

March 17, 1970

B. A. E. ANDERSSON ET AL

3,500,825

MOUTH COVER

Filed Dec. 19, 1966

4 Sheets-Sheet 1

FIG. 1

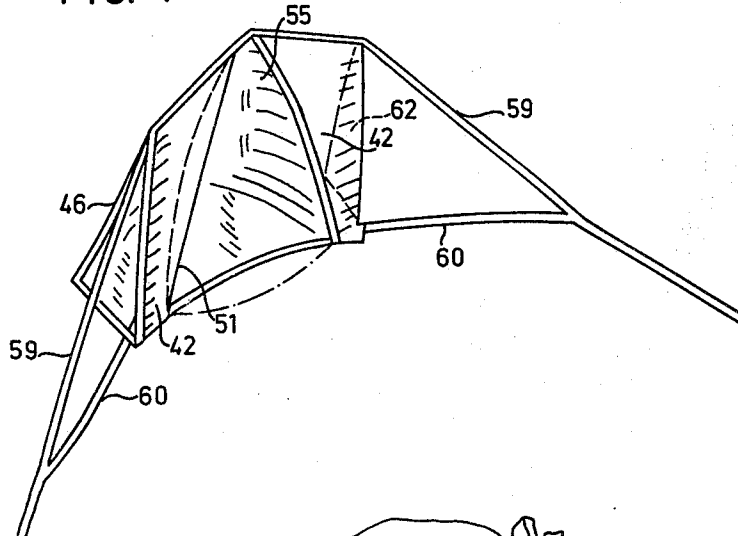
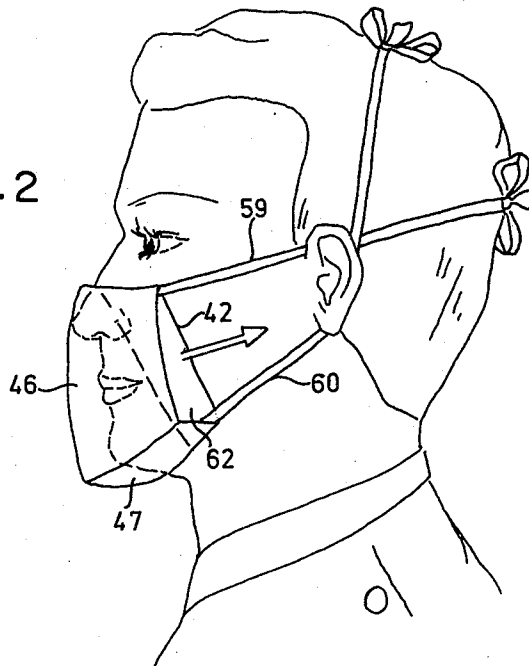


