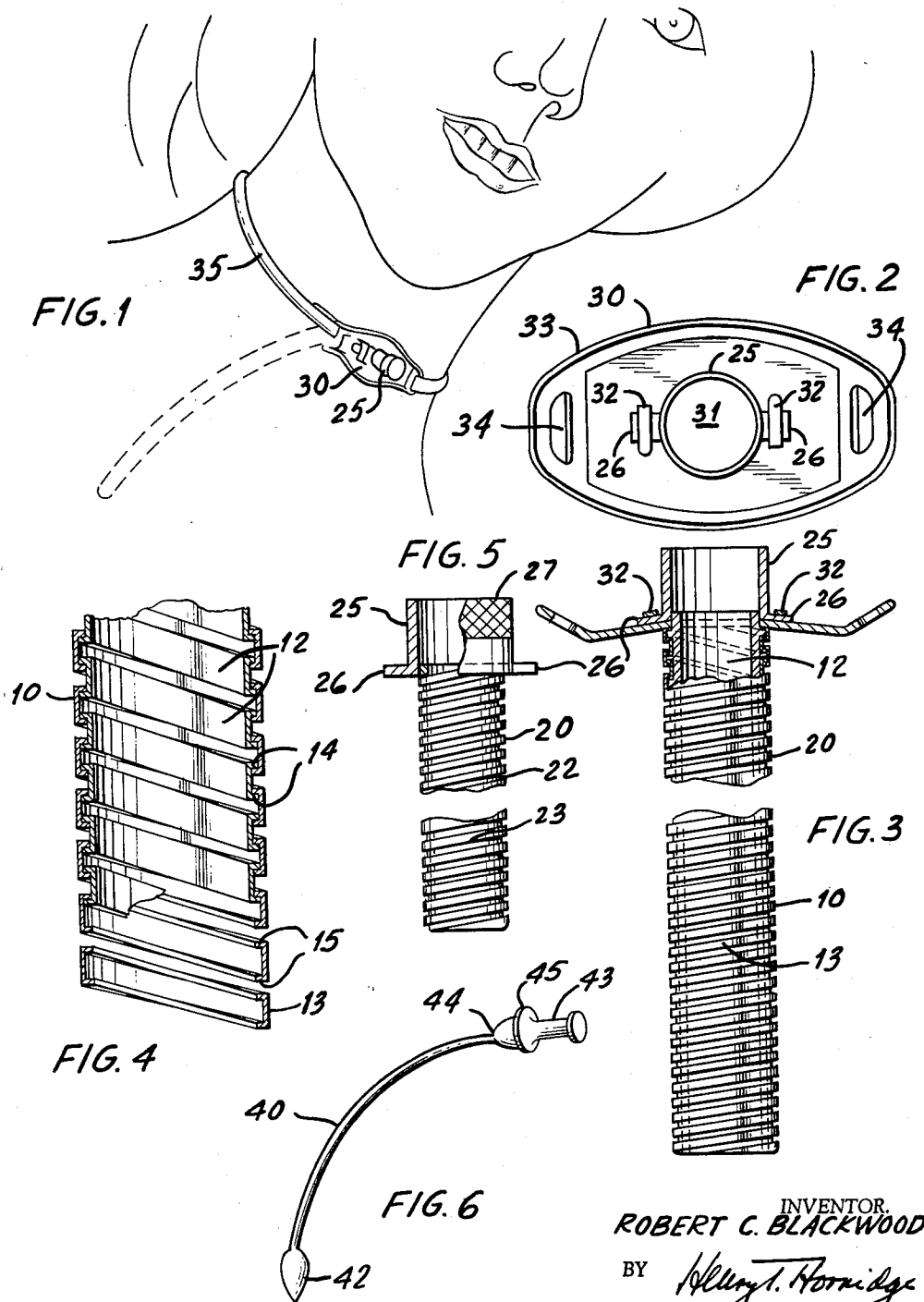


Feb. 2, 1960

R. C. BLACKWOOD
TRACHEOSTOMY TUBE DEVICE

2,923,299

Filed Oct. 17, 1957



INVENTOR
ROBERT C. BLACKWOOD
BY *Henry T. Hornidge*
ATTORNEY

1

2

2,923,299

TRACHEOSTOMY TUBE DEVICE

Robert C. Blackwood, Larchmont, N.Y.

Application October 17, 1957, Serial No. 690,664

5 Claims. (Cl. 128—351)

This invention relates to a tracheostomy tube assembly or unit comprising a flexible, non-corrosive tracheostomy tube, a flexible, non-corrosive mucus collector tube arranged within the tracheostomy tube and removable therefrom, and an apertured plate secured to the tracheostomy tube and removably supporting the mucus collector tube.

