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[54] **COLLAPSIBLE AIRWAY FOR RESUSCITATION**
4 Claims, 6 Drawing Figs.

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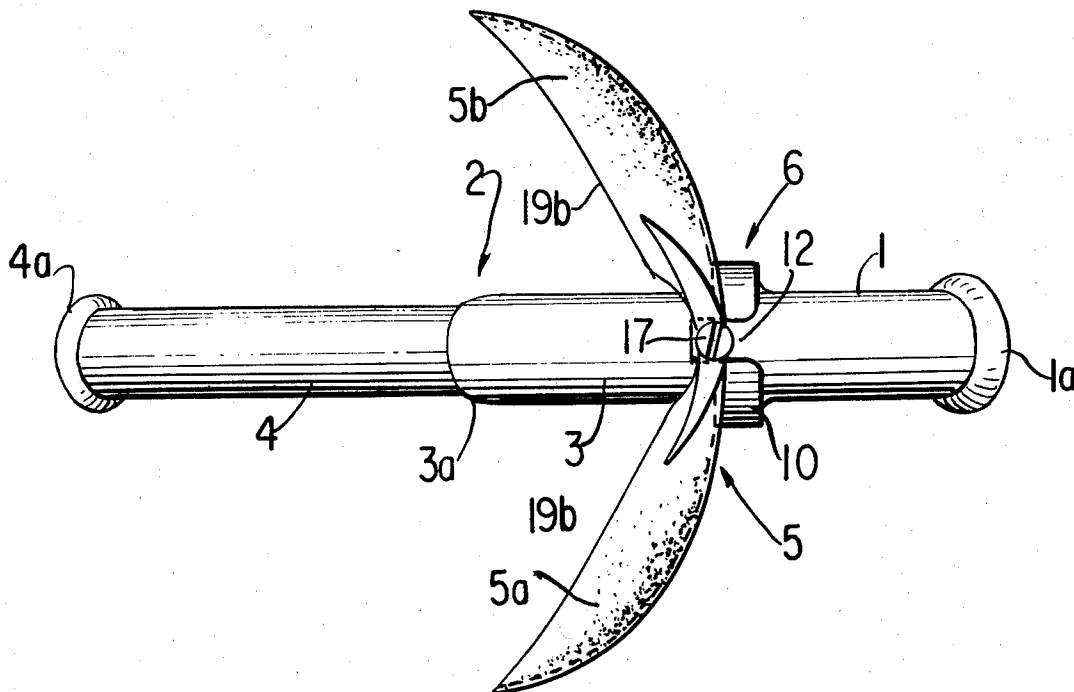
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ABSTRACT: A collapsible airway to be kept available as in one's pocket for resuscitation as by mouth-to-mouth respiration, consists of an arcuate tube having mouthpiece and oropharyngeal sections and having secured to it between those sections hinged, dished leaves which are contractible toward the tube from an open position in which they will cover and be sealable about a patient's mouth; and the oropharyngeal section comprises telescoping arcuate tube portions contractible to a position entirely within the confines of the closed leaves.



