Nov. 13, 1928. 1,691,648

A. B. DRÄGER

BREATHING DEVICE

Filed March 18, 1927

Fig. 2.

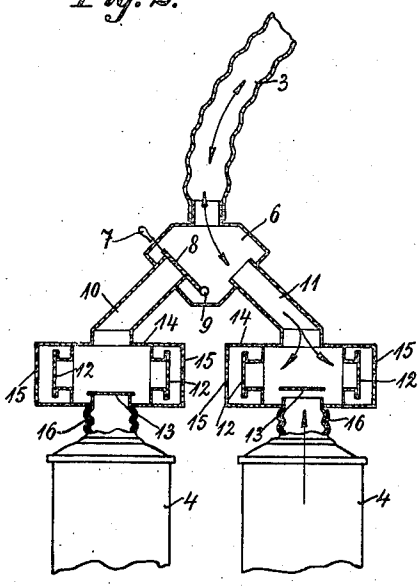


Fig. 1.

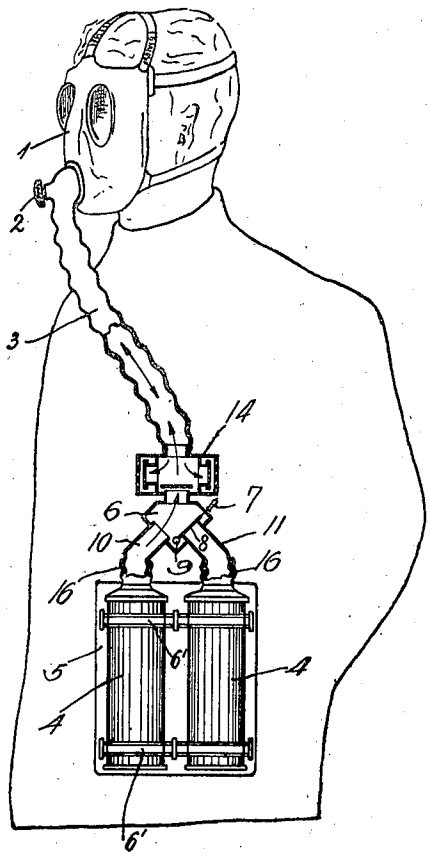
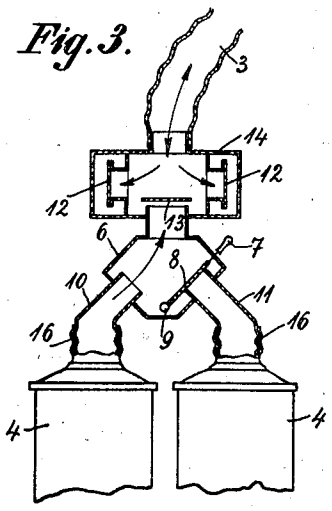


Fig. 3.



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UNITED STATES PATENT OFFICE.

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BREATHING DEVICE.

Application filed March 18, 1927, Serial No. 176,456, and in Germany March 16, 1926.

Breathing apparatus have been used heretofore in which respirators, adapted to be alternatively turned on or off or reversed by the aid of a multi-way controlling means, are connected with a common breathing mask, one of the respirators consisting of a filter and the other of a carbonic acid absorption cartridge in connection with an oxygen flask and a breathing bag. Moreover pure filter devices have been proposed comprising a plurality of filter cartridges through which the breathing air passes one after the other, the divers cartridges being filled with various chemicals, and finally it is known in filter devices to make the purified cartridges replaceable.

According to the present invention the breathing apparatus, which is provided with a gas protective filter and a multi-way controlling means differs from the apparatus known heretofore inasmuch as to a common face piece two or more gas protective filters of equal or different amounts of filling are connected so as to be adapted to be selectively and individually shut off whereby the filters may be removable or replaceable singly without thereby opening the air conduits of the apparatus. Such a combined apparatus has the technically important peculiarity, that on using two or more gas protective filters of one or the other kind a suitable filter may be selected during the use of the apparatus according to the nature of gas against which protection is contemplated. In such cases it is advisable to arrange a valve chest having an in- and exhaling valve between the multi-way controlling means and each filter, or alternatively a valve chest common to all filters may be interposed between the mask or the mouth piece and the multi-way controlling means. The individual valve chests or the common valve chest may be combined with the multi-way controlling means preferably to form a unitary rigid body, so that this portion of the complete apparatus may be replaceable in itself.

