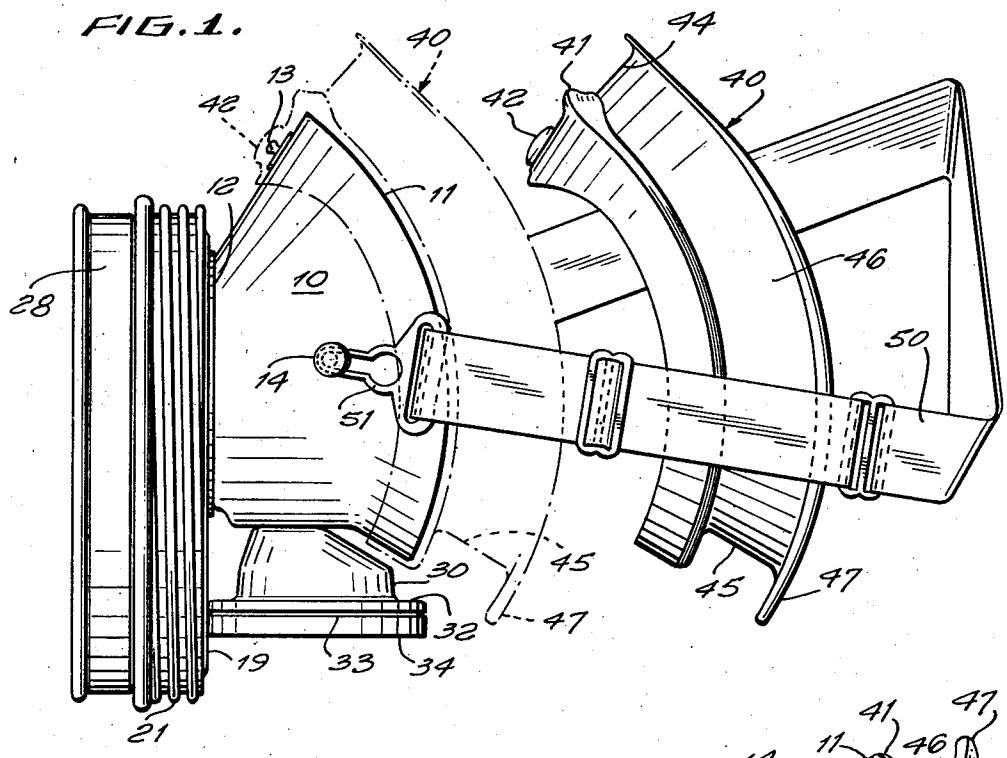
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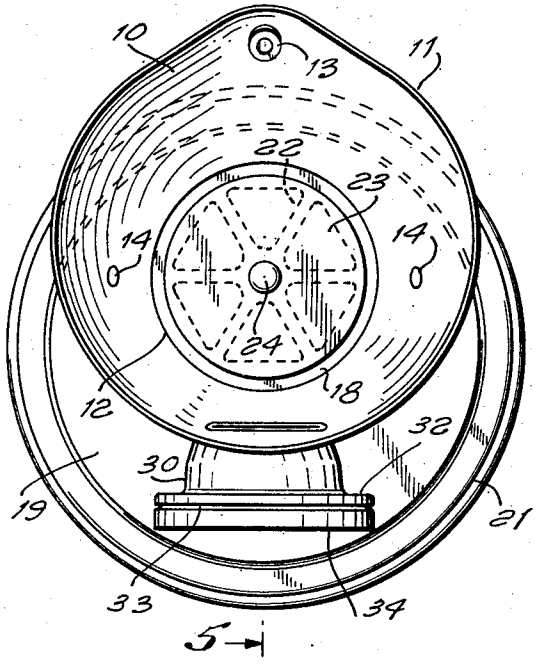
RESPIRATOR

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FIG. 1.



5 → FIG. 2.



