Oct. 22, 1957 W. B. REED 2,810,386

OXYGEN MASKS EMBODYING MEANS FOR VENTILATING GOGGLES

Filed Nov. 7, 1952 3 Sheets-Sheet 1

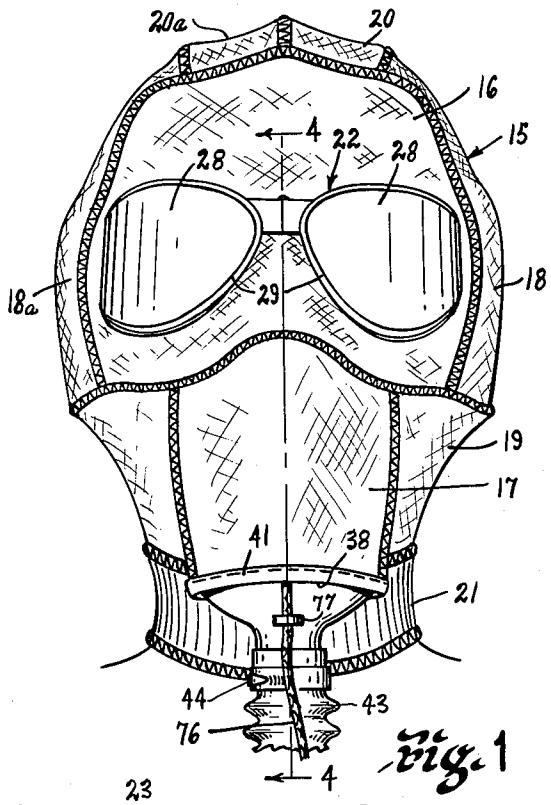


Fig. 1

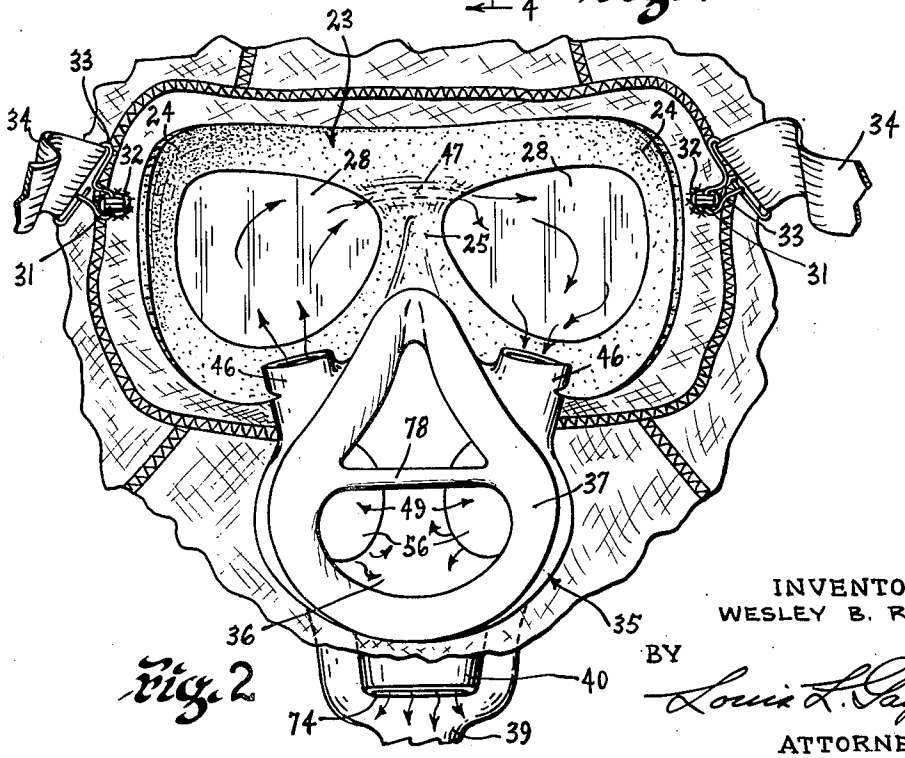


Fig. 2

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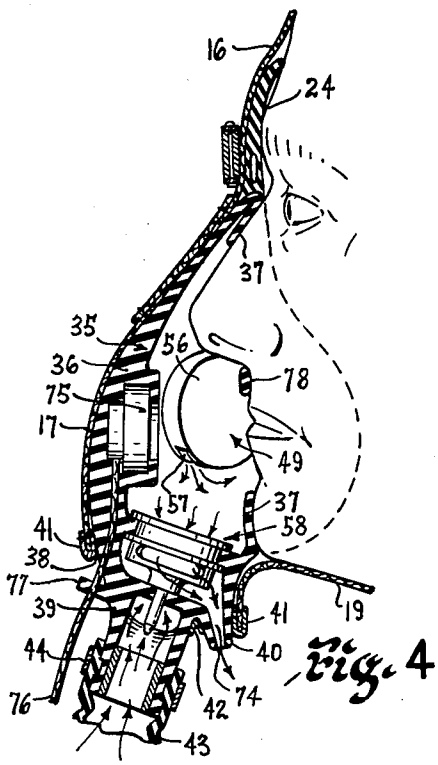


