Sept. 1, 1959 E. A. GALLEHER, JR 2,902,033

INHALER MASK WITH VISUAL MEANS

Filed April 15, 1958 2 Sheets-Sheet 1

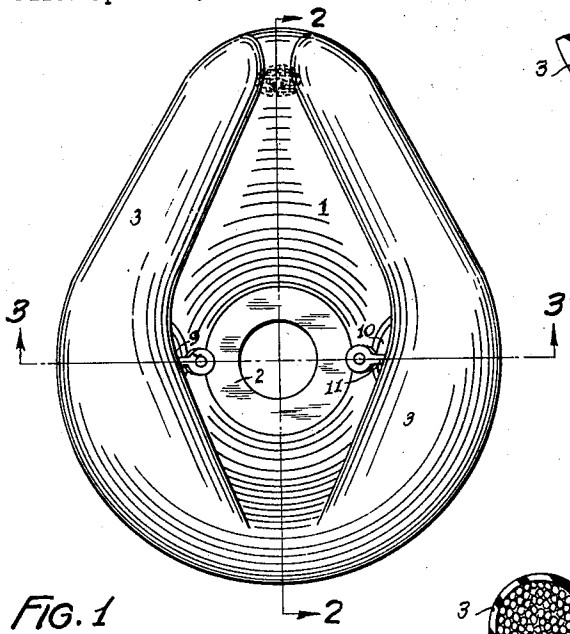

FIG. 1

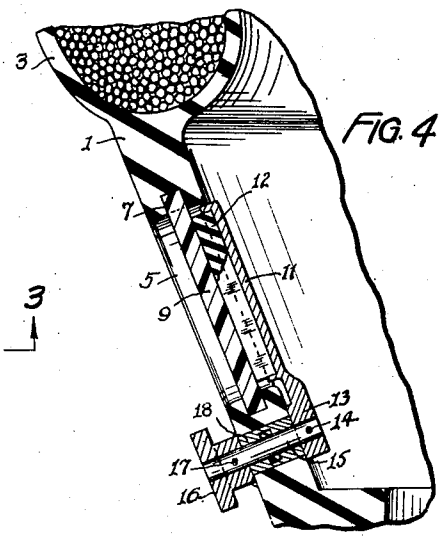

FIG. 4

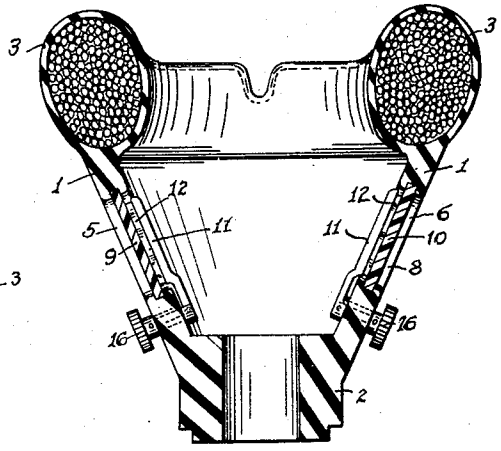

FIG. 3

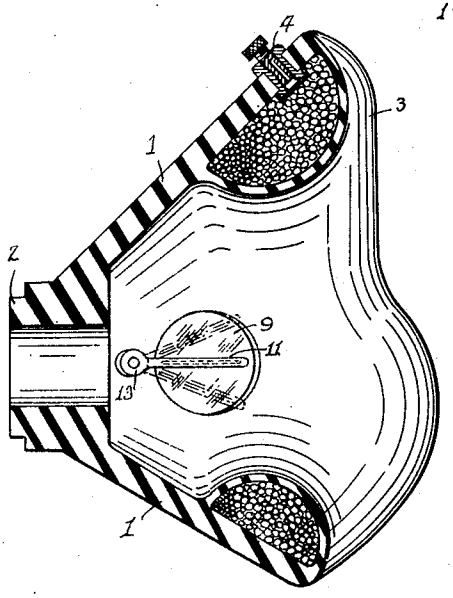

FIG. 2

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INHALER MASK WITH VISUAL MEANS