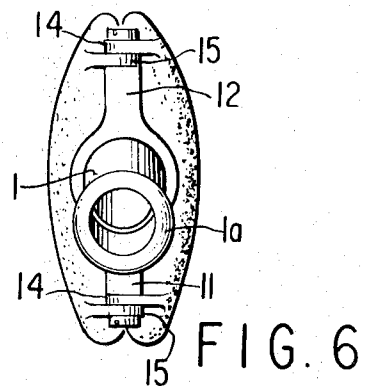
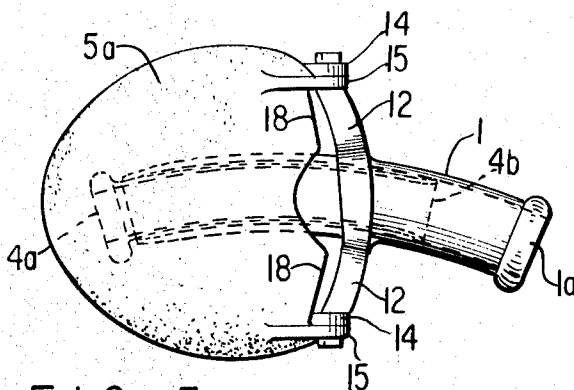
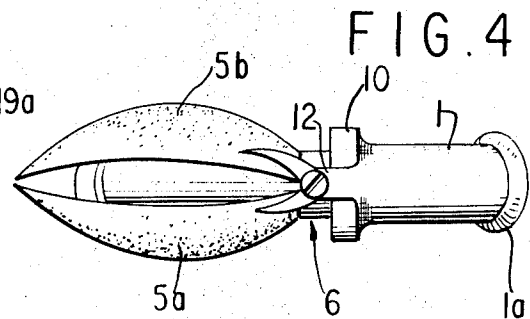
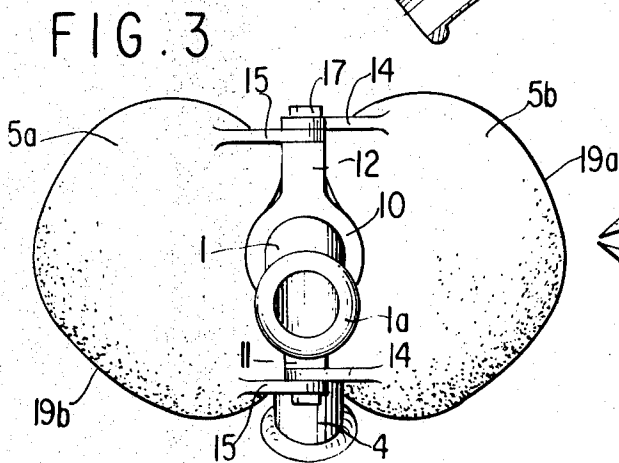
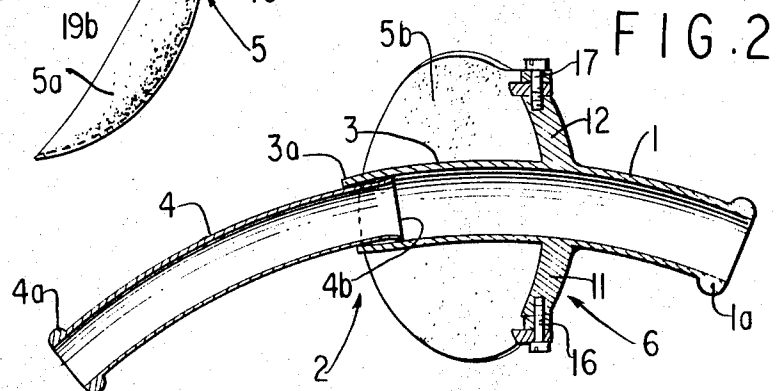
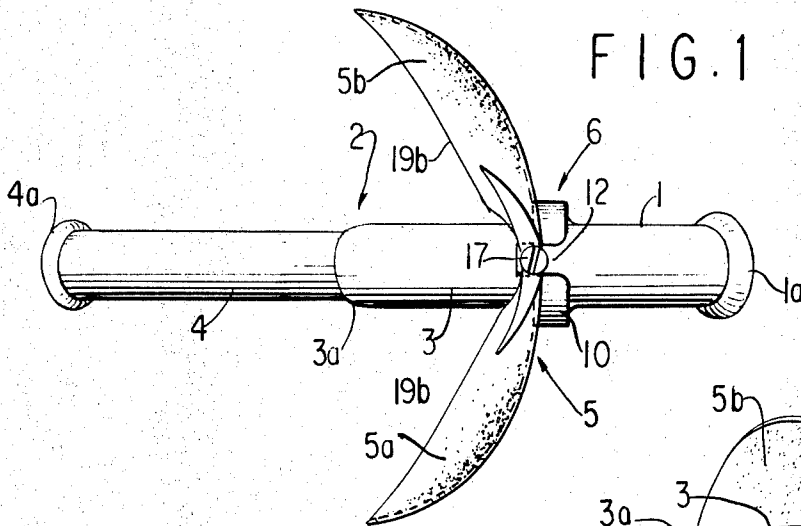


FIG. 5

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COLLAPSIBLE AIRWAY FOR RESUSCITATION

This invention relates to a new and improved medical instrument of the kind known as an airway, for use in resuscitation by artificial respiration.