Fig. 4

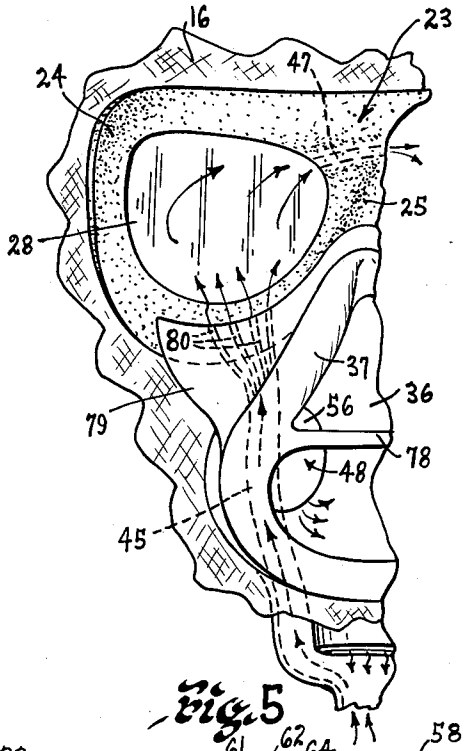


Fig. 5

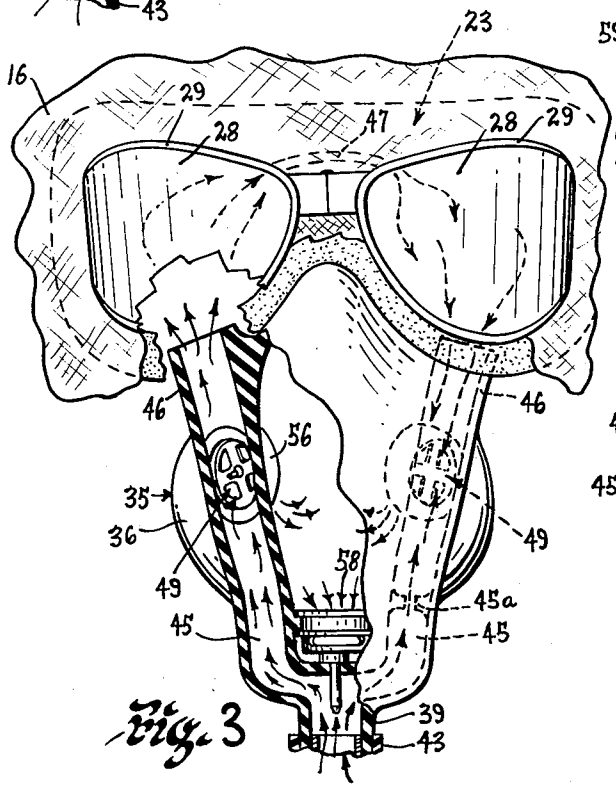


Fig. 3

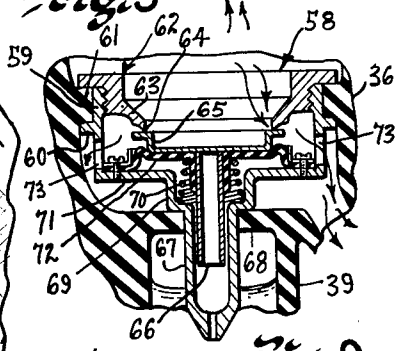


Fig. 9

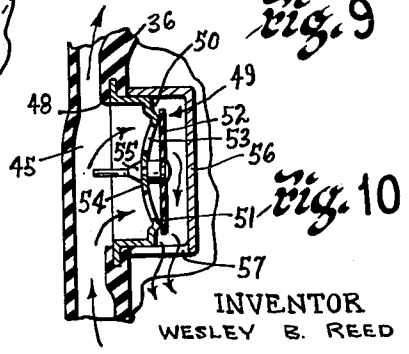


Fig. 10

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OXYGEN MASKS EMBODYING MEANS FOR VENTILATING GOGGLES

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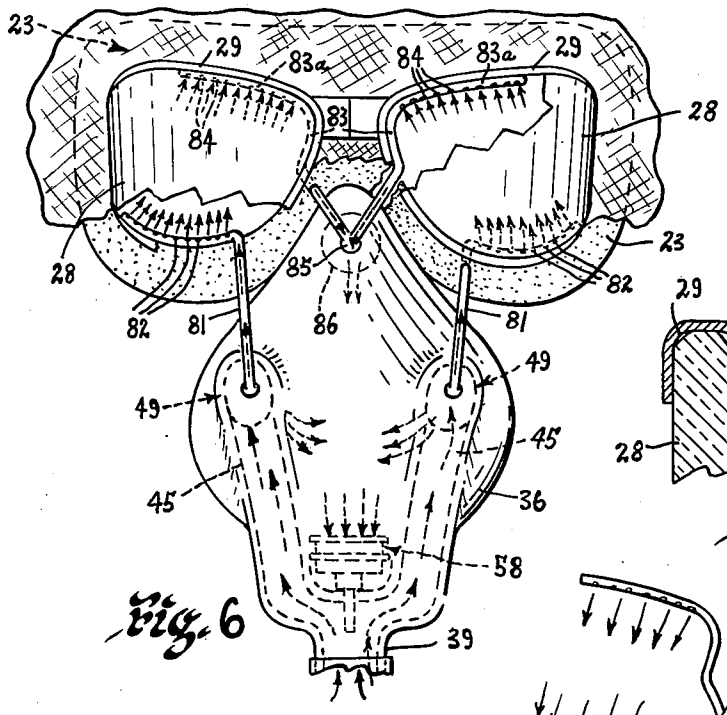


