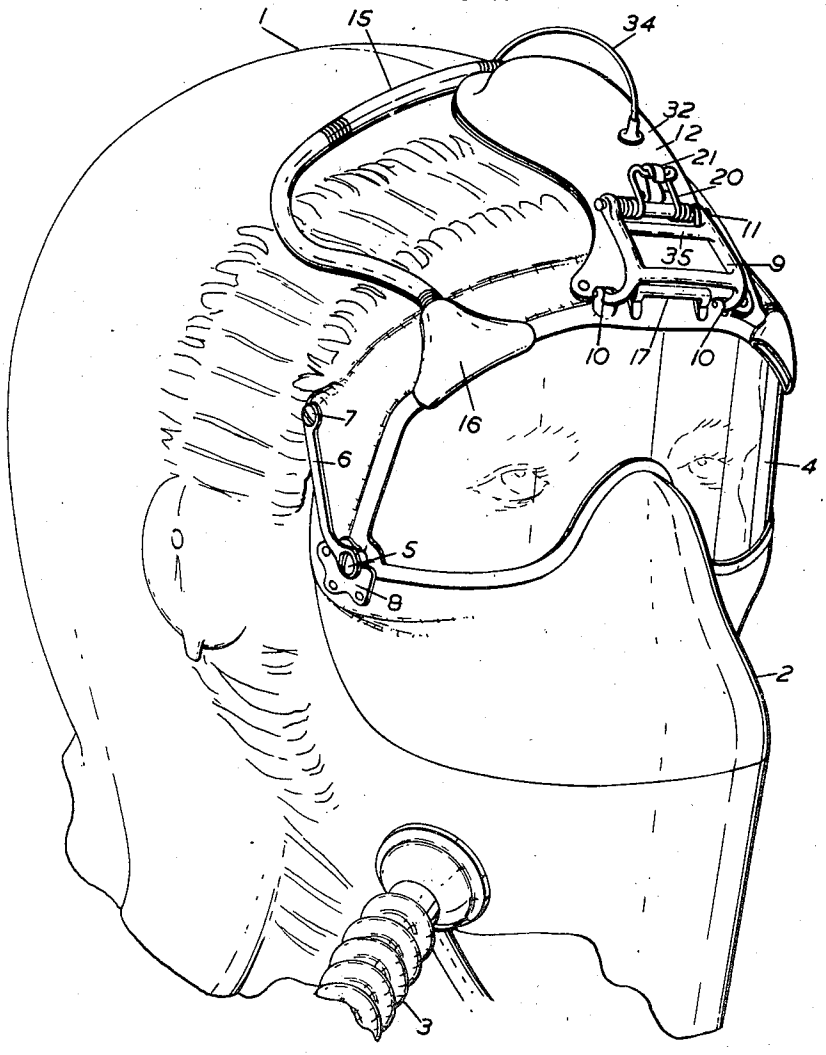
Dec. 22, 1959 M. J. O. LOBELLE 2,918,060

FACE MASKS FOR AIRMEN

Filed June 10, 1952 3 Sheets-Sheet 1

FIG 1.



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FACE MASKS FOR AIRMEN

Filed June 10, 1952 3 Sheets-Sheet 2

FIG. 3.