Tracheostomy tubes are required in many surgical cases where breathing through the nose or mouth has become impossible.

Heretofore tracheostomy tubes have been made as a stiff type of pipe arrangement which has prevented the wearer from turning or raising his head in a normal manner. The wearer is required to hold his head in one position with respect to his shoulders, and turning his head required turning his shoulders and the top part of his body. Likewise, the wearer has found it almost impossible to raise his head from one position to another without flexing some other part of his body.

The construction of the tracheostomy and mucus collector tubes of this invention allows flexibility in all directions, enabling them to function with ease and comfort to the wearer in carrying out all the duties desired of them.

Actual experience with the tracheostomy tube assembly of this invention, including examination by fluoroscopy, has established that its use by the wearer permits him to make all the ordinary movements of the head with the same ease and comfort that would attend such movements without its use.

Customarily a tracheostomy tube is inserted in the trachea through an incision made in the neck and trachea. Many tracheostomies are of a permanent nature; others are temporary, but, in each case, both the inner and outer tubes are left in the incision at all times for breathing purposes as well as the collection of mucus. In the case of the temporary, tracheostomy, the tube can be removed after surgical repair has been made.

The inner tube is used as a collector trap for mucus expressed from the lungs, which might be only once or twice a day, or several times in an hour. When mucus is forced up by air pressure into the inner tube, the latter can easily be removed leaving the outer tube in place, washed out with water, and replaced into the outer tube.

In the drawings:

Fig. 1 is a perspective view of the tracheostomy tube plate in place on the neck of the wearer, and indicates the position of the tracheostomy tube within the trachea.

Fig. 2 is an enlarged upper plan view of the plate.

Fig. 3 is an enlarged broken elevation of the tracheostomy tube assembly, the upper portion of the tracheostomy tube being cut away to expose a sectional view of the tracheostomy tube taken along its vertical median plane, the outline only of the mucus collector tube within the tracheostomy tube, being indicated.

Fig. 4 is an enlarged elevation of part of the tracheostomy tube, with a cutaway portion exposing a view along its vertical median plane, showing its structure.

Fig. 5 is an enlarged broken elevation of the mucus collector tube and its tubular grip.

Fig. 6 is a perspective view of the obturator.

Referring more particularly to the drawings:

Tracheostomy tube 10 is constructed of a pair of edge flanged strips 12, 13, of a material that is non-corrosive, flexible, resilient and durable. The two strips 12, 13, are helically wound, one outside the other in overlapped arrangement with their edge flange 14, 15, in opposed relation, thus forming an inner strip 12 with out-turned flanges 14, and an outer strip 13 with in-turned flanges 15.

As seen in Fig. 4, wherein strips 12, 13, are shown in their expanded position, flanges 14, 15, are in engagement and thus prevent further separation of the turns or windings.

At the proximal and distal ends of tracheostomy tube 10, several turns or windings of strips 12 and 13 are soldered together to prevent unwinding of the turns or windings, and the distal end of tube 10 is squared and its edge rounded. Its proximal end is transversely cut on an oblique plane.

Mucus collector tube 20 is constructed of an inner, 22, and an outer, 23, edge flanged strip of material of the same type and characteristics as employed in the construction of tracheostomy tube 10, which are arranged and helically wound as in the construction of tracheostomy tube 10, the turns or windings at their ends being soldered and the distal end shaped, as hereinbefore described in connection with the construction of the tracheostomy tube.

Figs. 3, 4 and 5 omit a showing of the soldering of the strips at the ends of tubes 10 and 20, to avoid confusion.

The outside diameter of mucus collector tube 20 is such as to provide a slide fit of tube 20 within tracheostomy tube 10.

At its proximal end tube 20 is provided with a tubular grip 25 to which such end of tube 20 is soldered.

Tubular grip 25 is provided near its lower end with a pair of diametrically opposed tongues 26 outwardly extending and bent to conform to the upper surface of plate 30. The upper portion 27 of grip 25 is preferably knurled to afford a firm grip enabling it to be easily removed by thumb and finger.

Plate 30, as shown in Fig. 2, is an oval shaped plate having a central circular opening 31 of a diameter sufficient to fit inner tube 20.

The oblique proximal end of tracheostomy tube 10 is soldered, or otherwise suitably secured to plate 30 in alignment with opening 31, so that tube 10 projects therefrom at a downward acute angle.