Fig. 6

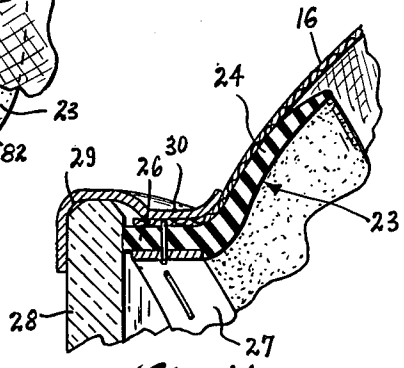


Fig. 11

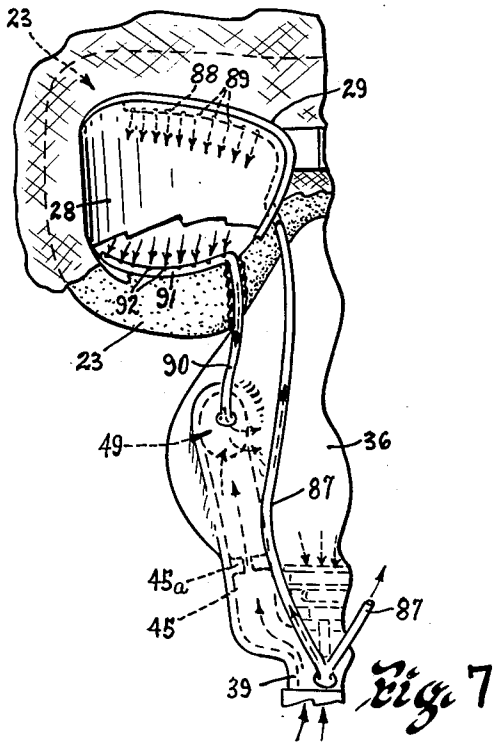


Fig. 7

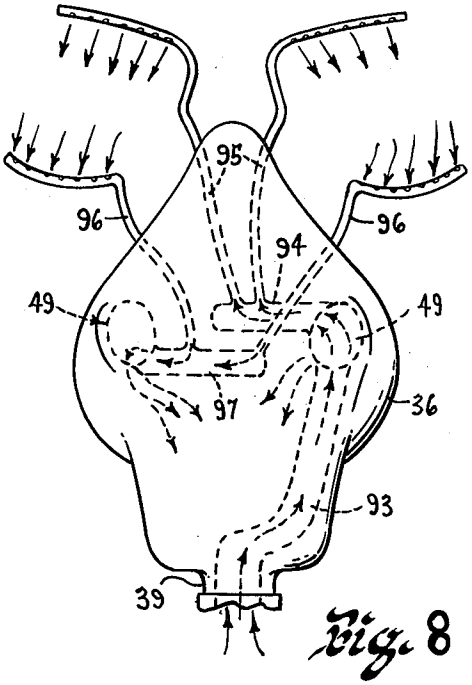


Fig. 8

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2,810,386

OXYGEN MASKS EMBODYING MEANS FOR VENTILATING GOGGLES

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Application November 7, 1952, Serial No. 319,396

4 Claims. (Cl. 128—142)

This invention relates to improvements in apparatus for supplying oxygen to the respiratory tract of an individual and for simultaneously providing means for ventilating goggles, and has particular reference to improved means for circulating air through oxygen masks and simultaneously through goggles adapted to be worn therewith.

It has been found in practice that masks for controlling the delivery of oxygen to aviators, particularly at extreme low temperatures and at high altitudes, sometimes perform inefficiently. Such inefficiency may be caused by any one or more of several factors such as lengthy air passages, condensation, or faulty valve structures. It has also been found that goggles worn by aviators under the above conditions may become fogged due to the effect of body heat upon the goggle lenses chilled by the atmosphere.

It is, therefore, a principal object of this invention to overcome the foregoing difficulties by the provision of an oxygen mask which embodies improved means and method of circulating a supply of oxygen to the respiratory tract of the wearer and of simultaneously circulating air over the inner surfaces of the lenses of goggles worn therewith.

Another object is to provide an improved oxygen mask and goggle combination constructed and arranged in such a manner that air entering the oxygen mask will be permitted to circulate from the oxygen mask into the goggles and thence back into the oxygen mask, thereby preventing the goggle lenses from becoming fogged.

Another object is to provide a device of the above character wherein the goggles are provided with a frame formed of relatively resilient material shaped to engage the face of the wearer in encircling relation with the eyes and wherein the oxygen mask, which is formed of resilient material and shaped to cover the nose and mouth of the wearer, is provided with ducts which extend from the mask into the interior of the goggles whereby air entering the mask from the exterior may pass through the ducts and circulate over the inner surfaces of the lenses to prevent the lenses from becoming fogged.

Another object is to provide a device of the above character wherein inhalation valve means are provided for permitting air to be drawn inwardly of the mask upon inhalation by the wearer whereby the act of inhalation will simultaneously cause the circulation of air through the goggles.

A still further object of the invention is to provide a device of the above character wherein air which has been permitted to flow over the inner surfaces of the goggle lenses may be re-used by being drawn into the interior of the mask for breathing purposes.

Another object of the invention is to provide improved means of ventilating goggles which is relatively simple in its construction and efficient in its use.

Other objects and advantages of the invention will become apparent from the following description taken in connection with the accompanying drawings, in which:

Fig. 1 is a front elevational view of a device embodying the invention;

Fig. 2 is an enlarged fragmentary rear elevational view of a goggle and face mask embodying the invention;

Fig. 3 is a fragmentary front elevational view of the device shown in Fig. 2;

Fig. 4 is a vertical sectional view taken substantially on line 4—4 of Fig. 1;

Fig. 5 is a fragmentary rear elevational view similar to a portion of Fig. 2 illustrating a modification of the invention;

Figs. 6, 7 and 8 are fragmentary front elevational views of portions of the device shown in Fig. 3 illustrating further modifications thereof;

Fig. 9 is an enlarged vertical sectional view taken substantially through the center of the exhalation valve;

Fig. 10 is an enlarged vertical sectional view taken substantially through the center of one of the inhalation valves; and

Fig. 11 is an enlarged fragmental vertical sectional view illustrating particularly the preferred method of supporting goggle lenses in the device.