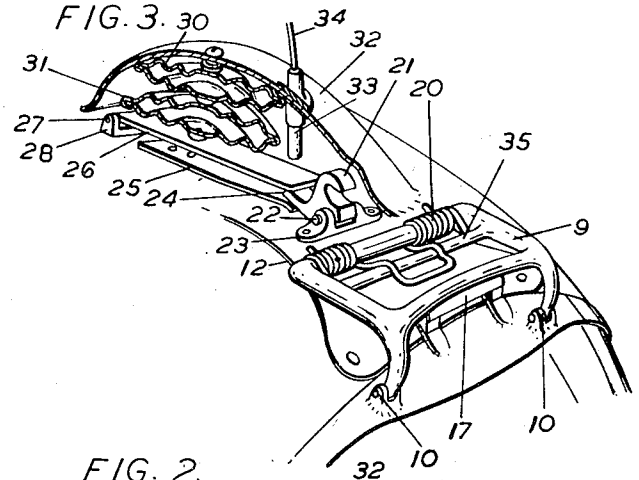
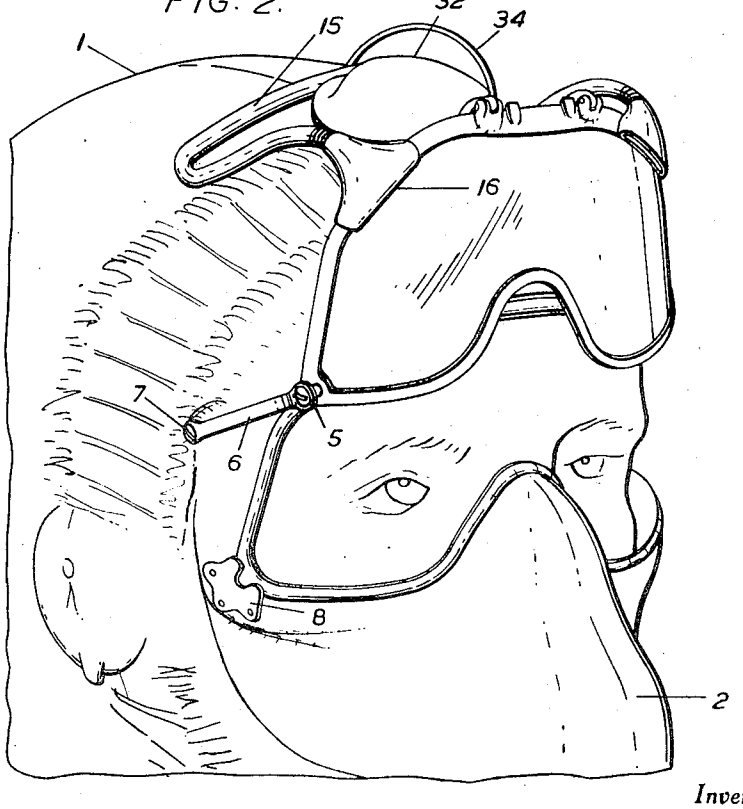


FIG. 2.



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FACE MASKS FOR AIRMEN

Filed June 10, 1952 3 Sheets-Sheet 3

FIG. 4.

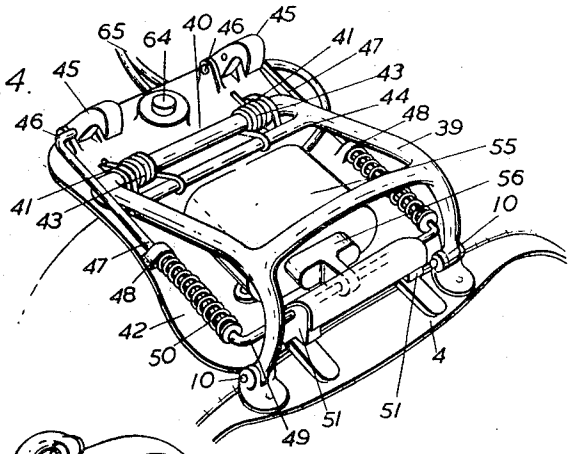


FIG. 5.

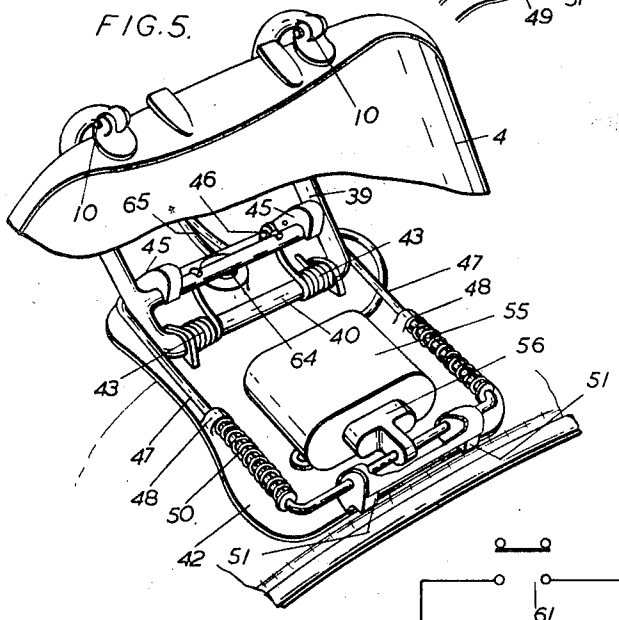
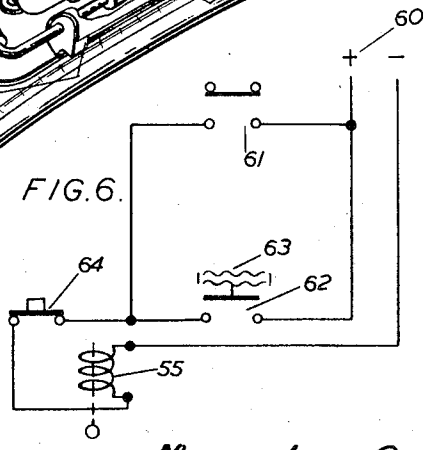


FIG. 6.