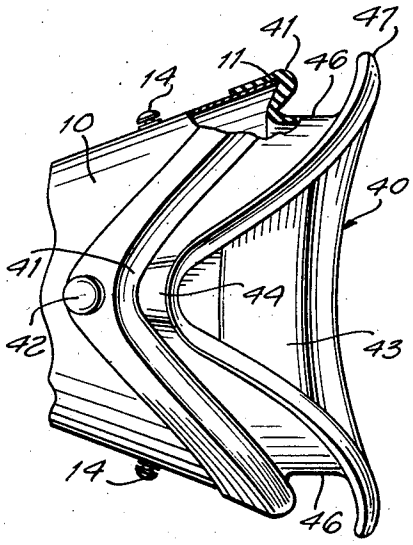


FIG. 7.

INVENTOR
JUDITH J. GARELICK
BY Derek Freeman
ATTORNEY

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FIG. 3.

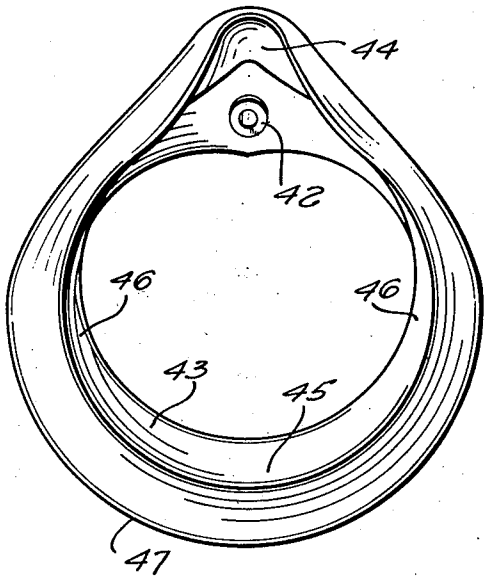


FIG. 4.

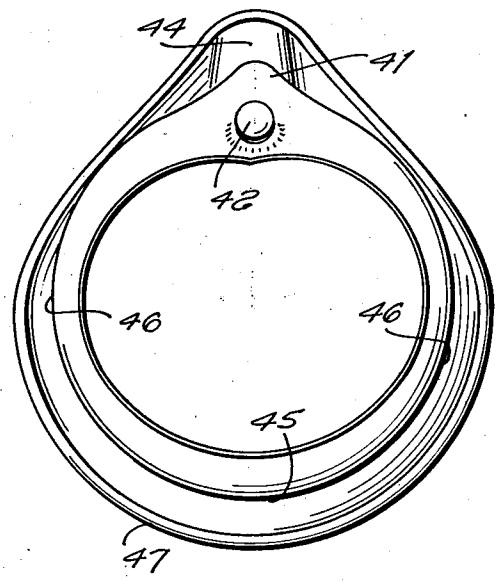
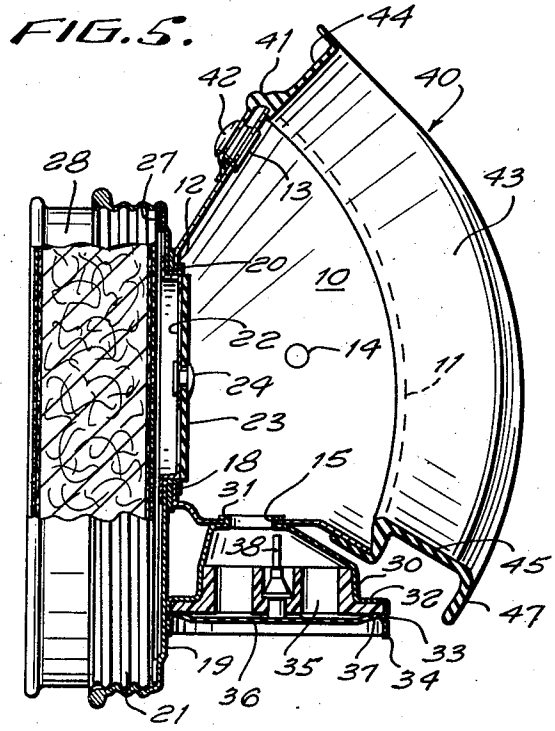


FIG. 5.



