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TRACHEAL TUBE ASSEMBLY AND TRACHEAL PLUG

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FIG. 1.

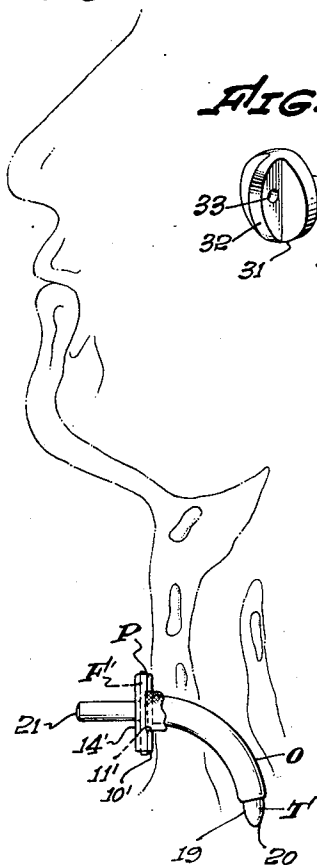


FIG. 5.

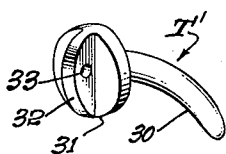


FIG. 2.

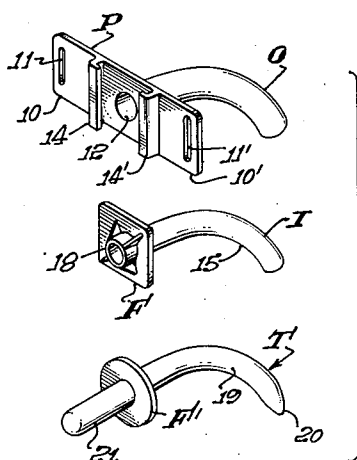


FIG. 3.

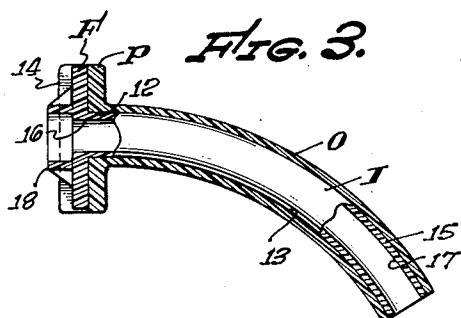
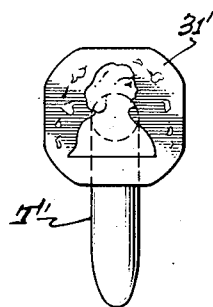


FIG. 4.



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TRACHEAL TUBE ASSEMBLY AND TRACHEAL PLUG

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4 Claims. (Cl. 128—351)

The present invention relates generally to the field of surgical instruments and accessories, and more particularly to a new and novel tracheal tube assembly and tracheal plug that may be disposed directly into a throat incision (tracheostomy) without the use of other appurtenances.

In the treatment of certain diseases of the larynx and certain paralyses, particularly poliomyelitis where normal respiration is inadequate, it is necessary to provide an artificial airway and to maintain clear passage through such airway. This is accomplished by a surgical procedure termed tracheotomy, followed by insertion of a tracheal tube assembly. The assembly is inserted through the opening made into the anterior aspect of the throat and trachea by tracheotomy.

In the past, passage to the trachea has been effected by means of a silver tube of predetermined curvature in which an obturator may be slidably disposed to close same. The silver tube is normally provided at the outer end thereof with two oppositely disposed flanges that lie flush against the exterior surface of the throat, and the whole assembly is held in a fixed position by a resilient band affixed to the flanges and extends around the throat.

The disadvantage of the conventional tracheal tube above described resides in the rigidity thereof, the fact that it is formed of a metal that tarnishes and becomes discolored, is of a fixed configuration, and difficult to clean.

A major object of the present invention is to provide a tracheal tube assembly and plug which eliminate all of the disadvantages found in prior devices of this nature, and which embody one form of plug especially designed to permit insertion thereof directly into a throat incision to completely close same temporarily, and yet maintain tracheostomy.

Another object of the invention is to provide a tracheal tube and plug which may be fabricated from an inexpensive resilient material, and due to use of this material, cannot be bent or permanently deformed by careless handling.

A further object of the invention is to supply a tracheal tube and plug of simplified structure that may be fabricated from a transparent or translucent material whereby it is inconspicuous when worn.

Another object of the tracheal tube assembly and plug is to provide one of a material which is far less irritating, and of a length and form particularly designed to lessen possibility of trauma previously encountered in the use of prior existing tracheal tubes.

A still further object of the invention is to provide devices which may be tinted or colored to blend with the patient's skin tones, but if noticed, will present an attractive ornamental appearance not possible with previously available equipment of this nature.

