

[54] AIRWAY

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[57] **ABSTRACT**

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128/145.5, 147, 208, 240, DIG. 26; 138/106,
111, 113

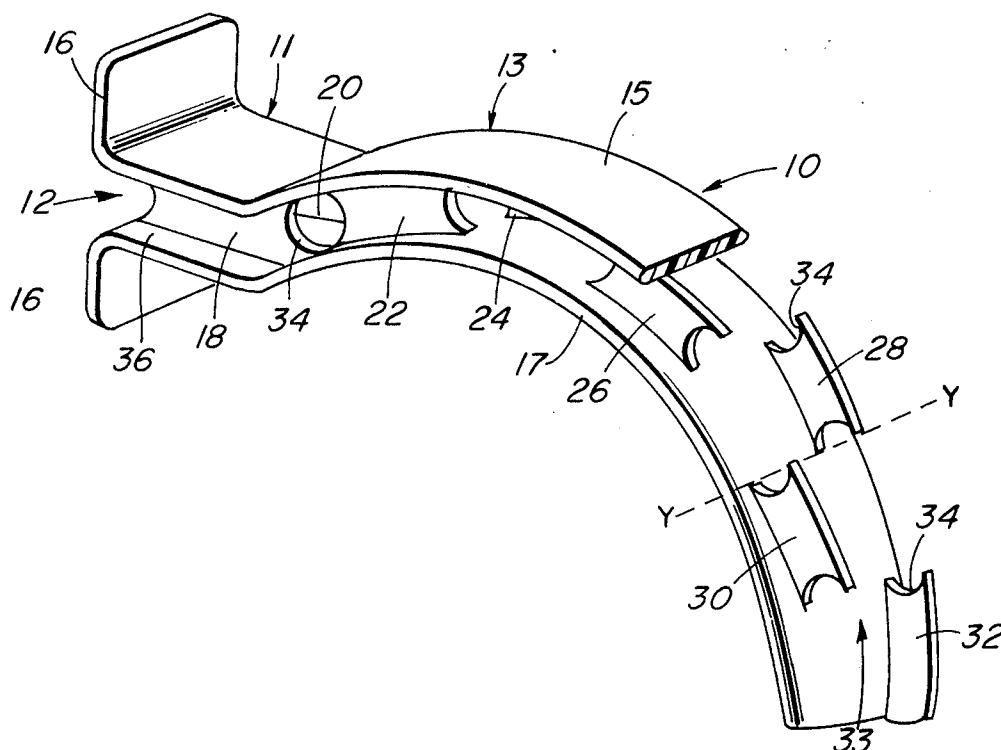
An airway has upper and lower elongated, substantially planar surfaces connected in spaced relation by two rows of longitudinally spaced apart struts on opposite sides of a central channel. Convergent inner surfaces of the struts guide a suction tube through the airway and the spaces between the struts allow for drainage of the central channel to prevent occlusion.

