Aug. 13, 1935. H. F. SHINDEL 2,011,088

CHECK VALVE FOR RESPIRATORS

Filed Aug. 12, 1933

Fig. 1

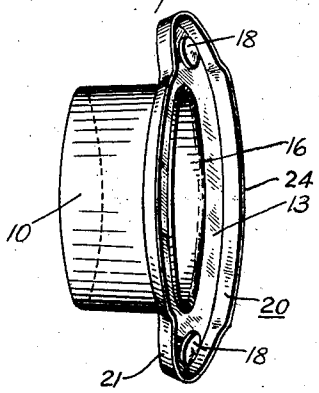


Fig. 2

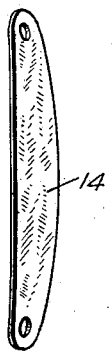


Fig. 3

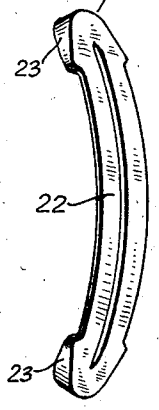


Fig. 4

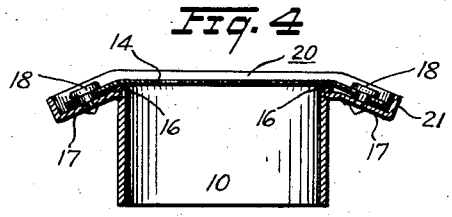


Fig. 5

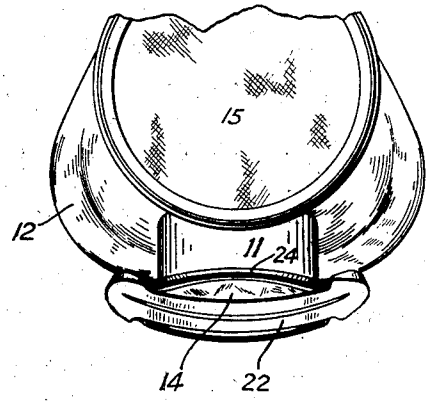
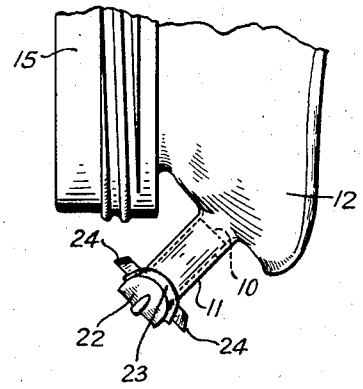


Fig. 6



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CHECK VALVE FOR RESPIRATORS

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2 Claims. (Cl. 251—119)

This invention relates to protective equipment and more particularly to a check valve for respirators of the type in which a flexible diaphragm is provided for controlling the exhalation outlet of the respirator.

In carrying out the present invention a relatively narrow flexible valve member is provided and arranged to close the exhalation outlet of the respirator by engagement with a valve seat in the form of a bead about the outlet aperture of the valve unit so that contact between the valve and its seat is along a line rather than over a considerable portion of the surfaces of the valve and seat. And while it is recognized that the provision of a bead seat to afford line contact with a valve member has been proposed heretofore the present invention contemplates forming the valve seat and mounting the valve on a carrier plate in such manner as to attain more efficient and reliable operation. It is also an object of the invention to protect the delicate valve member by means of a cover or guard engaging the specially formed outer end of the valve unit.

The above mentioned and other objects and advantages of the invention will become apparent upon consideration of the following description and appended claims when read in conjunction with the accompanying drawing in which:

Figures 1, 2 and 3 are perspective views illustrating, respectively, the valve carrier plate and neck portion of the valve unit which fits in the respirator outlet, the valve member, and the valve protecting guard;

Figure 4 is a longitudinal sectional view showing the mounting of the valve member; and

Figures 5 and 6 are fragmentary front and side views, respectively, illustrating the check-valve unit in conjunction with a respirator.

