Aug. 24, 1965 A. E. MILLER 3,202,150

FILTER ATTACHMENT FOR A PRESSURIZED BREATHING APPARATUS

Filed June 11, 1962 2 Sheets-Sheet 1

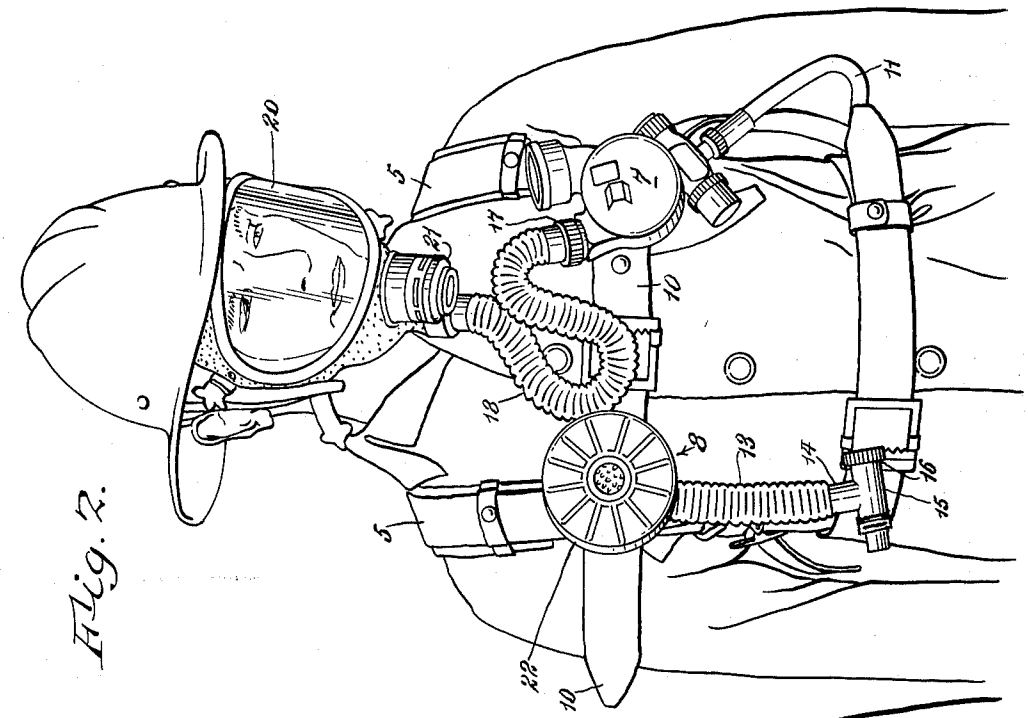


Fig. 2.

