Oct. 18, 1938. F. R. DAVIS 2,133,345

RESPIRATORY APPLIANCE

Filed March 31, 1937

Fig. 1.

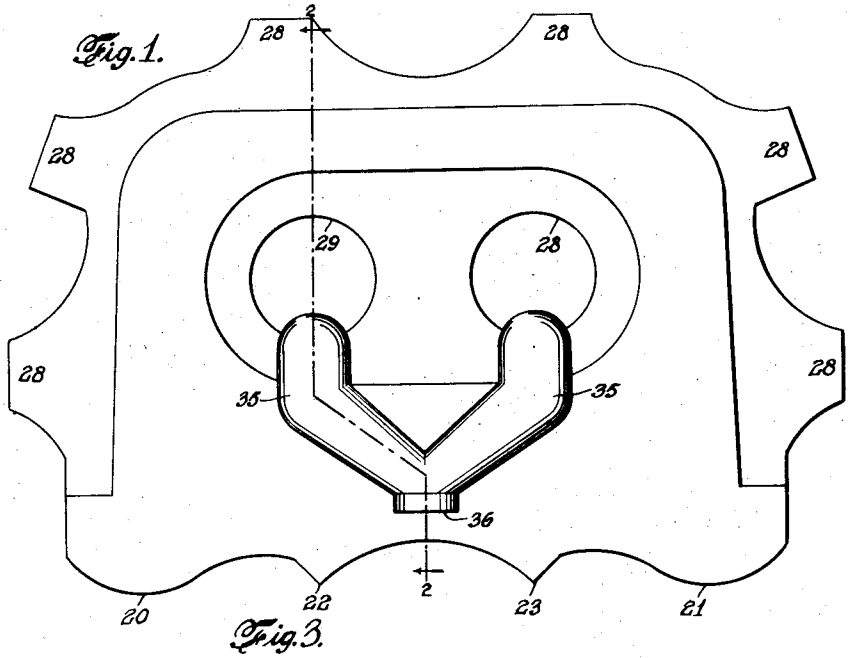


Fig. 2.

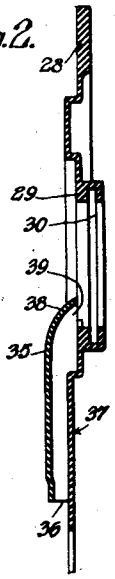


Fig. 3.

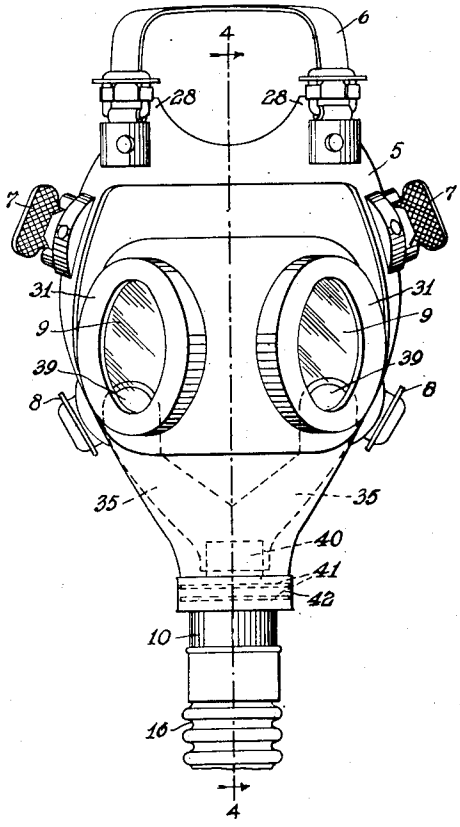
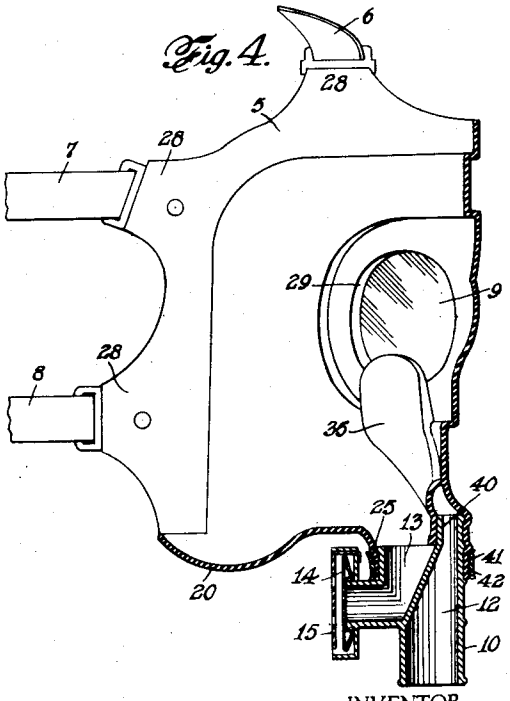


Fig. 4.