FIG. 2



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4 Sheets-Sheet 2

FIG. 3

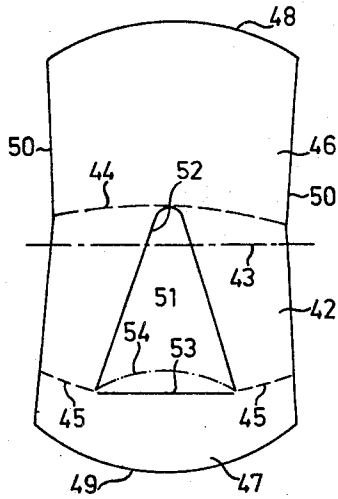


FIG. 4

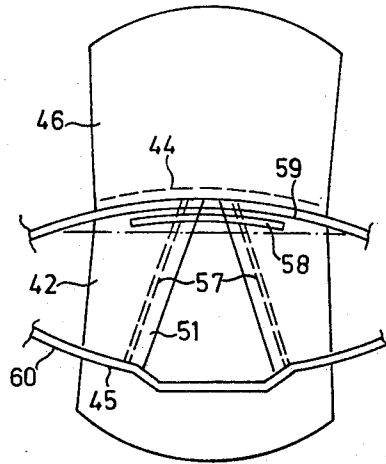


FIG. 5

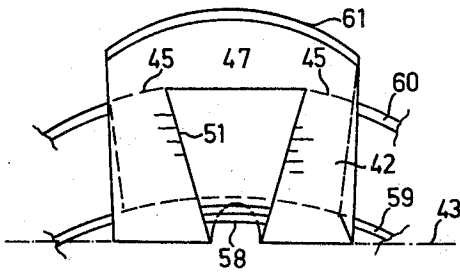
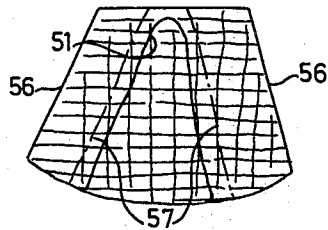


FIG. 6



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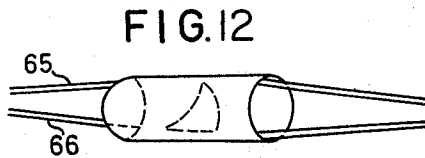
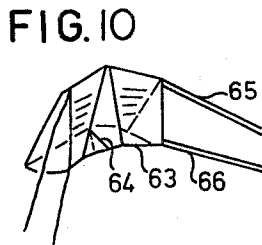
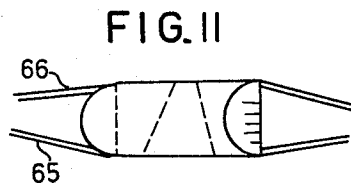
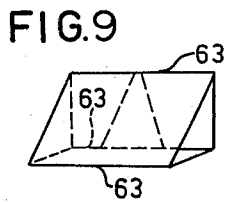
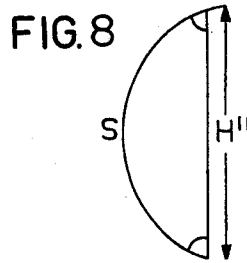
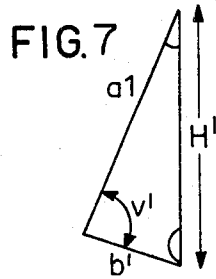
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4 Sheets-Sheet 3



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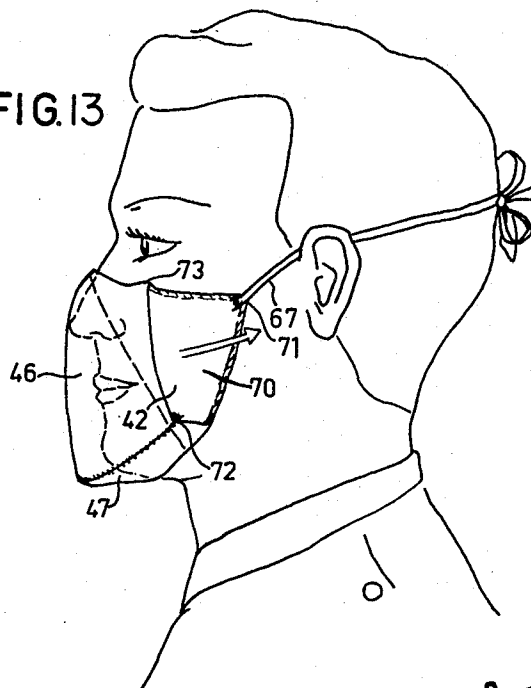
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MOUTH COVER

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4 Sheets-Sheet 4

FIG. 13



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MOUTH COVER

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16,996/65

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U.S. Cl. 128-139

10 Claims

ABSTRACT OF THE DISCLOSURE

A mouth cover having a shield wall which covers the nose, mouth and adjacent portions of the face and extends downwardly below the jaw-bone and also contains an inner wall having an opening to receive the passage of the nose and mouth therethrough. The inner wall is connected to the shield wall at the upper and lower portions thereof. The shield wall extends forward of the nose and mouth to define a through air channel in front of the nose and mouth. This air channel extends from one side of said shield wall to the other and guides the flow of inhalation and exhalation air for movement between said shield and inner walls from and to the opposite sides of said air channel.