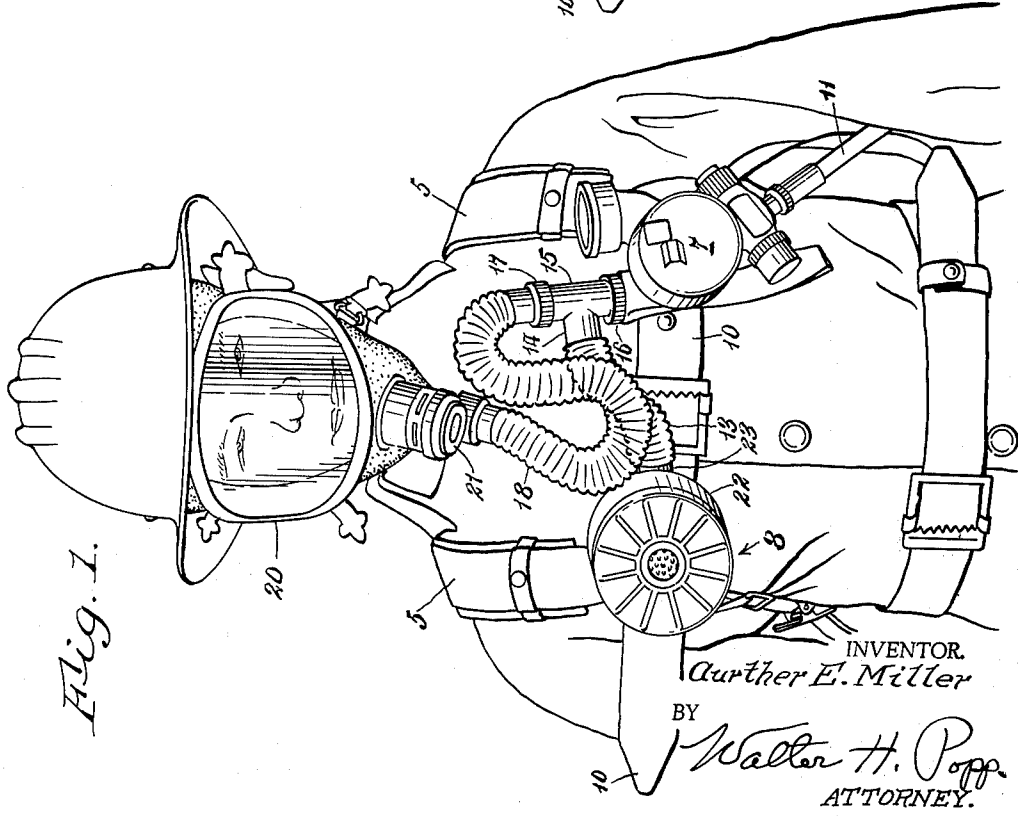


Fig. 1.

INVENTOR.
Aurther E. Miller
BY
Walter H. Popp
ATTORNEY.

Aug. 24, 1965 A. E. MILLER 3,202,150

FILTER ATTACHMENT FOR A PRESSURIZED BREATHING APPARATUS

Filed June 11, 1962 2 Sheets-Sheet 2

Fig. 4.

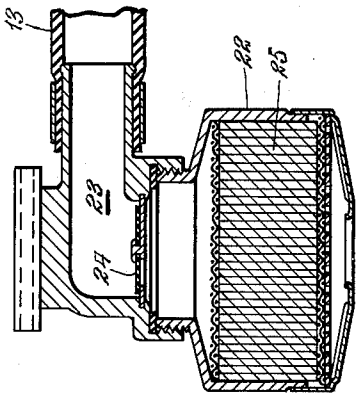
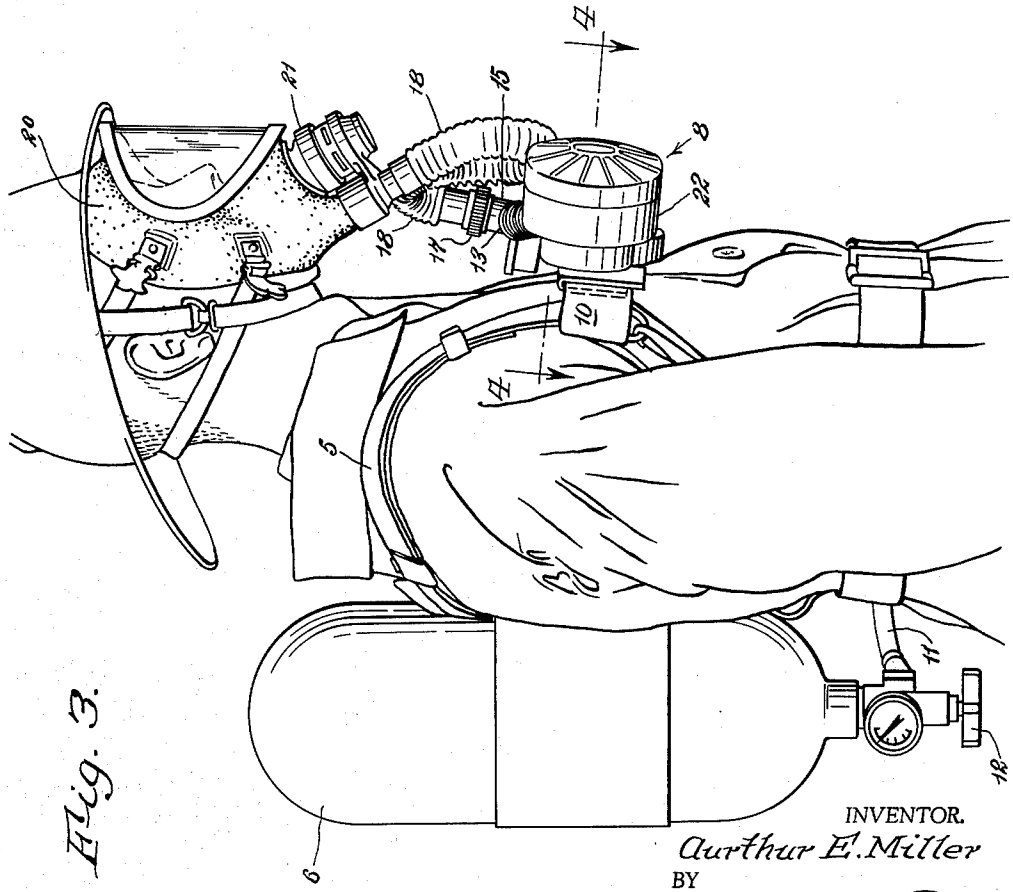