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2,133,345

RESPIRATORY APPLIANCE

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Application March 31, 1937, Serial No. 133,955

2 Claims. (Cl. 128—141)

The present invention relates to respiratory devices. More particularly, it pertains to the construction of gas masks of the full-face type. As is well-known in the art, masks of this type comprise a body of air-tight material adapted to cover the entire face of the user and provided with windows or eye-pieces to provide for visibility, the interior of the mask having a suitable connection with a source of pure air or a device for removing impurities from the air. The mask is also provided with an exhale valve for the exhausting of air emitted from the lugs in breathing. The air exhaled passes from the wearer's nostrils into the space between the mask and the face and by reason of the fact that it contains considerable moisture and heat and because the eye-pieces are cooled by the outside air, condensation of moisture is liable to take place on the inside surfaces of the eye-pieces, obstructing the vision of the wearer.

In order to prevent the condensation of moisture on the eye-pieces or to remove it as rapidly as it condenses, thus assuring good vision for the wearer, it has heretofore been the practice to attach tubes or other devices to the inlet for pure air and arrange them inside the mask in such a way as to direct a stream of incoming air against each eye-piece, in some cases attaching them to the inside of the mask to hold them in place. The use of these tubes or other tubes has been unsatisfactory in various ways. In the first place, increasing the size of the mask to accommodate such inner fittings also increases the dead air space within the mask. It has, furthermore, been necessary to fasten them in place by cementing or otherwise securing them to the inside surface of the mask, which requires an additional time-consuming assembly operation. There also exists the danger that these auxiliary devices may come loose from the mask with the natural deterioration.

The objects of this invention are to improve and simplify the construction of gas masks by forming the same from a single flat moulded blank which includes as an integral part air inlet tubes which also serve as clarifying tubes for the eye-pieces; to simplify the assembling of the mask by eliminating the necessity of assembling such tubes in the mask; to make the mask proof against the deterioration of any fastening means; and to so form said blank that it can be formed into a full face mask by a very simple operation and thereafter be readily attached to the usual air fittings.

An embodiment of the invention will now be described in detail as illustrative of the present preferred method of practicing the invention.

In the drawing:

Fig. 1 shows a flat, molded blank of rubber or rubber and fabric adapted to be formed into a full-face mask;

Fig. 2 is a section taken on the line 2—2 of Fig. 1;

Fig. 3 is a front view of a completed mask, and

Fig. 4 is a section taken on line 4—4 of Fig. 3.

Referring to Figs. 3 and 4, the completed mask comprises a formed face-piece 5, shaped so as to fit snugly against the face of the wearer, against which it is held by means of the straps 6, 7 and 8. In the front of the mask are eye-pieces having windows 9 of glass or other transparent material.

At the bottom of the mask is a fitting 10 of metal or other rigid material formed so as to provide an air inlet passage 12 and an outlet passage 13, at the end of which is the usual flutter-valve 14 surrounded by a rigid guard 15. The valve 14 permits air to be exhausted from the mask but prevents any air being drawn into it.

It will be understood, of course, that the air inlet of the fitting 10 is connected by means of a flexible tube 16 with a source of pure air or a filtering device such as a canister containing suitable chemicals for removing impurities from the air. The canister or other air supply (not shown) is usually provided with a check valve which prevents air being exhausted through passage 12.

Figs. 1 and 2 show a flat, molded blank from which the completed mask shown in Figs. 3 and 4 is made. This blank is formed into a mask by vulcanizing or otherwise securing together the complementary curved lower edges or segments 20 and 21, which forms the chin portion of the mask. The central arcuate portion between the points 22 and 23 forming at the same time a central circular opening of a size to fit around the top of the fitting 10, as in Fig. 4 at 25. Buckles for the holding straps are secured on the extensions 28 around the edge of the blank.

The blank is also provided with integral molded sockets 29 for the eye-pieces, the transparent windows 9 of which are held in the grooves 30. A metallic rim 31 is pressed onto the socket 29 after the window is inserted so that it is permanently retained therein.