The present invention relates to a mouth cover which is primarily intended for dentists and their assistants, doctors, nurses and similar persons.

A mouth cover of the most conventional type consists of a piece of cloth which is secured over the nose and the mouth. Instead of cloth the cover may be made of an air tight or air filtering paper on non-woven material which in its form and manner of attachment corresponds to the cloth cover. Another common mouth cover consists of a shield of celluloid which is placed over the nose and mouth.

The mouth cover types referred to above, however, are more or less unsatisfactory. One of the most dominant disadvantages is that the resistance to breathing is relatively great and upon longer periods of use this may become extremely tiring. Furthermore, some of the covers known are so formed that they do not effectively prevent the exhalation air from flowing upwardly towards the glasses of the operator which will result in that condensation deposits on the glasses. The mouth covers known are furthermore generally so shaped that the exhalation air of the operator is not possible to direct in desired direction but will flow outwardly in a direction towards the patient which may be irritating for the patient if the operator has a bad breath. Furthermore, dentists are often very restrained as they are aware of the risk of irritating the patient with a bad breath and, therefore, the dentist often attempts to reduce his breathing activity when he is breathing near the patient. Naturally, this may be very tiring for the dentist and may further cause him damages as to his health.

The general object of the invention is, therefore, to provide a mouth cover which, as far as possible, eliminates the disadvantages of the mouth covers known. In accordance with the invention this object is attained by means of a mouth cover which has the characteristics given in the annexed claims. Thus, the mouth cover according to the invention forms in its operating position a chamber located in front of the nose and mouth of the person carrying the cover, and this chamber is preferably at both ends formed with an outlet adapted to direct the exhalation air obliquely rearwardly, preferably in a direction towards the region ahead of and outside the ears. With the cover according to the invention, breathing air

will thus be sucked-in merely at the outer ends of the cover and will, with a very little flow resistance to flow, pass through the free passage between the shield and the bottom wall in front of the nose and mouth. When exhaling, the air will be blown out against the inside of the shield which will catch any possible liquid particles, and thereafter the air will flow freely to both sides through the channel formed and will be exhausted obliquely rearwardly so that the exhalation air will not irritate the patient nor will it transfer infections from the operator.

The mouth cover according to the invention has important advantages due to the fact that the inhalation air may flow through the free channel between the shield and the bottom wall and the face wall so that resistance of breathing will almost not be noticeable, also for longer periods of use.

By means of a proper form and attachment of the cover there are no difficulties to provide a channel with a through-flow area which is great enough for the purpose intended. The construction of the cover will also enable relatively great and short through-flow channels which result in a rapid exchange and mixing of the fresh inhalation air with the small, possibly remaining volume of exhalation air in the channels of the cover.

Covers consisting of one layer cloth and paper are often subjected to a through wetting of the cover due to saliva splash and condense from the exhalation air. The wetting of the cover results in a communication between the outer and inner sides of the cover in both directions for any possible micro-organisms which sometimes may carry diseases. Accordingly, there will be a risk of infection of the operator or the patient. However, the cover according to the invention is made of a liquid repelling material which will prevent through-wetting of the cover. On the contrary, saliva splash and condense will be caught on the inside of the shield. Furthermore, the shield is neither wetting through under the influence of liquid and dirt particles on the outside of the shield.

The cover may be manufactured of a cheap material such as impregnated paper, and therefore it may be destroyed in a hygienic way by burning when it has been used only once.

The attachment of the cover by means of the strings attached to the ends of the cover will normally give a satisfactory sealing but the sealing may be improved by providing sealing members or provide means for sealing at the upper edge of the middle portion of the shield which is intended to rest against the nose.

The cover may be made in one piece, e.g. by forming of e.g. a plastic foil or a paper which will yield a certain flexibility of the cover so that it will fit to individual shapes of faces. Alternatively, the cover may consist of a cloth which is maintained in the channel form desired partly by means of the attachment strings. The best result, however, will be obtained by means of a cover according to the invention which has a rear wall connecting the upper edge of the shield and rear edge of the bottom wall with each other, said rear wall having an opening for the nose and mouth and a support for the jaw.

