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C. H. HUDSON

2,843,121

OXYGEN MASK

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Fig. 1.

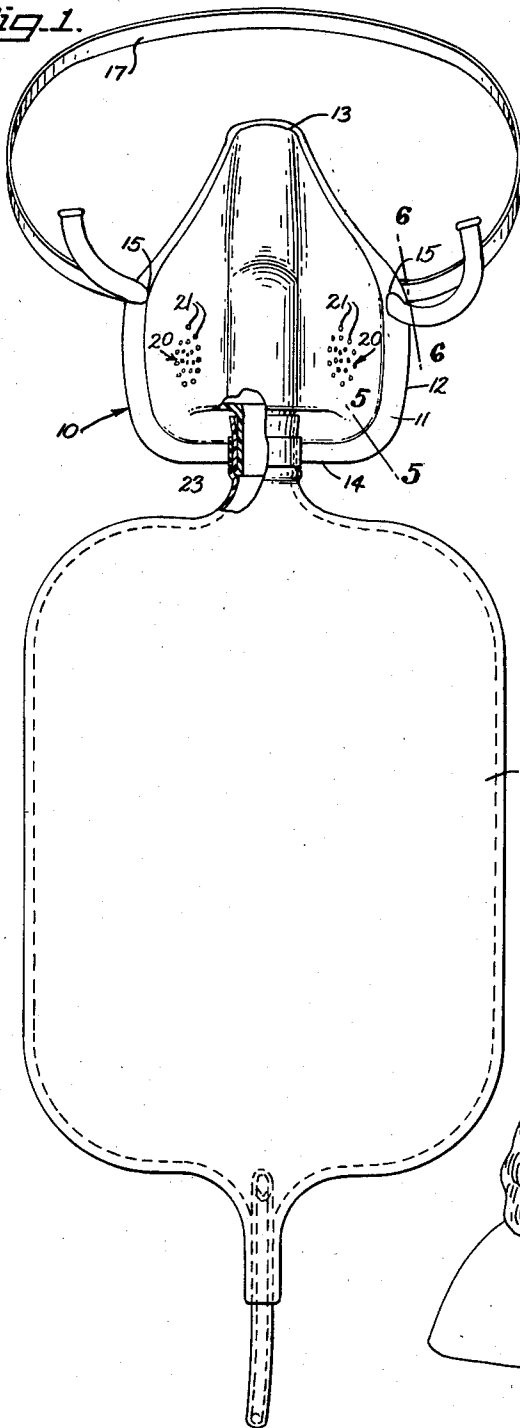


Fig. 2.

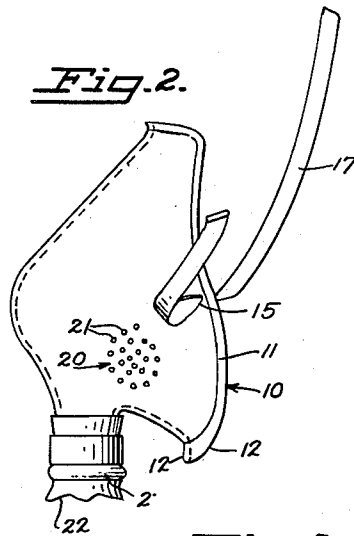


Fig. 5.

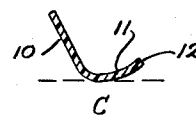


Fig. 4.

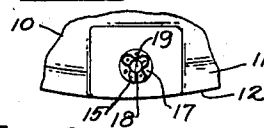


Fig. 6.

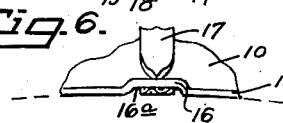
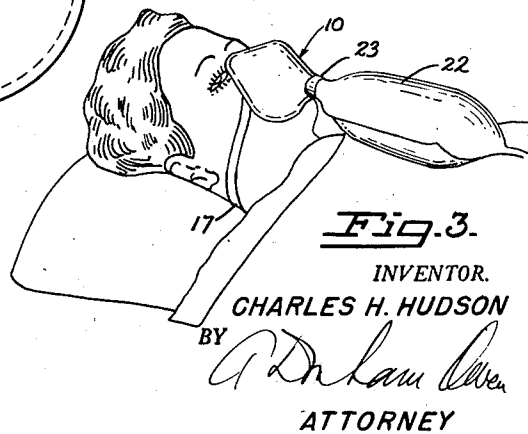


Fig. 3.



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1

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OXYGEN MASK

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3 Claims. (Cl. 128—146)

This invention relates to a breathing mask of the type utilized for administering oxygen or other gases to a patient.

One object of the invention is to provide an oxygen mask that is comfortable to wear.

Another object is to provide a breathing mask that tends to mold itself to the face for a perfect fit.

Another object is to provide a breathing mask that can be inexpensively produced, so that it becomes expendable. In other words, a mask may be assigned to a particular patient and when he has finished with it, the mask can be thrown away instead of having to be carefully re-sterilized. Yet the mask is so sturdily made that for an individual long-term user, it may repeatedly be cleaned and re-used many times.

Another object of the invention is to provide an oxygen mask having an exhalation opening of novel form, readily adaptable to varying needs.

Another object of the invention is to provide a mask whose structure makes it possible to obtain the correct resistance in the exhalation portion, so that the air dilution will be insignificant until the reservoir bag of oxygen is depleted and will, in fact, force the first part of the exhalation back into the reservoir bag.

Another object of the invention is to provide a novel means for fastening the mask about the face so as to achieve a firm and tight support without causing discomfort to the patient.