The check-valve unit comprises a hollow neck portion 10, fitting tightly in the exhalation outlet 11 of the respirator mask 12, and a centrally apertured valve carrier plate 13, both preferably but not necessarily of metal, on which is mounted an elongated flexible valve-member 14 of suitable material, such as thin elastic rubber, adapted to close outlet 11 by being suctionally drawn against its seat as a wearer inhales air through the filtering member 15 of the respirator, and to be readily moved off its seat on exhalation through outlet 11. To assure efficient and reliable operation and to minimize the possibility of the valve adhering to its seat, the valve member is arranged to contact its seat only along a line rather than over a considerable portion of its surface. With this end in view a bead 16 projecting slightly above the plane of the central portion of carrier plate 13 is formed about the aperture in the plate at the inner end of neck 10.

The end portions 17 of carrier plate 13 extend at an angle with respect to the plane of the central portion thereof and are provided with fastening devices 18 to which valve member 14 is attached.

The bead 16, and neck portion 10 also, are formed in the shape of an elongated ellipse so that the greater part of that portion of valve member 14 contacting bead 16 is in substantially straight line contact with the longer, nearly straight sides of the elliptical valve.

Inasmuch as valve member 14 is attached adjacent its ends to the fastening devices 18 which are located out of the plane of the central portion of plate 13 it is normally held under slight tension exerted in the direction of the major axis of the elliptical bead in close contact with its seat.

Because of the substantially straight line contact between the edge of the valve member and the major portion of its seat the valve member forms a tight closure preventing noxious gases entering through the exhalation outlet and is extremely sensitive to the breathing of a wearer, closing tightly against its seat on very slight suction due to inhalation and readily moving off its seat to quickly and fully open the outlet as the wearer exhales.

An upstanding flange 20 is provided around the edge of carrier plate 13 thus forming a protective dished enclosure within which valve member 14 is mounted. Because of the inclination of the end portions 17 of plate 13 relatively to the latter the corresponding portions 21 of flange 20 are differently inclined, as shown in Figs. 1 and 4. A cover or guard 22 of suitable resilient material and arcuate form is provided at its ends with attaching flange 23 engageable with said end portions 21 of flange 20 so that it may be removed from the valve unit when desired by pressing it between its ends to lessen its curvature and thus disengage it. The portions 24 of flange 20 between the undercut portions 21 may be flared outwardly, as shown in Figures 1, 5 and 6, so as to further free the easy discharge of air which the respirator wearer exhales past the raised edges of the narrow valve 14. The arcuate form of guard 22 also spaces its central portion from carrier plate 13 and this together with the narrow valve and the outward flare of flange portions 24 provides a clear passage between the carrier plate and guard beyond the valve member.

Although an illustrative embodiment of the invention has been described in detail, there are many changes and variations which may be made without departing from the spirit of the invention and, therefore, it is desired to include all such changes and variations within the scope of the appended claims.

What I claim is:

1. A check valve for the exhalation outlet of a respirator comprising an elongated carrier plate having a central aperture with a tubular outlet-engaging extension therefrom and a flat flexible valve mounted on said plate and controlling said aperture; said plate having its elongated end portions angularly inclined relatively to the plane of said aperture, an upstanding peripheral edge flange on said plate outwardly flared at such inclined ends, and an elongated arcuate guard plate spaced from said carrier plate and having end flanges engageable with the flared end flanges of the latter plate by flexing movement of said arcuate portion toward said latter plate.

2. An exhalation check valve for respirators comprising a respirator outlet-engaging tube, a valve-carrier plate on one end of said tube, an elongated tube-communicating aperture in said plate having a beaded aperture edge forming a valve-seat, angularly bent plate extensions at the elongated ends of said opening provided with valve-securing means, and an elongated flexible valve having sides overlapping said beaded-edge seat and tensionally seated thereon by tauted bent-valve-end engagement with said securing means on said bent plate extensions.

HARRY F. SHINDEL.