These and further details characterizing the invention and the advantages derived therefrom will be explained in more detail in the following description of some embodiments of the invention shown by way of example in the annexed drawings.

FIG. 1 is a view seen obliquely towards the rear side of one embodiment of the invention in its erected condition.

FIG. 2 shows the cover according to FIG. 1 in its operating position seen from the side.

FIG. 3 shows a blank for the cover shown in FIGS. 1 and 2.

FIG. 4 illustrates the attachment of attachment strings, sealing wire and a net cloth on the blank in FIG. 3.

FIG. 5 shows the blank in FIG. 4 when double-folded and the welding of the joint edge.

FIG. 6 illustrates how the net cloth is placed over the opening in the blank according to FIG. 4.

FIG. 7 is a diagrammatical end view of the cover according to FIG. 2.

FIG. 8 is a diagrammatical end view of a cover when the shield and bottom wall merge continuously into each other and form an arcuate wall.

FIG. 9 is a diagrammatical perspective view of that type of the cover shown in FIGS. 1-5 but having all edges straight.

FIG. 10 is a view seen obliquely from the rear side of the cover in FIG. 9 when bent to the operating position.

FIG. 11 shows a modification of the cover in FIG. 9 in the form of a half cylindrical tube.

FIG. 12 is a modification of the cover in FIG. 11 in the form of a cylindrical tube which in the same manner as the cover according to FIGS. 9 and 11 is adapted to fit to the shape of the face when mounted.

FIG. 13 shows a modification of FIG. 2 made of paper or cloth.

FIGURE 2 shows a mouth cover according to the invention. In the operating position, it has a shield forming the greater part of the front side of the cover and a bottom wall which extends inwardly below the lower jaw-bone. The shield and the bottom wall may be formed in one piece and merge continuously into each other to form a convex wall or to form an angle with each other in the operating position such as shown in FIG. 2. The shield and the bottom wall form parts of a single blank which is folded as shown in FIGS. 3-5 so that the shield and the bottom wall are held in a fixed position relative to each other in the erected position of the cover by means of a rear wall which in the operating position will rest against the face. The shield and the bottom wall and the rear wall respectively may be made of any suitable material which is flexible and water repellent. Preferably, the mouth cover is made of an impregnated paper or an impregnated fine-meshed cloth.

The arrangement of the shield and the bottom wall in all embodiments is such that they in the operating position form a chamber which is closed at its upper as well as lower end and is located in front of the nose and the mouth, said chamber extending to the sides and being opened at both ends provided to direct the exhalation air obliquely rearwardly as indicated by the flow arrows shown at the ends of the cover in FIG. 2. To this end the edges of said openings are preferably located in a somewhat inclined plane which is substantially at right angles to the adjacent portion of the lower jaw-bone as illustrated in FIG. 2.

The embodiment of the mouth cover shown in FIG. 2 has a completely satisfactory ventilation, that is practically all of the exhalation air will leave the cover before the following inhalation starts. However, in order to increase this ventilation it is possible to provide an inclined baffle wall in front of the mouth and nose openings, and this wall may be located on the inside of the shield portion or the shield in all embodiments of the invention.

Along the inner side of the upper edge of the shield there may be secured an upper attachment string, and inside this string there may be a deformable member in the form of a bendable metal wire intended to enable the forming of the shield to sealing engagement with the individual nose shape and the surrounding portions of the face. This member may be used in all embodiments of the invention.

The mouth cover according to FIG. 1 has the advantage that its form in the operating position will be fixed by the

rear wall 42 which furthermore forms a protection against the risk that condense from the exhalation air will deposit on those portions of the face covered by the rear wall.

