

Aug. 8, 1961

J. O. ELAM ET AL  
FACE MASK

2,995,131

Filed July 3, 1958

3 Sheets-Sheet 1

FIG. 2.

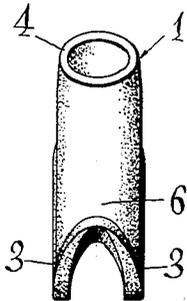


FIG. 1.

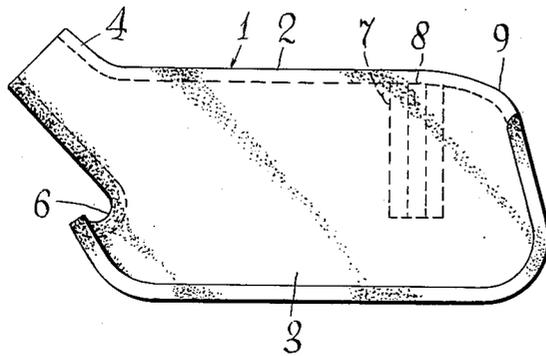


FIG. 3.

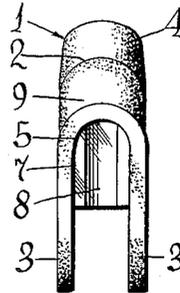


FIG. 4.

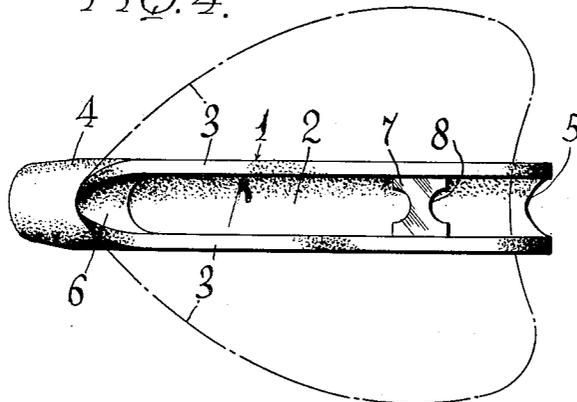


FIG. 5.

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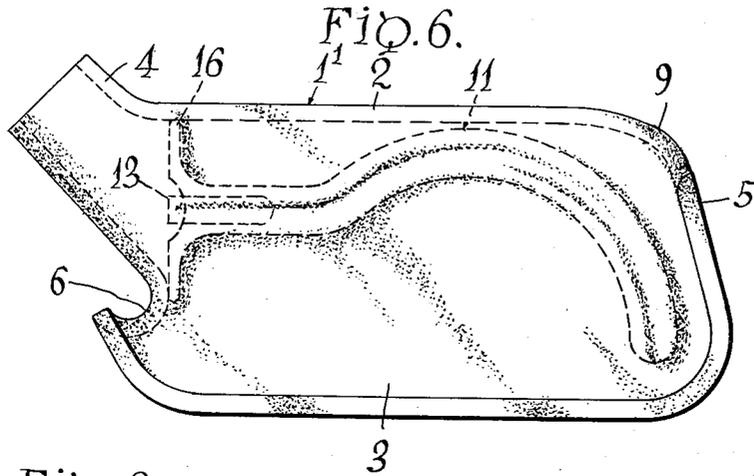


FIG. 8.

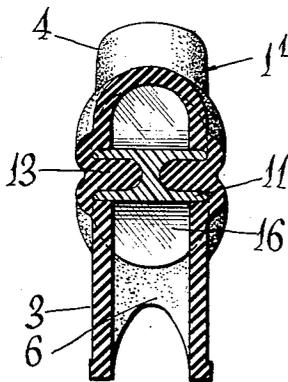


FIG. 7.