Other objects and advantages of the invention will appear from the following description of a preferred embodiment presented in accordance with 35 U. S. C. 112. In the drawings:

Fig. 1 is a view in front elevation of an oxygen mask embodying the principles of the present invention, showing also the connection to a breathing bag.

Fig. 2 is a view in side elevation of the mask of Fig. 1.

Fig. 3 is a view in perspective showing the mask in position on the face of the patient.

Fig. 4 is a fragmentary view partly in section showing how the retaining strap is secured to the mask.

Fig. 5 is a fragmentary enlarged section along the line 5—5 in Fig. 1.

Fig. 6 is a fragmentary enlarged section along the line 6—6 in Fig. 1.

The mask 10 preferably comprises a shaped shell arched to fit about the nose and mouth. The shell is preferably constructed from soft, pliable polyethylene or similar non-toxic plastic material and is relatively thin in cross section so as to be soft and flexible. Such a mask will tend to mold itself to the face of each patient; it will also be light in weight and sufficiently low in cost to warrant its use as a disposable hood.

To provide comfort for the user, the mask 10 is provided with an outturned flange 11 around the side, the edges 12 being turned gently up away from contact with the face, providing a rounded corner C where it contacts the face. (See Fig. 5.) Thus the flange 11 is cupped so

2

that the actual edge 12 does not come in contact with the wearer's face. At its upper end 13 the flange 11 is narrow, the arch being formed on a shorter radius of curvature for fitting on the bridge of the nose, while at the lower end 14 the flange is wider and the arching is more gentle to conform to the face just below the lower lip.

Along the side, the flanges 11 are provided with a pair of strap-retaining openings 15 which are preferably round, although they may be square or slightly oval, but they should not be flat. For greater strength, the flange portion 16 where the openings 15 are located may be somewhat thicker, and in any event, the portion 16 is upwardly offset or recessed at 16a (see Fig. 6) so that the retainer strap 17 will not need to come directly against the face. This recessed portion 16 provides the utmost in comfort, so far as the connection of the strap 17 to the mask 10 is concerned without causing any unwanted leakage.

As is best shown in Fig. 4, the retainer strap 17 is held in place in the opening 15 by virtue of the difference in shapes. The strap 17 is preferably flat and narrow, preferably being made of garter elastic or similar material; when inserted through the round opening 15, it must assume a rounded shape with its edges 18 coming together, surrounding a small tubular opening 19 at its center. A strap 17 installed in this manner will hold its position very well against considerable pull and can readily be moved only by pinching the strap 17 together adjacent the opening, forcing it into a relatively rounded shape and then pulling it. This is easier to do if it is pinched on both sides of the opening 15. It will be noted that the central location of the hole 15 and of the retainer strap 17, approximately midway between the upper and lower edges of the mask, makes it possible to obtain a very comfortable wearing position with the strap 17 extending just below the ears.

Another important feature of the invention is the novel exhalation opening 20, which consists of a large plurality of small openings 21, instead of a single large opening. This structure accomplishes several important results. For one thing, it is necessary in an exhalation opening to allow for the exchange of gases—entry of air from outside for dilution of the pure oxygen, and exhalation of the carbon dioxide. At the same time it is necessary to prevent too free a passage of the gases. There is, in fact, a correct amount of resistance to the passage of gases; the air dilution should be held at an insignificant level until the reservoir bag 22 (which is connected to the mask 10 through the opening 23) is depleted, and the first part of the exhalation should be forced back into the reservoir bag 22. This balance of areas can be more readily obtained by providing the series of small openings 21 instead of one large opening. For the small openings 21 create more resistance than did a single large opening having the same total area. Furthermore, I have found that the mental state of the patient is more reassured by the plurality of openings 21 than by a single large one. He does not feel that the oxygen will all leak out; yet he knows he is in no danger of suffocation.

I prefer to arrange the small openings 21 in a spiral, because of important advantages this produces. This construction makes for a flexibility in construction and also provides some resistance to exhalation so that there will be no waste of oxygen. The use of a large number of small holes 21 arranged in a spiral makes it possible to add or subtract relatively small increments of area in a particular mask 10 merely by adding or subtracting pins from the mold in which the mask 10 is made. Where the holes 21 are arranged in concentric circles, or in other formations, the missing openings would give the appear-

3

ance of a defect, even though it were intentional, and the spacing would not be even. The use of a spiral means that the omission or addition of openings at the outer end of the spiral cause no unevenness in spacing or apparent asymmetry.

To those skilled in the art to which this invention relates, many changes in construction and widely differing embodiments and applications of the invention will suggest themselves without departing from the spirit and scope of the invention. The disclosures and the description herein are purely illustrative and are not intended to be in any sense limiting.

I claim:

1. A breathing mask comprising an arched shell of molded plastic having its edges comprising an out-turned flange cupped to provide a curved surface where it touches the face and having upturned edges, said shell having an upwardly offset and thickened portion on each said side flange, midway between its upper and lower edges, each

4

provided with an opening through which an elastic strap extends.

2. The mask of claim 1 in which said opening is provided through a portion of the flange that is offset upwardly to permit said strap to extend therethrough without pressing on the face or the mask.

3. The mask of claim 1 in which the elastic strap is flat and broad in cross section and in which said openings are generally round.

References Cited in the file of this patent

UNITED STATES PATENTS

699,255	Stevens	May 6, 1902
2,123,353	Catt	July 12, 1938
2,269,461	Lehmberg	Jan. 13, 1941
2,342,982	Stern	Feb. 29, 1944

FOREIGN PATENTS

622,116	Great Britain	Apr. 27, 1949
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