To prevent condensation of moisture on the windows 9 it is desired as aforesaid to direct the incoming fresh air against them. For this pur-

pose the blank is so molded as to contain a pair of integral clarifying tubes **35**. The tubes **35** are generally in the form of a Y, their lower ends merging into a common opening **36**. The outer walls of the tubes **35** are formed by the outer surface of the mask itself as is clearly shown at **37** in Fig. 2. The top ends of the tubes **35** are curved outwardly toward the windows **9** as best shown in Fig. 2 at **38**, the opening through which the fresh air passes being shown at **39**.

The intake passage **12** of the fitting **10** tapers toward the top, as shown in Fig. 4, forming a rather flat neck **40** which fits into the opening **36** of the tubes **35**, the elasticity of the material of the mask making an air-tight joint. The fitting **10** as a whole is secured in the mask by wire or the like wrapped around the lower portion **25**, which wire **41** is afterward covered by a rubber strip **42**.

From the foregoing description it will be clear that when the wearer of the mask inhales, the suction produced will draw fresh air in through the passage **12** of fitting **10** and up through the tubes **35**, the upper curved portions **38** of which will deflect the air against the windows **9**, thus keeping them free from any condensed moisture. When the wearer exhales the air will leave the mask through the passage **13** and the valve **14**.

By constructing the mask in the manner described above, the manufacture thereof is greatly simplified. The blank shown in Figs. 1 and 2 is molded in a single piece and is formed into a full-face mask by merely vulcanizing together the curved lower edges **20** and **21**. The fitting **10** is then inserted into the lower opening **25**, the neck **40** being inserted into the opening **36**. As shown in the drawing, the opening **36** of the clarifying tubes is so positioned relative to the lower edge of the molded mask, between the points **22** and **23**, that when the fitting **10** is inserted into the lower opening **25** its neck **40** will be properly positioned in the opening **36**. The fitting is secured in the mask by means of the wires **41**. It thus becomes unnecessary to separately manufacture any clarifying tubes and it also eliminates the operation of assembling them in the mask and securing them thereto. Forming the tubes **35** as an integral part of the mask has the further advantage that they are always accurately located with respect to the windows **9** so that the air is directed accurately in the most useful direction, affording maximum visibility. Integrally molded tubes occupy much less space than separate tubes and reduce the size and weight of the mask.

As the invention has been described in connection with a single embodiment it will be understood that this is given merely by way of illustration and is not intended to limit the invention as defined by the claims.

What is claimed is:

1. A face piece of a gas mask of the full-face type which consists of a flat molded blank including sockets for a pair of eye-pieces, the lower edge of said blank having complementary curved segments which are joined together to form the chin portion of the mask, said lower edge also having a central arcuate portion between said segments which forms a substantially circular opening when said segments are joined together, air passages molded as an integral part of said blank and extending from positions adjacent each of said sockets so located as to direct the air against the eye-pieces and having a common opening adjacent said arcuate portion, and a fitting having inlet and outlet ports for conducting air to and from the interior of the mask, the inlet port of said fitting being connected with the said common opening and the outlet port being secured in the said circular opening.

2. A face piece for a gas mask of the full-face type which consists of a flat molded blank including sockets for a pair of eye-pieces, the lower edge of said blank having complementary curved segments which are joined together to form the chin portion of the mask, said lower edge also having a central arcuate portion between said segments which forms a substantially circular opening when said segments are joined together, air passages molded as an integral part of the blank and having the surface of the mask as one of their walls, said passages being positioned to direct incoming air against the inside of the eye-pieces and extending downwardly to a common opening positioned above but near the edge of said arcuate portion, a substantially rigid fitting having an upwardly-extending air inlet port and an air outlet port, said fitting being secured within the opening formed by said arcuate portion and having its inlet port extending upwardly into the common opening of said air passages.

F. RUTLEDGE DAVIS.

CERTIFICATE OF CORRECTION.

Patent No. 2,133,345. October 18, 1938.

FRANK RUTLEDGE DAVIS.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 1, first column, line 12, for the word "lugs" read lungs; line 30, for "tubes" second occurrence, read devices; page 2, second column, line 10, claim 1, for "of" first occurrence, read for; and that the said Letters Patent should be read with this correction therein that the same may conform to the reccrd of the case in the Patent Office.

Signed and sealed this 22nd day of November, A. D. 1938.

Henry Van Arsdale

(Seal) Acting Commissioner of Patents.