

July 25, 1944.

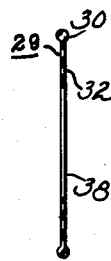
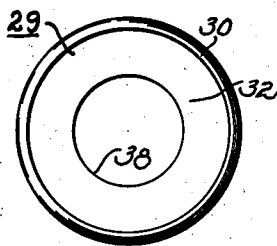
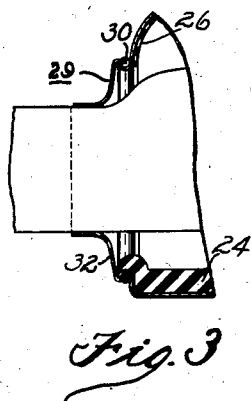
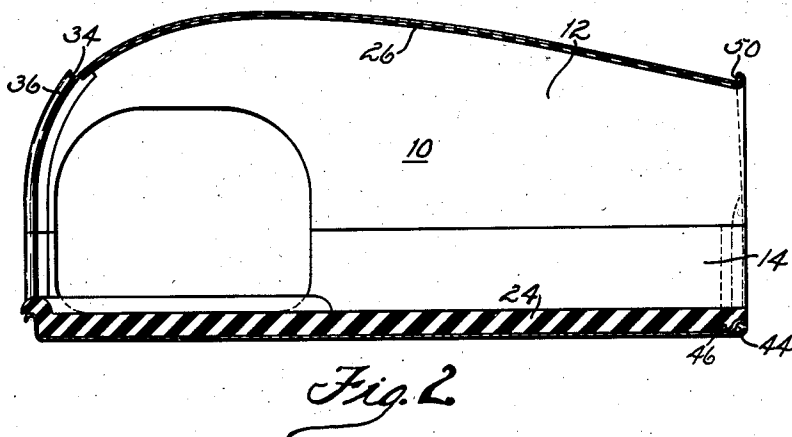
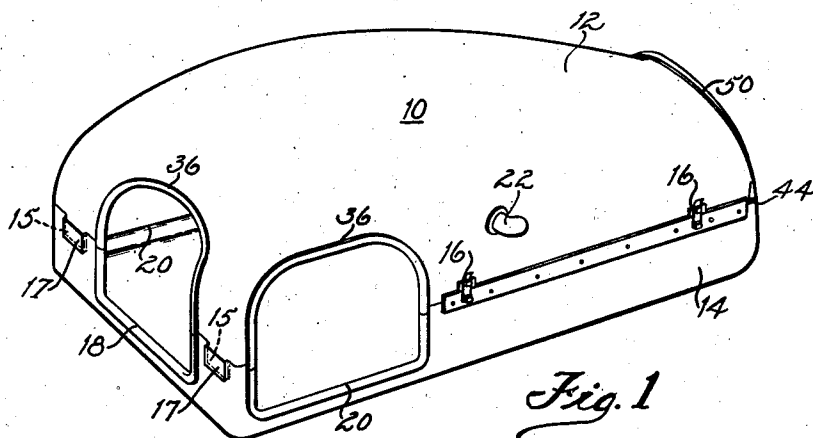
S. E. MILLER