Tongues 32 are stamped out of plate 30 at diametrically opposed positions, facing in opposite directions, and are bent to space them from plate 30 to receive tongues 26 of grip 25. By a clockwise turn of grip 25, tongues 26 are secured between tongues 32 and plate 30 and by a counter clockwise turn are released.

The ends 33 of plate 30 are bent upwardly and have transverse slots 34 formed therein to which straps 35 are attached. Straps 35 are fastened together at the back of the neck of the wearer by a conventional strap fastener, not shown.

Obturator 40 is predeterminedly shaped to follow the average contour of the average trachea. Its entry member 42 is so dimensioned that on protrusion from the distal end of tube 10, its sides will contact the inner edge of tube 10. Entry member 42 facilitates easy introduction of tube 10 through the incision and down the trachea. Upper dome shaped member 44 centers the obturator in tube 10 and the protruding circular base 45 of its handle 43 supports it in the tube.

The material of the strips must be non-corrosive. The width and thickness of the material, its flexibility and resilience must be predetermined to secure an elasticity of tubes 10 and 20 that will respond to the bending pressures encountered in their use within the trachea as freely as the trachea normally responds to such pressures. The depth of the flanges of the strips employed in the construction of the tracheostomy tube should be confined to that required for the proper interlocking of the flanges, in order to reduce the depth of the exterior helical spacing between the flanges, thereby providing a smoothness of the outer surface of said tube which is necessary to avoid irritation of or injury to the trachea.

I have found that silver is a very satisfactory material for the construction of the tracheostomy and mucus collector tubes, as well as for the plate 30 and the obturator 40, but I do not limit this invention to the use of that material.

The transverse oblique formation of the proximal end of the tracheostomy tube at its junction with plate 30 and its resultant downward projection therefrom provide an easier drop of the tracheostomy tube into the trachea and a better fit of said tube with the trachea.

The drawings herein show one embodiment of my invention. Changes and modifications therein may be made without departing from the scope of this invention.

I claim:

1. In combination, a tracheostomy tube adapted for insertion in the trachea through an opening in the neck, a mucus collector tube inserted in said tracheostomy tube, each comprising a tubing formed of a pair of edge flanged strips of a non-corrosive, flexible and resilient material, helically wound, one outside the other in overlapped arrangement and in opposed relation, thus forming an inner strip with out-turned flanges and an outer strip with in-turned flanges, each said tubing having a predetermined elasticity freely responsive to movements of the neck, a plate secured to the proximal end of said tracheostomy tube, a grip secured to the proximal end of said mucus collector tube, coacting coupling means on said collar and grip, and a neck fastening means for holding said collar in position.

2. In combination, a tracheostomy tube adapted for insertion in the trachea through an opening in the neck, and a mucus collector tube inserted in said tracheostomy tube, each comprising a tubing formed of a pair of edge

flanged strips of a non-corrosive, flexible and resilient material, helically wound, one outside the other in overlapped arrangement and in opposed relation, thus forming an inner strip with out-turned flanges and an outer strip with in-turned flanges, each said tubing having a predetermined elasticity freely responsive to movements of the neck, a plate secured to the proximal end of said tracheostomy tube limiting its downward movement in the trachea, a tubular grip secured to the proximal end of said mucus collector tube, said plate having an opening fitting said mucus collector tube, coupling means on said plate and tubular grip and a neck fastening means for holding said plate in position.

3. A combination according to claim 2 wherein the depth of the edge flanges of the inner and outer strips of the tracheostomy tube is confined to that required for the interlocking of said flanges.

4. A combination according to claim 2 wherein the proximal end of the tracheostomy tube at its junction with said plate is cut on a plane inclined to the axis of said tube, which is so mounted on said plate that it projects therefrom at a downwardly extending angle.

5. A tracheostomy tube device comprising an outer tube adapted for insertion in the trachea through an opening in the neck, and an inner tube inserted in said outer tube, each comprising a tubing formed of a pair of edge flanged strips of a non-corrosive, flexible and resilient material, helically wound, one outside the other in overlapped arrangement and in opposed relation, thus forming an inner strip with out-turned flanges and an outer strip with in-turned flanges, each said tubing having a predetermined elasticity freely responsive to movements of the neck, means connected to said outer tube limiting its downward movement in the trachea, and means releasably holding said inner tube in said outer tube.

References Cited in the file of this patent

UNITED STATES PATENTS

399,540	Lee	Mar. 12, 1889
953,922	Rogers	Apr. 5, 1910
2,765,792	Nichols	Oct. 9, 1956

OTHER REFERENCES

V. Mueller and Co., Catalog, Eye, Ear, Nose and Throat Instruments. Copyright 1929, p. 233 #A8550 Photocopy of page in Div. 55.