAL CANNULA OR TUBE.
APPLICATION FILED JUNE 17, 1907.

953,922.

Patented Apr. 5, 1910.

Fig. 1.

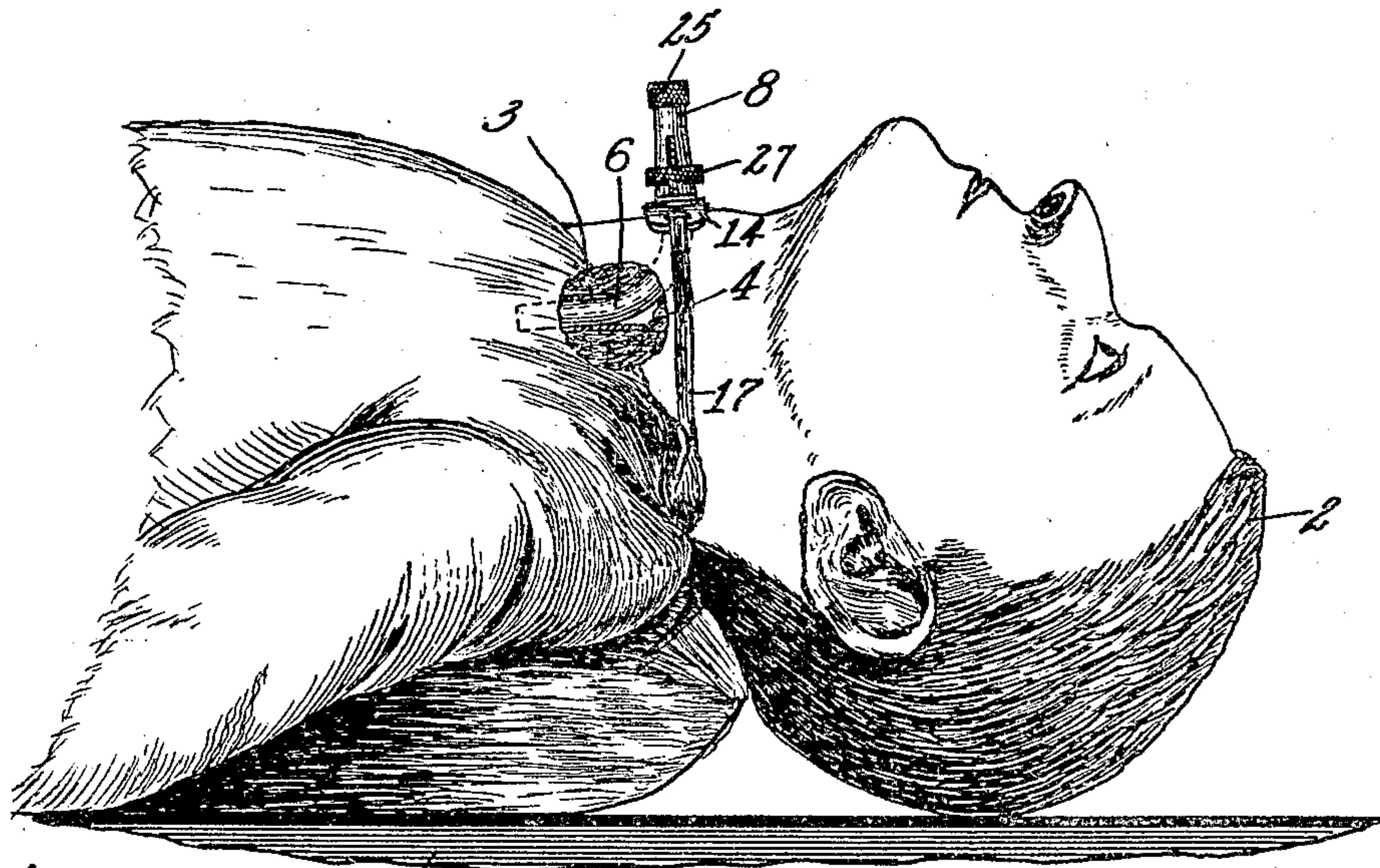


Fig. 4.