Fig. 3.



INVENTOR.
Arthur E. Miller
BY
Walter H. Popp.
ATTORNEY.

United States Patent Office 3,202,150
Patented Aug. 24, 1965

3,202,150

FILTER ATTACHMENT FOR A PRESSURIZED BREATHING APPARATUS

Arthur E. Miller, Buffalo, N.Y., assignor to Scott Aviation Corporation, Lancaster, N.Y., a corporation of New York

Filed June 11, 1962, Ser. No. 201,521
3 Claims. (Cl. 128—142)

This invention relates to the combination of a filter and a breathing apparatus, said combination being so constituted that the person who is wearing the combination may either breathe in ambient air which was originally slightly contaminated but which has been completely purified by a filter or, optionally, may cut off this flow of ambient air through the filter and breathe in only breathing fluid that is supplied by a breathing apparatus from a tank of compressed breathing fluid.

The principal object of the invention is to enable a person, who is approaching an area which might be contaminated, to breathe in either pure air or lightly contaminated, ambient air through a purifying filter so long as the contaminants in the ambient air are not greater than the filter can adequately handle, and then, if or when the percentage of contaminants becomes excessive, to switch over from the filter to a breathing apparatus that is supplied by pure breathing air from a pressurized tank.

Other objects of the invention and practical solutions thereof are described in detail in the following specifications and in the accompanying drawings, wherein:

FIGURE 1 is a front elevation of the upper torso of a fireman equipped with my complete invention with all of its component parts connected together.

FIGURE 2 is a similar front elevation, but showing the filter 8 disconnected from the pressurized breathing apparatus.

FIGURE 3 is a side elevation of the fireman equipped with my complete invention with all of its component parts connected together, as in FIGURE 1.

FIGURE 4 is a fragmentary, horizontal section through the filter 8, taken on line 4—4, FIGURE 3.

For convenience, I will describe my invention precisely as it is illustrated, but it is to be definitely understood that the breadth of my invention is to be measured solely by its intrinsic novelty and by the scope of the appended claims.

I will further assume that the user of my invention is a fireman and that he has been ordered to move into an area which might be contaminated by nuclear "fall-out," and that he has prepared himself to go a maximum distance and directly to the heart of the catastrophe, after leaving an outlying region where he is sure that the ambient air is pure.

Now as he is about to enter the area where the ambient air might be contaminated, he dons a harness 5 which carries a pressurized air tank 6 on his back, and a demand regulator 7 and a filter 8 on his chest, said regulator and filter being hung on the chest strap 10 of the harness 5. He then connects the high-pressure, air-hose 11 of the air tank shut-off valve 12 with aforesaid demand regulator 7.

The filter 8 is provided with a short, corrugated hose 13 whose distal end is tubularly connected to the lateral arm 14 of a metal T pipe fitting 15. The coupling nut 16 of the T pipe fitting 15 is then screwed onto the demand regulator 7, while the coupling nut 17 of the mask hose 18 is screwed onto the upper end of said T pipe fitting 15, the upper end of said mask hose 18 being tubularly connected with a mask 20. An exhalation valve 21 is connected to the mask. (This mask 20 can, of course, be replaced by an oro-nasal mask or by a plain mouth piece, if desired.)