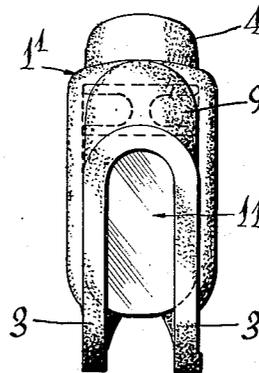
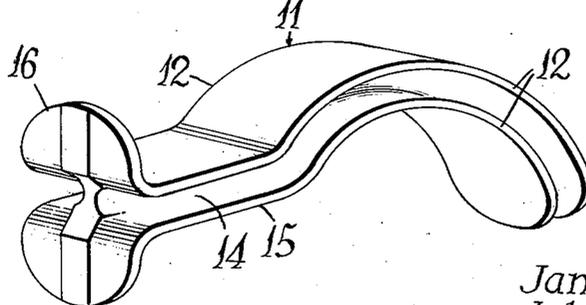


FIG. 9.



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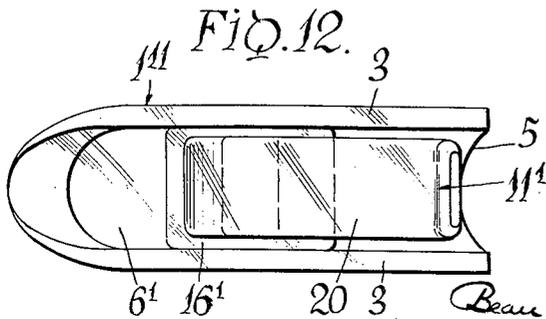
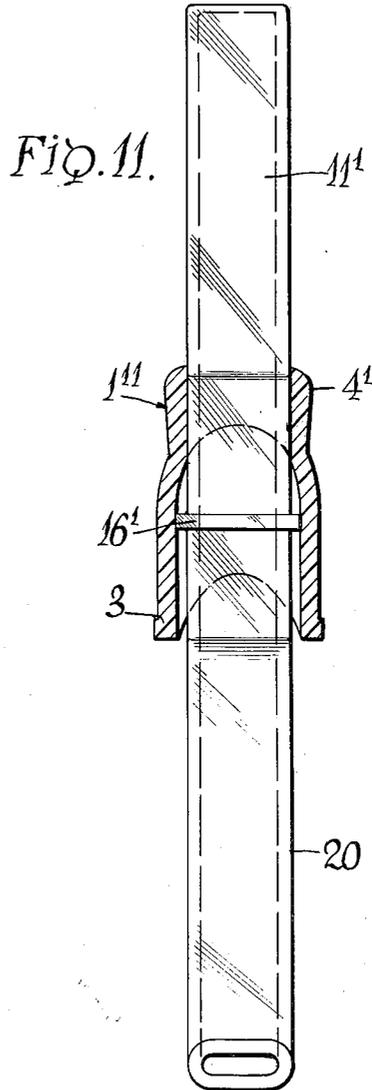
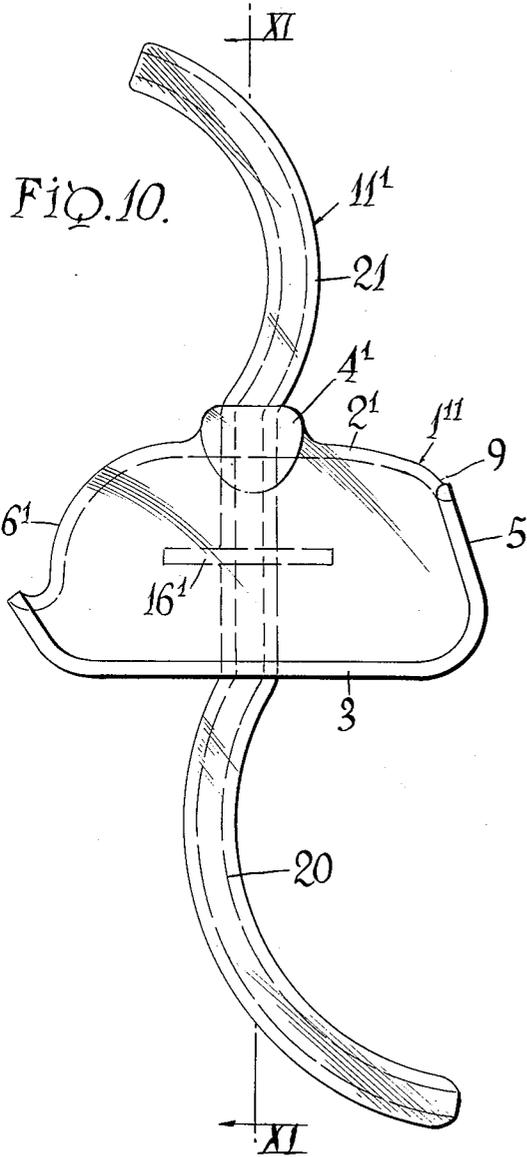
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2,995,131  
FACE MASK

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6 Claims. (Cl. 128—29)

This invention relates to a new and useful oronasal face mask adapted for use in bag-mask, bellow-mask and mouth-to-mask procedures of artificial respiration as well as for use in inhalation anesthesia.

