May 24, 1927.

H. S. OLGARD

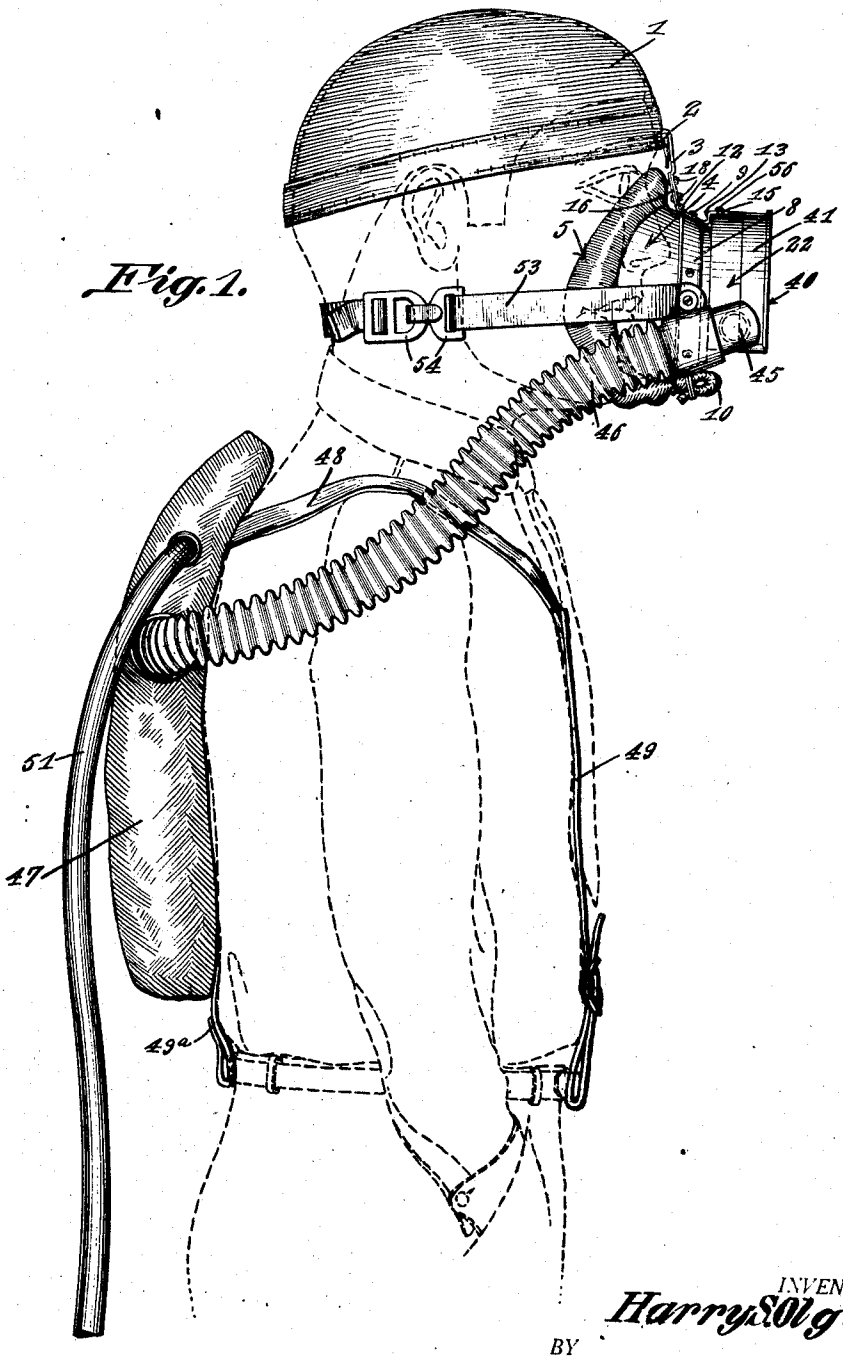
1,630,209

RESPIRATOR MASK

Filed April 9, 1926

2 Sheets-Sheet 1

Fig. 1.



