May 7, 1940. E. W. BULLARD 2,199,690

MASK

Filed July 20, 1936

Fig. 1

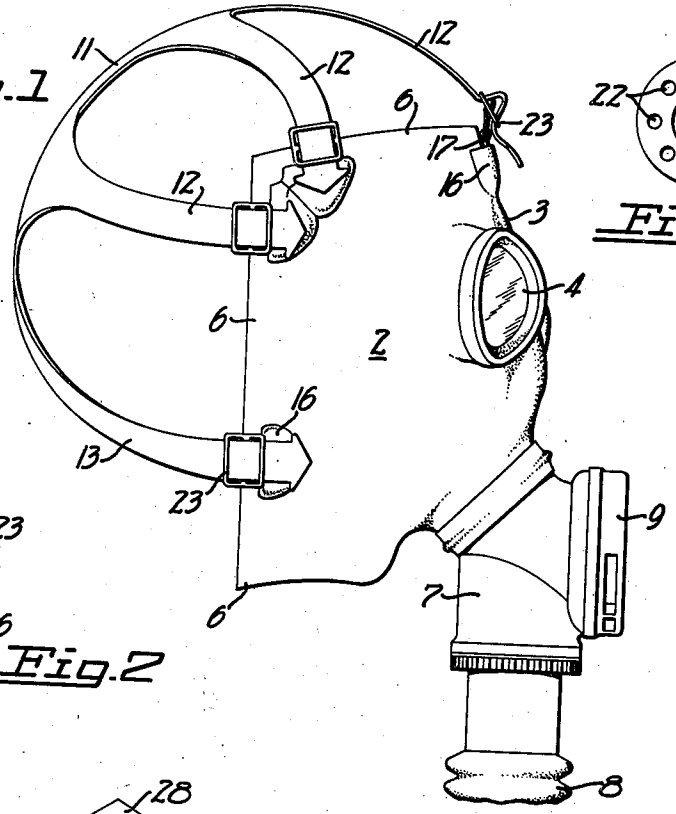
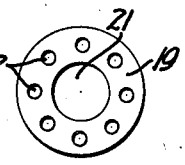


