Oct. 7, 1947. I. M. LEVITT 2,428,425

SELF-CONTAINED EMERGENCY OXYGEN BREATHER

Filed Aug. 6, 1945 2 Sheets-Sheet 1

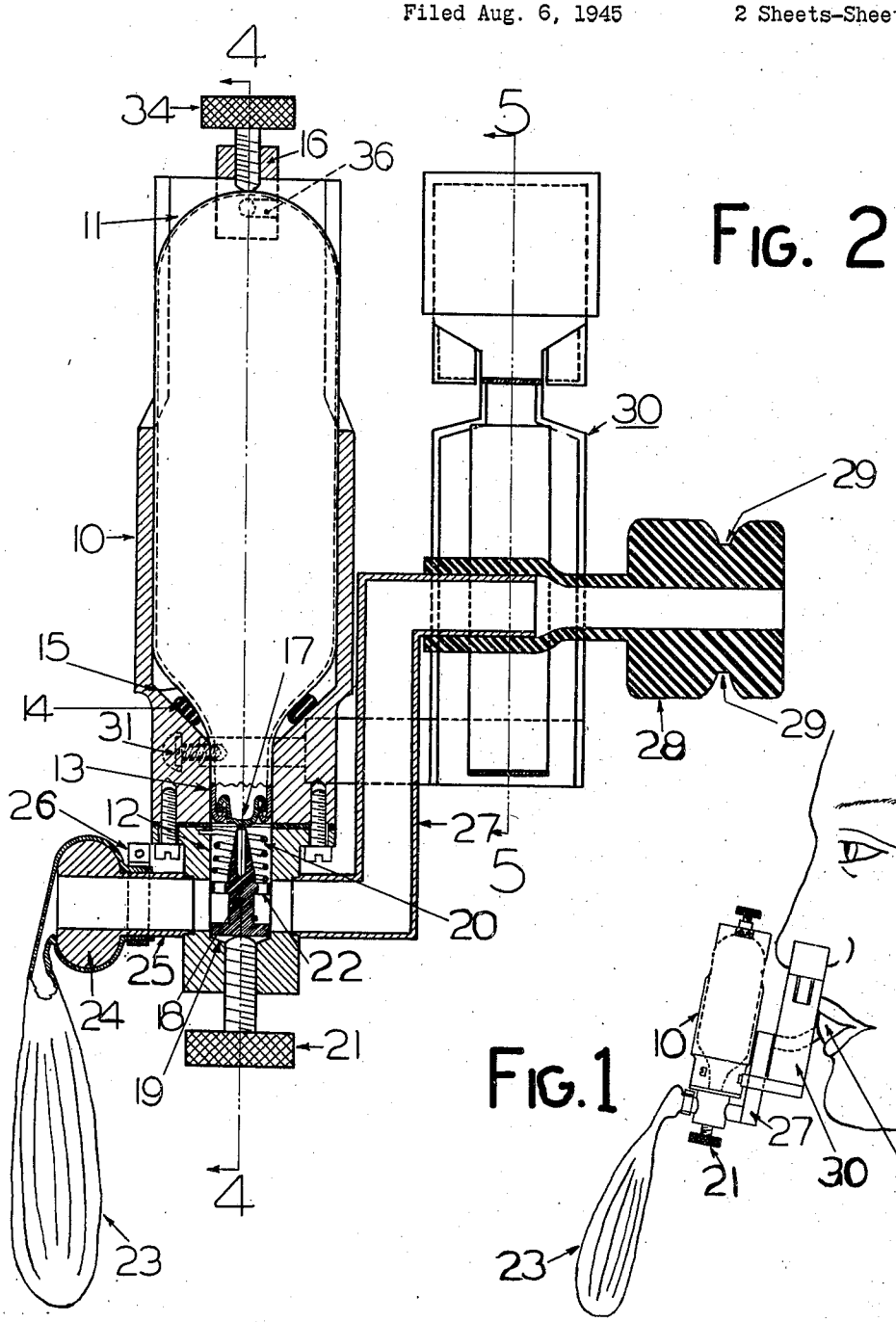


FIG. 2

FIG. 1

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Oct. 7, 1947. I. M. LEVITT 2,428,425