Referring more particularly to the drawings wherein like characters of reference designate like parts throughout the several views, the device illustrated in Fig. 1 comprises a helmet **15** which is preferably shaped to enclose the entire head of a wearer. A helmet **15** of the preferred type is particularly adapted for wear by an aviator in extremely low temperatures and at high altitudes and, therefore, is adapted to snugly enclose the entire head. The helmet **15** is shown as embodying a plurality of elastic and non-elastic portions which are stitched together to form a composite structure. An elastic panel **16** is adapted to be located over the forehead, eyes and upper portions of the cheeks and nose of the wearer and a non-elastic panel **17** is attached to the lower edge of the panel **16** and depends downwardly therefrom. A pair of non-elastic panels **18** and **18***a* are attached to the side edges of the panel **16** and are adapted to cover the temples, ears and adjacent portions of the wearer's head. An elastic panel **19** is adapted to extend beneath the chin of the wearer and has its forward edges attached to the side edges of panel **17** and further has portions adapted to be superimposed over the sides of the wearer's chin, lower cheeks and sides of the neck, the panel **19** being attached at its upper edges to the respective panels **18** and **18***a* as well as to a portion of the lower edge of panel **17**. One end of a pair of elongated elastic panels **20** and **20***a* are attached in side-by-side relation to the upper edge of panel **16**, extending rearwardly and downwardly therefrom, and are attached at their sides to the respective upper and rear edges of the panels **18** and **18***a*, thus being adapted to extend along the top and back of a wearer's head. A neck band **21** is adapted to encircle the neck of the wearer and is attached to the lower edges of adjacent panels **19**, **20** and **20***a*. The non-elastic panels are preferably formed of knitted nylon which, like all knitted fabrics, is easily deformable and capable of slight stretching. However, the so-called elastic panels are preferably formed of a material which may be stretched and deformed from its initial shape and size to a relatively great extent in comparison with the non-elastic material, which elastic material may, for example, be formed of rubber or a combination of knitted nylon and latex. The neck band **21** may be so formed as to possess a still greater degree of elasticity if desired.

Panel **16** is provided with a pair of spaced openings therein which are adapted to be located in substantial alignment with the wearer's eyes. Goggles **22** are adapted to be mounted over the eye openings in panel **16** and

comprise a frame 23 (Fig. 2) which is preferably formed of molded rubber or similar other resilient material shaped to fit over the eyes of the wearer and has a pair of spaced eye-encircling portions 24 which are connected by an integral bridge portion 25. The eye-encircling portions 24 are relatively wide to provide a substantial surface area for engagement with the face of the wearer. The frame 23 is provided with annular flanges 26 which encircle the respective eye openings therein and which extend forwardly through the eye openings in the panel 16. To the inner sides of the flanges 26 are sewed, riveted, or otherwise securely attached a pair of annular stiffeners 27 which are formed of relatively rigid material such as plastic, metal or the like.

Mounted over the ends of the annular flanges 26 are respective lenses 28. Rim members 29 are shaped to encircle or receive the contour edges of the lenses 28 and are provided with portions 30 which extend rearwardly toward the panel 16 and into overlying relation with the flanges 26 and stiffeners 27 secured thereto. The rim members 29 completely encircle the respective lenses 28 and are provided in their temporal areas with tongues 31 (Fig. 2) which extend through openings 32 into the interior of the helmet. The tongues 31 are provided with openings adjacent their ends to which are connected clips 33 which are carried at the respective ends of a head band 34. The head band 34 is adapted to extend around the head of the wearer inside the helmet and when properly adjusted to the head will retain the goggles in position of use with the frame 23 being securely positioned over the eyes and adjacent portions of the wearer's face.

It is desirable that the eye-encircling portions 24 of the frame 23 be formed of resilient material as described above so that these portions of the goggles will intimately engage the wearer's face and conform to the irregularities of the contours thereof, thus preventing the passage of air around the edges of the portions 24.

The oxygen mask 35 formed in accordance with this invention comprises a facepiece 36 (Figs. 2, 3 and 4) which is adapted to cover the lower portions of the face of the wearer, the facepiece 36 being formed of flexible pliable material such as soft rubber or the like which can readily adapt itself to the contour of the facial features of the wearer so as to prevent passage of air between the edges of the facepiece and the wearer's face. The facepiece 36 is provided with an inturned lip 37 throughout its entire contour edge, which lip 37 may be substantially decreased in thickness from the major portion of the facepiece so as to provide greater flexibility thereof and to insure an efficient seal between the facepiece and the wearer's face with maximum comfort to the wearer. In the present construction the lip 37 is formed as an initially substantially flat lip which engages the bridge of the wearer's nose and extends over the cheeks and the front of the chin.