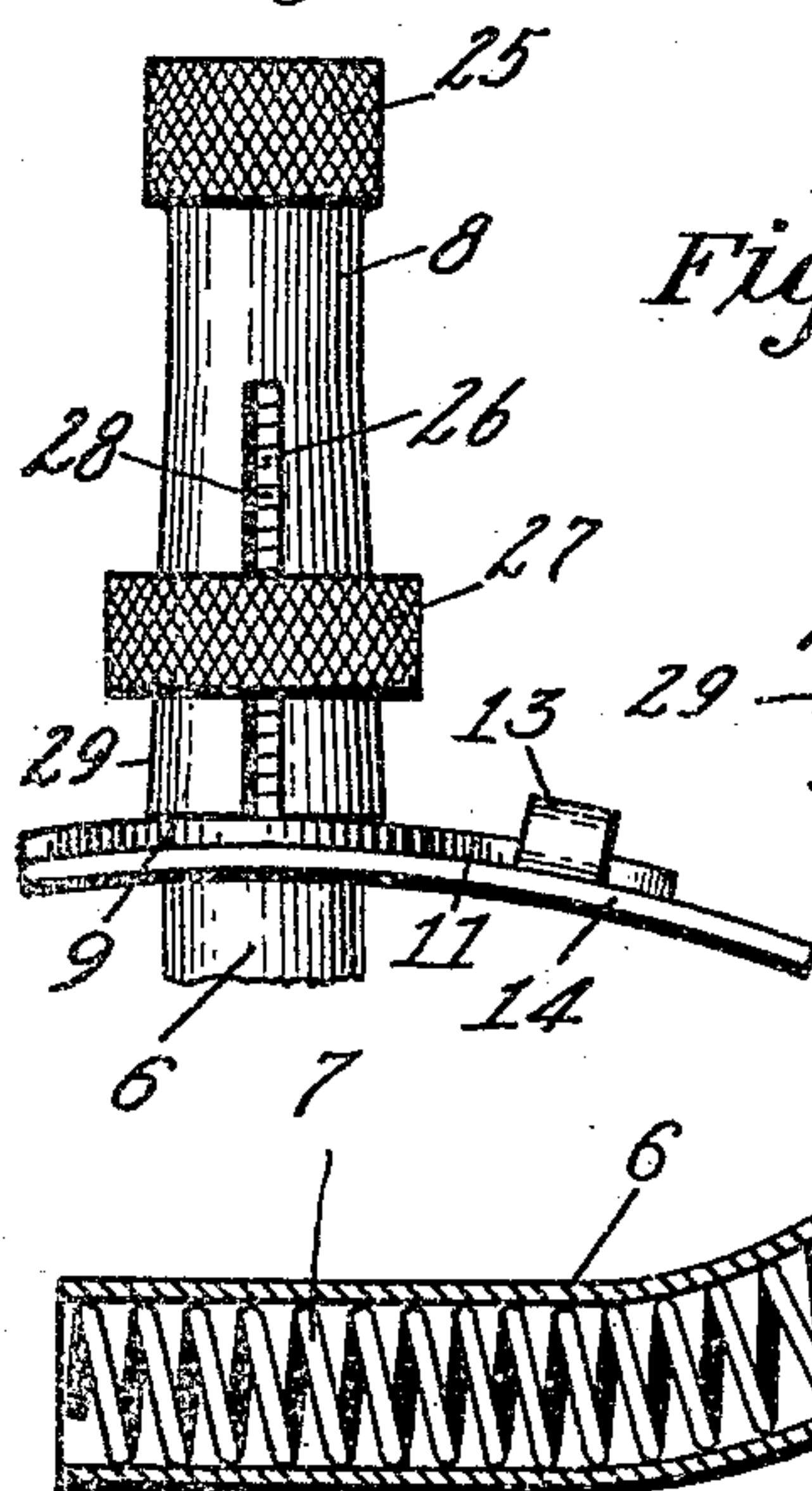


Fig. 2.