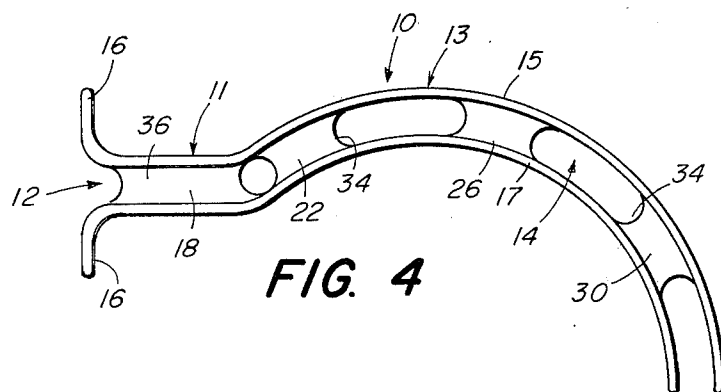
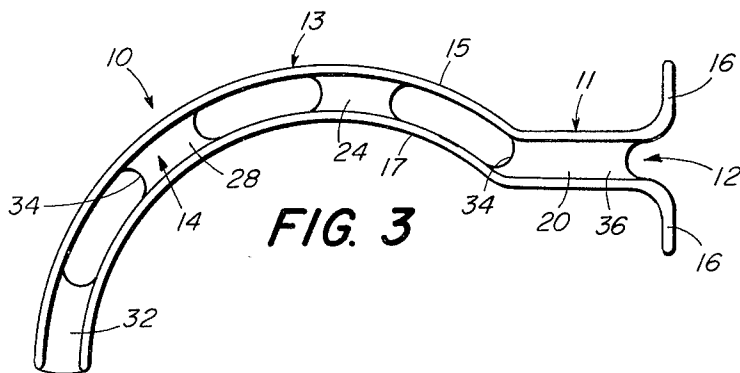
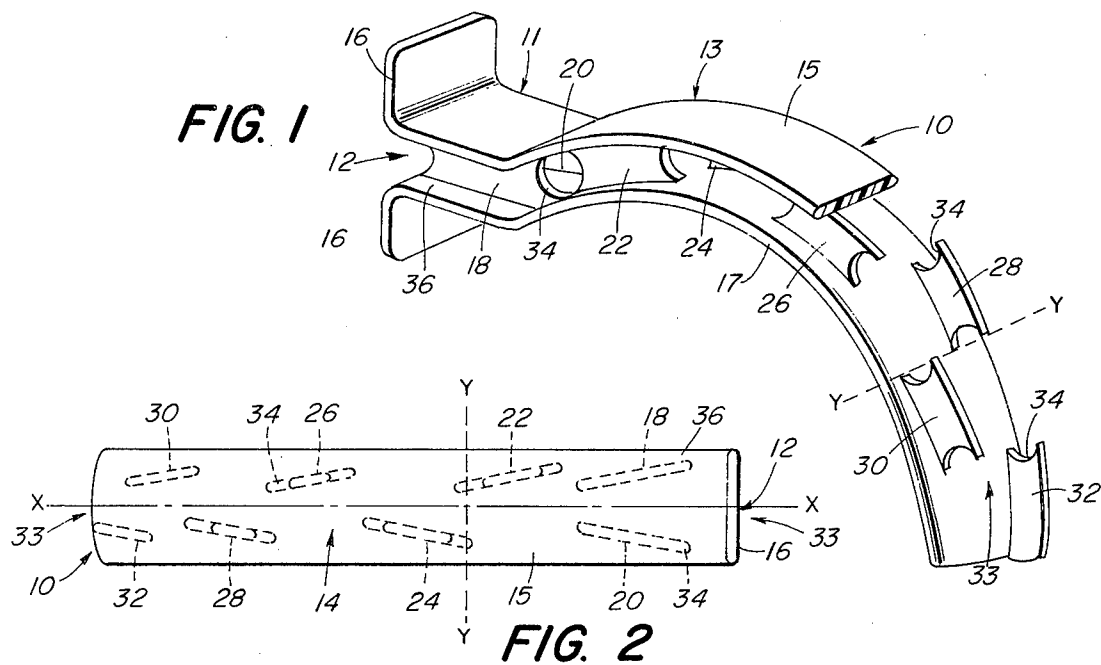
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7 Claims, 4 Drawing Figures





AIRWAY

BACKGROUND OF THE INVENTION

The present invention relates to oral airways used to insure a passageway through a person's mouth to his trachea. Such an airway is particularly important when a person has been anesthetized, as he then has little control over his mouth, tongue, and lips. It is quite possible that the flow of air to his lungs could be blocked. It has long been recognized that a physical means inserted in a person's mouth is one of the most effective and convenient ways of preventing this blockage. It is also known that such an airway can serve to provide means for inserting a tube such as a suction catheter into the oro-pharyngeal cavity and the trachea to remove accumulated fluid. However, oral airways presently in use are subject to one or more disadvantages which render their use less than completely satisfactory.

For example, during the time an airway is in place, usually during surgery, mucous, saliva and other body fluids tend to collect in the oral cavity. Airways having tube guide means tend to be occluded by these accumulated fluids. This prevents both an adequate air flow and the insertion of a tube through the airway into the trachea.

It is an object of this invention to provide an oral airway adapted to ensure an air passageway through a person's mouth to the trachea which includes means for guiding a tube such as a suction catheter through a person's mouth into the trachea and which will not become obstructed by accumulated body fluids.

It is another object of this invention to provide an oral airway adapted to allow the passage of a tube to a person's trachea and a second tube into a person's oro-pharyngeal cavity.

It is another object of this invention to provide an oral airway of sufficient strength to prevent the occlusion of the airway by biting pressure from a person's teeth.