Filed April 15, 1958 2 Sheets-Sheet 2

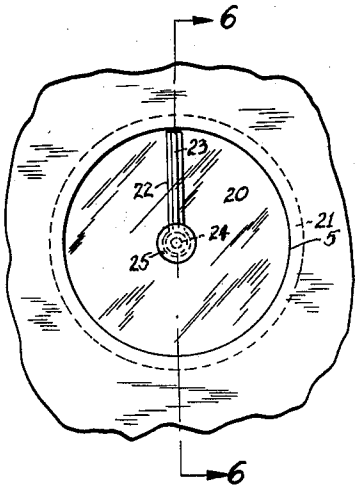

FIG. 5

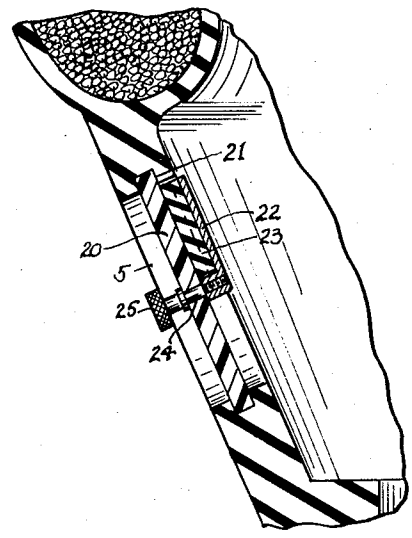

FIG. 6

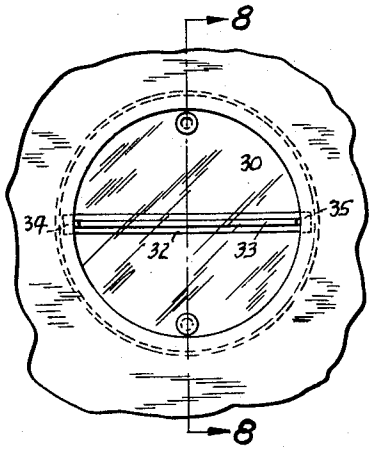

FIG. 7

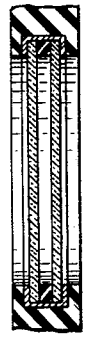

FIG. 9

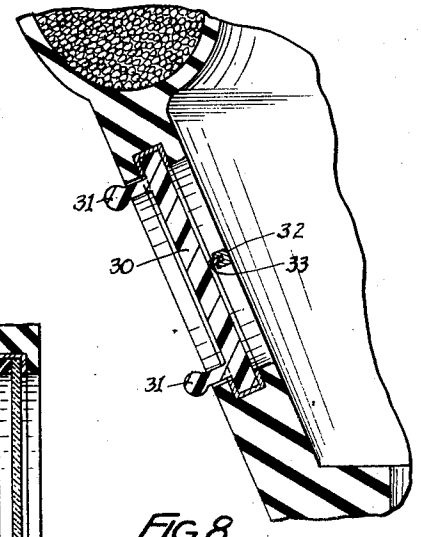

FIG. 8

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2,902,033

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INHALER MASK WITH VISUAL MEANS

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Application April 15, 1958, Serial No. 728,606

2 Claims. (Cl. 128—146)

This invention relates to inhaler masks and is an improvement in masks of the type shown in my copending applications Serial Nos. 407,081, filed January 29, 1954; 477,972, filed December 28, 1954, and 615,970, filed October 15, 1956.

Heretofore, so far as I am aware, inhaler masks employed in the administration of anesthetics, while effective for the purpose, did not prevent observation of the patient's condition as might be indicated by the color of the patient's lips as an index to the oxygen content in the blood, or by the activity in the breathing, as indicated by the degree of fogging within the mask, or even the presence of vomitus in the mask, without lifting or removing the mask from the face. Aspiration of vomitus is one of the leading causes of anesthetic deaths. Without visual means in the mask, dangerous conditions may exist which might pass unnoticed unless the mask is lifted or removed. In such event, there is loss of time and gas.

One of the objects of this invention is to provide a mask of the inhaler type and preferably formed of electrically conductive latex or rubber and having a peripheral cell for contouring the mask to the facial contour to which it is applied and to provide in such a mask means whereby the area of the patient's face covered by the mask in use may be observed from the exterior of the mask thereby permitting the attendant direct observation of the color of the patient's lips as an index to the oxygen content in the blood, and to observe breathing conditions as well as the presence of vomitus. All these factors are of prime importance in maintaining a high degree of safety in the administration of anesthetics.