2,354,397

JACKET TYPE RESPIRATOR

Filed Dec. 26, 1941

2 Sheets-Sheet 1



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JACKET TYPE RESPIRATOR

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2 Sheets-Sheet 2

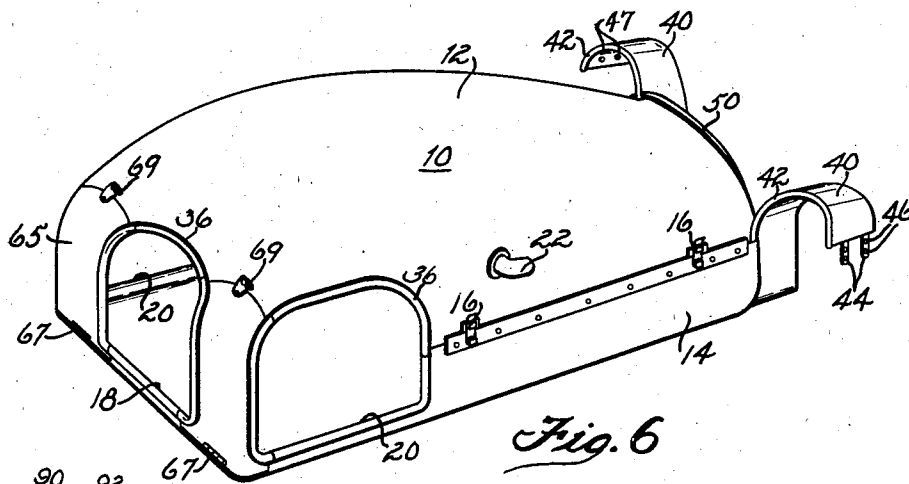


Fig. 6

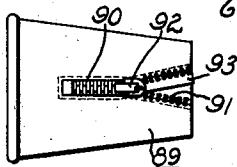


Fig. 9

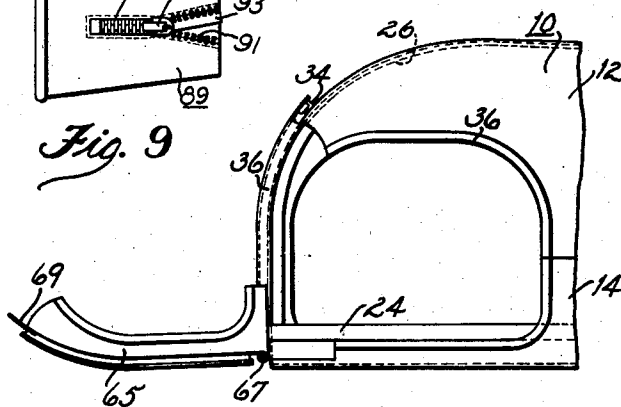


Fig. 7

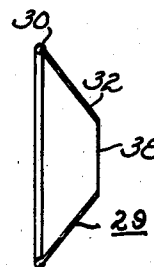


Fig. 8

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UNITED STATES PATENT OFFICE

2,354,397

JACKET TYPE RESPIRATOR

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Application December 26, 1941, Serial No. 424,425

2 Claims. (Cl. 128—30)

This invention relates to a therapeutic device and more particularly to an improved form of breathing machine.

One object of this invention is to provide a breathing machine which may be applied with a minimum amount of delay and inconvenience.

Another object of this invention is to provide a breathing machine which may be worn for longer periods of time without discomfort.

Still another object of this invention is to provide a breathing machine in which the gaskets are readily removable and replaceable.

A further object of this invention is to provide a breathing machine which eliminates the necessity of applying any pressure to the clavicle region adjacent the neck which would interfere with the normal breathing movement in this region.

Another object of this invention is to provide a breathing machine in which the shoulder enclosing portion may be removed so as to make it possible to massage the shoulders without removing the entire machine.

Further objects and advantages of the present invention will be apparent from the following description, reference being had to the accompanying drawings, wherein a preferred form of the present invention is clearly shown.

In the drawings:

Fig. 1 is a perspective view of the main portion of the breathing machine with the gaskets removed;

Fig. 2 is a vertical sectional view of the apparatus shown in Fig. 1;

Fig. 3 is a fragmentary sectional view showing the arrangement of the arm gasket;

Fig. 4 is an elevational view of one of the arm gaskets;

Fig. 5 is a sectional view of the gasket shown in Fig. 4;

Fig. 6 is similar to Fig. 1 but shows a modified breathing machine construction;

Fig. 7 is a fragmentary elevational view showing one shoulder strap swung out of position;

Fig. 8 is a sectional view of a modified gasket construction; and

Fig. 9 is a plan view of a modified gasket arrangement.

Referring now to Fig. 1, reference numeral 10 designates a lightweight jacket type of breathing machine or respirator having a breastplate 12 and a backplate 14. The plates 12 and 14 are held together by means of latches 16 provided on each side of the jacket. The breastplate 12 is provided with lugs 15 at the shoulder which

engage within the pockets 17 formed on the backplate 14 so as to assist in holding the breastplate in alignment with the backplate. Reference numerals 18 and 20 designate neck and arm holes respectively, and reference numeral 22 designates a pipe which is adapted to be connected to a suitable respirator pump not shown. The interior of the jacket may be lined with sponge rubber or the like so as to increase the comfort. As shown in Fig. 2, the backplate 14 is provided with a relatively thick sponge rubber member 24. Inasmuch as the patient may be required to wear this jacket while lying down, the sponge rubber element 24 has been made relatively thick, whereas, the sponge rubber element 26, which forms a lining for the breastplate 12, may be relatively thin or may be omitted altogether.

The elements 12 and 14 may be of a lightweight metal such as aluminum, or they may be made out of a transparent plastic material. I have found that transparent plastics can be used whereby it is possible to observe the patient's respiration.

In order to prevent leakage of air around the arms, neck and abdomen, special gaskets have been provided. In Fig. 3, I have shown a sectional view through a gasket 29 of the type used for preventing the leakage of air at the point where an arm or the neck passes through the wall of the jacket. The gasket 29, as best shown in Figs. 3, 4 and 5, comprises a thin resilient portion 32 and a circumferentially arranged resilient bead 30 which is formed integrally with the thin portion 32. The thin portion 32 may be made from sponge rubber if desired or sponge rubber may be secured to a thin rubber membrane adjacent the central opening 38. The bead 30 is adapted to slip into the groove 34 which is formed by providing a flange 36 surrounding the opening to be sealed. In order to provide an airtight seal between the bead 30 and the opening in the jacket, the length of the bead is made such that it is necessary to stretch the bead over the flange 36.

