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T. F. WRIGHT
BREATHING APPARATUS
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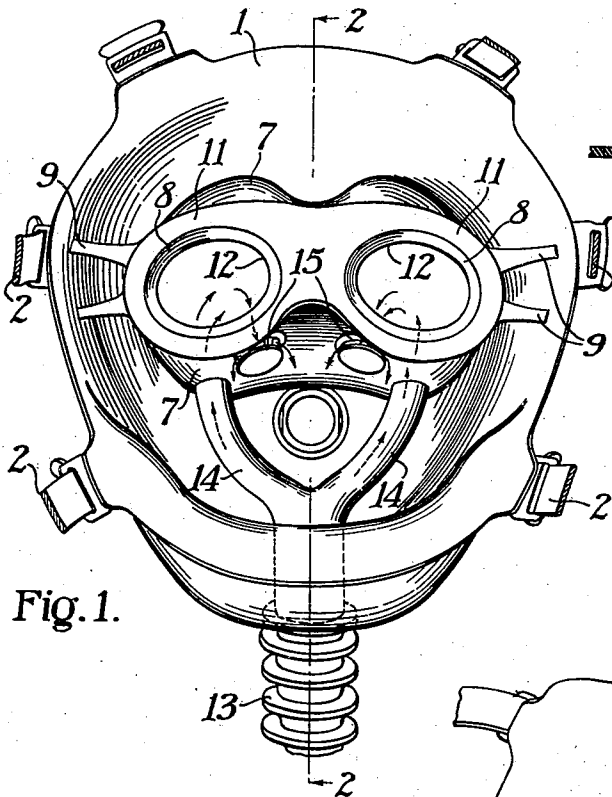


Fig. 1.

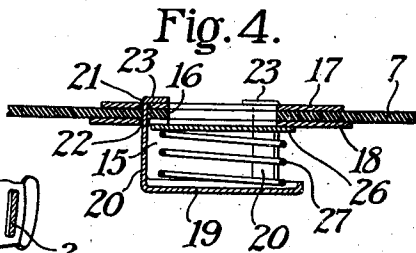


Fig. 4.

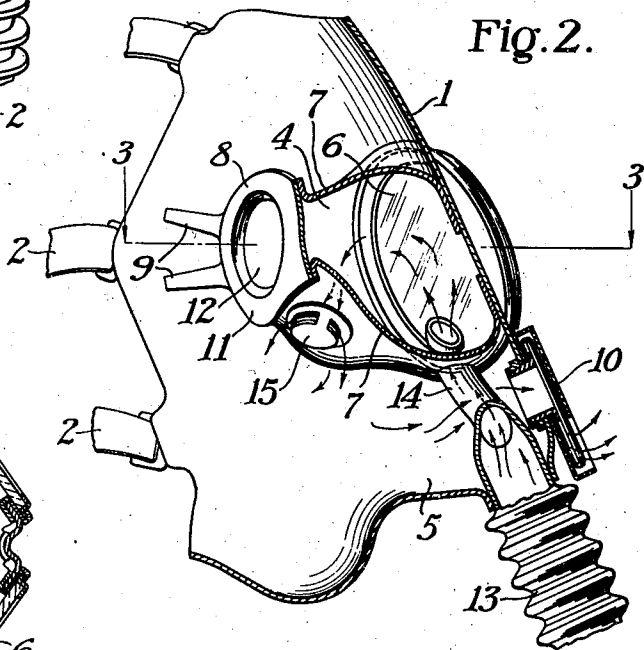


Fig. 2.

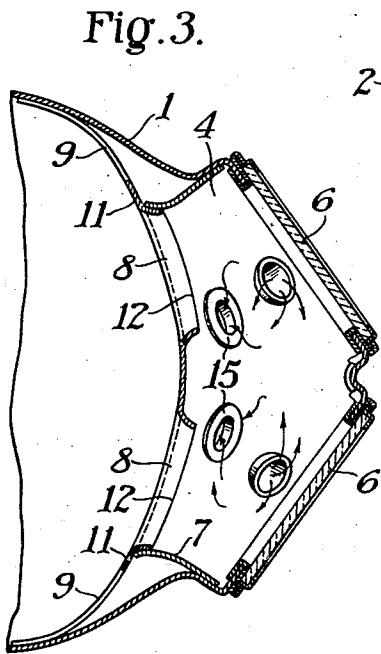


Fig. 3.

Thomas F. Wright

INVENTOR

Newton M. Perrius

BY J. Griffin Little
ATTORNEYS

UNITED STATES PATENT OFFICE

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BREATHING APPARATUS

Thomas F. Wright, Rochester, N. Y.

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2 Claims. (Cl. 128-141)

The present invention relates to a breathing apparatus or mask of the type which includes a face-piece that covers the entire face of the user.

One object of the invention is the provision of a mask which provides the wearer or user with unobstructed vision over a long period of continuous use.