A further object of the invention is the provision of visual means in the wall of an inhaler type mask which will insure a higher safety factor in the use of the mask for the application of anesthetics.

Another object of the invention is to provide visual means in opposed walls of the mask thereby permitting more light to enter the mask in use.

A further and important object of the invention is the provision of visual means in a mask of the inhaler type which may be kept free of condensation while in use. The degree of fogging of the visual means is, of course, an index to the degree of activity in the patient's breathing.

Another object of the invention is a mask of the above identified type and having transparent windows in its side walls and having associated with said windows wiper means may be operated from the outside of the mask by the attendant to keep the inner surfaces of the windows clear of condensation or vapor which otherwise would collect and cloud the vision through the windows during the use of the mask in supplying anesthetics and other gases to the patient.

A further object is a mask construction possessing extremely high safety characteristics in combining visual means for observation of the patient's condition, such as breathing, oxygen content in the blood, or the presence of vomitus, together with an electrical conductive mask

body for grounding the patient to the anesthetic machine to eliminate the possibility of explosion due to static discharges in the presence of the anesthetic gas.

Other objects and advantages of this invention will become more apparent as the following description of an embodiment thereof progresses, reference being made to the accompanying drawing in which like reference characters are employed to designate like parts throughout the same.

In the drawings:

Figure 1 is a view of a mask incorporating my invention as seen from the rear of the mask, that is, that portion which engages the facial contour of the patient;

Figure 2 is a section taken on line 2—2 of Figure 1;

Figure 3 is a section taken on line 3—3 of Figure 1;

Figure 4 is an enlarged sectional view through one of the windows of the mask and illustrates one form of means for removing condensation from the inner surface of the pane;

Figure 5 is an enlarged view of a modified form of means wherein a wiper is movably mounted in and carried by the pane providing a window and wiper unit which may readily be assembled as a unit in an apertured wall of the mask;

Figure 6 is a sectional view taken on line 6—6 of Figure 5;

Figure 7 is a further modified form of the window and wiper means in which the wiper is carried by and supported in the mask walls and for wiping engagement with a rotatable pane mounted in the mask side walls;

Figure 8 is a view taken on line 8—8 of Figure 7; and

Figure 9 is a further modification of the invention in which the visual means constitutes a double walled pane having low thermal conductivity.

Referring first to Figures 1 through 4 which illustrate one embodiment of the present invention, I provide a mask body formed preferably of electrical conductive latex or rubber or other suitable material comprising forwardly converging walls 1 which terminate forwardly in a gas inlet nipple 2 which may secured by suitable means to a hose supplying gas to the interior of the mask.

The form of the mask perferably employed is one which is provided with a peripheral cell such as shown at 3 formed integrally with the mask walls 1 and which contains a filler comprising a mass of finely divided resilient inflatable particles characterized by their ability to move over one another and to be compressed under a light force of compression as when applying the mask to the contour of the patient's face, this cell being valved to the outside atmosphere by means of a valve 4 so that when the mask is pressed against the face of the wearer to contour it to the contour of the face, and when the valve 4 is open, part of the air within the cell will be exhausted. When the valve 4 is closed, while the particles are under compression, the mask may be removed from the face and the peripheral areas thereof will be found to be mated with the contour of the face to which the mask was applied.

While I am aware that precautions are taken in the administration of anesthetics to a patient wearing a mask through which the condition of the patient's lips cannot be observed, the present invention provides an even greater degree of safety because it provides, in addition, a visual means by which the color of the patient's lips, or his breathing activity, as well as the presence or absence of vomitus, may be observed while the mask is in place and in use, thus obviating the necessity of removing the mask to observe the patient's appearance during the administration of the anesthetic or other gases.

In the form of the invention shown in Figures 1 through 4, the side walls of the mask are provided with openings 5 and 6 which may be circular or at least of arcuate

shape. The peripheral walls forming the openings are also channeled as at **7** and **8**, respectively, to receive the respective transparent panes **9** and **10** and to retain them securely in the position shown and, at the same time, preventing the leakage of gases around the transparent panes or windows.