The cover according to FIGS. 1 and 2 is made in one piece of that blank shown in FIG. 3. The blank is substantially symmetrically cut with equal portions in either side relative to the middle line 43 indicated by a dotted line. By means of an arcuate crease line 44 and two short crease lines 45 the blank is divided into a middle portion which in the operating position forms the rear wall 42 of the cover, an end portion which in the operating position forms the front side of the cover and a front side or shield 46, and a second end portion which in the operating position forms the bottom wall 42 of the cover. The edges 48, 49 of the end portion are arcuate and have an arc-shape which is somewhat stronger than the arc-shape of the crease line 44. The side edges 50 of the blank may be straight and parallel but in the example shown they are somewhat turned inwardly in order to obtain inclined side openings. Between the crease lines 44, 45 a triangular opening 51 is cut out, the upper end 52 of which being positioned at the crease line 44 whereas its bottom edge 53 is in line with the crease lines 45. In the example shown the bottom edge 45 is straight but may also be turned inwardly as indicated by a dotted line 54. The upper end of the opening may consist of a straight edge coinciding with the portion of the crease line.

As shown in FIG. 1 a net bag 55 may, if desired, be provided inside the opening 51 in the rear wall 42. The bag is secured at the side edges of the opening and is bulged into the cover in order to be located at a free distance from the nose and mouth opening. This net may originally have a flat shape and may consist of one or more layers of an air filtering cloth.

From the position shown in FIG. 6 the side edges 56 of the net are moved towards each other to the position for welding the same together along the welding lines 57 indicated by dotted lines, the net being folded so that it later on may be erected to the conical bag shape according to FIG. 1.

When the net has been secured by welding in this way to the blank according to FIG. 4, a sealing thread 58 is secured and an upper and lower attachment string 59, 60 respectively is secured to the rear wall near the crease lines 44, 45, that is the upper and lower edges of the rear wall. Due to the fact that the shape of the cover in the operating position is fixed by the rear wall and the two portions 42 respectively to the final tube form, the attachment strings may run out freely from each other at the ends of the cover and may be secured by knots individually as shown in FIG. 2. In this way a very effective attachment of the cover is enabled where the strength in the upper and lower attachment string respectively may be adjusted to obtain the best possible fitting of the cover to the face.

In the next stage of manufacture, the blank in FIG. 4 is double-folded to the position shown in FIG. 5 where the arcuate edges 48, 49 are united with each other for instance by welding or glueing to a squared shape 61. In this collapsed position the cover is stored before use.

As in the embodiment according to FIG. 5 the cover according to FIG. 2 enables a soft and easy erection of the cover to the operating position which is enabled by the arcuate or angular edge 61 at the lower edge of the shield. From the position shown in FIG. 5 the cover is simply opened by a person who inserts his fingers in the side openings 62 at the ends of the cover and forms the cover according to the crease lines 44, 45 and bends the cover to the shape shown in FIG. 10, upon pressing the cover against the face. Thereafter, the attachment strings 59, 60 are secured around the head.

The extension of the cover to the sides may be short or long. In the example shown the ends of the cover are positioned somewhat inside the yoke bones but the ends of the cover may also be positioned at a place further to the sides.

5

The out-flow at the ends of the cover shall, however, be directed obliquely rearwardly towards the region in front of and outside the ears as indicated by the flow arrow in FIG. 2.

In FIG. 7 an embodiment is shown having a rear wall, the height of which being denoted by H at the ends of the cover. The length of the shield and the bottom wall is denoted by a' and b' respectively and the angle by ν' . In FIG. 8 the shield and the bottom wall are formed by an arcuate wall c and the height between the upper and lower edge is denoted by H .

In order to obtain a suitable construction the ratio a/b and a'/b' respectively is in the region $1/5-5/1$, preferably about $2.5/1$. Naturally, the sum of a and b shall be greater than H which in its turn should be equal to or greater than h . The value of H may be in the region 4-12 cm. and as a preferred medium value it may be about 8 cm. The angle ν should be about 90° and should preferably not be greater than 120° . The same is true for a' , b' and ν' . For H the same holds true as for H and H' .

In FIGS. 9-12 are shown some simplified modifications of the cover according to FIG. 2. The cover according to FIGS. 9 and 10 has straight fold edges 63 and may, therefore, be manufactured with straight cut edges and crease lines and a straight joint edge which facilitates a simple mass production. However, the adaption to the shape of the face is less good but may be improved somewhat if one or more slots are provided, for instance a slot 64 in the middle portion of the bottom wall so that the edges of the slots overlap each other. The same is true for the straight tube forms according to FIGS. 11 and 12. In these embodiments it is particularly important that the distance between the attachment strings 65, 66 at the ends of the cover is within the region recommended above.