Another object of the invention is the provision of a mask of this type in which the exhaled air cannot circulate around the inside surface of the viewing lenses, thus preventing fogging of the latter.

A further object of the invention is the provision in such a mask of an arrangement for limiting perspiring skin areas exposed to the viewing lenses.

A still further object of the invention is the provision of a mask construction which maintains the air adjacent the inside of the viewing lens surface at a temperature and humidity close to that of the outside air.

Yet another object of the invention is the provision of a mask of the type described which is relatively simple in construction, and adapted to be worn for long periods without fogging of the lenses.

To these and other ends, the invention resides in certain improvements and combinations, all as will hereinafter be more fully described, the novel features being pointed out in the claims at the end of the specification.

In the drawing:

Fig. 1 is a rear view of a breathing apparatus or mask constructed in accordance with the present invention;

Fig. 2 is a vertical sectional view taken through the mask substantially on the line 2-2 of Fig. 1, showing the arrangement of the various parts;

Fig. 3 is a horizontal sectional view taken on the line 3-3 of Fig. 2, showing the relation of the various parts of the eye compartment of the mask; and

Fig. 4 is a sectional view of a one-way valve positioned between the eye and mouth compartments of the mask, showing the arrangement of the various parts of the valve member.

Similar reference numerals throughout the various views indicate the same parts.

The type of masks now in use suffer from certain disadvantages, perhaps the greatest of which is the fogging of the viewing lenses. This fogging is caused by the increased humidity of the air in the region near the inner surface of the viewing lenses. This increase in humidity results from both the presence of the perspira-

tion on the adjacent skin surfaces of the user, and also from the moisture present in the exhaled breath. Many masks attempt to overcome this difficulty by the use of rubber deflecting tubes which pass the incoming air across the inner surfaces of the lenses. While this arrangement has proven somewhat successful, it is effective for only short periods of time. Eventually the rise in temperature and humidity from exhaled air and perspiration causes the lenses to fog over with condensed moisture.

In order to overcome these disadvantages, the present invention provides a gas mask, the interior of which is divided into separate eye and mouth compartments. The eye compartment is provided with flanged rubber cups which fit tightly around the eyes of the user so as to effectively exclude substantially all perspiring skin areas from communication with the eye compartment. Air communication between the compartments is by means of a one-way valve which freely opens during inhalation to permit the fresh outside air to be drawn over the lenses, through the eye compartment, and into the mouth compartment. When, however, the inhalation ceases, the one-way valve automatically closes to cut off further communication between the compartments so that the moist exhaled air in the mouth compartment cannot recirculate back into the eye compartment to fog the lenses, but is discharged through a suitable exhaust valve, of well-known construction, all of which will be hereinafter more fully described.

The drawing shows a breathing apparatus or mask constructed in accordance with the preferred embodiment of the invention. This mask comprises a face-piece 1, preferably rubber, provided with a plurality of flexible adjusting straps 2 for fitting the face-piece to the user, as is well known. In the present embodiment, the mask is provided with a goggle construction which divides the interior of the mask into an upper eye compartment 4 and a lower mouth compartment 5.

This goggle construction comprises a pair of viewing lenses 6 which are connected by a flexible rubber member or diaphragm 7 to a pair of flanged rubber cups 8 adapted to surround the eyes of the user. Elastic bands 9 extend from the cups 8 to the inner surface of the face-piece 1, see Fig. 1, in such a position that when the straps 2 are drawn up for adjustment, the peripheral flanges 11 of the cups 8 are pressed against the skin of the user. The cups 8 are formed

with sight apertures 12 in alignment with the lenses 6, as clearly shown in Fig. 3. This goggle construction may be securely fastened, as shown in Fig. 3, or in any other suitable manner, to the rubber face-piece 1.

It is thus apparent that such an arrangement provides separate eye and mouth compartments 4 and 5 respectively. It is also apparent that the presence of the diaphragm 7 and the eye cups 8 effectively exclude substantially all the perspiring skin portions from direct communication with the eye compartment.

Air is supplied from a purifying canister, not shown, through a flexible hose 13 which enters the bottom of the mask and extends into the mouth compartment 5, see Fig. 2. At this point the hose branches in the form of a Y, each branch 14 leading to the inner lower edge of one of the viewing lens 6, as shown in Fig. 3. Thus the fresh incoming air is first passed over the inner surfaces of the viewing lenses. The air then passes through the eye compartment 4, and then through a one-way check valve, generally indicated by the numeral 15 and hereinafter described, which is built into the bottom of the flexible member or diaphragm 7, as shown in Fig. 4. After passing through the one-way valve, the air then enters the mouth compartment 5 and is available for breathing purposes. The moisture laden exhaled air is then discharged through a flutter valve 10 of well-known construction.