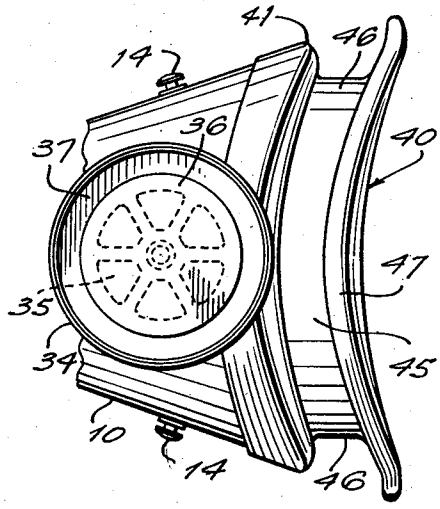


FIG. 6

INVENTOR
JUDITH J. GARELICK
BY Percy Freeman
ATTORNEY

United States Patent Office 2,823,671 Patented Feb. 18, 1958

2,823,671

RESPIRATOR

Judith J. Garelick, Brooklyn, N. Y., assignor to Pulmosan Safety Equipment Corporation, Brooklyn, N. Y., a corporation of New York

Application March 29, 1954, Serial No. 419,251

4 Claims. (Cl. 128—146)

The present invention relates to a novel and improved air filtering device of the respirator type.

The particular embodiment of the present invention, which is illustrated in the drawings and which will be described hereinafter in greater detail, comprises generally a hollow open-ended body having one end adapted to be positioned over the nose and mouth of the user, an inlet filter means on the remote body end, and outlet means arranged intermediate the ends of the body.

There are, of course, many respirator type filtering devices on the market and in the prior art, but such devices have proved subject to various serious disadvantages under practical conditions of use. For example, such devices have been found extremely uncomfortable after relatively short periods of use. Further, previous devices have been ill-fitting, so as to require frequent adjustment, resulting in work stoppages and other delays.

An important feature of the present invention is the provision, in a respirator, of a metal insert for retaining the rubber exhalation valve. This is accomplished by the unusual shaping of the aluminum holder and the use of only one lip on the rubber valve seat. In addition, the valve is held securely in place and a perfect seal obtained by forming a bead or ridge which presses against the edge of the valve seat.

It is a further object of the present invention to provide a respirator of the type described having novel and improved face-engaging means, which are adapted to be hand-molded to conformably engage with all facial contours, and which are constructed and arranged to apply a minimum of pressure to the more sensitive regions of the face, and thus afford a high degree of comfort in use. More particularly, the face-engaging means of the present invention is adapted to apply only very slight pressure to the nose of the wearer, and is adapted to be deformed by the hands to more closely or accurately fit varying contours of the face.

Adsorption tests with organic vapors show that the efficiency of a given quantity of adsorbent is higher when the adsorbent is used in a single cartridge rather than divided and used in two smaller cartridges as in comparative, competitive models. Hence, it is a further object of the invention to provide a respirator utilizing a single replaceable cartridge or canister of adsorbent material.

It is a further object of the present invention to provide a respirator having the characteristics mentioned in the foregoing paragraphs, which is simple in construction and durable in use, which is effective for its intended purposes, and which can be manufactured and sold at a reasonable cost.

Other objects of the present invention will become apparent upon reading the following specification and referring to the accompanying drawings, which form a material part of this disclosure.

The invention accordingly consists in the features of construction, combinations of elements, and arrangements of parts, which will be exemplified in the construction

hereinafter described, and of which the scope will be indicated by the appended claims.

In the drawings:

Fig. 1 is a side elevational view showing a respirator constructed in accordance with the present invention, the face-engaging means being illustrated in solid lines as removed from the mask, and shown in assembled condition in dot-and-dash outline.

Fig. 2 is a rear elevational view showing the respirator of the present invention with the face-engaging means detached therefrom.

Fig. 3 is a rear elevational view of the face-engaging means.

Fig. 4 is a front elevational view of the face-engaging means.

Fig. 5 is a sectional view, taken substantially along the line 5—5 of Fig. 2.

Fig. 6 is a partial, bottom plan view of the mask assembled with the face-engaging member.

Fig. 7 is a partial top plan view, partly in section, illustrating the mask in assembled relation with the face-engaging member.

Referring now more particularly to the drawings, the embodiment of the invention illustrated therein comprises a hollow aluminum or other metal body **10** converging from its rearward end **11** to its forward end **12**. The body is provided on its upper, exterior surface with one mating element **13** of a snap fastener, and is provided on its opposite side, exterior surfaces with a pair of lugs **14**, **14**, all for a purpose appearing presently. The bottom side of the body **10** is formed intermediate its ends with an aperture **15** (Fig. 5).