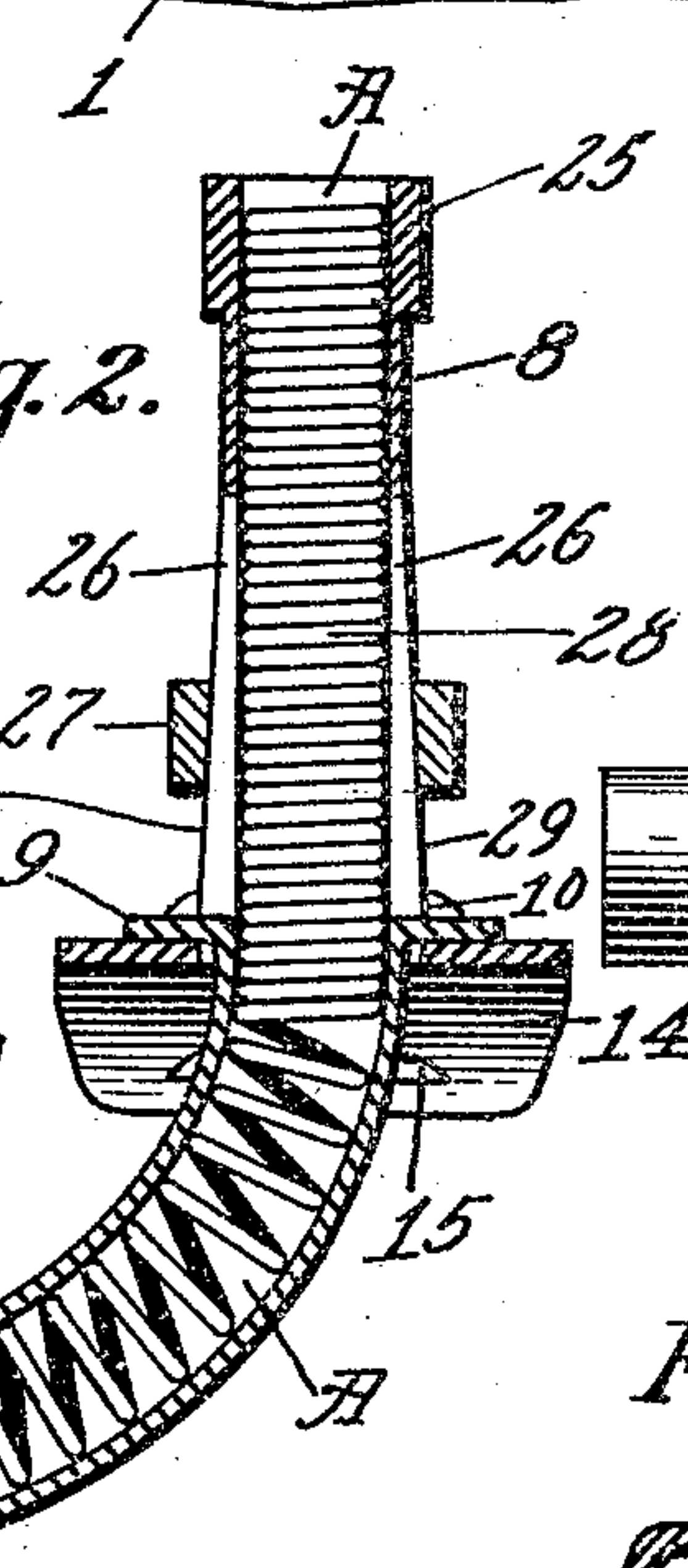


Fig. 3.

