

May 14, 1963

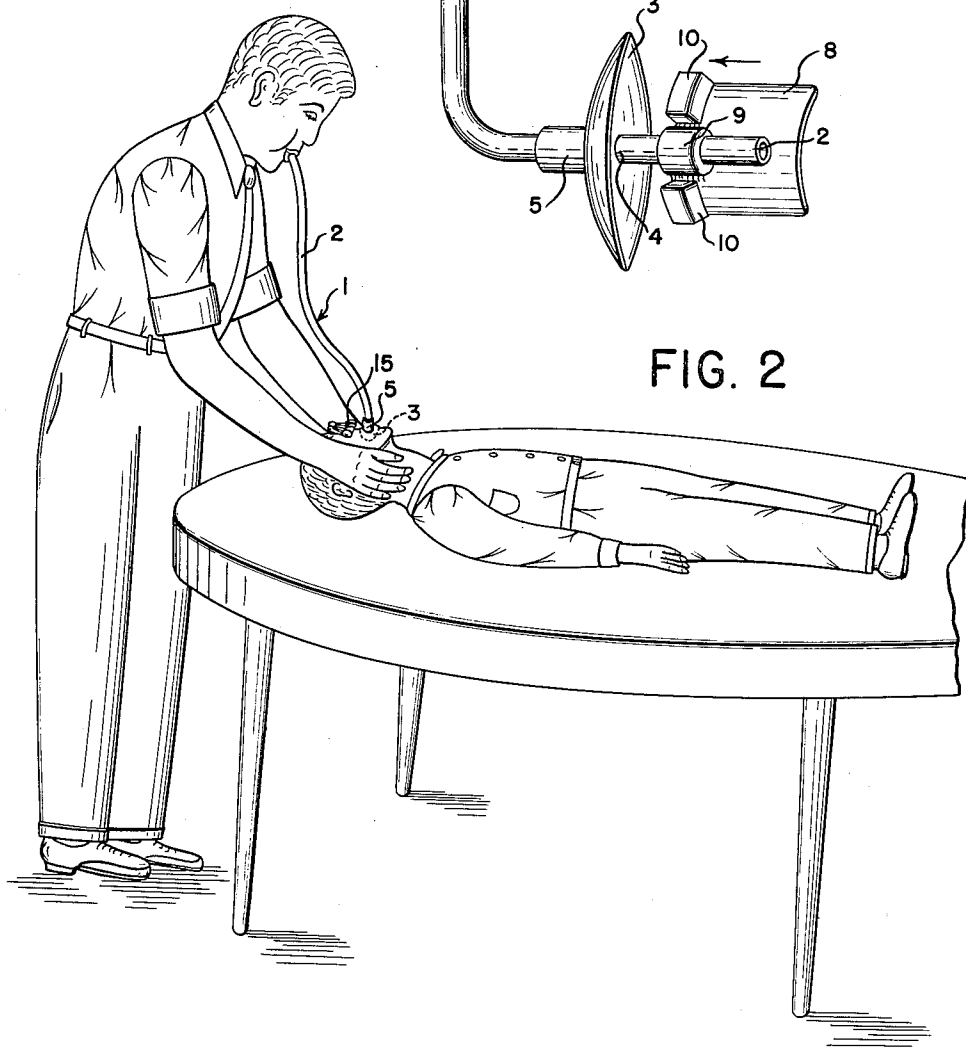
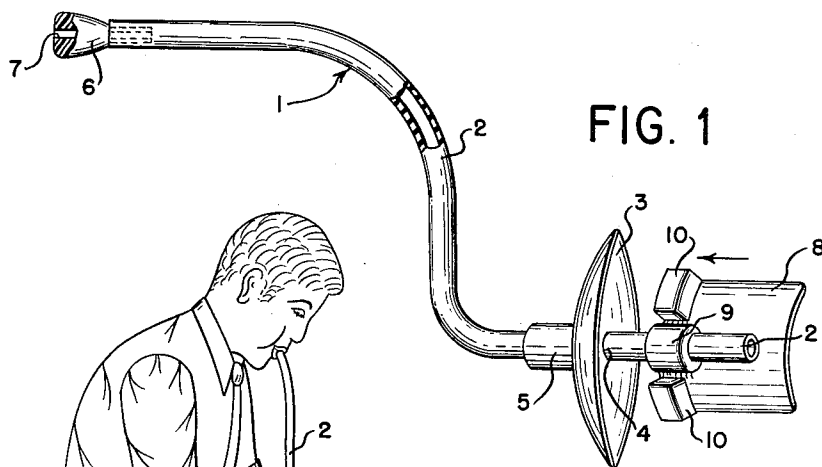
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3,089,485