In all embodiments according to the invention they may be formed by sealing flaps particularly at the nose portion and these flaps may be folded to sealing engagement to the face. Instead of these sealing flaps or in combination with them and/or the deformable sealing members described such as metal wires it is possible to provide suitable sealing members of elastic material on the cover in order to establish a good sealing. Whether the sealing members under consideration are necessary depends of course on the detailed shape of the respective cover and on the stiffness of the material of which the cover is manufactured.

Finally, FIG. 13 illustrates slight modifications of the embodiment shown in FIG. 2, the difference being substantially that in FIG. 13, the cover is formed at its ends for attachment of a single attachment string or ribbon 67.

In FIG. 13 the rear wall of the cover resting against the face is at both ends extended with a triangular flap 70 which at its end 71 is connected to the single attachment string 67.

If the cover shown in FIG. 13 is made of cloth, it may have a seam at 72 as indicated in the figure. Furthermore, a small seam 73 may be provided at the upper edge of the cover at 73 to urge the forward wall 46 of the cover outwardly at its upper portion in order to hold the openings of the cover wide opened when the cover is mounted as shown in FIG. 13.

What we claim is:

1. A mouth cover comprising a shield wall which in its operating position covers the nose, mouth and adjacent portions of the face and extends downwardly below the jaw-bone,
an inner wall when resting against the face having an opening to receive the passage of the nose and mouth therethrough,
said inner wall being connected with said shield wall at the upper and lower portions thereof,

6

said shield wall extending forward of the nose and mouth to define a through air channel in front of the nose and mouth,

said air channel extending from one side of said shield wall to the other and guiding the flow of inhalation and exhalation air for movement between said shield and inner walls from and to the opposite sides of said air channel, and

means to attach said mouth cover to a face.

2. A mouth cover as in claim 1, characterized in that said shield wall having connected front and bottom walls united together along a transition line spaced forward of the face jaw and extending in a longitudinal direction obliquely rearward to opposite sides of said shield wall.

3. A mouth cover as in claim 2, characterized in that the relative heights of said shield wall and said inner wall between their upper and lower connections being such that when said inner wall rests against the face, the body of said shield wall is caused to extend forward away from said nose and mouth to define said air channel.

4. A mouth cover as in claim 3, characterized in that the mouth and nose opening in the inner wall extends between the upper and lower connected portions thereof and leaves a middle portion free.

5. A mouth cover as in claim 4, characterized in that the edges defining the mouth and nose opening of said inner wall extend obliquely downwardly to the bottom wall.

6. A mouth cover as in claim 2, characterized in that the united portions of the front wall and the bottom wall lie flat on each other in inoperative collapsed condition and the mouth cover is erectable to its operating position to form said air channel.

7. A mouth cover as in claim 2, characterized in that said attachment means includes strings secured to the upper and lower portions of said shield and inner walls,

said transition line between said connected front and bottom walls in the inoperative collapsed condition having an arcuate shape,

and said transition line being spaced forward of the jaw and jaw-bone of the face when said attachment strings are stretched to attach said mouth cover to the face.

8. A mouth cover as in claim 7, characterized in that the distance between said attachment strings at the respective sides of said mouth cover is less than the height of the shield wall defining said air channel.

9. A mouth cover as in claim 1, characterized in that an air filtering cloth comprising one or more layers of net material having a small resistance to the through-flow of air is secured to the cover in front of the nose and mouth, said net cloth being preferably bulged into said air channel.

10. A mouth cover according to claim 9, characterized in that the net cloth extends towards the sides and forms a through-flow wall in each of said air channel sides so that liquid particles and like matter in the exhalation air flow will be caught by the first net layer in front of the nose and mouth whereas particles in the inhalation air will be caught by the outer net layers remote from the nose and mouth.

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