Mouth-to-mouth respiration has become the prime method used by rescue workers to revive persons nearing death from drowning, electrocution, asphyxiation or cardiac arrest. Although simple and effective, this method is objectionable in several respects. Many persons hesitate to use it, and it may present hazards to the rescuer, due to the presence in the patient's mouth of secretions which often contain noxious substances such as sputum, blood and germs. In addition, the direct mouth-to-mouth method sometimes fails for lack of a way to depress the patient's tongue so as to create or ensure the continuance of a clear passageway for the flow of air to his lungs.

Various forms of airways have been proposed heretofore and some have been used for avoidance of the stated shortcomings. The known airways, however, are found rarely outside of hospitals and practically never in physicians' bags; they are too bulky or cumbersome to be carried easily by potential users such as police, firemen, lifeguards, soldiers, electrical workers, ambulance attendants, doctors, nurses and boy scouts. Consequently, lives have been lost in many cases where they might have been saved had the persons first attending victims of accidents or of cardiac arrest been in possession of a suitable resuscitating instrument.

According to the present invention, an airway of collapsible construction is provided, which in its collapsed form is so compact and light that it can be easily carried on the person of any potential rescuer yet can be distended within a few seconds into an open, working form enabling resuscitation by artificial respiration to be performed quite effectively by either lay or professional users, as if by the mouth-to-mouth method but without the shortcomings of that method. The invention thus provides an efficient resuscitator suited for being kept constantly available among many potential rescuers for use whenever needed to save lives.

The new airway is similar to known resuscitators in that it comprises a tube for conducting air from the mouth of a rescuer for delivery to the lungs of a patient, this tube having an elongate, oropharyngeal section to be inserted into and through the patient's mouth to the pharynx with depression of the tongue and an extra-oral section forming a mouthpiece for the rescuer, and in that a guard structure is secured to a part of the tube between those sections to rest over the patient's mouth and limit the distance of insertion of the oropharyngeal section.

In the airway of this invention, however, the guard structure comprises leaves which are displaceable between an open, working position in which they project laterally from the tube to cover the patient's mouth and a closed position in which they are contracted toward the tube. The leaves advantageously are dished and mated with support means on the tube structure so as to form in their open position a mouth cup having a concave ovaloid configuration such that it presents peripheral edges sealable about the patient's lips. Ordinarily, two similarly formed leaves are disposed at opposite sides of the airway tube and secured to the support means through suitable hinge connections, for swinging movement between their open and closed positions.

Further according to the invention, the elongate, oropharyngeal section of the tube comprises tube portions which are contractible one relative to another in the direction toward the guard structure. This section ordinarily is made to be contracted to a position in which all parts of it disposed below the support means of the leaves lie entirely within the space encompassed by the leaves when they are in closed position.

The airway tube is made longitudinally arcuate so as to be easily inserted into a patient's mouth over the tongue to the region of the pharynx. Still, the tube portions forming the oropharyngeal section can be formed, as by being telescoped one within another, so as to be readily contractible to a posi-

tion within the confines of the closed mouthguard leaves, as by simply sliding a lower arcuate tube portion upwardly within an upper arcuate tube portion integral with the extra-oral section of the tube structure.

The new airway can be collapsed to a very compact form easily carried on the person of any potential rescuer, as in his suit pocket, and can be distended quickly from that form to a fully serviceable open form. In fully collapsed condition, it ordinarily has a length of less than 10 cm. and a maximum width of less than 6 cm.

The foregoing and other objects, features and advantages of the invention will be apparent from the following detailed description and the accompanying drawing of a preferred embodiment thereof. In the drawing:

FIG. 1 is a plan view of the airway in its open, working condition;

FIG. 2 is a longitudinal cross-sectional view thereof;

FIG. 3 is an end elevation thereof, looking in the direction toward the mouthpiece;

FIG. 4 is a plan view of the airway in its fully closed, or collapsed, condition;

FIG. 5 is a side elevation thereof; and

FIG. 6 is an end elevation thereof.