The mask 35 is adapted to be carried in the lower front of the helmet by the non-elastic panel 17 and adjacent portions of the elastic panel 19. The lower edges of the panels 17 and 19 are so constructed that an opening 38 (Figs. 1 and 4) is provided through which the inlet portion 39 of the mask 35 extends as well as does the outlet portion 40. The edges of the opening 38 are preferably reinforced by a strip 41 of reinforcing material such as a strong fabric, leather, plastic or the like which is doubled over along the edge of the opening 38 and stitched, cemented or otherwise relatively permanently secured thereto. The inlet and outlet portions 39 and 40 of the mask are formed as two separate spaced downwardly extending substantially tubular portions. Supporting means for the mask is provided by a narrow strip 42 of the reinforcing material which is attached at its ends to the strip 41 at opposed sides of the opening 38 and which extends beneath the mask between the inlet and outlet portions 39 and 40. Thus, the mask may be comfortably supported in position of use.

Air enters the interior of the facepiece 36 from an air hose 43 which is securely connected to the tubular portion 39 as by a conventional ring-like clamp or connector 44. From the tubular portion 39 the air passes directly through ducts 45 (Fig. 3) which are formed within the material of the facepiece 36 into extensions 46 of the ducts 45, which extensions 46 protrude through openings in the eye-encircling portions 24 of the goggle frame 23. Thus, the air entering the ducts 45 and 46 from the hose 43 and inlet portion 39 will circulate over the inner surfaces of the lenses 28. To provide the most efficient circulation, the frame 23 is provided with an opening 47 through the bridge portion 25 which allows air to pass from the area behind one lens 28 into the area behind the other lens. Thus, air may pass from hose 43 into the valve portion 39, and ducts 45 and 46, and will circulate over one of the lenses 28, from which it will pass through opening 47 to the other lens, and thence back into the other ducts 46 and 45.

An opening 48 is provided in each of the ducts 45 (Fig. 10) for permitting air to pass from the ducts 45 into the interior of the facepiece 36. Inhalation valves 49 are provided in each of the openings 48 to permit the air to flow only in a direction into the facepiece 36. The inhalation valves 49 comprise an annular member 50 which is provided with a flanged portion which is disposed in an annular groove formed in the material of the facepiece 36 about the openings 48. The annular member is provided with an annular raised seat 51 upon which is adapted to be located a resilient disc-like valve member 52, the valve member 52 overlying the central opening 53 in the annular member 50. The annular member 50 is also provided with a plurality of spoke-like elements which extend across the opening 53 to a central hub portion 54 to which the valve member 52 is attached as by a connecting member 55. Thus, it will be apparent that inhalation of the wearer will draw air inwardly from the ducts 45 through the openings 48, causing the resilient valve member 52 to be forced inwardly away from the raised annular seat 51, permitting the air to pass into the interior of the facepiece 36. Exhalation by the wearer will, however, urge the exhaled air against the outer surface of the valve member 52, causing the valve member to be urged toward the valve seat 51 to seal the opening 53 and prevent the air from passing back into the ducts 45. A relatively rigid cover 56 is adapted to be mounted over the inner side of each inhalation valve 49 for protection of the valve parts, the cover 56 being provided in one side thereof with an aperture 57 through which the air is permitted to pass. The directions of flow of air throughout the device are indicated by arrows in Figs. 2, 3, 4 and 10.

In order to provide an efficiently functioning apparatus, is it necessary to provide means for controlling the passage of air from the ducts 45 into the goggles and oxygen mask respectively. For example, it is apparent that air will normally flow through each of the two ducts 45 in substantially equal amounts, and thus no direct circulating system for the goggles exists. Therefore, there is provided in one of the ducts 45 an apertured stop member 45*a*, the aperture in the member 45*a* providing a restricted passageway for permitting only a relatively small amount of air to pass therethrough. With this construction, it is apparent that since a greater amount of air will be permitted to pass through the first or entrance duct 45 which is without the restriction 45*a*, circulation from the entrance duct through the goggles and back into the second duct 45 which has the restriction 45*a* is accomplished. However, it is also desirable that the goggles be ventilated simultaneously with the inhalation of the wearer. Therefore, the inhalation valve 49 which is located in the entrance duct 45 is provided with a resilient valve member 52 which is somewhat stiffer or less resilient than the

corresponding resilient valve member in the valve 49 which is located in the second duct 45 having the restriction 45a therein. Thus, it will be apparent that air passing through entrance duct 45 will be only partially drawn into the interior of the mask upon inhalation by the wearer while the remainder of the air will be forced through the goggles and into the interior of the mask through the weaker inhalation valve 49 which is located in the second duct 45. In this manner a complete and efficiently functioning circulation system is provided.

An exhalation valve 58 (Figs. 3, 4 and 9) is located in the tubular inlet portion 39 of the facepiece 36 and comprises an inner cylindrical member 59 (Fig. 9) which is secured to the inner portion of the facepiece 36 adjacent the upper end of the tubular inlet portion 39, the cylindrical member 59 being provided with an annular flange 60 which is adapted to rest against the lower surface of an annular flange or ledge 61 formed on the inner surface of the facepiece 36. The cylindrical member 59 is provided with an inner threaded portion to which is threadedly secured an annular member 62 which has a portion adapted to be disposed against the upper surface of the annular ledge 61, thus serving to retain the assembled parts of the exhalation valve 58 in desired position in the facepiece 36. The annular member 62 is provided with an inwardly extending annular portion 63 which is provided on its lower surface with an annular knife-edge valve seat 64 which is adapted to be engaged by a valve member 65 carried at one end of a reciprocal member 66 which is disposed within an elongated tubular valve-supporting member 67 extending into the interior of the tubular valve-supporting portion 39 through an opening 68 formed in the lower portion of the facepiece 39. The tubular valve-supporting member 67 is enlarged as indicated at 69 and has positioned therein a coil spring 70 which urges the valve member 65 in a direction toward the valve seat 64. The valve-supporting member 67 is further provided at its upper end with an annular flange-like portion 71 which is formed integral with the lower end of the cylindrical member 59 and to which is connected a resilient sealing member 72. The sides of the cylindrical member 59 are provided with a plurality of openings 73 and thus air is permitted to leave the interior of the facepiece 36 upon exhalation by the wearer, and upon consequent movement of the valve member 65 away from the valve seat 64, through the space therebetween and through the openings 73, out through the exhalation vent 74 (Figs. 2 and 4) as indicated by the arrows.