SUMMARY OF THE INVENTION

The present invention provides an oral airway comprising upper and lower elongated surfaces connected in spaced relation by rows of longitudinally spaced apart struts such that the upper and lower surfaces together with the struts form an open area. The struts are adapted to ensure an unobstructed channel extending the entire length of the airway for providing an elongated air passageway as well as means for inserting a suction catheter or other flexible tube into the trachea. The open spaces between the struts in each row form lateral passages which allow drainage from the channel to prevent fluid buildup and eventual occlusion of the channel.

In a preferred embodiment the struts are positioned so that none of them cross a longitudinal midline of the airway, thus leaving an unobstructed central channel. Each strut defines a surface facing the central channel which converges toward the midline of the channel and which is adapted to guide a catheter inserted in the airway through it to the trachea. The struts are arranged diagonally across a vertical plane passing through the longitudinal midline of the airway. That is, the struts in one row are set in a generally staggered relationship to the struts in the other row. The struts nearest the entrance of the airway, however, are directly opposed

across the midline to provide a well defined entrance to the channel as well as sufficient strength to resist the biting pressure of the teeth. The directly opposed struts do not extend to the outside edge of the airway, thereby providing passageways on each side of the central channel for tube access to the oro-pharyngeal cavity.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view with portions cut away of a preferred embodiment of the present invention.

FIG. 2 is a plan view of the structure represented in FIG. 1.

FIG. 3 is a side elevation of the structure shown in FIG. 1.

FIG. 4 is another side elevation of the structure shown in FIG. 1.

DETAILED DESCRIPTION OF THE DRAWINGS

Referring to FIGS. 1 - 4, the present invention comprises an airway 10 having a straight section 11 adapted to be received into a person's mouth and fit between the teeth, connected to a curved section 13 which extends from the end of the straight section to the entrance of the trachea and which is adapted to fit over the tongue. The straight section 11 of the airway extends out of the mouth, the outer end serving as the entrance 12 of the airway. Stop flanges 16 which extend perpendicularly from the outer end of the airway are adapted to externally abut the lips to prevent the airway from being inwardly displaced while it is in use.

The straight and curved sections form a continuous, elongated body comprising a substantially planar upper surface 15 and a substantially planar lower surface 17 aligned along their central longitudinal axes X, represented in FIG. 2. The upper surface is connected in spaced relation to the lower surface by two rows of longitudinally spaced apart struts 18 - 32. The struts are so positioned that no strut crosses the longitudinal midline of the airway, thus forming an unobstructed central passageway 23 extending the entire length of the airway through which air can flow and a catheter or other tube may be inserted. A central passageway is preferred but the passageway may extend along other longitudinal axes.

The struts in the preferred embodiment are substantially flat, solid plates, each plate being joined along its entire length perpendicularly to the upper 15 and lower 17 surfaces. The end 34 of each plate is a concave curve with a radius of curvature approximately equal to one-half the distance separating the upper and lower surfaces, each end thus forming a semi-circle tangent to the upper and lower airway surfaces. The plates are oriented so that they define surfaces which face the central channel 33 and converge toward said channel. They converge in the direction of that end of the airway adapted to be adjacent the trachea. The plates are in a staggered arrangement such that no plate is directly across the central channel from any other plate, with the exception of the two plates 18, 20 nearest the entrance 12 of the airway which are directly opposed. The end portion of a plate in one row, however, may be allowed to overlap the end portion of a plate in the other row. Overlapping and non-overlapping staggered arrangements are both acceptable. A staggered arrangement is desirable in that it provides a number of open spaces 14 between the plates in each row. The open spaces form lateral passageways extending through each row which facilitate drainage of fluid ma-

terial from the central channel of the airway which could otherwise accumulate and occlude it. The plates 18-32, as shown in FIG. 2, are positioned so that the concave, semi-circular ends 34 on opposite sides of the central channel are aligned approximately directly across the channel from one another. This results in open lateral passages between the plates extending from one side of the airway completely through it to the other side along a path Y-Y perpendicular to the longitudinal axis. This feature further facilitates fluid drainage from the central channel, particularly when the head is turned to the side and the plates are consequently in a vertical spaced relation rather than their normal horizontal relation.