Referring to FIG. 1 and FIG. 2 of the drawing, the illustrated embodiment of the new airway in the open, working condition there shown is composed of a longitudinally arcuate tube having an extra-oral section 1 and an elongate, oropharyngeal section 2 consisting of telescoped upper and lower tube portions 3 and 4, together with a mouthguard structure 5 which includes two similar dished leaves 5a and 5b projecting laterally from opposite sides of the tube structure and secured thereto by support means 6 fixed to a part of the tube between sections 1 and 2.

The extra-oral section 1 is formed with a beaded open end 1a and with a length suiting it for service as a mouthpiece to be taken in the mouth of a person about to administer artificial respiration to the victim of an accident or of cardiac arrest.

The oropharyngeal section 2 extends beyond the support means 6 as an elongate continuation of the extra-oral section, with a length when distended and a longitudinal curvature suiting it for insertion into and through the victim's mouth to the region of the pharynx, with depression of the tongue, so that air blown through the tube from the mouth of a rescuer will pass without obstruction into the trachea and, therefore, into the victim's lungs.

The support means 6 comprises a collar member 10 having shoulders 11 and 12 which protrude radially from opposite sides of the tube structure in the plane of its longitudinal curvature. The leaves 5a and 5b are hinged to the shoulders, as by means of respective arms 14 and 15 thereon pivotally engaging hinge pins 16 and 17 on the shoulders, so that they will swing freely between their spread, open position shown in FIG. 1 and a closed position, shown in FIG. 4, in which they are contracted together, or nearly so, toward the plane of the longitudinal curvature of the tube.

Each of the leaves 5a and 5b is a rigid panel member of dished configuration having a sort of semiovaloid outline. The inner edge 18 between the hinge arms 14 or 15 of each leaf is formed to mate with adjacent surfaces of the collar member 10, and the leaves are so dished that when spread open they will form a cuplike structure having a concave ovaloid configuration such that it will fit over the mouth of a patient and present peripheral edges 19a and 19b which are sealable about the patient's lips by pressure lightly applied by the hand of a person holding the airway in the patient's mouth.

The lower portion 4 of the elongate tube section has a beaded open end 4a suitable for easy insertion over a patient's tongue to the region of the pharynx. The body of this tube portion has an outside diameter slightly smaller than the inside diameter of the upper tube portion 3, and it is telescoped inside portion 3 so that by a simple sliding movement of portion 4 upwardly within portion 3 these parts can be contracted to a position, as shown in FIG. 4, in which all parts of them

disposed below the tube part carrying the support means 6 lie entirely within the space encompassed by the leaves 5a and 5b in their closed position. The beaded end 4a prevents portion 4 from being slid too far into portion 3 and enables it to be easily grasped in one's fingers and slid out from contracted position to distended position. The upper end 4b of portion 4, located inside portion 3, is somewhat enlarged so that it will engage with the somewhat constricted lower end 3a of portion 3 to prevent the lower tube portion from being pulled away from the upper tube portion.

The tube structure shown is generally circular in cross section, but if desired it can be made with an oval or flattened tubular cross section.

The entire instrument is made of hard noncorrosive nontoxic material enabling it to be sterilized, collapsed and opened easily, and carried and used repeatedly without deterioration under any weather conditions. The material preferably is a suitable metal, for example stainless steel or another alloy. A suitably hard, durable nontoxic plastic composition could also be used.

It is to be understood that the invention is not limited to details of the illustrated embodiment and that various modifications may be effected therein by one skilled in the art without departing from the fair scope of the invention, which is intended to be defined by the appended claims.

I claim:

1. An airway for human resuscitation, comprising a tube for conducting air from the mouth of a rescuer for delivery to the lungs of a patient, said tube including an elongate section adapted and sufficiently long to extend through the patient's mouth into the pharynx with depression of the tongue and an extra-oral section forming a mouthpiece adapted to be taken in the mouth of the rescuer, and guard means secured to a part of said tube between said sections and adapted to rest over the patient's mouth to limit the distance of insertion of said elongate section thereinto, said guard means comprising oppositely disposed leaves connected with and extending from opposite sides of said tube part, said leaves being displaceable between an open position in which they project laterally from opposite sides of said tube and constitute a mouth cover adapted to seal about the patient's lips, and a closed position in which they lie in confronting relation to each other along and adjacent to part of said elongate section of said tube, said elongate section comprising an upper tube portion fixed relative to said extra-oral section and a lower tube portion displaceable relative thereto, said tube portions being contractible one relative to another in the direction toward said guard means, whereby the structure can be collapsed to a compact form easily carried in one's pocket and can be distended quickly to serviceable open form, said tube portions being longitudinally arcuate and said lower tube portion being telescoped inside said upper tube portion for sliding movement therewithin toward said extra-oral section.