Yet another object of the invention is to provide a tracheal tube and plug which may be easily inserted or removed from an incision without danger of tearing or

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injuring the delicate throat tissues due to the soft, resilient material from which the devices are fabricated.

These and other objects and advantages of the invention will become apparent from the following description thereof, and from the drawing illustrating same, in which:

Figure 1 is a side elevational view of the tracheal tube and plug positioned in a throat incision;

Figure 2 is a perspective view of the tracheal tube assembly including a flanged outer tube, and inner tube and plug;

Figure 3 is a longitudinal vertical cross-sectional view of the outer tracheal tube showing an inner cannula tube slidably disposed therein;

Figure 4 is an elevational view of the exposed end of a tracheal plug, which plug may be directly inserted into the throat incision; and

Figure 5 is a perspective view of a tracheal plug that may be inserted directly into the throat incision to close same temporarily.

The general structure of the tracheal tube assembly of the present invention may best be seen in Figures 1 and 2 of the drawings. An outer cannula O is provided that terminates at one end in an elongate plate P substantially rectangular in shape. The cannula O and plate P are preferably formed as an integral unit from a synthetic plastic such as polyethylene, or other polymerized resinous materials having similar physical characteristics.

Because polyethylene is non-absorbent, inert to acids and alkalis, and may be bent into any desired shape under elevated temperatures without damage thereto, makes this synthetic plastic a most desirable material from which to fabricate the outer cannula O and plate P. In addition, the wax-like quality of this plastic makes it particularly adaptable for use in either its natural color or when tinted in flesh tones, and while resilient, yet it has sufficient inherent rigidity to retain its shape. All of these factors contribute in providing a tracheal tube assembly that is easy to use and which may be worn with a minimum of discomfort.

As shown in Figure 3, the smoothly curved portion of cannula O permits it to extend downwardly into the trachea tube when the plate P is positioned against the exterior surface of the throat. Two oppositely disposed flanges 10 and 10' are provided on plate P. Slots 11 and 11' are transversely formed in flanges 10 and 10' respectively, by means of which a ribbon, band or chain may be attached to hold the tube and plate assembly in fixed position on the throat. A central annular opening 12 is formed in plate P that is in communication with bore 13 of tube O. Two ribs 14 and 14' are formed on opposite sides of opening 12 as an integral part of plate P, which ribs serve as locking means for a flange F formed on an inner cannula I, or obturator T, as will hereinafter be described.

The inner cannula I is formed from a tubular member 15 having an outer diameter of such size as to permit it to be slidably inserted within the confines of tube O. As seen in Figure 3, the degree of curvature of tubular member 15 is the same as that of tube O. Flange F which is transversely disposed and integrally formed on one end of tubular member 15 (Figure 2), is preferably substantially square or rectangular in cross section and is of such dimensions to permit it to be inserted between ribs 14 and 14' when in contact with plate P, as shown in Figure 3. A bore 16 is formed in flange F that is in communication with the bore 17 of tubular member 15 and a flexible tube 18 integrally connected to said flange, or affixed thereto by a conventional fitting 18a (not described).

The plug or obturator T shown in Figure 2 includes a

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curved solid member 19 having a tapered blunt forward end 20. Member 19 is of such diameter that it may be slidably inserted within bore 13 of outer cannula O, in the same manner as the inner cannula I. An annular flange F' is formed on member 19 (Figure 2), but it may be rectangular if desired. A handle 21 is provided which projects outwardly therefrom when flange F' contacts the plate P. By spreading apart the resilient ribs 14 and 14', flange F' may be inserted therebetween to be engaged and held in position thereby when said ribs are allowed to retract. In this manner the tracheal plug T is removably held in a fixed position relative to plate P until such time as it is desired to remove same. In Figures 1 and 2 the handle 21 is shown to be cylindrical, but it should be understood that other designs may be utilized if desired.

The tracheal tube assembly of the present invention is used by inserting plug T into the outer cannula O, and then inserting them as a unit into the tracheostomy. During such insertion the tapered blunt forward end 20 of the plug T serves to spread apart the delicate throat tissues whereby they will not be torn or injured as could occur should the outer cannula O be inserted without the plug. After insertion, the plug T is removed in order that the inner cannula I may be positioned in its place within the outer cannula O.

For purposes of artificial aeration, positive pressure may be administered by means of the tube 18. This airway may be kept clear by inserting a catheter (not shown) through outer cannula O after the inner cannula I has been removed therefrom. In use of the invention, the inner cannula I is maintained within the outer cannula O at all times except during suctioning operations, or when the inner cannula is being cleansed of accumulated secretions.

A tracheal plug T' is shown in Figure 5 that includes an elongate curved solid member 30 formed from polyethylene or a similar polymerized resinous material, having a transverse annular plate 31 situated on one end thereof. A handle 32 extends outwardly from plate 31, and may be of any desired configuration such as the arcuate shape shown. Also, a bore 33 may be formed in the handle through which a small chain, band or ribbon (not shown) can be inserted and encircle the neck to securely hold plug T' in position. If preferred, a plate 31' of generally hexagonal configuration may be substituted for the annular plate 31 (see Figure 4). An attractive motif or design may be carried on the exterior surface of plate 31', much in the manner of a piece of jewelry.