Fig. 3



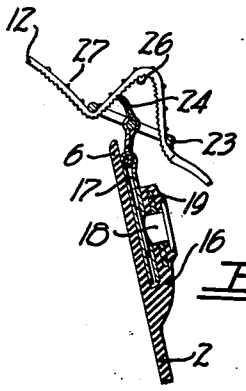


Fig. 2

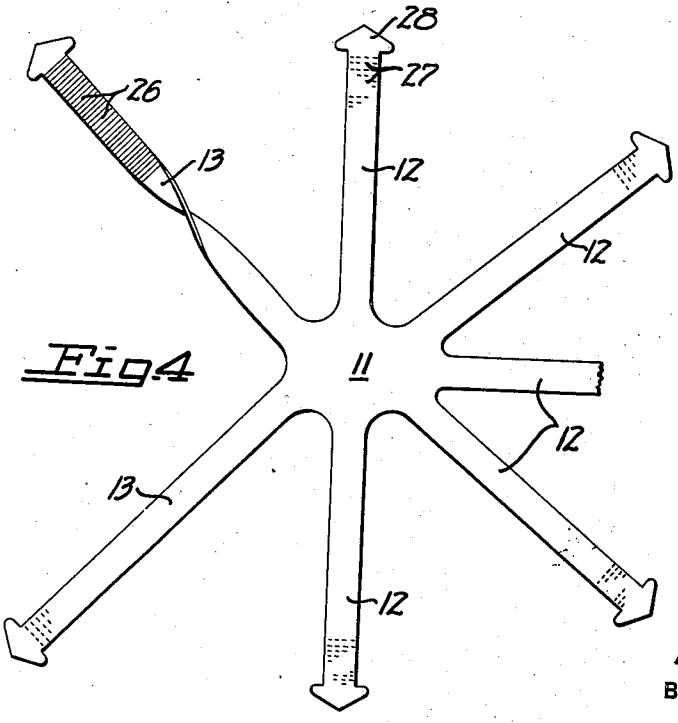


Fig. 4

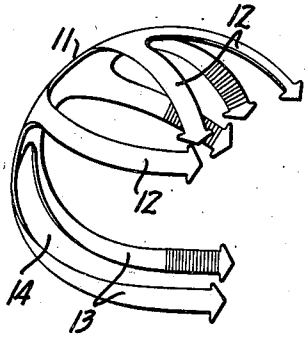


Fig. 5

INVENTOR
EDWARD W. BULLARD.
BY Charles J. Evans
HIS ATTORNEY

Patented May 7, 1940 2,199,690

UNITED STATES PATENT OFFICE

2,199,690

MASK

Edward W. Bullard, San Francisco, Calif., assignor to E. D. Bullard Company, San Francisco, Calif., a corporation of California

Application July 20, 1936, Serial No. 91,560

1 Claim. (Cl. 128—141)

My invention relates to improvements in the face piece and supporting harness of a mask, such as a gas mask; and it is among the objects of my invention to provide a more secure means for fastening the harness straps to the face piece.

Another object of my invention is to provide a harness which will allow the mask to be placed on the head of the wearer without disconnecting a harness strap.

The invention possesses other objects and features of advantage, some of which, with the foregoing, will be set forth in the following description of my invention. It is to be understood that I do not limit myself to this disclosure of species of my invention, as I may adopt variant embodiments thereof within the scope of the claim.

Referring to the drawing:

Figure 1 is a side elevational view of a gas mask embodying the improvements of my invention; and

Figure 2 is a detail sectional view on somewhat larger scale, taken through one of the buckle mountings.

Figure 3 is a plan view on still larger scale showing one of the reinforcing rings.

Figure 4 is a plan view showing the harness with the straps laid out flat; and

Figure 5 is a side view on somewhat smaller scale showing the harness with the straps assuming the position they would take over the wearer's head.

In terms of broad inclusion, the mask embodying my invention comprises a face piece and a harness for supporting the same on a wearer's head. The harness straps are connected to the face piece by buckles, and the latter are mounted by clips riveted to fastening tabs provided on the face piece. The face piece is preferably molded of rubber, and the fastening tabs are preferably molded as an integral part of the face piece. Reinforcing rings are also preferably imbedded in the tabs about the rivets. The harness comprises a plurality of straps radiating from the upper portions of the wearer's head, and the lower straps are preferably spaced to provide an opening therebetween sufficiently large to permit placing the mask on the wearer's head without unfastening the harness straps.

In greater detail, and referring to the drawing, the mask embodying my invention comprises a face piece **2**, preferably molded of a suitable material, such as soft rubber. The molded piece is preferably formed with thickened, central portions, preferably with a rib **3** arranged between the eye-pieces **4**, for holding the face piece in shape and for preventing bending and cracking across this point. From the thickened central portions, the face piece preferably tapers gradually toward the edges to provide a marginal flap **6** of relatively thin sheet rubber for overlying the forehead, side and throat portions of the wearer's face.

This marginal flap approaches the face substantially tangentially, so that the soft flap sheet lies flat against the face and is able to fold into conformity with irregular features of the wearer. The soft flexible character of the thin rubber flap sheet allows the latter to yield readily under suction caused by each inhalation of the wearer, whereby substantially the entire inner surface of the flap sheet may be drawn by the act of inhaling into sealing contact with the adjacent face portions to prevent the entrance of noxious gases into the mask past the edge portions.

The face piece is also preferably designed for connection with a suitable air duct **7** coupled with an air inlet hose **8**. The latter may be either connected with a cannister or supplied with fresh air from a remote source. Duct **7** also provides a mounting for the exhalation valve, and a suitable cover **9** is provided over the valve opening.