It is a primary object of this invention to provide a relatively simple and inexpensive mask which is easily used, and which normally is folded and assumes a relatively flat shape, whereby it is readily carried and packaged.

Another object of this invention is to provide an oronasal face mask which causes the rescuer, in mouth-to-mask resuscitation, to assume the recommended position over and somewhat above the head of the victim.

Still another object of this invention is to provide a face mask having the aforesaid characteristics and which also comprises a carrying case for pharyngeal airways, and the like.

It is also an object of this invention to provide an oronasal face mask which closely fits a wide variety of face types and contours, and which provides a minimum of mask dead space.

An oronasal face mask constructed in accord with our invention is characterized by the provision of an elongated bridge portion, a pair of opposed resiliently flexible wings extending from the bridge portion in side by side relation, the wings normally assuming a folded position relative to the bridge portion and being spread apart in use to fit the face of a victim, and a mouthpiece projecting from the bridge portion.

The foregoing and other objects, advantages and characterizing features of a face mask constructed in accord with our invention will become clearly apparent from the ensuing detailed description of certain presently preferred forms thereof, taken in conjunction with the accompanying drawings illustrating the same wherein like reference numerals denote like parts throughout the various views and wherein:

FIG. 1 is a side elevational view of an oronasal face mask of our invention, carrying a mouth prong in the form of a bite block;

FIG. 2 is an elevational view of one end thereof;

FIG. 3 is an opposite end elevational view thereof;

FIG. 4 is a bottom plan view thereof, illustrating in broken lines the shape assumed by the mask when in use, as compared to its normally flat shape, illustrated in solid lines, when not in use;

FIG. 5 is a view illustrating the manner of use of the mask of FIGS. 1-4 in mouth-to-mask resuscitation;

FIG. 6 is a view of the mask modified to comprise a carrying case for a conventional oropharyngeal airway;

FIG. 7 is an end elevational view thereof;

FIG. 8 is a transverse sectional view thereof;

FIG. 9 is a perspective view of the airway carried within the mask in FIGS. 6-8;

FIG. 10 is a side elevational view of another modification of the mask of our invention, adapted for use alone or with another type of airway;

FIG. 11 is a transverse sectional view thereof, taken about on line XI—XI of FIG. 10; and

FIG. 12 is a bottom plan view thereof.

Referring now in detail to the embodiment illustrated in FIGS. 1-5, there is shown a mask of our invention, generally designated 1. Mask 1 is formed as an integral, one-piece construction of resiliently flexible material, such as rubber or a synthetic plastic, to provide an elongated bridge portion 2, a pair of opposed wings 3 extending in

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side by side relation from opposite sides of the bridge portion 2, and a mouthpiece 4 projecting from the bridge portion. Bridge portion 2 has a length several times the width thereof, as clearly evident from FIG. 4 of the drawings.

Wings 3 are disconnected along their outer side edges and across one end of the mask, indicated at 5, whereby the mask is open at these points. The wings 3 are joined across the opposite end of the mask, as indicated at 6, whereby the mask is closed at this point.

With this construction the mask, when not in use, assumes the folded, generally flat shape illustrated in FIGS. 1-3, and in solid lines in FIG. 4. This is clearly distinguished from the conventional cone shaped or rounded type of mask, and provides a mask which is conveniently carried in the pocket, causing no more distortion or bulging than for example a tobacco pouch or the like, and which is readily packaged, transported, and stored. The ease with which this mask can be transported and stored is extremely advantageous.