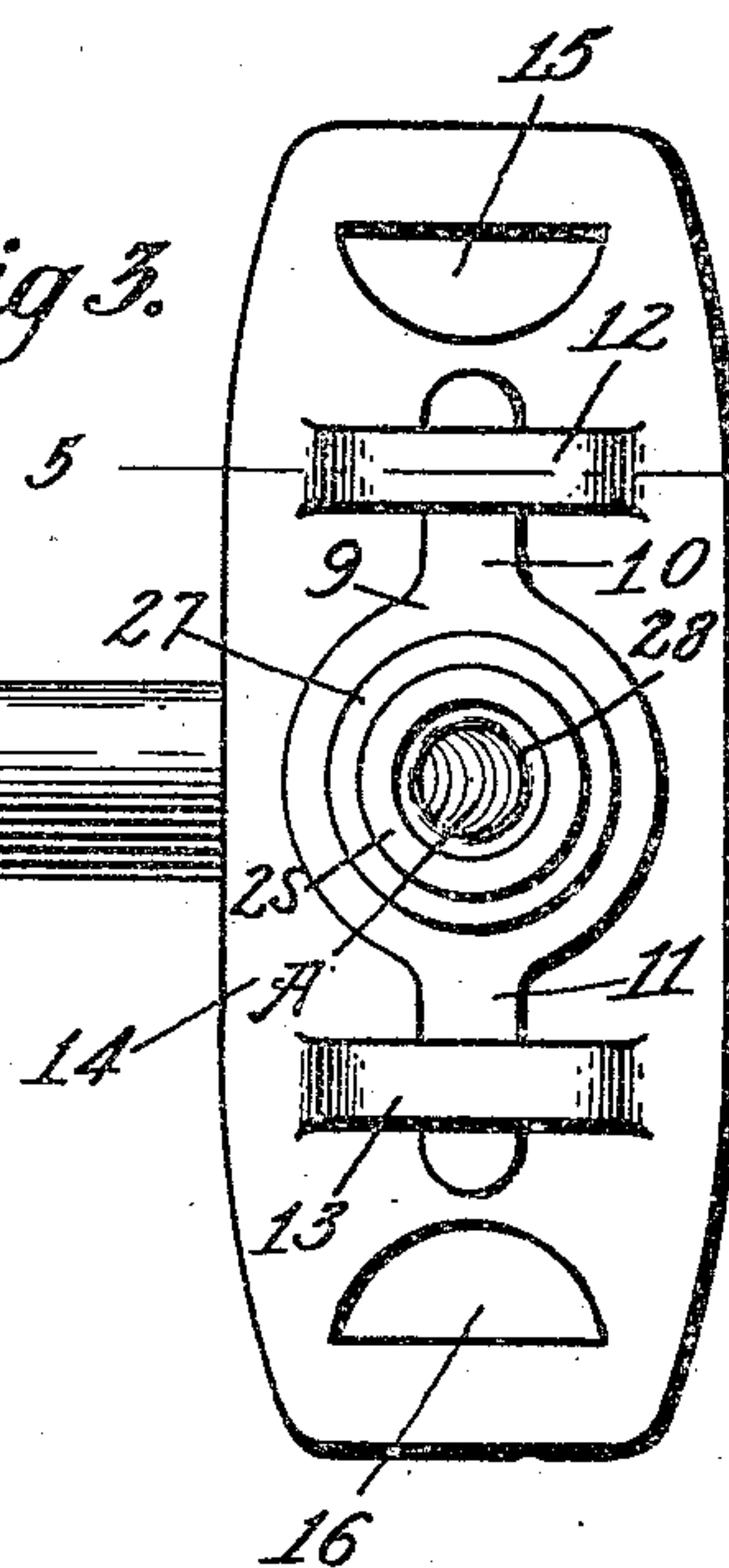
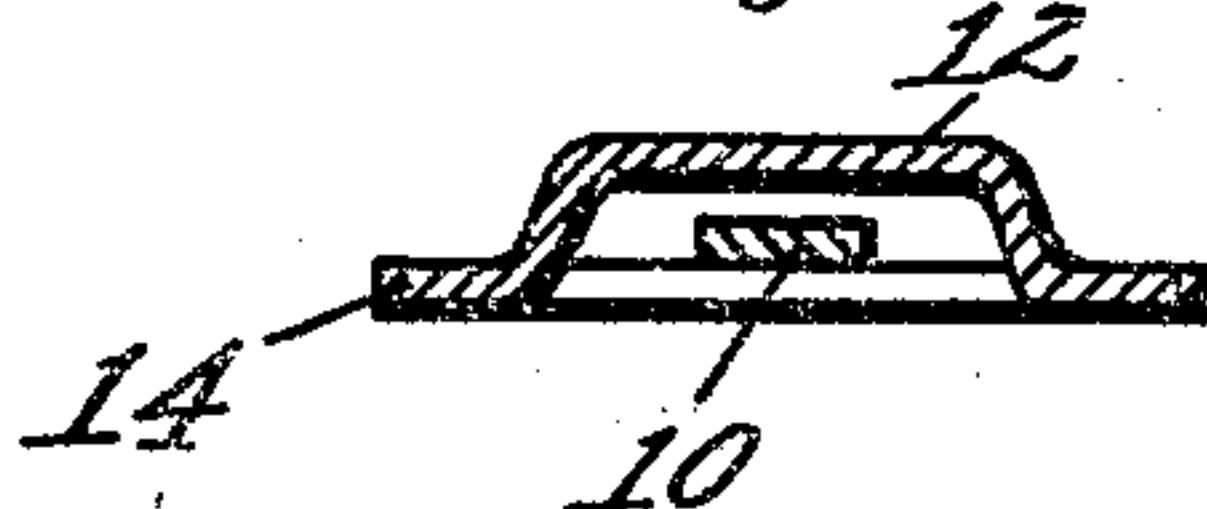


Fig. 5.