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Filed Aug. 6, 1945 2 Sheets-Sheet 2

FIG. 3

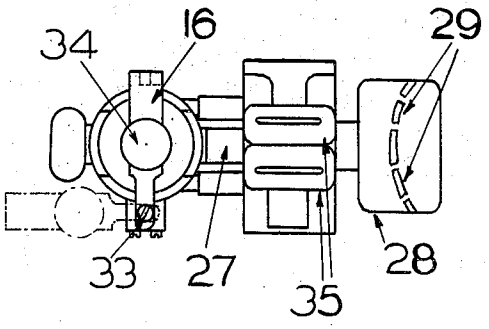


FIG. 4

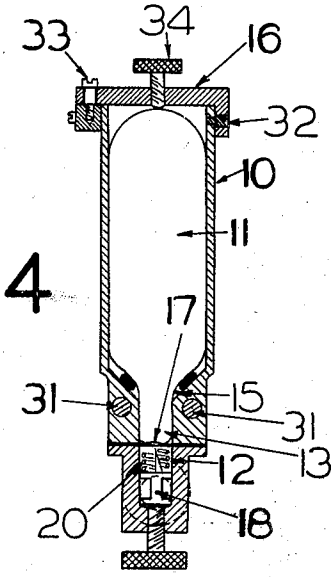
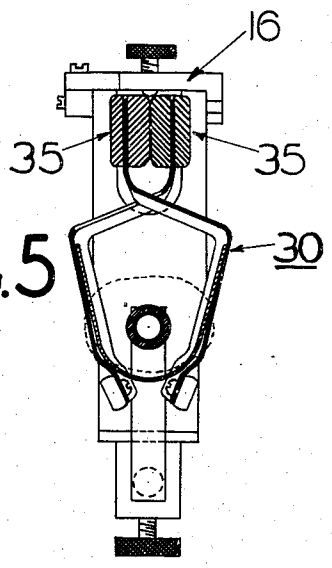


FIG. 5



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Patented Oct. 7, 1947

2,428,425

UNITED STATES PATENT OFFICE

2,428,425

SELF-CONTAINED EMERGENCY OXYGEN BREATHER

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Application August 6, 1945, Serial No. 609,210

3 Claims. (Cl. 128—147)

1

The present invention relates to respiratory apparatus and it relates more particularly to an oxygen respirator or the like.

An object of the present invention is to provide a new and improved respirator. Another object of the present invention is to provide a small, simple, compact, light-weight, inexpensive and self-contained emergency oxygen breather or respirator. Still another object of the present invention is to provide a self-contained oxygen breather which is capable of quick attachment and which does not require supporting straps or belts or the like.

Other objects and advantages of the present invention are apparent in the following detailed description, appended claims and accompanying drawings.

For the purpose of illustrating the invention, there is shown in the accompanying drawings one form thereof which is at present preferred, although it is to be understood that the various instrumentalities of which the invention consists can be variously arranged and organized and that the invention is not limited to the precise arrangements and organizations of the instrumentalities as herein shown and described.

Referring to the accompanying drawings in which like reference characters indicate like parts throughout:

Figure 1 represents a side elevational view of one embodiment of the present invention as it appears in use.

Figure 2 represents a vertical cross-sectional view of the embodiment of Figure 1, enlarged to approximately double scale.

Figure 3 represents a plan view of the embodiment of Figures 1 and 2.

Figure 4 represents a cross-sectional view, drawn to full scale, generally along the line 4—4 of Figure 1.

Figure 5 represents a cross-sectional view, drawn to full scale, generally along the line 5—5 of Figure 1.

In one embodiment of the present invention shown generally in Figures 1 to 5, I may provide a socket or container 10, which may be of light-weight metal or the like, which is open at its upper end and is adapted to receive a sealed cartridge 11 in inverted position. The cartridge 11 may contain compressed oxygen or air or other gas capable of supporting life.