In order to accomplish the purpose of the present invention, it is essential that the valve 15 readily open during inhalation to permit the fresh incoming air to flow from the eye to the mouth compartment, yet quickly and automatically close when inhalation ceases to prevent any moist air in the mouth compartment from circulating into the eye compartment and thus tending to fog the lenses 6. It is also important that such a valve freely operate even when moist. It has been found that the type of valve illustrated in Fig. 4, and to be presently described, is admirably adapted for this purpose.

An opening 16 in the diaphragm 7 is reinforced by a pair of flat annular members or washers 17 and 18 arranged on opposite faces of the diaphragm 7, as best shown in Fig. 4. A dish-shaped member 19 is positioned below the member 18, see Fig. 4, and is provided with a plurality of connecting strips 20, in the present instance three, which extend upwardly from the member 19 to engage the member 18. The reduced ends 21 of the strips 20 extend through registering openings 22 in the members 17 and 18 and pierce the diaphragm 7, and are bent over, as shown at 23 Fig. 4, to clutch the ends 21 and to securely maintain the parts in assembled relation, as shown in Fig. 4. A flat valve member 26 or disk is arranged to engage the washer 18 and to close the opening 16 in the diaphragm 7, the washer 18 providing a valve seat for the valve member 26. The latter is held in place against the washer 18 by means of a coil spring 27 which interposes between the member 26 and the dish-shaped member 19, as clearly illustrated in Fig. 4. The valve member 26 is thus resiliently held against its valve seat.

When the user inhales, a slight vacuum or reduced pressure is created in the mouth compartment 5. This vacuum, although quite small, is sufficient to cause the valve member 26 to move away from its valve seat, the washer 18, against the action of the spring 27 to permit fresh air to

be drawn through the flexible hose 13 and the eye compartment 4 to the mouth compartment 5. When inhalation ceases, normal pressure is restored in the compartment 5, and the valve member 26 is forced against the washer 18 under the action of the spring 27 to close the valve. As the valve 15 is now closed circulation of the moist or humid air in the mouth compartment 5 cannot circulate into the eye compartments 4 to fog the lenses 6, as is apparent. The moist exhaled air is then expelled through a flutter valve 10 of well-known construction.

It is thus apparent from the above description, that the present invention provides a mask construction which provides unobstructed vision for a long period of continuous use. This result is secured by (1) preventing circulation of moist air from the mouth compartment to the eye compartment, and (2) by reducing to a minimum the perspiring skin area exposed to the viewing lenses.

While one embodiment of the invention has been disclosed, it is contemplated that the inventive idea may be carried out in a number of ways. This application is therefore, not to be limited to the precise details described, but is intended to cover all variations and modifications thereof falling within the spirit of the invention and the scope of the appended claims.

I claim:

1. A breathing apparatus comprising a face piece, a pair of interocular spaced lens members mounted in said face piece, flanged rubber cups surrounding the eyes of the user and formed with a pair of interocular spaced openings of such size as to frame said eyes, a flexible member having one end secured to said cups adjacent the periphery thereof and the other end secured to the inner surface of said face piece adjacent said lens members to divide the interior of said face piece into separate eye and mouth compartments, means for supplying outside air to said eye compartment, resilient means connecting said cups to said face piece so that when the latter is adjusted on the user the cups will be drawn tightly against the skin area surrounding said eyes so that only the latter will be exposed to said lenses so as to thus reduce to a minimum the perspiring skin area in communication therewith, and a one-way valve mounted on said member and adapted to connect said compartment in fluid communication, said valve comprising a movable member adapted to be automatically moved to open position when the user inhales to permit free air circulation from said eye to said mouth compartment, said movable member being also movable to a valve closing position upon completion of said inhalation to prevent reverse circulation from said mouth to said eye compartment.

2. A breathing apparatus comprising a face piece, a pair of interocular spaced lens members mounted in said face piece, flanged rubber cups surrounding the eyes of the user and formed with a pair of interocular spaced openings of such size as to frame said eyes, a flexible member having one end secured to said cups adjacent the periphery thereof and the other end secured to the inner surface of said face piece adjacent said lens members to divide the interior of said face piece into separate eye and mouth compartments, means for supplying outside air to said eye compartment, resilient means connecting said cups to said face piece so that when the latter is adjusted on the user the cups will be drawn tightly against the skin area surrounding said

eyes so that only the latter will be exposed to said lenses so as to thus reduce to a minimum the perspiring skin area in communication therewith, and a one-way valve mounted on said member and adapted to connect said compartment in fluid communication, said valve comprising a stationary valve seat and a spring actuated valve member adapted to engage said seat, said valve member being movable away from said seat when

the user inhales to permit free air circulation from said eye to said mouth compartment but automatically moving into engagement with said seat under the action of said spring to close said valve upon the completion of such inhalation to positively prevent reverse circulation from said mouth to said eye compartment. 5

THOMAS F. WRIGHT.