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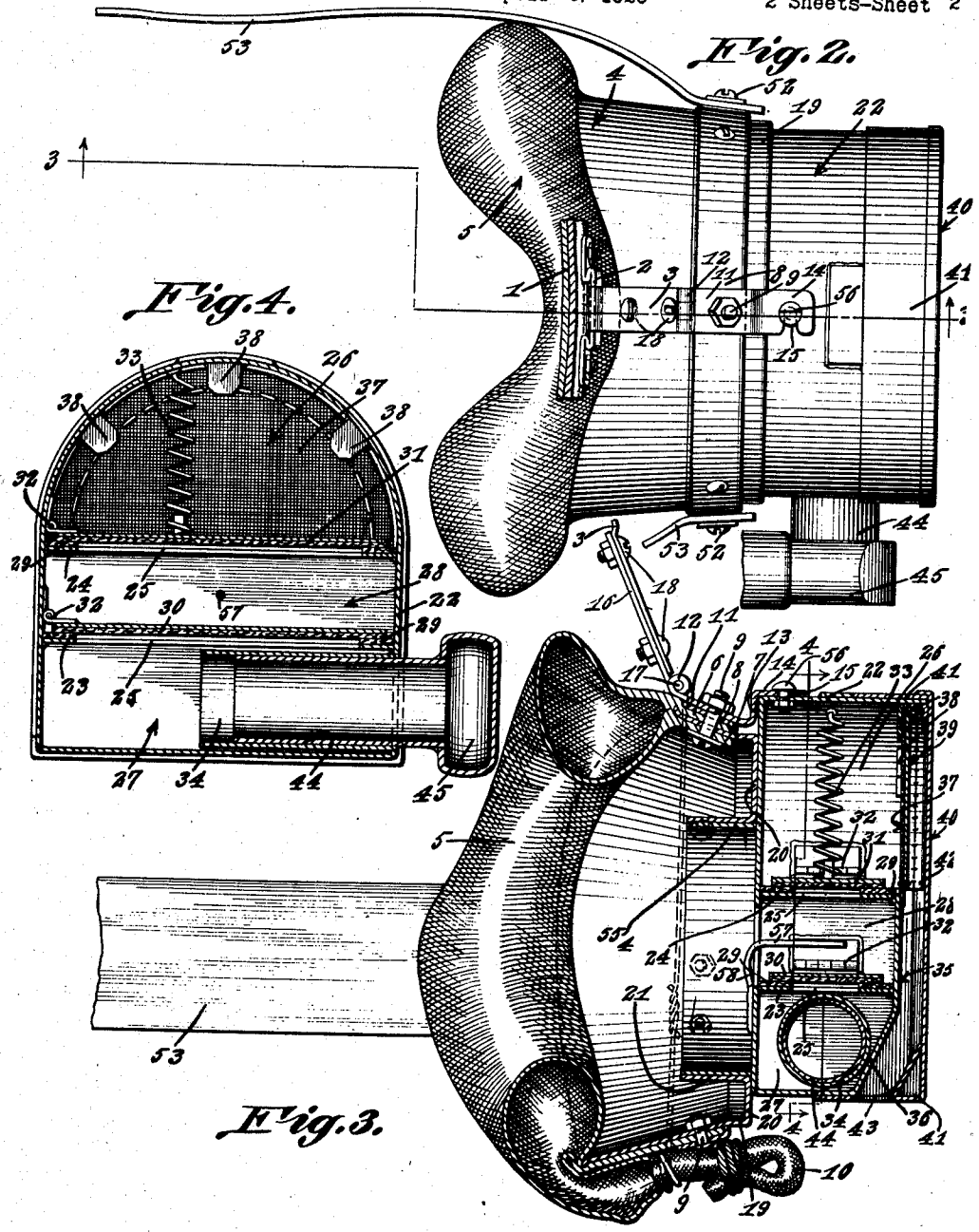


Fig. 2.

Fig. 4.

Fig. 3.

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UNITED STATES PATENT OFFICE.

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RESPIRATOR MASK.

Application filed April 9, 1926. Serial No. 100,883.

This invention relates to respiratory masks and pertains particularly to a mask designed to be positioned against the face to enclose the mouth and nostrils, for the protection of the wearer against noxious gases, dust laden air, and other deleterious substances in the atmosphere.

Another object of the invention is to provide, in a manner as hereinafter set forth, an improved type of respiratory mask having improved air inlet and outlet means of such construction as to require a minimum amount of space in the mask structure, thus materially reducing the size and weight of the same.

A still further object of the invention is the provision, in a manner as hereinafter set forth, of a respirator mask having the front portion thereof adapted for easy and quick removal in a plurality of sections, so that the interior of the mask can be easily gotten at for repair or adjustment.

Other objects of the invention are the provision, in a manner as hereinafter set forth, of a respirator structure of light but strong and durable construction, easily placed into position, and comparatively inexpensive to manufacture and set up.

The invention will be best understood from a consideration of the following detailed description taken in connection with the accompanying drawings, with the understanding that the invention is not confined to any strict conformity with the showing of the drawings, but may be changed and modified so long as such changes and modifications mark no material departure from the salient features of the invention as expressed in the appended claims.

In the drawings:—

Figure 1 shows the complete device embodying this invention in the position assumed by it when in use.