Witnesses:

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UNITED STATES PATENT OFFICE.

JOHN B. ROGERS, OF YORK, MAINE.

TRACHEAL CANNULA OR TUBE.

953,922.

Specification of Letters Patent.

Patented Apr. 5, 1910.

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To all whom it may concern:

Be it known that I, JOHN B. ROGERS, a citizen of the United States, residing at York, county of York, and State of Maine, have invented certain new and useful Improvements in Tracheal Cannulas or Tubes, of which the following is a specification.

My invention relates to that part of surgical practice, known as tracheotomy, which signifies an opening made from without into the trachea, more commonly known as the wind-pipe. By this procedure the lives of many persons have been saved, in extreme cases of diphtheria, membranous croup, and like diseases in which suffocative symptoms persist, and are urgent or frequently recur, as the result of the pressure of foreign matter in the air passage which cannot be speedily and readily removed through the mouth. When the imminence of suffocation is such as to demand haste in opening the trachea, it is obvious to those learned in the profession that the instrument which experience has shown to be indispensable is a suitable cannula or tube inserted therein for the purpose of giving the patient relief, and is also extremely desirable in after treatment to prevent premature closure of the new respiratory orifice. The tube which is most generally used, is a double curved one, approximately a quadrant of a circle. This construction, however, is open to objection on account of the inner tube being difficult to clean, very annoying to the patient while being removed or inserted into the outer tube, due to the extreme rigidity of the same. A further annoyance, owing to the smooth inner surface of the tubes which permits the foreign matter to work back and forth during respiration, causing a disagreeable, rattling sound. This foreign matter often accumulates at the lower extremity of the cannula or tube, and before it can be removed or thrown off, the patient expires. It is to obviate these conditions that the embodiment of my invention lies.

The object of my invention is to provide a cannula or tube in which is inserted a flexible member or helical spring, whose function is to retain foreign matter thereon, and prevent the same from dropping back into the trachea. This is for the purpose of removing the said foreign matter from the cannula or tube which would stop or retard respiration. The spring member also in-

creases the efficiency of the cannula or tube, by reason of the fact that the air can circulate more freely around the spring and through the air passage and is less liable to retard respiration in contradistinction from the old method of using a secondary tube.

A further object of my invention is to provide an inner flexible member or spring which is adjustable relative to the length of the cannula or tube, and in extreme cases when large amounts of foreign matter collect below the tube, the said spring can be lowered into the trachea, and by rotating the said spring, the said foreign matter will follow the convolutions of the spring in an upward direction until such a period in the operation is reached that the spring can be removed, carrying with it the above mentioned matter.

In the accompanying drawings, which represent one embodiment of my invention: Figure 1 illustrates my tracheal cannula or tube, located in the trachea of the patient. Fig. 2 shows a vertical section through the cannula or tube, with the spring member in full. Fig. 3 is a plan of the same. Fig. 4 is a fragmentary view illustrating the clamping device. Fig. 5 is a section on line 5, Fig. 3.

Referring to the drawings, and in detail, 1 represents an operating table, 2 a patient having been placed in position, and an operation having taken place.

4 is the trachea or wind-pipe in which there is an orifice 3. Located in the trachea 4, is a cannula or tube 6, provided with a respiratory air passage A, the operation of which will be described hereinafter. Located in the cannula or tube 6 is a helical spring 7, which extends upwardly and is secured to an operating handle 8. The upper extremity of the cannula or tube 6 is formed into a flange 9. Integral with the flange 9 are outwardly extending projections 10 and 11. These projections, 10 and 11, cooperate with loops 12 and 13, which are integral with the shield 14. Punched in the shield 14 are holes 15 and 16, which permit the cord 17 to be tied to the said shield. By this construction, the cannula or tube 6 is securely fastened to the patient's neck. The loops 12 and 13 are punched to a raised position, as illustrated in Fig. 5, with sufficient room to allow the projections 12 and 13 a free movement, thereby permitting the can-

nula or tube 6 to adjust itself to the trachea 4, and still be securely retained to the shield 14.