In use, the mask is applied over the nose and mouth of the victim, with the open end 5 being adjacent the victim's chin and the closed end 6 covering the bridge of the victim's nose. The wings 3 flex away from each other about the hinge provided by bridge portion 2, as to the position shown in broken lines in FIG. 4, being spread apart to fit and conform to the face of the victim on opposite sides of the centerline thereof. The resiliency of the mask, and the joining wall 6, cause the mask to return to and assume its flat position or condition in repose and this, with the resilient flexibility of wings 3, assures a good fit to a wide variety of face types and contours, including the edentulous individual. Even small faces can be fitted by allowing the end 5 of the mask to overhang the chin.

Connection then is made to the mouthpiece 4, to alternately insufflate the victim's lungs and permit them to expire their contents. In the mouth-to-mask method, illustrated in FIG. 5, the rescuer places his lips over the mouthpiece 4 and exhales into the mask and through either the nose or the mouth, as the case may be, to inflate the victim's lungs. The rescuer then removes his lips from mouthpiece 4 and inhales while the victim exhales. This process is repeated, in a manner known in the art. Obviously, while particularly adapted thereto, the mask of our invention is not limited to such method of resuscitation.

It is a feature of our invention that mouthpiece 4 projects obliquely upwardly from bridge portion 2, at for example approximately a 45° angle, and away from the open, chin end 5 of the mask, automatically leading the rescuer to assume the position illustrated in FIG. 5, over and somewhat above the head of the victim. This is the recommended position for this type of resuscitation, because it enables the rescuer to view the chest of the victim and thereby visually determine when sufficient inflation of the victim's lungs has occurred. It also enables the rescuer to hold the mask against the face and simultaneously hold the mandible in an elevated position so as not to obstruct the patient's airway. This latter is important, because if the mandible is not supported, and is permitted to relax, it will slide posteriorly allowing the anterior soft parts (tongue, epiglottis, and pharyngeal muscles) to approximate the posterior pharynx, obstructing the upper airway of the victim.

Of course, mouthpiece 4 can be varied to fit other connection arrangements, for use in other methods of resuscitation and/or inhalation anesthesia, and if desired it can be positioned at other points along bridge portion 2, as illustrated for example in FIG. 10.

In addition, it is a particular advantage of the mask of our invention that, by virtue of its normally folded con-

struction, with the opposed wings spreading to fit the face, most of the inner surface of the mask is placed against the victim's face, leaving only a minimum of dead space in the mask, on the order for example of 20 to 30 cc.

To assure an even better fit, bridge portion 2 is curved downwardly at the end 5, as illustrated at 9, whereby the bridge end 9 is flexed inwardly as wings 3 are spread outwardly to cup the mask to the facial contour of the victim and thereby provide a better fit, the mask assuming for example the position illustrated in broken lines in FIG. 4.

To maintain the victim's mouth open and provide an airway therethrough we provide a mouth prong or bite block 7 carried by and projecting at generally a right angle to the lengthwise extent of bridge portion 2, between wings 3, for insertion in the victim's mouth, the prong having grooves 8 in opposite sides thereof to insure a pathway for air at all times.

FIGS. 6-8 show a modified embodiment of the mask, generally designated 1', which is constructed in the same manner as the mask of claims 1-5, excepting that it is slightly modified to act as a carrying case for a conventional oropharyngeal airway 11, as illustrated in FIG. 9, which per se comprises no part of this invention. As illustrated by the broken line showing in FIG. 6, the oropharyngeal airway 11 is conveniently carried between the opposite side walls 3 of the mask 1', fitting against the inner wall of bridge portion 2, and if desired the inner surface of side walls 3 can be grooved to receive the opposite side edges 12 of airway 11. To further support airway 11 in position, the inner surfaces of side walls 3 are formed with inwardly projecting, opposed protuberances or embossments 13 which are adapted to fit in the air passages or grooves 14 extending along the opposite sides of the airway 11, in the flat portion 15 adjacent end flange 16, as clearly illustrated for example in FIG. 8, whereby the airway is securely held in position while being readily removed from the mask for insertion in the victim's mouth, prior to use of the mask. The airway is used in the conventional manner, and the mask 1' then is applied and used to the face of the victim in the manner illustrated in FIG. 5. The mask can comprise a carrying case for a conventional nasopharyngeal airway, in similar manner.