As shown in FIGURE 4, the filter 8 is constructed of a cylindrical, metal, replaceable canister 22 which is screwed into a metal, L, pipe fitting 23 in the lower bore of which is staked, or otherwise secured, a check valve 24. This check valve 24 allows ambient air to be sucked in through the corrugated, paper, filter element 25 and then to pass through said check valve 24 and thence into the short, corrugated, filter hose 13 to the T pipe fitting 15. Any reverse flow is, of course, prevented by said check valve 24.

Operation

In FIGURES 1 and 3 we will at first assume that the shut-off valve 12 of the pressurized air tank 6 is closed. We will also assume in these FIGURES 1 and 3 that the fireman has left the area where the purity of the ambient air is unquestionable and that he is about to enter an area which may be at least lightly contaminated with for instance, atomic "fall-out." He is, therefore, at this time about to breathe ambient air in through the filter 8 whose filter element is capable of removing small percentages of contaminants.

It is to be borne in mind that, at this time, he is not depleting the supply of compressed air in his tank 6, and hence is lengthening his radius of operations by putting off any breathing from said air tank just as long as it is safe to do so.

Assuming that he is now moving straight to the center of the disaster, it is to be expected that, at some point or other, he will learn from his Geiger or other contaminant counter, that the contaminant percentage is too high for the filter 8 to adequately handle the difficulty. At this point the fireman opens the shut-off valve 12 of his air tank 6 and also adjusts his demand pressure regulator to provide a "positive" pressure. This prevents any inhalation pressure from opening the check valve 24 of the filter 8, and hence all the air he then breathes is supplied from the compressed air tank 6.

Dual use of breathing apparatus

FIGURE 2 illustrates how the pressurized breathing apparatus can be used as a commercial unit independently of the filter 8. In other words, this FIGURE 3 illustrates how a large quantity of standard pressurized breathing equipment can be carried on hand by the fire department, and, in addition, a limited number of filter assemblies kept available, any one of which can be joined to any one of the pressurized breathing apparatii, or idly hung of the chest strap 10 of the harness 5 (as in FIGURE 2) for use in doubtful situations where it might possibly be advantageous to have a contaminant filter available.

I claim:

1. Portable breathing apparatus comprising, in combination, a face mask, an exhalation valve connected to said mask, a filter tubularly connected to said mask for supplying filtered ambient air to said mask, a container of compressed breathing fluid, a demand regulator of the positive pressure type tubularly connected to said container and to said mask for supplying breathing fluid to said mask from said container on demand, and a check valve in the tubular connection between said filter and said mask preventing the escape of breathing fluid from said container through said filter, said filter, said container and said regulator being adapted to be carried by the user, wherein the tubular connections between said filter and said mask and between said regulator and said mask include a T fitting, means detachably connecting said fitting to said regulator, a first hose interconnecting said filter and said fitting, a second hose inter-

connecting said mask and said fitting, and means detachably connecting said second hose to said fitting both said means being interchangeable whereby said second hose can be detached from said fitting and attached to said regulator upon detachment of said fitting from said regulator.

2. The combination set forth in claim 1, together with a shut-off valve interposed in the tubular connection between said regulator and said container.

3. Portable breathing apparatus comprising, in combination, a face mask, an exhalation valve connected to said mask, a filter tubularly connected to said mask for supplying filtered ambient air to said mask, a container of compressed breathing fluid, a demand regulator of the positive pressure type tubularly connected to said container and to said mask for supplying breathing fluid to said mask from said container on demand, and a check valve in the tubular connection between said filter and said mask preventing the escape of breathing fluid from said container through said filter, said filter, said

container and said regulator being adapted to be carried by the user, wherein the tubular connections between said filter and said mask and between said regulator and said mask include a first hose connected to said filter, a second hose connected to said mask, means including a fitting carried by said regulator for detachably connecting said first hose to said second hose, thereby supplying filtered ambient air to said mask, and means detachably connected said second hose to said regulator for supplying breathing fluid to said mask from said container.

References Cited by the Examiner

UNITED STATES PATENTS

2,764,151	9/56	Cupp	128—142
2,818,066	12/57	Glidden	128—142
2,948,292	8/60	Fitt	128—142

RICHARD A. GAUDET, *Primary Examiner.*

JORDAN FRANKLIN, *Examiner.*