The lower end of the socket 10 is provided with a reduced axial opening 12 into which the neck 13 of the cartridge 11 fits. A compressible ring 14 of rubber or the like is adapted to provide a resilient air-tight support for the shoulder 15 of the cartridge 11.

2

A yoke 16 is adapted to fit over the open upper end of the socket 10. The yoke 16 is provided with a notch 36 which is adapted to engage with a pin 32 mounted adjacent the upper end of the socket 10. A bolt or shoulder screw 33 is adapted pivotally to mount the yoke 16 upon the socket 10, as indicated particularly in Figures 3 and 4.

The yoke 16 carries a knurled screw 34 which is adapted to be tightened against the adjacent portion of the cartridge 11 and to force it against the ring 14 so as to prevent "wobbling" or other undesirable movement of said cartridge when the breather of the present invention is in use.

Tightening of the screw 34 also locks the yoke 16 in the position shown in solid lines in Figure 3.

A perforable seal 17 is provided at the end of the neck 13 of the cartridge 11.

A piercing element 18 is slidably disposed within the opening 12 and is normally urged to lowermost position, away from the seal 17, and against a shoulder 19, by a helical spring 20.

A knurled screw 21 is adjustably mounted at the lower end of the opening 12 and is adapted to force the piercing element 18 upward against the tension of the spring 20 so as to perforate the seal 17 of the cartridge 11.

When this occurs, the oxygen or other gas contained within the cartridge 11 escapes therefrom and passes through apertures 22 provided in the element 18 into a flexible bellows-like storage bag 23 to be hereinafter described.

The storage bag 23, which may be of rubberized silk or other flexible fluid-tight material capable of imperviously containing gaseous materials, is fitted over the enlarged knob or head 24 of an apertured connector 25 which is in communication with the opening 12. The mouth of the bag 23 is held in position upon the knob 24 by an adjustable clamp 26.

A pipe 27 which communicates with the opening 12, leads from the lower end of the socket 10 and is provided, at its free end, with an apertured mouth-piece 28 of rubber or other resilient material. The mouth-piece 28 is provided with indentations 29 whereby the mouth-piece can be gripped between the teeth of the wearer; the lips and tongue of the wearer forming a hermetical seal around the mouth-piece 28.

A bifurcated clamp member 30 (shown particularly in Figure 5) is fastened adjacent the lower part of the socket 10 by means of a pair of screw-threaded bolts 31 and is provided at its upper

end with a pair of rubber pads 35 adapted grippingly to fit over and to seal the nostrils of the wearer, as indicated in Figure 1.

The operation of the novel emergency breather of the present invention is as follows:

Should the need arise for an emergency supply of oxygen (as for example, when the wearer is under water or is in an atmosphere containing insufficent oxygen or containing noxious gases), he attaches the emergency oxygen breather by gripping the mouth-piece 28 and by fastening the pads 35 of the clamp member about his nostrils to shut off breathing through the nose.

The screw 33 is then tightened to drive the piercing element 18 upward and to break the seal 17. This permits the oxygen or air within the cartridge 11 to escape into the bag 23. As can be seen particularly in Figure 1, the apertured connector 25, the opening 12, the pipe 27 and the apertured mouth-piece 28 form a continuous passage from the bag 23 to the mouth of the wearer.

Thus, when the wearer breathes through his mouth, he takes in oxygen from the bag 23.

The wearer continues inhaling from and exhaling into the bag 23 thereby gradually using up the oxygen.

The cartridge 11 can be made large enough to provide sufficient oxygen for 5 or 10 minutes or more of normal breathing.

If desired, soda-lime (or other material capable of absorbing carbon dioxide) can be provided in the lower part of the bag 23 to prevent the building up of toxic concentrations of carbon dioxide within the breather and thereby to prolong the period of use obtainable from a single cartridge.

Alternatively, the oxygen breather of the present invention can be provided with any suitable valve mechanism (not shown) such as is well known in the art, to permit venting of the exhaled air and thereby to prevent the building up of carbon dioxide in the breather system.

When it is desired to replace an exhausted cartridge, the screw 21 is retracted and the upper screw 34 is then retracted to loosen the yoke 16 and to permit it to be swung about the bolt 33 to the position shown in the dash-dot lines in Figure 3. The socket 10 is then inverted whereupon the exhausted cartridge drops out.