It will be appreciated that the mask can be made of any suitable material providing the requisite flexibility and resilience to cause it to return to its normally generally flat shape, and that wings 3 can have a slightly irregular, sculptured surface, to better fit the facial contour of a victim, without departing from a generally flat shape.

Also, the mask can be made of a transparent material such as a suitable synthetic plastic, as illustrated in FIGS. 10-12, which transparency is of significance because it enables the rescuer to see the presence of blood, vomitus or other clogging matter beneath the mask and immediately remove the same.

The mouthpiece arrangement illustrated in FIGS. 1-5 and 6-8 properly positions the rescuer, and is particularly convenient for use where the victim and the rescuer are at different levels, as for example with patients in bed. Where the rescuer and the victim are at about the same ground level, experience has indicated that it is more convenient when the mouthpiece is positioned more centrally of the mask. Such an arrangement is provided by the mask 1'' illustrated in FIGS. 10-12, which mask has a closed end 6' and a mouthpiece 4' positioned generally centrally along bridge portion 2 and projecting outwardly therefrom. The mask 1'' otherwise is substantially identical to masks 1 and 1' and possesses the various advantages provided thereby as previously enumerated, the main difference being the repositioning of the mouthpiece from adjacent one end of the bridge portion to adjacent the center thereof for greater convenience in certain situations.

The centrally positioned mouthpiece 4' of mask 1'' also enables use of the mask with a pharyngeal airway of the type illustrated at 11'. Such a double airway has one portion 20 adapted to be inserted into the patient's oropharynx, and an external portion 21 adapted to slide through and project from the mouthpiece 4', as illustrated in the drawing. A central retaining flange 16' also is provided on the airway. The airway is hollow, and the rescuer blows through the external portion 21. The mask 1'' is used with such an airway 11' when excessive leak occurs if the airway is used alone. The mask is held firmly in position against the patient's face, and mouthpiece 4' is designed to closely embrace the airway, whereby excessive leaks are avoided.

Of course, mask 1'', like masks 1 and 1', can be used alone, without any bite blocks or airways, and can be used with bite blocks and airways other than those specifically disclosed herein, which latter are per se no part of our invention and are included for illustrative purposes only.

Also, the mouthpiece can be positioned at any point along bridge portion 2 or 2', even adjacent the open end 5 of the mask, depending upon the use for which the particular mask is intended.

The mask can be made of any suitable material, natural or synthetic, which material can be reinforced, and can be rendered conductive as for use in inhalation anesthesia.

While we have illustrated and described only two presently preferred embodiments of our invention, we do not intend to be limited thereto and recognize that variations and modifications will occur to those skilled in the art without departing from the spirit of our invention and the scope of the appended claims.

Having fully disclosed and completely described our invention, together with its mode of operation, what we claim as new is:

1. An oronasal face mask comprising, a member of resiliently flexible material formed to provide an elongated bridge portion and a pair of normally substantially flat wings on opposite sides thereof, said bridge portion having a length several times the width thereof, said wings normally being folded about said bridge portion and lying in substantially parallel planes in side by side relation to each other, the outer ends of said wings normally being spaced apart no more than substantially the width of said bridge portion, whereby said mask normally is folded and relatively flat in shape when not in use, said wings being resiliently flexible away from each other for spreading apart and conforming to the face of a victim when in use, and a mouth piece projecting from said bridge portion and defining an opening through said bridge portion in communication with the space between said wings, said bridge portion being otherwise imperforate.

2. A mask as set forth in claim 1, wherein said mask is open along the outer side edges of said wings and along one end of said mask.

3. A mask as set forth in claim 1, wherein said mouthpiece extends upwardly from adjacent the midpoint of said bridge portion.

4. A mask as set forth in claim 2, wherein said mouthpiece extends obliquely upwardly away from said one end of said mask.

5. A mask as set forth in claim 2, wherein said bridge portion adjacent said one end of said mask is curved lengthwise thereof toward said outer side edges of said wings, whereby as said wings are spread apart to receive the face of a victim said bridge portion at said one end of said mask is flexed inwardly to cup the mask and closely fit the chin of a victim.

6. A mask as set forth in claim 2, wherein the outer side edges of said wings curve upwardly toward said bridge portion adjacent said opposite end of said mask.

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