MOUTH-TO-AIRWAY ARTIFICIAL RESPIRATION DEVICE

Filed July 15, 1960

2 Sheets-Sheet 1



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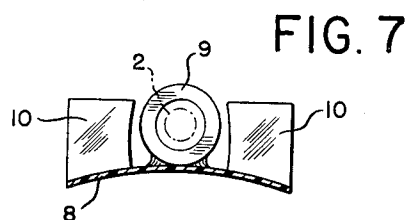
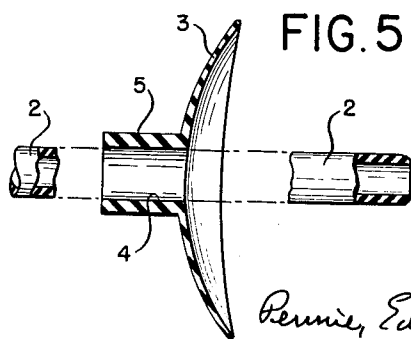
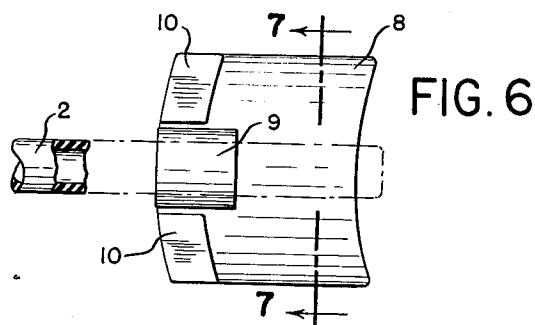
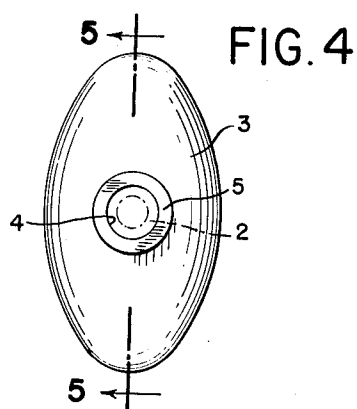
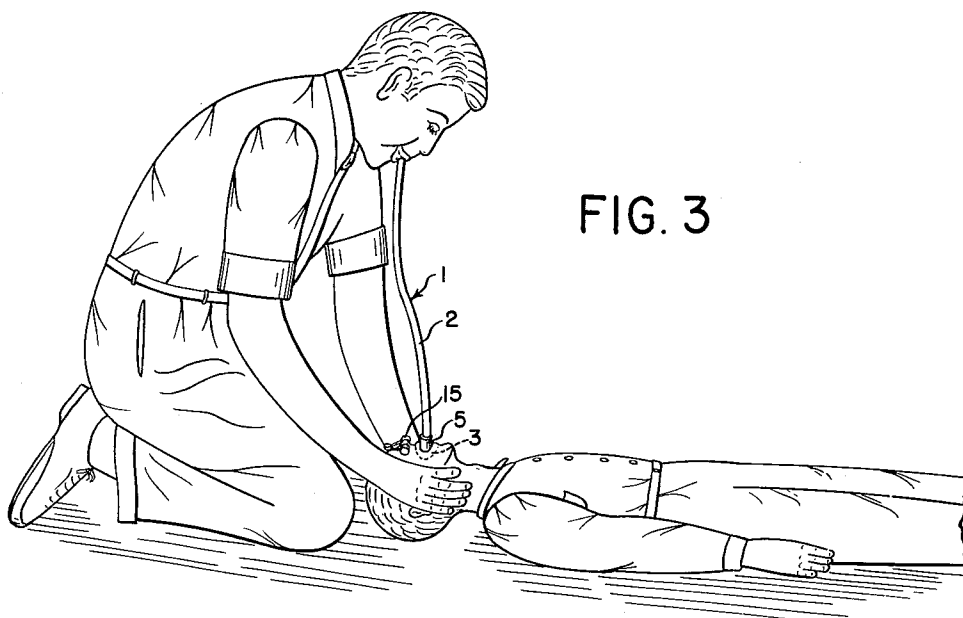
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MOUTH-TO-AIRWAY ARTIFICIAL RESPIRATION DEVICE

Filed July 15, 1960

2 Sheets-Sheet 2



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3,089,485

MOUTH-TO-AIRWAY ARTIFICIAL RESPIRATION DEVICE

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Filed July 15, 1960, Ser. No. 43,127

5 Claims. (Cl. 128—29)

This invention relates to an improved device for effecting mouth-to-airway artificial respiration.