In the drawing two examples of the invention are shown.

Fig. 1 is a diagrammatical view of a combined apparatus comprising two filters shown partly in section and a breathing device such as for instance a mask.

Fig. 2 is a section of the upper part of the apparatus in a construction in which a valve chest is interposed between the multi-way controlling member and each filter.

Fig. 3 is a similar view as Fig. 2 showing the means used in Fig. 1 to a larger scale.

Connected to the face piece in the form of a breathing mask 1 is a flexible inhaling and exhaling hose 3, which leads to two or more filter cartridges 4 preferably constructed so as to be connected with one another and attached to a common foundation plate 5 by straps 6'. Interposed in the conduit connecting the face piece with the filter 4 is a valve chest 6 containing a multi-way controlling member, which in the construction shown is formed as a flap 8, pivotally fastened at 9 and connected with an outer handle 7, by which it may be oscillated to shut off selectively the pipe 10 or the pipe 11 leading to one or the other filter 4.

The number of filters 4 may be increased if desired, in which case the multi-valve will be arranged accordingly, to properly co-operate therewith.

As heretofore mentioned, the various filter cartridges are preferably of different kinds, i. e. the purifying chemical in the one cartridge is different from that in another cartridge. This enables the wearer operating in an atmosphere with a poisonous gas content of a varying nature to select at any time, such a cartridge, the chemical of which is most suitable for absorbing the particular poison prevailing in such atmosphere.

In the construction shown in Fig. 2 between each filter cartridges 4 and the multi-way controlling chamber 6, a chamber 14 provided with exhalation check valves 12 and inhalation check valves 13 is provided. Perforated screens cover the valves 12. The chamber 14 is in rigid connection and communication with the valve chest 6 forming a common casing with the same. The connection 16 of the filter 4 with the chamber 14 is detachable.

The construction shown in Fig. 3 differs from that shown in Fig. 2 inasmuch as the valve chest is common to all filters, in which case it is interposed between the mask and the multi-way controlling member 6 to which again it may be connected to form a unitary rigid body. In this case also the connections 16 are adapted to be loosened. The location

of the valve chest 14 independently of or together with the multi-way control-line member 6, may be otherwise than as shown.

In the construction shown in Fig. 2 the right-hand filter 4, and in the position shown in Fig. 3 the left-hand filter is in operation. That filter, which is closed by the flap 8 may be interchanged for the other at any time without fear of outer air entering the air conduits of the apparatus. As has been explained the filters are preferably filled with such chemicals as are effective against different kinds of poisonous gas. Thus for the absorption of sulphur dioxide the absorbent may be pumice impregnated with potassium carbonate and for the absorption of benzol or petroleum vapors, activated carbon may be used.

I claim:—

1. A breathing apparatus comprising a plurality of filter cartridges having inlets opening to the atmosphere, a chemical in one of said cartridges for purifying atmospheric air containing a certain poison, a different chemical in another one of said cartridges for purifying atmospheric air containing a different poison, a face piece, a conduit communicating therewith and terminating in a plurality of branches leading to said cartridges, an inhalation check valve inserted in said conduit and opening towards the face piece, an exhalation check valve inserted in the wall of said conduit at a point situated between said face piece and said inhalation check valve and opening to the atmosphere, and a valve means common to the branches of said conduit and adapted to shut off said branches selectively and individually.

2. A breathing apparatus comprising a plurality of filter cartridges having inlets opening to the atmosphere, a chemical in one of said cartridges for purifying atmospheric air containing a certain poison, a different chemical in another one of said cartridges for purifying atmospheric air containing a different poison, a casing having a plurality of inlet ports each communicating with one of said cartridges, and containing valve means adapted to shut off said inlet ports selectively and individually, an outwardly opening exhalation check valve inserted in the wall of said casing to discharge the exhaled air, a face piece, a flexible hose connecting the same with said casing, and inhalation check valve means arranged in said casing to prevent the exhaled air from entering said cartridges.

In testimony whereof I have signed my name to this specification.

ALEXANDER BERNHARD DRÄGER