Another important feature of the present invention is that the convergent arrangement of the plates serves to provide tube guide means. In use a tube such as a suction catheter is inserted into the entrance 12 of the airway. If it strikes a plate in one row the tube will be deflected back toward the middle of the central channel 33 because of the convergent nature of the plate surfaces. If the end of the tube continues across the channel and strikes a plate in the other row, it will similarly be deflected back toward the central channel, thereby being guided along the length of the airway to the trachea. The plates are spaced near enough to each other to prevent the leading end of the tube from passing out of the central channel through any of the open passages 14 between them. The tube guiding capability of the plates is further enhanced by the concave shape of the plate ends 34. As a flexible tube enters the curved section 13 of the airway it will strike the lower surface 17 of the airway, sliding upwards along it until it reaches the descending portion of the curved section. At that point the tube will strike the upper surface 15 of the airway, sliding downwards along it until the end of the tube passes out of the end of the airway. Thus the leading end of the tube remains in sliding contact with either the upper or lower surface of the airway along most of its curved length. Since the ends of the plates are concave in shape, the plates have their greatest length where they join the upper and lower surfaces. Thus the longest portion of each plate is positioned where the tube will most often strike the plate, and the maximum guiding potential of each plate is thereby realized.

As already stated, the two plates 18, 20 nearest the entrance 12 of the airway are directly opposed across the central channel 33. These plates serve to define the entrance to the central channel and increase the ease with which a tube may be inserted. Furthermore, these plates are positioned in that part of the airway where the person's teeth will exert pressure on it. The presence of two plates there rather than just one insures sufficient structural strength to resist this biting pressure and avoid occlusion or twisting of the airway.

The struts, particularly the two opposed plates 18, 20, do not extend all the way to the outside edges of the airway. Thus the plates 18, 20 and the outer edges of the upper and lower surfaces 15, 17 in combination define two passages 36, one on each side of the entrance to the airway. These three-sided passages 36 serve to provide entrances to the oro-pharyngeal cavity through which can be inserted a tube such as a suction catheter.

It can readily be seen that the two rows of struts provide a channel through the mouth of the trachea, and that the spaces between the struts allow fluid material to drain from said channel. Thus the present airway

achieves two desirable goals. It provides an easily used and reliable method for inserting a tube such as a suction catheter through a central channel of an airway into the trachea, as well as adequate drainage means to prevent fluid material from accumulating in and occluding said central channel. The present airway also provides teeth support means of sufficient strength to prevent crushing of the airway by biting pressure, and openings on each side of the central channel for providing access to the oro-pharyngeal cavity.

We claim:

1. An oral airway for providing both an air passage to a person's trachea and a channel through which to insert a flexible tube into the trachea comprising:

15 a curved section adapted to fit over a person's tongue and extending to the entrance of the trachea connected to one end of a second section adapted to fit between and support a person's teeth, the other end of said second section being adapted to extend out of a person's mouth to serve as the entrance of said airway, said curved and second sections forming an upper surface and a lower surface, said upper surface being spaced from and connected to said lower surface by two rows of struts, said two rows of struts together with said upper and lower surfaces defining said channel, said struts in each of said rows being separated from one another to form open passages therebetween, wherein struts in each of said rows define surfaces facing said channel which converge toward the longitudinal midline of said channel to form tube guides for directing the end of a tube inserted through said entrance toward said midline to thereby guide said tube through said channel and into the trachea, and means mounted on said airway to inhibit inward displacement of said airway.

2. The invention of claim 1, wherein no strut crosses said midline.

3. The invention of claim 2, wherein struts in said second section are set directly opposite each other to form a well defined entrance opening to said channel and provide support for a person's teeth.

4. The invention of claim 2, wherein struts in one row are in a staggered relationship to struts in the other row.

5. The invention of claim 4, wherein said struts along said curved section in one of said rows do not overlap said struts along said curved section in the other row, so that no part of any strut is perpendicularly across said channel from any part of another strut in said curved section.

6. The invention of claim 4, wherein said struts are generally flat, solid plates, each of said plates being connected along its entire length perpendicularly to said upper and lower surfaces and having concave ends each with a radius of curvature approximately equal to one half the distance separating said upper and lower surfaces, each end thus forming a semicircle tangent to said upper and lower surfaces, said plates being positioned so that the surfaces of said plates face said channel and converge toward said midline and so that said semi-circular ends of said plates are aligned approximately directly across said channel from one another to form lateral passages extending completely through said airway perpendicularly of said midline to facilitate fluid drainage.

7. The invention of claim 6, comprising directly opposed struts in said second section which do not extend

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to the outside edges of said upper and lower surfaces of said airway, the outside edge portions of said upper and lower surfaces in combination with said opposed struts defining passages at each side of said airway to serve as

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entrances to the oro-pharangeal cavity through which a flexible tube may be inserted.

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