Figure 2 is a top plan view of the respirator mask.

Figure 3 is a vertical section taken upon the line 3—3 of Figure 2 and,

Figure 4 is a transverse section taken on the line 4—4 of Figure 1.

Referring now to the drawings in detail wherein like numerals of reference indicate corresponding parts throughout the several views, there is indicated by the numeral 1 a head cap of the type ordinarily used in connection with respirators of this type and this cap is provided at the front edge with the metal loop 2 into which the hook member 3 of the respirator mask is adapted to engage to assist in maintaining the mask in position against the user's face.

The mask which constitutes a part of the respirator structure embodying this invention, comprises a face cone portion 4 which as is shown, is in the form of a frusto-conical body having the edge of the base portion thereof cut to conform roughly to the contour of the human face.

Secured about the base edge of the cone 4 is an air cushion body 5 which is roughly in the form of a tub which traverses the edge of the base of the cone 4. This air or cushion tube 5 is provided with the inwardly extending web 6 which overlies the outer surface of the cone 4 and is secured thereto by cementing or other appropriate means. At the upper side of the cone 4, the cushion tube 5 is provided with the tongue 7 which extends inwardly against the inner wall of the cone as shown in Figure 3.

A securing band 8 extends about the cone body 4 adjacent the forward end thereof and is secured to the body by means of the bolts 9. As is shown in Figure 3 one of these bolts 9 passes through the tongue 7 of the cushion tube and secures the same in position against the inner wall of the cone.

A valve 10 forms a part of the cushion tube structure 5 and by means of this valve the cushion can be filled with air.

Extending transversely of the band 8 which fastens about the cone body 4, at the top of the cone body, is a relatively short band 11 which terminates at the rear end in the hinged knuckles 12 and the forward end thereof is bent upwardly as at 13 and then has the terminus directed forwardly of the cone body as indicated at 14. This forwardly directed portion 14 is formed with the notch 15 to form a hook member. A hinge leaf 16 has one end pivotally attached to the hinged knuckles 12 by means of the pivot pin 17 and this hinge leaf is securely bolted by the bolt members 18 to the lower end of the hook body 3.

The edge of the forward or constricted portion of the cone body 4 is formed to set up the forwardly directed annular portion

19 which forms a part of the inwardly directed flange 20, which flange constitutes the front wall of the cone body. As is shown, this flange is relatively broad and has extending in through the cone from the edge thereof the collar portion 21.

Positioned against the outer side of the wall 20 of the cone structure 4, is an air exchange receptacle indicated generally by the numeral 22. This receptacle 22 is of rectangular conformation at the lower portion while the upper portion thereof is substantially semi-circular as shown in Figure 4. Extending transversely of the interior of the receptacle is a pair of horizontally spaced partitions 23 and 24 respectively, each of which partitions has an elongated passage therethrough as indicated by the numeral 25. There is thus set up the upper and lower, or air outlet and inlet chambers, 26 and 27, respectively, while between these two chambers there is formed a vestibule 28 one side wall of which is provided with the opening 29 which opens through the collar 21 into the cone body 4, when the parts are in the position shown in Figure 3, or assembled.

Covering the upper surfaces of the partitions 23 and 24, is a leather or felt body 29 and resting upon these coverings and overlying and closing the passages 25 through the partitions 23 and 24, are flap valves 30 and 31 respectively. Each of these flap valves 30 and 31 has the under side thereof covered with material similar to that which covers the partitions 23 and 24, so that a perfectly air-tight closure can be made by the valve bodies. As is clearly shown in Figure 4, these flap valves 30 and 31 are hingedly attached as at 32 to one side wall of the body 22 and both valves are arranged to open upwardly.

The upper valve 31 which controls the flow of air from the cone body 4 through the vestibule 28 and the chamber 26 to the atmosphere, is held closed under slight tension by means of the spring 33, one end of which bears against the top of the valve body while the other end bears against the underside of the top of the casing 22.

One side wall of the casing 22 adjacent the bottom thereof, has an opening formed therethrough and extending inwardly from this opening into the lower or air inlet chamber 27, is a tube 34, the inner end of the tube terminating at approximately the central portion of the casing.

The front wall 35 of the casing 22, is set inwardly from the front edges of the side walls of the casing as is shown in Figure 3 and the lower portion of this front wall 35 slopes inwardly or cuts beneath the casing 22 as indicated at 36.