2. An airway for human resuscitation, comprising a tube for conducting air from the mouth of a rescuer for delivery to the lungs of a patient, said tube including an elongate section adapted and sufficiently long to extend through the patient's mouth into the pharynx with depression of the tongue and an extra-oral section forming a mouthpiece adapted to be taken in the mouth of the rescuer, and guard means secured to a part of said tube between said sections and adapted to rest over the patient's mouth to limit the distance of insertion of said elongate section thereinto, said guard means comprising oppositely disposed leaves connected with and extending from opposite sides of said tube part, said leaves being displaceable between an open position in which they project laterally from opposite sides of said tube and constitute a mouth cover adapted to seal about the patient's lips, and a closed position in which they lie in confronting relation to each other along and adjacent to part of said elongate section of said tube, said elongate section being longitudinally arcuate and including an

upper tube portion integral with said extra-oral section and a lower tube portion slidable within said upper portion to a contracted position in which all parts of said elongate section disposed below the aforesaid tube part lie entirely within the space encompassed by said leaves in closed position, whereby the structure can be collapsed to a compact form easily carried on one's pocket and can be distended quickly to serviceable open form.

3. An airway for human resuscitation, comprising a tube for conducting air from the mouth of a rescuer for delivery to the lungs of a patient, said tube including an elongate section adapted and sufficiently long to extend through the patient's mouth into the pharynx with depression of the tongue and an extra-oral section forming a mouthpiece adapted to be taken in the mouth of the rescuer, and guard means secured to a part of said tube between said sections and adapted to rest over the patient's mouth to limit the distance of insertion of said elongate section thereinto, said guard means comprising oppositely disposed leaves connected with and extending from opposite sides of said tube part, said leaves being displaceable between an open position in which they project laterally from opposite sides of said tube and constitute a mouth cover adapted to seal about the patient's lips, and a closed position in which they lie in confronting relation to each other along and adjacent to part of said elongate section of said tube, whereby the structure can be collapsed to a compact form easily carried in one's pocket and can be distended quickly to serviceable open form, said guard means further comprising support means on said tube part, said leaves being secured to said support means through hinge means for swinging movement between their open and closed positions, and each being dished and mated with said support means so as to form in their open position a mouth cup presenting peripheral edges sealable about the patient's lips, said support means comprising a collar having shoulders protruding from opposite sides of said tube part, said leaves having arms hinged to said shoulders and having inner edges which fit against surfaces of said collar in the open position of said leaves.

4. An airway for human resuscitation, comprising a tube for conducting air from the mouth of a rescuer for delivery to the lungs of a patient, said tube including an elongate section adapted and sufficiently long to extend through the patient's mouth into the pharynx with depression of the tongue and an extra-oral section forming a mouthpiece adapted to be taken in the mouth of the rescuer, and guard means secured to a part of said tube between said sections and adapted to rest over the patient's mouth to limit the distance of insertion of said elongate section thereinto, said guard means comprising oppositely disposed leaves connected with and extending from opposite sides of said tube part, said leaves being displaceable between an open position in which they project laterally from opposite sides of said tube and constitute a mouth cover adapted to seal about the patient's lips, and a closed position in which they lie in confronting relation to each other along and adjacent to part of said elongate section of said tube, said guard means further comprising support means on said tube part, said leaves being secured to said support means through hinge means for swinging movement between their open and closed positions, said leaves each being dished and mated with said support means so as to form in their open position a mouth cup representing peripheral edges sealable about the patient's lips, said elongate section being longitudinally arcuate and comprising arcuate tube portions telescoped one within another, including an upper tube portion integral with said extra-oral section and a lower tube portion slidable within said upper portion to a contracted position in which all parts of said elongate section disposed below said support means lie entirely within the space encompassed by said leaves in closed position, whereby the structure can be collapsed to a compact form easily carried in one's pocket and can be distended quickly to serviceable open form.