Each gasket may be formed with or without a central opening 38. If formed without a central opening, then it is necessary to cut an opening of the proper size when the jacket is fitted to the patient. Inasmuch as the gaskets are readily removable and inexpensive, gaskets with several different size openings may be provided with each jacket so as to allow for differences in the size of the patients. Thus, a patient having large arms would use gaskets having larger arm openings than a patient having small arms. Each gasket

may be made up in a flat form, such as shown in Fig. 5, or it may be made in a special form, such as shown in Fig. 8. The form shown in Fig. 8 makes it possible to stretch the bead without stretching the material next to the opening 38. In Fig. 9, I have shown another type of gasket 89 in which a slide fastener 90 of the zipper type is used for adjusting the effective size of the central opening in the gasket. In this modification, the thin rubber portion is formed as shown and is provided with a slit 91 on the one side in which the slide fastener 90 is mounted. The position of the slide element 92 determines the size of the central opening. A thin rubber flap 93 is provided adjacent the slit 91 as shown.

The abdominal gasket used adjacent the lower end of the jacket is constructed as shown in Fig. 6. This gasket comprises a thin elastic strip 40 provided with a bead 42 along one edge thereof. Straps 44 provided with snap fasteners 46 and 47 are used for holding the gasket in place at the point where the ends of the gasket overlap. The bead 42 is adapted to be slid into the slot 44 (see Fig. 2) provided along the bottom edge of the backplate 14. The slot 44 is formed by fastening a strip 46 along the lower edge of the backplate 14, as shown in Fig. 2. The lower edge of the breastplate 12 is partially rolled, as best shown in Figs. 1, 2 and 6, so as to provide a groove 50 for the reception of the beaded portion 42 of the gasket 40. A slide fastener of the zipper type may be substituted for the straps 44 if desired.

The gaskets have been omitted from the showing in Figs. 1 and 2 so as not to interfere with the showing of the structural details of the jacket.

In Figs. 6 and 7, I have shown a modified jacket arrangement in which hinged shoulder pieces 65 have been provided. These shoulder pieces are hinged to the backplate 14 by means of hinges 67. Latches 69 hold the shoulder piece in place during use. In all other respects, the jacket shown in Figs. 6 and 7 is similar to the one shown in Figs. 1 and 2. The purpose of providing shoulder straps which are hinged or similarly mounted is to make it possible to massage the patient's shoulders without the necessity of removing the whole jacket. Fig. 7 shows one of the shoulder straps swung open. As shown in Figs. 6 and 7, the shoulder straps are flanged adjacent the neck and arm openings whereby the beaded portions

of the neck and arm gaskets assist in holding the shoulder straps in place when the breathing machine is in operation. Since it is frequently necessary for a patient to wear the jacket for prolonged periods of time, it is desirable to be able to massage the shoulder without removing the entire jacket. By virtue of the construction shown in Figs. 6 and 7, it is not necessary to remove the entire jacket in order to massage the shoulder since the shoulder straps may be swung into the position shown in Fig. 7, whereby the shoulders of the patient are accessible. This may all be done without unlatching the latches 16 and without disturbing the abdominal gasket 40. It would, of course, be necessary to remove the beaded portion of the neck and arm gaskets from the shoulder straps, but it is not necessary to completely remove these gaskets during the massaging operation.

Obviously some of the features of my invention are also applicable to high altitude flying jackets of the type commonly used by aviators for compensating for changes in pressure resulting from changes in altitude.

While the form of embodiment of the invention as herein disclosed constitutes a preferred form, it is to be understood that other forms might be adopted, all coming within the scope of the claims which follow.

What is claimed is as follows:

1. A lightweight breathing machine comprising in combination, a backplate, a breastplate cooperating with said backplate to form a chest enclosing jacket, shoulder pieces connecting said backplate and said breastplate, said jacket having arm and neck openings, gasket means for preventing the ingress and egress of air at said openings, and means whereby at least one of said shoulder pieces may be moved relative to the remainder of said jacket.

2. A lightweight breathing machine comprising in combination, a chest enclosing jacket, shoulder pieces connecting the back and the front of said jacket, said jacket having arm and neck openings, gasket means for preventing the ingress and egress of air at said openings, and means whereby at least one of said shoulder pieces may be moved relative to the remainder of said jacket.

SIDNEY E. MILLER.