Since Biblical times the mouth-to-mouth method has been used to effect artificial respiration in babies. It is also effective in adults, but due to understandable hesitancy on the part of an operator to place his mouth in direct contact with the mouth of a moribund human, it has been frequently avoided.

Mouth-to-mask and mouth-to-airway devices and techniques are generally well known, but they have not superseded the mouth-to-mouth method for the reason that they are rarely at hand in emergencies being generally expensive and requiring trained operators.

It is the principal object of the present invention to provide a simple and inexpensive mouth-to-airway device which is safe for inexperienced operators to use and the cost of which should enable its wide availability for adoption and use.

The mouth-to-airway devices heretofore proposed and known generally have employed modified Connell oropharyngeal airways of metal welded or fused together with the tips faced in opposite directions, forming a rigid "S-shaped" instrument of metal or vulcanized rubber, as the case may be (see The New England Journal of Medicine, vol. 258, No. 14, April 3, 1958, pp. 671-77). More recently there has been placed on the market a semi-rigid unitary molded plastic (polyethylene) airway having generally the S configuration of the above-described two-united Connell airways, but having in addition an integral cup-like flange adapted to be pressed over the patient's face about the lips to prevent air leakage while the operator is blowing.

The principal disadvantages and indeed the dangers inherent in the use of the S configuration of two united airways and the similarly S-shaped molded plastic airway reside principally in the lack of provision for adjustment of the tip portion to be placed in the patient's mouth, and the rigidity or semi-rigidity of the said tip. In the case of the molded plastic airway in order to occlude the lips with the fixed and unitary cup-like flange, it is necessary to insert the tip some four inches into the patient's mouth. This could set up inhibitory impulses to respiration and also could injure the delicate tissues around the entrance to the trachea. Since no adjustment is provided for moving or sliding the cup along the tip, it is necessary to force the tip into the patient's mouth its full permanent length in order to occlude the lips and thus prevent air leakage while the operator is blowing.

Then, too, in the case of the said molded plastic airway just above described, the operator's mouth portion is located only some two inches from the cup-like portion when reviving adults. Thus the mouth and lips of the operator are required to be positioned much too close to a supine patient's face and mouth for the operator's comfort, while he is blowing. Under such circumstances, it is difficult for the operator simultaneously to occlude the patient's nose, watch the patient's chest movement, hold the patient's head back with jaw and chin upward ("sniffing position") with the hands while pressing the cup-flange over the patient's lips to prevent air leakage. Moreover, in the absence of adjustability of the cup-flange along the tip the airway will not fit many adult patients, and much less so children.

Another form of mouth-to-airway device placed upon

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the market is of plastic consisting of three parts, two separate cup-like elements joined by a short stiff tube, and wherein the cups each are provided with a central opening and cylindrical boss over which the stiff tube may be slidably fitted to provide an airway from cup to cup. This construction while avoiding the dangers attendant upon the use of the S-shaped airway described above, fails to provide the advantages of the mouth-to-airway of the present invention as will be understood from the description to follow.

The improved mouth-to-airway device of the present invention is inexpensive to manufacture and overcomes the difficulties and disadvantages of the prior proposed devices in that it provides an oval mouthpiece of thin flexible material having a central opening and which is adapted to be easily inserted and retained in the subject patient's mouth between the inner portions of the upper and lower lips and the front surfaces of the upper and lower front teeth. A flexible tubing is disposed in the said mouthpiece opening in adjustable but restrained slideable friction engagement therewith. Thus at once air leakage is prevented without the necessity of occluding the patient's outer lips, but, more importantly, the tubing may be quickly adjusted in the mouthpiece to accommodate the patient's mouth and throat dimensions. In this way, by relative movement of said mouthpiece and tubing preadjustment may be made of the distance the tubing shall extend into the patient's mouth over the tongue and in proximate relation to the trachea, but not in aggravating contact with the delicate tissues thereabout.