Arranged across the front end **12** of the body **10** is an inlet filter cup **19** disposed eccentrically with respect to the front body end **12** and formed with an opening **20** communicating with the interior of the body. The walls of the cup **19** are preferably threaded or corrugated as at **21**. In Fig. 5, it will be noted that an annular portion **18** of the cup **19** is upset through the front end **12** of the body **10** and spread about the interior thereof to fixedly secure the cup to the body.

Disposed within the cup opening **20** and the front body opening **12** is an apertured plate or spider **22**, which has a flexible resilient sheet **23** arranged closely adjacent to and interiorly of the spider, and fixedly secured thereto by a centrally disposed rivet **24**. Hence, the spider **22** and sheet **23** combine to provide a one way, inlet valve communicating between the interior of the cup **19** and the body **10**.

A gasket **27** is seated in the bottom wall of the cup **19** and a filter element or cartridge **28**, preferably cylindrical in configuration, is threadedly and removably secured in the cup in abutting engagement with the gasket. It will be noted that the cup **19** and filter element **28** are arranged eccentrically of the inlet valve defined by plate **22** and sheet **23**, so that the cup and filter element depend substantially beyond the lower side of the body **10**.

Arranged exteriorly of and adjacent to the opening **15** in the bottom side of body **10** is a hollow, funnel-like metal mounting member or exhalation insert **30**, which converges upwardly toward the elongated opening **15** and is fixedly secured thereto by the upset edge portion **31**. The mounting member or shell **30** diverges downwardly, being formed with a radially extending web **32** constituting a downwardly facing shoulder with a circumjacent annular flange **34**, and an internal bead **33** intermediate the shoulder **32** and lower open end of flange **34**. It will be noted that the lower end **34** of the mounting member is spaced substantially above the lower end of the cup **19** and filter element **28**, and is of less transverse dimension than the latter, so as to be effectively shielded there-

by. An apertured plug or spider 35 is seated in the lower end of the mounting member 30 in abutting engagement with the shoulder 32 and retained therein by the bead 33. Closely adjacent to and underlying the plug 35 is a flexible, resilient valve sheet 36, preferably fabricated of rubber, and having an upwardly offset marginal edge portion 37. In the particular embodiment illustrated (see Fig. 5), the sheet 36 is formed with an integral, central extension 38 which is fixedly secured within the plug 35 and retains the valve in its closely underlying position. It will be noted that the upturned marginal edge portion 37 is in abutting engagement with the plug 35 and effectively seals the apertures of the plug against exterior fluid pressure. However, the sheet 36 and its marginal edge portion 37 are readily displaceable downwardly under increased fluid pressure within the body 10 to permit escape of fluid therefrom.

It has been found, in practice, that by locating the outlet means, namely the exhalation insert member 30, spider 35 and valve sheet 36 closely beneath the body 10 so as to be shielded by the cup 19 and filter element 28, the outlet means has been located out of the path of the dust or otherwise impure gases, so as to operate substantially trouble-free.

Extending about the periphery of the rear body edge 11 is a face-engaging member, generally designated 40. The face-engaging member is preferably fabricated of flexible, resilient material, such as rubber or the like, and includes a bead 41 extending about the rear body edge 11 and snugly embracing the latter. Although the face-engaging member 40 is substantially self-retaining on the body 10 by reason of the snug engagement of the bead 41 with the body edge 11, a complementary fastener element 42 is provided for securement to the element 13 in order to assure proper circumferential relation between the parts, and facilitate assembly. A flange 43 is offset inwardly from the bead 41 and extends circumferentially thereabout and rearwardly therefrom. The inward offsetting of the flange 43 serves to provide additional resiliency for the latter, for reasons which will soon become apparent. It will be noted that the upper and lower flange portion, 44 and 45, respectively, diverge from each other, while the opposite side flange portions 46, 46 extend substantially parallel in the rearward direction. Extending circumferentially along the rearward edge of the flange 43, is formed an outwardly extending lip 47.