The function of tracheal plug T' is merely to maintain tracheostomy and provide a means to permit a suctioning operation at such stage of a disease where it is no longer necessary to administer positive pressure ventilation. However, until such time as the patient is completely beyond danger of relapse and completely recovered, it is advisable to maintain tracheostomy. The tracheal plug serves this purpose. Because of its design and the material from which it is fabricated, the plug of the present invention has been found to considerably reduce irritation, avoiding the usual resultant trauma; lessens and/or completely eliminates the need for suctioning; eliminates damage to tissue by accidental rough handling or carelessness; eliminates thermal shock to surrounding tissue; lessens obstruction in trachea and resultant resistance in tracheal airway; and is less conspicuous and more comfortable in general than any device previously utilized for such purposes.

Although the tracheal assembly and plugs of my invention have been found from experience to provide the advantages and achieve the objects hereinbefore mentioned, it is to be understood that there is no intention to limit the invention to the details of construction as described herein other than as defined in the appended claims.

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I claim:

1. A translucent tracheal tube assembly, which includes: an outer cannula, the degree of curvature of which enables said cannula to extend downwardly in the trachea after insertion through a throat incision; an elongate plate integral with and transversely disposed on one end of said cannula, said plate having an opening formed therein in communication with the bore of said cannula, and said plate having two laterally spaced slots formed therein to which a band may be attached for holding said plate and outer cannula in fixed position on the throat; two laterally spaced ribs integrally formed in said plate extending outwardly from the exterior face thereof; an inner cannula, the external diameter and degree of curvature of which permits said inner cannula to snugly and slidably engage the bore of said outer cannula; and a transverse flange integrally formed as part of said inner cannula positioned on one end thereof, said flange having an opening formed therein communicating with the bore of said inner cannula, the dimensions of said flange being such as to permit said flange to be removably gripped between said ribs when said inner cannula is fully disposed within said outer cannula, with said outer cannula, plate, inner cannula and flange being fabricated from a polymerized resinous material that is inert to acid and alkalis, resilient, but sufficiently rigid to retain its fixed configuration when not subjected to a deforming pressure.

2. A translucent tracheal tube assembly, which includes: an outer cannula, the degree of curvature of which enables said cannula to extend downwardly in the trachea after insertion through a throat incision; an elongate plate integral with and transversely disposed on one end of said cannula, said plate having an opening formed therein in communication with the bore of said cannula, and said plate having two laterally spaced slots formed therein to which a band may be attached for holding said plate and cannula in fixed position on the throat; two laterally spaced ribs integrally formed in said plate extending outwardly from the exterior face thereof; an elongate tracheal plug of such external diameter and degree of curvature as to snugly and slidably engage the bore of said outer cannula; and a transverse flange formed as an integral part of said tracheal plug disposed on one end thereof, the dimensions of said flange being such as to permit it to be removably gripped between said ribs when said tracheal plug is fully disposed within said outer cannula, with said outer cannula, plate, tracheal plug and flange being fabricated from a polymerized resinous material inert to acid and alkalis, resilient, but sufficiently rigid to retain its fixed configuration when not subjected to a deforming pressure.

3. A tracheal tube assembly, which includes: an outer cannula, the degree of curvature of which enables said cannula to extend downwardly in the trachea after insertion through a throat incision; an elongate plate integral with and transversely disposed on one end of said cannula, said plate having an opening formed therein in communication with the bore of said cannula; two laterally spaced ribs integrally formed in said plate extending outwardly from the exterior face thereof; an inner cannula, the external diameter and degree of curvature of which permits said inner cannula to snugly and slidably engage the bore of said outer cannula; and a transverse flange integrally formed as part of said inner cannula positioned on one end thereof, said flange having an opening formed therein communicating with the bore of said inner cannula, the dimensions of said flange being such as to permit said flange to be removably gripped between said ribs when said inner cannula is fully disposed within said outer cannula.

4. A tracheal tube assembly, which includes: an outer cannula, the degree of curvature of which enables said cannula to extend downwardly in the trachea after insertion through a throat incision; an elongate plate in-

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tegral with and transversely disposed on one end of said cannula, said plate having an opening formed therein in communication with the bore of said cannula; two laterally spaced ribs integrally formed in said plate extending outwardly from the exterior face thereof; an elongate tracheal plug of such external diameter and degree of curvature as to snugly and slidably engage the bore of said outer cannula; and a transverse flange formed as an integral part of said tracheal plug disposed on one end thereof, the dimensions of said flange being such as to permit it to be removably gripped between said ribs when said tracheal plug is fully disposed within said outer cannula.

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