A recess in the interior of the facepiece 36 adjacent the location of the mouth of the wearer contains a microphone 75 which is connected to a suitable audio system by conventional wires 76, which wires 76 pass through the material of the facepiece 39 and emerge adjacent the upper end of the tubular inlet portion 39. The tubular portion 39 carries an apertured tongue 77 on its outer surface through which the wires 76 pass to lessen the chance of the wires 76 pulling out of the microphone 75 when they become twisted or entangled.

The facepiece 36 is further provided with a resilient integral cross member 78 (Figs. 2 and 4) which is adapted to engage the face of the wearer between the nose and upper lip. This aids in retaining the facepiece 36 in its cupped shape when being worn, thus also serving to maintain the microphone 75 in desired spaced relation with the mouth of the wearer.

From the foregoing description which relates particularly to the method of ventilating goggles and supplying oxygen to the interior of the facepiece 36 of the oxygen mask 35 as shown in Figs. 2 through 5, 9 and 10, it is apparent that improved means is provided for accomplishing these purposes wherein air entering the tubular inlet portion 39 of the facepiece 36 from hose 43 will pass upwardly through ducts 45 and 46 into the space behind one of the goggle lenses 28 and thence through opening 47 to the space behind the second lens 28, from which it will pass through the second ducts 46 and 45 to the inhalation valves 49, and wherein air can be simultaneously drawn inwardly of the facepiece 36 from the ducts 45 through the inhalation valves 49 upon inhalation by the wearer, with an improved exhalation valve 58 also being provided in the lower regions of the facepiece 36 whereby the air exhaled by the wearer will be permitted to flow outwardly of the mask through the valve 58 and vent 74.

It is to be understood, however, that such means for ventilating the goggles may be modified as shown in Fig. 5 wherein the facepiece 36 is provided with relatively wide upwardly extending portions 79 formed integral therewith adjacent the upper ends of the ducts 45, the portions 79 being provided with a plurality of small spaced passiges 80 therethrough, each of which passages 80 communicates with a duct 45. Thus, air may pass upwardly through a duct 45 and through the plurality of passages 80 to the rear surface of a lens 28. By providing the plurality of spaced passages 80 it is obvious that air from the duct 45 will be distributed over a greater surface of the lens 28 than may be otherwise possible. The remaining structural features of the device are similar to that shown in the preferred embodiment of the invention.

Fig. 6 illustrates a further embodiment of the invention wherein the ducts 45 terminate at the inhalation valves 49. In such a case, leading from the ducts 45 adjacent their upper ends are respective tubes 81 which project through the outer surface of the facepiece 36 and extend upwardly toward the goggles 22 and project through the material of the frame 23 in a direction toward the face of the wearer. The upper ends of the tubes 81 are shaped to follow the lower contour edge of the respective lenses 28 along the inner surface thereof and are provided with a plurality of small openings 82 therein. Thus, air entering the ducts 45 will pass upwardly through tubes 81 and out through the openings 82 to the inner surfaces of the lenses 28. Similar tubes 83 provided with upper portions 83a are disposed adjacent the rear surface of each lens 28 and extend along the upper contour edges thereof, said portions 83a being provided with a plurality of openings 84 therein similar to the openings 82 through which the air can pass into the interior of the tubes 83. The tubes 83 pass outwardly through the material of the frame 23 and are joined adjacent the upper end of the facepiece as indicated at 85 to form a single tube which extends through the facepiece 36 and is connected to a valve 86 similar to the inhalation valves 49, which valve 86 is secured to the inner surface of the facepiece 36 and prevents air from passing from the interior of the mask back into the goggles. Thus, to ventilate the goggles 22, air will pass through ducts 45 and tubes 81 to the interior of the goggles as described and then will pass through tubes 83 into the interior of the mask. It is apparent that with such a construction the ducts 45 will also contain the inlet valves 49 so that exhaled air will not be permitted to pass out of the facepiece into the tubes 81 and thence into the tubes 83 and consequently be re-breathed by the wearer. The valves 49 in this case, however, should be relatively stiff in comparison with the valves 86 to insure passage of air through the goggles. Upon inhalation by the wearer, air will be drawn through ducts 45 and inhalation valves 49 directly into the interior of the facepiece 36 as well as simultaneously from the goggles through ducts 83 and inhalation valve 86. Exhalation, in such a case, will be similar to that described with respect to Figs. 3, 4 and 9.