The upper portion of the front wall of the casing 22, instead of being solid as is the lower portion 36, is formed of a foraminous body of material 37 the lower edge of which is secured along the front edge of the partition 24. Thus the entire front wall of the upper or air exhaust chamber 26 is formed of this foraminous body. Tongue members 38 project inwardly from the curved top portion of the casing 22, as shown in Figure 4, and against these tongues the foraminous body 37 bears. The outer surface of the foraminous body 37 is covered by another foraminous body of finer weave as indicated at 39. It is preferred to make the body 37 of copper gauze and the body 39 of cloth material.

Fitted over the front of the casing 22 of the respirator body, is a cap 40 having the surrounding flange 41 which engages the top, sides and bottom of the casing. As above stated, the front wall 35 of the casing 22 is set inwardly from the front edge thereof and it will be readily seen that when the cap 40 is in position across the front of the casing there will be set up between the cap top and the wall 35 a chamber 42. That part of the flange 41 which extends across the lower side of the cap 40, is provided with the slot 43. As is shown, the lower portion of the passage 42 which is thus set up between the top of the cap 40 and the wall 35 of the casing, turns inwardly following the line of the inwardly inclined wall portion 36. It will be readily seen from this description that air passing from the cone 4 through the vestibule 28 and through the valve into the chamber 26 will escape from the respirator through the foraminous wall structures 37 and 39 and into the atmosphere through the port 43 of the passage 42.

Frictionally engaged in the tubular sleeve 34, is a fresh air discharge nozzle 44 which extends from one side of the head 45 of the flexible fresh air supplying tube 46. The other end of the tube 46 opens into and receives air from the pouch or bag 47 which is adapted to be secured to the back of the user of the respirator, by means of the strap 48, of which there are two, which pass over the users shoulders to a meeting point over the chest, from which point a depending strap 49 extends to, and is secured to, the waist belt, as shown. From the bottom of the bag there extends a strap 49^a which is secured to the waist belt, at the back to hold the bag down.

Leading to the air pouch, is an air inlet tube 51 which may be valved at the inner end to allow the air to enter the bag, only. The other end of the tube is usually allowed to trail free along the floor at the user's feet.

Pivotally attached to each side of the cone structure 4, by means of the screws 52, are securing or holding bands 53 which are adapted to be passed across the back of the head of the wearer of the mask, and

secured together by means of the buckle structure 54 to assist in holding the mask in position against the wearer's face.

The inner wall of the casing 22 has an annular flange 55 extending therefrom, the overall diameter of which annular flange is slightly less than the interior diameter of the collar 21 formed upon the front wall 20 of the cone. This annular flange 55, is as shown in Figure 3, adapted to extend into and frictionally engage the collar 21 to support the casing 22 in position against the front wall of the cone. In adition to this supporting means for the casing 22, there is provided the stud 56 upon the top of the casing body beneath the head of which the hook 15 of the member 14 is engaged as shown. This hook 15 is pivotally held by the bolt 9 which extends through the top part of the cone 4 so that when it is desired to engage the hook beneath the head of the stud 56, the body portion 11 is formed about the bolt 9 to engage or disengage the stud 56 with the hook.

As above described, the outlet valve 31 within the casing 22, is normally held closed by the tension of the spring 33. In connection with the inlet valve 30, however, no means is employed for holding the valve in closed position except the attraction of gravity. Means is employed, however, for preventing this valve from opening too far, which means comprises an arm 57 which overlies the valve and which has a leg 58 extending through the vestibule opening 29 and secured to the inner wall of the casing as shown in Figure 3.

Having thus described my invention what I claim is:—

1. A respirator comprising a hollow frusto-conical face engaging member formed with cushioning means to abut the face of the wearer, a casing having an inset front wall provided with a foraminous upper part and a rearwardlyy inclined lower part, means within said casing to provide an upper air escape compartment, an intermediate air vestibule and a lower fresh air inlet compartment, means for connecting the casing to the front of and for establishing communication thereof with said body, said vestibule opening into said means, valve controlled passages for establishing communication between said compartments and the vestibule, said foraminous upper part of said wall forming the front of said air escape compartment, and a flanged cap member mounted upon said casing and providing with said front wall an air escape passage for said air escape compartment, means for conveying fresh air to said inlet compartment, and said cap member having an opening in its lower portion to provide an outlet for said air escape passage.

2. A respirator in accordance with claim 1 having a foraminous element interposed between the foraminous upper part of said front wall and said cap member.

3. A respirator in accordance with claim 1 having said cap member formed with an inclined lower portion opposing the inclined lower part of said front wall and with the outlet for the air passage arranged between the inclined lower part of the front wall and the inclined lower portion of the cap member.

4. A respirator in accordance with claim 1 having the hollow frusto-conical shaped body thereof provided with a hinged element for detachably connecting said body to a head cap.

In testimony whereof, I affix my signature hereto.

HARRY S. OLGARD.