A new cartridge can then be inserted and the yoke 16 swung back to the solid-line position of Figure 3 after which the screw 34 is tightened and the oxygen breather is ready for use.

The compressible ring 14, in addition to provide a resilient support for the shoulder 15 of the cartridge 11 as described above, also forms a fluid-tight seal intermediate said cartridge 11 and the adjacent portion of the socket 10, thereby preventing escape of oxygen through the open upper end of said socket, when the seal 17 is punctured.

The novel emergency breather of the present invention provides a small, simple, compact, light-weight, self-contained, easily attached unit which requires no supporting straps or braces or masks, other than the clamp member 30 which is essential to prevent breathing through the nose and the rubber bit that forms the mouthpiece. Thus, the breather and the oxygen supply are both supported primarily by the teeth and nose of the wearer and the usual requirement of straps or belts (conventionally employed to support a remote oxygen tank or the like) is eliminated.

This permits the novel breather of the present invention to be carried about in a coat pocket or the like and to be installed, on a moment's notice, should any emergency arise requiring a temporary source of oxygen.

The breather of the present invention can be inexpensively manufactured and, therefore, can be made available for many purposes for which the conventional, relatively expensive, respirators heretofore employed would not be used due to their considerably greater cost and to their comparative difficulty in installation.

The present invention may be embodied in other specific forms without departing from the spirit or essential attributes thereof, and it is therefore desired that the present embodiment be considered in all respects as illustrative and not restrictive, reference being had to the appended claims rather than to the foregoing description to indicate the scope of the invention.

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

1. A respirator comprising a generally vertical socket having an open top and constructed and arranged to receive a small sealed cartridge of compressed oxygen or the like in inverted position, a yoke pivotally mounted at the top of said socket, said yoke having a screw adapted to tighten against the cartridge and to lock said cartridge within said socket, said socket having a conduit adapted to receive the discharge end of said cartridge, an expansible fluid-tight container supported by said socket and communicating with said conduit, a piercing needle slidably mounted within said conduit, a spring normally urging said needle away from the discharge end of said cartridge, a screw adapted to force said needle against said spring into piercing relationship with the discharge end of said cartridge thereby to permit the contents of said cartridge to fill said container, a pipe communicating with said container, an apertured mouth-piece of rubber or the like mounted on the free end of said pipe, and a nose-clamp fastened to said socket and adapted resiliently to close the nostrils of the wearer, said mouth-piece and said nose-clamp providing the entire support for said respirator and cartridge.

2. A respirator comprising a generally vertical socket having an open top and constructed and arranged to receive a small sealed cartridge of compressed oxygen or the like in inverted position, a yoke mounted at the top of said socket, said yoke having a screw adapted to tighten against the cartridge and to lock said cartridge within said socket, said socket having a conduit adapted to receive the discharge end of said cartridge, an expansible fluid-tight container supported by said socket and communicating with said conduit, a piercing needle mounted within said conduit, means for forcing said needle into piercing relationship with the discharge end of said cartridge thereby to permit the contents of said cartridge to fill said container, a pipe communicating with said container, an apertured mouth-piece mounted on the free end of said pipe, and a nose-clamp fastened to said socket and adapted to close the nostrils of the wearer, said mouth-piece and said nose-clamp providing the entire support for said respirator and cartridge.

3. A respirator comprising a socket constructed and arranged to receive a small sealed cartridge of compressed oxygen or the like in generally vertical position, adjustable means for locking said cartridge immovably in position within said socket, said socket having a conduit adapted to receive the discharge end of said cartridge, an

expansible fluid-tight container supported by said socket and communicating with said conduit, manually-operable means for piercing the discharge end of said cartridge thereby to permit its contents to fill said container, a pipe communicating with said container and adapted to convey said oxygen or the like to the mouth of the wearer, and a nose-clamp fastened to said socket and adapted to close the nostrils of the wearer, said mouth-piece and said nose-clamp being adapted to provide the entire support for said respirator and cartridge.

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