In Fig. 7 there is illustrated another embodiment of the invention wherein the ducts 45 also terminate adjacent the inhalation valves 49. To conduct air directly to the goggles there are provided a pair of tubes 87 which are joined at their lower ends to form a single tube which is inserted through the material of the facepiece 36 into

the tubular inlet portion 39 of the mask. The tubes 87 extend upwardly over the outer surface of the facepiece 36 and project through the material of the frame 23 into the interior of the respective goggle portions, which tubes 87 are provided with the portions 88 which are shaped to follow the upper contour edge of the respective lenses 28 along the inner sides thereof. The portions 88 are provided with a plurality of small openings 89 therein through which air from the tubes 87 can flow directly over the inner surfaces of the lenses 28. A second pair of tubes 90 are connected to the inhalation valves 49 and extend outwardly through the material of the facepiece 36 and upwardly toward the goggles, and are provided with portions 91 which project through the frame 23 and are shaped to follow the lower contour edge of the lenses 28 along the inner sides thereof. The portions 91 are also provided with a plurality of openings 92 through which the air will pass from the interior of the goggles into the tubes 90 and inhalation valves 49. Thus, to ventilate the goggles, air will pass directly from the inlet portion 39 into the tubes 87, then through openings 89 to the rear surfaces of the lenses 28, and thence through openings 92 into the tubes 90 and valves 49. Inhalation by the wearer will cause air to be drawn inwardly through the inhalation valves 49 simultaneously from both the ducts 45 and the tubes 90.

It is apparent, however, that in order to provide an efficiently functioning circulation system with the construction shown in Fig. 7, the restriction 45*a* must also be included in each of the ducts 45 in order to cause air to be forced into the goggles through the tubes 87 before it passes into the interior of the mask 36.

In Fig. 8 there is illustrated a still further embodiment of the invention wherein the facepiece 36 is provided with a single upwardly extending duct 93 which has mounted in its upper end one of the inhalation valves 49. The facepiece 36 is also provided with a transversely disposed duct 94 therein which communicates directly with the duct 93 and which has connected thereto a pair of tubes 95 which lead directly into the goggles and which have portions thereof following the upper contour edge of the respective lenses along the inner surfaces thereof. Thus, air will pass through ducts 93 and 94 and tubes 95 to the inner surfaces of the lenses. A second pair of tubes 96 are provided with portions shaped to follow the lower contour edges of the lenses along the inner surfaces thereof, which tubes 96 are both connected to a second transversely disposed duct 97 which is provided within the material of the facepiece 36 in spaced relation with the transverse duct 94. The duct 97 is connected at one end with the second inhalation valve 49. With this construction, air can be drawn inwardly through ducts 93 and 94 and tubes 95 to the inner surfaces of the lenses and out through tubes 96 and duct 97. Upon inhalation by the wearer, the air will be drawn out of the duct 97 through inhalation valve 49 and will simultaneously be drawn out of the duct 93 through the other inhalation valve 49 and thus fresh air is supplied to the wearer. It is apparent that by inhalation and withdrawal of air from duct 97 a continuous circulation of the air over the inner surfaces of the lenses is produced. It is apparent here also that the inhalation valve in the entrance duct 93 should be substantially stiffer than the valve in duct 97 to insure passage of air into the goggles upon inhalation by the wearer.

While the preferred method of supporting an oxygen mask and goggles in a helmet has been described in the foregoing, it is to be understod that any one of various other methods may be employed for this purpose. Also, it is to be understood that the specific goggle construction can be modified in any one of several ways as desired.

From the foregoing description, it will be apparent that all of the objects and advantages of the invention have been accomplished.

While the novel features of the invention have been shown and described and are pointed out in the annexed claims, it is to be understood that various omissions, substitutions and changes in the construction and arrangement thereof may be made by those skilled in the art without departing from the spirit of the invention. Therefore, it is to be understood that all matter shown or described is to be interpreted as illustrative and not in a limiting sense.

I claim:

1. In apparatus of the character described the combination of a goggle having lens supporting frame means embodying a face-engaging portion shaped to assume an intimate air-sealed relation with the face about the eyes, lens means in said lens supporting frame means, an oxygen mask having a portion shaped to fit over the nose and mouth and embodying a face-engaging portion shaped to assume an air-sealed relation with the face, said lens supporting frame means having an air inlet opening and an air outlet opening communicating with the interior thereof, said openings being on opposite sides of the lens means whereby air drawn through said inlet opening and passing outwardly of said outlet opening will be directed transversely of the interior of said lens means, said oxygen mask having a pair of air inlet openings therein, inhalation valve means associated with each of said openings, a pair of air passageways, one of said passageways being in communicating relation with a main source of oxygen and with a first one of said inhalation valves in said oxygen mask and having direct communication with an opening in the lens supporting frame means and the other of said passageways being in communicating relation with the other of said openings in said frame means and with a second of said inhalation valves, said first inhalation valve communicating with said first-mentioned passageway being relatively stiff and less easily operable in comparison with the second of said inhalation valves communicating with said other passageway whereby, during inhalation, said second inhalation valve will more readily operate and cause air to be drawn outwardly through the outlet opening of the lens supporting frame means into the oxygen mask while simultaneously causing a portion of the air passing through said first-mentioned passageway and which is bypassed by the stiffer valve communicating with said passageway to be drawn through the inlet opening in said frame means and to move transversely of the inner surface of the lens while simultaneously causing some oxygen from said main supply to be drawn directly inwardly of the oxygen mask, and an exhalation valve in said oxygen mask for permitting air to pass outwardly of the interior thereof during exhalation.