As shown in Figures 1, 4 and 5, the harness for supporting the face piece on the wearer's head comprises a plurality of straps radiating outwardly from a central pad **11** disposed adjacent the upper portions of the wearer's head. The straps are divided generally into two sets—an upper set of straps **12** adapted to provide a cap over the head, and a lower set of two straps **13** adapted to extend downwardly along the sides of the head. Figure 5 shows this arrangement best. Any suitable material, such as rubber, may be used for making the harness.

An important feature of the harness is the location of the principal supporting straps **12** about the crown portions of the head, leaving a long wide opening **14** between the two lower straps **13**. Figure 4 shows the wide angle between the two lower straps when the harness is spread out. This spacing of the lower straps provides an opening sufficiently large to permit placing the mask on the wearer's head without unfastening the harness straps. Such an arrangement is very desirable in a gas mask because it allows the latter, after once being adjusted to be put on without an instant's delay. This avoids the lost time of unfastening and refastening one or more of the harness straps to get the mask on, which is the usual procedure in gas mask construction.

Another feature of my improved harness is that it rests easily on the wearer's head, without disagreeable binding. As a result the mask may be worn with comfort.

Another important improvement in the mask construction is the fastening means for the harness straps shown in Figure 2. A fastening tab **16** is provided on the outer surface of the face piece, and is spaced inwardly from the edge to leave the marginal flap **6** free to perform its sealing function, without subjecting the flap portions to stresses occurring in the harness and in the body of the mask. This fastening tab is preferably of rubber molded as an integral part of the face piece. As shown in Figures 1 and 2, the tabs are joined to the body of the face piece at the ends and along the rear sides only of the tabs, leaving the forward edge open for receiving a clip **17**.

The clip is preferably of metal and is yoke-shaped with both arms interposed between the tab and the face piece. A rivet **18** penetrates the tab and one arm of the clip for fastening the elements together. The other arm of the clip underlies the rivet and serves as a supporting plate when the head is riveted over during the manufacture of the mask. Also the underlying arm or plate serves to prevent the rivet from pressing against the sealing flap **6** when the mask is being worn.

In order to reinforce the rubber tab **16**, a ring **19** is preferably imbedded in the body of the tab to surround the rivet **18**. This ring, as shown in Figure 3, has a central rivet aperture **21** and a series of peripheral rubber penetrating apertures **22**. Such a ring, moldably imbedded in the tab, provides a secure mounting for the rivet, from which the rivet cannot be pulled.

As shown in Figure 2, the harness straps are fastened by means of a buckle having a frame **23** and a pivoted tongue **24**. One end of the tongue extends forwardly for engaging the harness strap, and the other end projects rearwardly and is hooked in the bight of the clip **17**. Such an arrangement provides a simple and secure mounting for the buckle, and tends to tighten the tongue against the strap when the latter is pulled. In order to further insure a tight buckle grip on the strap, the tongue **24** is preferably curved so that the forward edge of the tongue bears directly against the strap, as clearly shown in Figure 2.

Since a non-slip buckle grip on the strap is very important in a gas mask, the strap is preferably further provided with transverse grooves **26** for receiving the end of the tongue **24**, and also with protuberances **27** to prevent the buckle frame from slipping along the strap. These features all tend to prevent the strap from becoming unfastened. Another precautionary feature is the provision of enlarged ends **28** on the harness straps to prevent the latter from accidently pulling out of the buckles, especially at a time when a buckle is opened for adjustment.

I claim:

A mask comprising a face piece, a fastening tab on the face piece, said face piece having a flexible marginal flap underlying the tab, a yoke-shaped clip having a pair of arms, a harness for the face piece and having an element hooked in the bight of said clip, and a rivet penetrating the tab and one only of the clip arms, the other arm of the clip being free to allow hooking of said harness element in the bight of the clip, said free arm being interposed between said tab and marginal flap to prevent disengagement of the harness element when the face piece is lying against the face of the wearer.

EDWARD W. BULLARD.