Referring to the drawings which illustrate a preferred embodiment of the invention:

FIG. 1 is a view partly in perspective of a mouth-to-upper airway device in accordance with the invention including a tongue depressor;

FIG. 2 illustrates a manner of effecting mouth-to-upper airway artificial respiration with the device of the present invention, the subject being supine on a table and the operator standing at the head of the patient;

FIG. 3 illustrates the use of a device in accordance with the invention with the patient supine on the ground, and the operator kneeling at the subject's head;

FIG. 4 is a top view of one form of oval disk-like flexible mouthpiece adapted to be inserted in the patient's mouth between the inner portions of the upper and lower lips and the front surfaces of the upper and lower front teeth;

FIG. 5 is a sectional view of the flexible mouthpiece of FIG. 4 and illustrates the manner in which the flexible tubing providing a blow-way is slidably arranged in the central opening of the mouthpiece;

FIG. 6 is a top view of a form of tongue depressor which may be used with the device of the present invention; and

FIG. 7 is a view partly in section of the tongue depressor of FIG. 6.

In the drawings, FIG. 1 shows the mouth-to-upper airway device 1 of the invention as comprising a flexible tubing 2 preferably of rubber, and of a length sufficient to enable use of the device with the operator standing as shown in FIG. 2 or kneeling as shown in FIG. 3. At one end of the tubing 2 there is arranged an oval disk-like mouthpiece member 3 of flexible material, preferably rubber, having a central opening 4 and at one side thereof a cylindrical boss 5 through which the flexible tubing 2 may be inserted and frictionally restrained to provide ready preadjustment of the distance said tubing shall extend into the subject's mouth over the tongue and into the mouth cavity, not exceeding approximately two inches and not beyond the uvula, thus avoiding aggravating contact with the delicate tissues about the epiglottis.

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A rigid bit 6 having a central opening 7 is adapted to be inserted and retained in the tubing 2. The bit 6 is so shaped as to be readily retained in the operator's mouth between the upper and lower teeth.

Optionally a mouth depressor 8 in the form of a segment of a cylinder and providing a support for an integral hollow cylinder member 9 is adapted to be supported on the tubing 2 and restrained in adjusted position near the mouthpiece 3. The bosses 10 may provide a support for the upper and lower front teeth of the subject, thus keeping the jaws open and preventing the teeth of the subject to close upon the tubing 2 and thus close the air passage therein.

The oval mouthpiece member 3 is adapted to be wholly inserted and retained in the subject's mouth between the inner portions of the upper and lower lips and the front surfaces of the upper and lower front teeth, as generally illustrated in FIGS. 2 and 3. In this way, air leakage is prevented from the subject's mouth without the necessity of occluding the subject's outer lips. Moreover, by sliding the mouthpiece 3 along the tubing 2 the device may be quickly adjusted to accommodate the subject's mouth and throat dimensions. The tubing 2 should not protrude beyond the mouthpiece 3 more than approximately two inches, for the reasons stated above.

The advantages of the device illustrated in FIG. 1 are apparent from the illustrations shown in FIGS. 2 and 3.

It will be observed that in FIG. 2 the operator may comfortably stand at the head of the supine subject without requiring proximity of the face and mouth of the operator to the face and mouth of the subject. In FIG. 3 the operator is shown in the kneeling position at the head of the supine subject and it will be observed, as shown in FIG. 2, the operator's face and mouth are comfortably removed from the face and mouth of the subject.

In both the illustrations of FIGS. 2 and 3, it will be observed that the nostrils of the subject's nose are closed by means of a spring clip 15. Thus, the operator may comfortably hold the subject's head back with the jaw and chin upward (sniffing position) while blowing and observing the subject's chest movement.

The form and construction of the oval mouthpiece member 3 is shown in FIGS. 4 and 5. In FIG. 5, a sectional view, the disposition and construction particularly of the cylindrical boss 5 is shown so as to make clear the manner in which the oval mouthpiece member 3 is supported on the flexible tubing 2 along which it may be moved yet restrained in mutual frictional engagement.

FIGS. 6 and 7 illustrate the construction of the optional tongue depressor 8, FIG. 7 showing clearly the arrangement and disposition of the cylinder member 9 and the bosses 10. FIG. 6 illustrates the manner in which the flexible tubing 2 may be inserted into the cylinder member 9 for the purpose of supporting and restraining the tongue depressor 8 and with the tubing 2 extending into the mouth cavity a distance not exceeding approximately two inches.

Among the many advantages of the apparatus of the present invention is its compactness when not in use. The flexibility of all the component parts make it readily foldable and easily storable in a very limited space yet it is instantly available for use. The improved mouth-to-upper airway device of the present invention may be made, for example, in a size especially useful for small children and because of the compactness of the device when folded induces and enables the carrying of both adult and small children sizes for emergency purposes, for example, by firemen, policemen, ambulance attendants and the like.