The operating handle 8 is provided with a knurled gripping knob 25. This is for the purpose of rotating or removing the spring 7 in or from the cannula or tube 6. Cut in the operating handle 8, are longitudinal slots 26, adapted to make it radially flexible. Concentric with the operating handle 8 is a clamping collar 27. The close wound portion 28 of the spring 7 is placed in the operating handle 8, and the clamping collar 27 is manually forced against the tapered portion 29 of the operating handle 8. This operation causes the slotted portion to be forced inwardly against the spring 7, thereby securely clamping them together. This construction is for the purpose of adjusting the spring 7 to any reasonable desired length relative to the cannula or tube 6, as the circumstances may dictate.

Having thus described my invention in detail, we will now consider the operation thereof.

The patient 2 is properly placed in position on a suitable operating table 1. The patient being in position, the operator causes the skin to be made somewhat taut, and with a suitable instrument an incision is made therein. As the dissection deepens, the underlying tissues are separated, thereby exposing the trachea or wind-pipe 4. At this stage of the operation, providing every precaution has been taken, an incision is made in the trachea or wind-pipe 4, in which is inserted the tracheal cannula or tube 6, which in turn is securely fastened to the patient's neck by means of the cord 17. The shield 14 being held rigidly in position by the cord 17, and the cannula or tube 6 retained in position by means of the loop connections, permits the cannula or tube 6 to adjust itself to the trachea without discomfort to the patient. The embodiment of my invention lies in the fact that the inner member 7 is constructed of a flexible material of a spring construction whereby it will adjust itself to the curved contour of the outer cannula or tube 6, without previous calculation as to manufacture. The tendency of the spring 7, located in the cannula or tube 6, is to assume a position in a straight line, thereby causing sufficient friction to retain it in position and also to eliminate rattling or noises between the said members 6 and 7. The operating handle 8, to which the spring 7 is secured, limits the downward movement of the said spring 7 while being inserted into the cannula or tube 6. The construction of the spring 7 permits the foreign matter to lodge between its convolutions, thereby preventing the said foreign matter from dropping back into the trachea or wind-pipe 4.

It is obvious that after foreign matter has accumulated between the convolutions of the spring 7, sufficient to retard respiration, the spring 7 can be removed, cleaned and returned to the cannula or tube 6 with ease, rapidity and no discomfort to the patient. Should the accumulation of foreign matter in the trachea be sufficient in volume to clog the lower extremity of the cannula or tube 6, instant relief can be obtained by lengthening the spring 7, and turning it in the direction which would cause the foreign matter to follow the convolutions of the spring upwardly to a position inside the cannula or tube 6, at which time the spring 7 can be removed carrying with it the above mentioned foreign matter. To adjust the spring 7, move the collar 27 upwardly until it is loose on the operating handle 8. Locate the spring 7 to any desired position, then force the collar 27 downwardly onto the tapered slotted portion of the said operating handle 8. By this operation, the spring 7 is rigidly secured to the operating handle 8.

In accordance with the provisions of the patent statutes, I have described the principle of operation of my invention, together with the apparatus which I now consider to be the best embodiment thereof; but I desire to have it understood that the apparatus shown is only illustrative, and that the invention can be carried out by other means.

What I claim as new, and desire to secure by Letters Patent of the United States, is:

1. In a tracheal cannula or tube, the combination of a tube, a helical spring inserted therein, a handle for the purpose of locking and operating said spring, and means for securely adjusting said handle relative to said spring for the purpose herein described.

2. In a tracheal cannula or tube, the combination of a tube, a helical spring inserted therein, an operating and adjusting handle, said handle having longitudinal slots therein, adapted to provide a certain flexibility, and means for forcing the slotted member against the spring, for the purpose herein described.

3. In a tracheal cannula or tube, the combination of a tube, a helical spring, an operating and adjusting handle, said handle being tapered and having longitudinal slots cut therein, a clamping collar cooperating with said taper, thereby locking the handle to said spring for the purpose herein described.

4. In a tracheal cannula or tube, the combination of a tube, a flange provided with outwardly extended projections integral therewith, a shield loosely connected thereto, a helical spring inserted in said tube, an operating and adjusting handle provided with a taper and slots, and a clamping collar for locking said handle to said spring.

5. In a tracheal cannula or tube, the combination of a tube, a helical spring inserted therein, a handle located on said spring, a shoulder on said handle, cooperating with
5 said tube, for the purpose of limiting the downward movement of said spring.

In testimony whereof I have hereunto

signed my name this 25th day of May, 1907,
in the presence of two witnesses.

JOHN B. ROGERS.

Witnesses:

C. H. WENTWORTH,
WM. A. H. GOODWIN.