2. In apparatus of the character described the combination of a goggle having lens supporting frame means embodying a face-engaging portion shaped to assume an intimate air-sealed relation with the face about the eyes, lens means in said lens supporting frame means, an oxygen mask having a portion shaped to fit over the nose and mouth and embodying a face-engaging portion shaped to assume an air-sealed relation with the face, said lens supporting frame means having an air inlet opening and an air outlet opening communicating with the interior thereof, said openings being adjacent and on opposite sides of the lens means whereby air drawn through said inlet opening and passing outwardly of said outlet opening will be directed transversely of the interior of said lens means, said oxygen mask having a pair of air inlet openings therein, inhalation valve means associated with at least one of said openings, a pair of air passageways communicating at one end thereof with a main source of oxygen, one of said passageways being in communicating relation with the inhalation valve in said oxygen mask and having communication with an opening in the lens supporting frame means and the other of said passageways being in communicating relation with

the other of said openings in said frame means and with said main source of oxygen, said air passageway communicating with said inhalation valve having at least a portion thereof between said valve and the main source of oxygen of a restricted diameter less than the diameter of the other of said passageways for limiting the volume of air permitted to flow therethrough toward said valve and the other of said passageways being relatively unrestricted for permitting a greater volume of air to pass therethrough, said portion of restricted diameter and said valve being so cooperatively controlled in response to inhalation as to cause air to be drawn outwardly through the outlet opening of the lens supporting frame means into the oxygen mask and simultaneously cause air to be drawn through the unrestricted passageway into the inlet opening in said frame means and to move transversely of the inner surface of the lens while simultaneously causing some oxygen from said main supply to be drawn directly inwardly of the oxygen mask, and an exhalation valve in said oxygen mask for permitting air to pass outwardly of the interior thereof during exhalation.

3. In apparatus of the character described the combination of a goggle having lens supporting frame means embodying a face-engaging portion shaped to assume an intimate air-sealed relation with the face about the eyes, lens means in said lens supporting frame means, an oxygen mask having a portion shaped to fit over the nose and mouth and embodying a face-engaging portion shaped to assume an air-sealed relation with the face, said lens supporting frame means having an air inlet opening and an air outlet opening communicating with the interior thereof, said openings being on opposite sides of the lens means whereby air drawn through said inlet opening and passing outwardly of said outlet opening will be directed transversely of the interior of said lens means, said oxygen mask having a pair of air inlet openings therein, inhalation valve means associated with each of said openings, a pair of air passageways communicating at one end thereof with a main source of oxygen, one of said passageways being in communicating relation with an inhalation valve in said oxygen mask and having direct communication with an opening in the lens supporting frame means and the other of said passageways being in communicating relation with the other of said openings in said frame means, one of said air passageways having at least a portion thereof of a restricted diameter less than the diameter of the other of said passageways for limiting the volume of air permitted to flow therethrough and being located between said inhalation valve and the main supply of oxygen and the other of said passageways communicating with the other of said inhalation valves being relatively unrestricted for permitting a greater volume of air to pass therethrough, said inhalation valve communicating with said unrestricted passageway being relatively stiff and less easily operable in comparison with the other inhalation valve communicating with the air passageway having the restricted portion whereby, during inhalation, said valve communicating with said air passageway having the restricted portion will more readily operate and cause air to be drawn outwardly through the outlet opening of the lens supporting frame means into the oxygen mask while simultaneously causing a portion of the air passing through said unrestricted passageway and which is bypassed by the stiffer valve communicating with said passageway to be drawn through the inlet opening in said frame means and to move transversely of the inner surface of the lens while simultaneously causing some oxygen from said main supply to be drawn directly inwardly of the oxygen mask, and an exhalation valve in said oxygen mask for permitting air to pass outwardly of the interior thereof during exhalation.

4. In apparatus of the character described the combination of a goggle having a face-engaging portion shaped to assume an intimate air-sealed relation with the face about the eyes and a pair of spaced lens supporting frame means carried thereby, lens means in said lens supporting frame means, an oxygen mask having a portion shaped to fit over the nose and mouth and embodying a face-engaging portion shaped to assume an air-sealed relation with the face, said lens supporting frame means for each of said lenses having an air inlet opening and an air outlet opening communicating with the interior thereof, said openings being on opposite sides of the lens means whereby air drawn through said inlet opening and passing outwardly of said outlet opening will be directed transversely of the interior of said lens means, one of the outlet openings in one of said frame means being in connected relation with the inlet opening in the other of said frame means, said oxygen mask having a pair of air inlet openings therein, inhalation valve means associated with each of said openings, a pair of air passageways communicating at one end thereof with a main source of oxygen, one of said passageways being in communicating relation with an inhalation valve in said oxygen mask and having direct communication with an inlet opening in one of said lens supporting frame means and the other of said passageways being in communicating relation with the outlet opening in the other of said frame means, said air passageway communicating with said outlet opening having at least a portion thereof of a restricted diameter less than the diameter of the other of said passageways for limiting the volume of air permitted to flow therethrough and with said restricted portion being located between the inhalation valve associated with said passageway and the main supply of oxygen and the other of said passageways communicating with the other of said inhalation valves being relatively unrestricted for permitting a greater volume of air to pass therethrough, said inhalation valve communicating with said unrestricted passageway being relatively stiff and less easily operable in comparison with the other inhalation valve communicating with the air passageway having the restricted portion whereby, during inhalation, said valve communicating with said air passageway having the restricted portion will more readily operate and cause air to be drawn outwardly through the outlet opening of the associated lens supporting frame means into the oxygen mask while simultaneously causing a portion of the air passing through said unrestricted passageway and which is bypassed by the stiffer valve communicating with said passageway to be drawn through the inlet opening in said frame means and to move transversely of the inner surface of the lens while simultaneously causing some oxygen from said main supply to be drawn directly inwardly of the oxygen mask, and an exhalation valve in said oxygen mask for permitting air to pass outwardly of the interior thereof during exhalation.

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