Modifications and changes may be made in the embodiment illustrated without departing from the essence of the invention or the scope of the following claims.

I claim:

1. A mouth-to-upper airway device for effecting artificial respiration comprising an oval disk-like mouthpiece

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member of flexible material having a central opening therein and adapted to be wholly inserted and retained in a subject's mouth between the inner portions of the upper and lower lips and the front surfaces of the upper and lower front teeth, a continuous length of hollow cylindrical flexible tubing adjustably and slidably arranged in said central opening of the mouthpiece, said tubing having a total length of the order of eighteen inches and adapted to be frictionally restrained in said opening and to protrude from said mouthpiece at one side thereof a distance of the order of approximately two inches during useful application of the airway.

2. A mouth-to-upper airway device for deflecting artificial respiration comprising an oval disk-like mouthpiece member of flexible material having a central opening therein and adapted to be wholly inserted and retained in a subject's mouth between the inner portions of the upper and lower lips and the front surfaces of the upper and lower front teeth, a hollow cylindrical boss disposed on said mouthpiece about said central opening, the size and shape of the opening in said boss being substantially that of the said central opening of said mouthpiece, a continuous length of hollow cylindrical flexible tubing adjustably and slidably arranged in said boss and said central openings, said tubing having a total length of the order of eighteen inches and adapted to be frictionally restrained in said openings and to protrude at one side thereof a distance of the order of approximately two inches during useful application of the airway.

3. A mouth-to-upper airway device for effecting artificial respiration comprising an oval disk-like mouthpiece member of flexible material having a central opening therein and adapted to be wholly inserted and retained in a subject's mouth between the inner portions of the upper and lower lips and the front surfaces of the upper and lower front teeth, a hollow cylindrical boss disposed on said mouthpiece about said central opening, the size and shape of the opening in said boss being substantially that of the said central opening of said mouthpiece, a continuous length of hollow cylindrical flexible tubing adjustably and slidably arranged in said boss and said central openings, said tubing having a total length of the order of eighteen inches and adapted to be frictionally restrained in said openings and to protrude at one side thereof a distance of the order of approximately two inches during useful application of the airway, and a bit disposed on said tubing at the end distant from said mouthpiece adapted to be retained in an operator's mouth between the upper and lower teeth.

4. A mouth-to-upper airway device for effecting artificial respiration comprising an oval disk-like mouthpiece member of flexible material having a central opening therein and adapted to be wholly inserted and retained in a subject's mouth between the inner portions of the upper and lower lips and the front surfaces of the upper and lower front teeth, a hollow cylindrical boss disposed on said mouthpiece about said central opening, the size and shape of the opening in said boss being substantially that of the said central opening of said mouthpiece, a continuous length of hollow cylindrical flexible tubing adjustably and slidably arranged in said boss and said central openings, said tubing having a total length of the order of eighteen inches and adapted to be frictionally restrained in said openings and to protrude at one side thereof a distance of the order of approximately two inches during useful application of the airway, a tongue depressor member slidably disposed and frictionally restrained on said tubing closely adjacent said mouthpiece on the tubing protruding at said one side of the mouthpiece.

5. A mouth-to-upper airway device for effecting artificial respiration comprising an oval disk-like mouthpiece member of flexible material having a central opening therein and adapted to be wholly inserted and retained in a subject's mouth between the inner portions of the

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upper and lower lips and the front surfaces of the upper and lower front teeth, a length of flexible tubing providing a blow-way slidably arranged in the central opening of said mouthpiece and adapted to be frictionally restrained therein to provide ready preadjustment of the distance said tubing shall extend into the subject patient's mouth over the tongue and into the mouth cavity not exceeding approximately two inches and not beyond the uvula thus avoiding aggravating contact with the delicate tissues about the epiglottis, said tubing having an overall length not exceeding twenty-four inches, sufficient to enable an operator to freely manipulate and tilt back the patient's head, and to hold the patient's jaw forward with his hands, while either standing or kneeling at the head of the supine patient, and without requiring proximity of the operator's mouth to that of the patient's when blowing through the tubing, a rigid bit having a central open-

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ing adapted to be retained in the operator's mouth between the upper and lower teeth of the operator and adapted to be inserted in said tubing at the end thereof and restrained in said tubing.

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