As the patient breathes with the mask in place, there is the problem of accumulation of condensation of moisture upon the inner surface of the transparent panes **9** and **10**. According to this form of the invention, I provide means operable from the exterior of the mask whereby the windows or panes may be wiped clear of such condensation that forms thereon from time to time during the use of the mask, thus providing clear vision to the interior of the mask from the outside, permitting the attendant to observe the reaction and condition of the patient. Such means includes a wiper arm **11** containing a wiper blade **12** of suitable material, such as rubber, plastic or felt material, the arm **11** terminating at one end in a hub **13** which is keyed at **14** to the shaft **15**. The shaft **15** extends through a bearing sleeve **18** carried in the mask body **1** and terminates outside the mask. An operating knob **16** is keyed at **17** to the outer end of the shaft **15** and has bearing engagement against the bearing sleeve **18** in which the shaft **15** is mounted for oscillatory movement therein.

It will be seen that by oscillating the knobs **16** that the wipers **12** will be caused to traverse the inner surfaces of the transparent windows or panes **9** and **10** and wipe away any deposit of condensation which may appear during the use of the mask.

In Figures 5 and 6, I have illustrated a modified form of the invention which may be described as comprising a window of transparent material **20** which may be secured within channels in the opening in the mask's side walls in a manner similar to that shown in Figures 2, 3 and 4, that is, by the provision of a suitable channel **21** into which the window **20** may be inserted in sealing relation so as to prevent the leakage of gases from the interior of the mask when the mask is in use. In this embodiment of the invention, I provide a wiper arm **22** having a blade **23** in wiping contact with the interior surface of the window. The arm **22** is carried on a shaft **24** which operates in a central opening in the window **20** and terminates on the outer side of the window in a knob **25** by which the wiper arm may be caused to rotate through a full 360°, or by which the same may be merely oscillated to clear the area required for proper visual observation of the patient's lips. This form of the invention requires no mounting of the operating knob and shaft in the wall of the mask since the same is carried in the transparent window itself and therefore the entire unit, as a unit, may be inserted in the channeled openings of the mask.

In Figures 7 and 8, I have illustrated a still further modified form of the present invention in which the transparent window **30** may be rotated a full 360° by means of a window knob **31** while the wiper **32** and its blade **33** remain stationary with respect to the mask wall. The ends of the wiper, as at **34** and **35**, are embedded in or secured to the mask wall and anchored in such position so that the wiper **33** will have wiping engagement with the inner surface of the pane **30**.

In Figure 9, I have illustrated another form of the invention in which the visual means consists of a double walled transparent window mounted in the mask side walls. Each window comprises the spaced apart panes **40** and **41** enclosing an evacuated air space **42**, and provides a visual means of sufficiently low thermal conductivity as to prevent condensation of moisture on the inner surface of the inner pane, thus insuring clear visibility through the windows at all times for the observance of conditions within the mask during the administration of anesthesia gas. In the carrying out of the form of the invention, the use of wipers may be eliminated.

Thus it will be seen that the present invention affords a high degree of protection to the patient by providing a mask body of electrically conductive latex or rubber together with means for visual observation of the patient's lips when the mask is in place and in use. Furthermore, it will be seen that the several embodiments of the invention are of extreme simplicity in construction, effective in use and are so mounted with respect to the mask that clear vision is afforded to observe the conditions existing within the mask. In each of the constructions shown, leakage of the gases, introduced into the mask, is prevented.

Various changes may be made in the details of construction and arrangement of parts of the invention without departing from the spirit thereof or the scope of the appended claims.

I claim:

1. In an inhaler mask, a hollow mask body having a gas inlet at one end and open at its opposite end for sealing contact with the facial contour of the patient, said body having a visual pane for observing the condition of the patient's lips when the mask is in use, and relatively movable means in contact with the inner surface of the pane for removing condensation deposited thereon, said means comprising a fixed wiper member anchored in the mask body and traversing said pane, said pane being rotatably mounted in said mask body wall.

2. In an inhaler mask, a hollow mask body having a gas inlet at one end and open at its opposite end for sealing contact with the facial contour of the patient, said body having a visual pane for observing the condition of the patient's lips when the mask is in use, and relatively movable means in contact with the inner surface of the pane for removing condensation deposited thereon, said means comprising a fixed wiper member anchored in the mask body and traversing said pane, said pane being rotatably mounted in said mask body wall, and means carried by the pane for relatively rotating said pane and wiper.

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