As best seen in Fig. 3, the lower and side flange portions, 45 and 46, 46, along with their adjacent rim portions, combine to define a substantially arcuate lower segment. It will be further observed that the upper flange portion 44, the flange portions adjacent thereto, and the adjacent rim portions, all combine to define a substantially inverted, V-shaped peripheral upper segment, continuous with the lower, arcuate segment.

The above-described face-engaging member configuration has been found to be ideally suited for conforming engagement with the large majority of facial contours. That is, the arcuate lower circumferential segment is conformably engageable with the chin and cheeks of the user, while the upper, inverted V-shaped circumferential segment is extremely well suited for conforming engagement with the nose of the wearer.

In addition to its other functions, the aluminum body 10 acts as a frame for the rubber cushion and thus eliminates the need for additional metal or rubber supports which are necessary to minimize mushrooming of rubber parts. Hence the combination rubber-aluminum body is shape-retaining.

It will be further noted that the cross-sectional thickness of the lower arcuate segment, both the flange and rim, is substantially greater than that of the inverted V-shaped segment, as seen in Fig. 5. It has been found that the jaw and cheeks are capable of comfortably withstanding greater pressures than is the nose, so that the increased

section of the lower circumferential segment will serve to transmit greater pressure than the relatively thin section of the upper circumferential segment. As the lower circumferential segment transmits the greater proportion of force necessary to hold the respirator on the face in conforming engagement therewith, it has been found desirable to offset the flange 45 a greater amount than the flange portion 44, to thereby afford greater yieldability to the former. This difference in offset distance will be readily perceived in Fig. 5. Further, it will be observed that the rim portion adjacent to the upper circumferential segment is reduced both in thickness and lateral extent, so that it is now possible to comfortably wear a conventional pair of spectacles at the same time as one is wearing the respirator of the present invention.

In order to put on the respirator, it is only necessary to place the mask in position on the face and slip the headbands over the head. One of the headbands is worn over the ears on the back of the head and the other around the back of the neck. Of course, removal of the mask may be effected by reversing this procedure. Hence, frequent removal and replacement of the mask without inconvenience or discomfort is permitted.

From the foregoing, it will be apparent that the present invention provides a respirator which fully accomplishes its intended objects, and which is well adapted to meet practical conditions of use.

Although the present invention has been described in some detail by way of illustration and example for purposes of clarity of understanding, it is understood that certain changes and modifications may be made within the spirit of the invention and the scope of the appended claims.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent, is:

1. A respirator comprising a hollow, open-ended body, engaging means on one end of said body extending about the periphery thereof and adapted to conform with the facial contours of a wearer, an inlet valve on the other end of said body, an inlet filter means secured to said body eccentrically of said inlet valve and depending substantially beyond said body, and outlet means intermediate the ends of said body and shielded by the depending portion of said inlet filter, said outlet means constituting an exhalation unit and comprising a metal mounting member or holder, an exhalation valve and valve seat plug, said mounting member being secured to and in communication with the body and having a web circumjacent the mounting member and an annular flange extending outwardly from said web, said valve seat plug being apertured and being located within said mounting member and abutting against said web, its circumference fitting within said flange, an annular bead in said flange extending inwardly against the valve seat plug to securely retain said plug in said member, said exhalation valve comprising a flexible resilient sheet exteriorly of and closely underlying said plug, said sheet having an upturned marginal edge portion normally engaging said plug to seal said apertures, and movable away from said plug in response to increased fluid pressure interiorly of said body.

2. A respirator according to claim 1, said engaging means comprising a bead extending along and snugly embracing the peripheral edge of said one body end, and an outstanding flange fabricated of flexible, resilient material and extending along said bead, said flange having an arcuate circumferential portion adapted to engage with the chin and cheeks of a wearer and an inverted V-shaped circumferential portion adapted to engage over the nose of the wearer, said V-shaped portion being of relatively thin cross-section to apply a minimum of pressure to the nose.

3. A respirator according to claim 2, in combination with a flexible, resilient lip extending along the edge of said flange to afford substantial surface contact with the wearer's face and effect sealing of said contact.

4. A respirator according to claim 3, said lip being of lesser dimensions in the region of said V-shaped portion to permit normal resting of spectacles on the wearer's nose.

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