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FACE MASKS FOR AIRMEN

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Application June 10, 1952, Serial No. 292,710

Claims priority, application Great Britain June 12, 1951

6 Claims. (Cl. 128—141)

This invention relates to suits for airmen and is particularly concerned with the headgear and arrangements for protecting the face of the airman. Although it is desirable to protect as much of the face as possible under normal conditions, it is convenient for the airman to have at least his eyes uncovered, from the point of view both of comfort and clarity of vision. In the event of ejection from the aircraft, however, his eyes must be covered, and if the suit is pressurised, it must be completely sealed as soon as the pressure in the cabin drops below the critical value for the airman. In non-pressurised cabins this will occur merely with increasing altitude, but if the cabin is pressurised the pressure may suddenly drop either in action or for a variety of other reasons.

According to the present invention, a face mask forming part of such a suit is provided with a transparent eye shield pivoted to the body of the mask so as to move between an open position and a position in which it closes an aperture in the upper part of the mask, and this eye shield is provided with controls for moving it under mechanical action into the closed position. When closed, the eye shield seals the aperture in the mask so as to maintain pressure in the suit despite the fact that the pressure in the cabin itself may be below the critical value and also completes the protection of the airman's face.

It is desirable to close the eye shield automatically as soon as the pressure has fallen to its critical value for any of the reasons previously mentioned. Preferably, therefore, a barometric capsule is provided which is responsive to a drop of pressure below a predetermined value, and this capsule serves to control the mechanical action closing the eye shield. Thus as soon as the pressure drops below the predetermined value, which in general is the critical value for the airman, the eye shield is automatically closed to maintain the pressure in the headpiece. Preferably the eyeshield is closed by spring action and under normal conditions, it may be held in the open position by means of a latch which can be released either automatically by means of the barometric capsule as already described, or manually by the airman if the need arises.

In one form of construction, the barometric capsule is mounted on the headgear of the pressure suit and is thus able to exert the necessary control directly through a mechanical linkage. In an alternative form of construction, the capsule is mounted independently in the aircraft and when the pressure drops below its predetermined value serves to complete an electrical circuit to control the mechanical action. This electric circuit may, for example, serve to energise a solenoid, which in its turn releases the latch to close the eye shield.

Examples of face masks in accordance with the invention will now be described in more detail by way of example with reference to the accompanying drawings, in which:

Figure 1 shows the complete headgear of a pressure suit fitted with a face mask in accordance with the invention with an eye shield in the closed position;

Figure 2 shows part of the face mask of Figure 1 with the eye shield in the open position;

Figure 3 is a view of part of the mechanism shown in Figures 1 and 2 and showing a barometric capsule in cross-section;

Figure 4 is a view of an alternative form of mechanism with the eye shield in the closed position;

Figure 5 is a view corresponding to Figure 4, but with the eye shield in the open position, and

Figure 6 is a circuit diagram.

As seen in Figure 1, the headgear 1 of an airman's pressure suit is formed with a face mask shown generally at 2 and has an oxygen supply pipe 3. The upper part of the mask 2 is formed with an eye aperture closed by a transparent eye shield 4. This is pivoted at 5 to arms 6 duplicated on each side of the eye shield and these are pivoted to the upper part of the mask at 7. In the closed position, seen in Figure 1, the pivot pins 5 seat in notches formed in catches 8. In addition, the eye shield 4 swings about a central gate 9 pivoted to the top of the eye shield at 10 and turning about a spindle 11 secured to a plate 12 on the crown of the headgear.

The mating surfaces on the eye shield and the edge of the eye aperture in the mask are provided with rubber mouldings so as to form a pressure-tight seal when the shield is closed. A flexible pipe 15 leads from a source of warm air to the upper edge of the eye shield at 16 for de-misting and de-icing purposes. The eye shield is held in the closed position shown in Figure 1 by a pivoted catch 17 which is sprung to engage with the upper rim. In order to open the eye shield, this catch is lifted by means of thumb pressure, when the eye shield may be raised by hand into the position shown in Figure 2. In opening the eye shield, a spring 20 encircling the spindle 11 is forced back until it is held by a latch 21. This relieves the spring pressure from the eye shield and thus allows it to stay in the open position of Figure 2. If, subsequently the eye shield is closed by hand, the spring 20 is retained by the latch 21, as shown in Figure 1.

The latch 21 is formed as a bell-crank lever pivoted at 22 to a bracket 23 secured to the plate 12. One arm of the bell-crank lever forms the latch proper, while the other arm 24 is pressed upwardly by a light leaf spring 25 secured at its other end to the blade 12, and is engaged on its upper side by a plate 26 pivoted at 27 to a bracket 28. The effect of the spring 25 is to move the latch into a position where it is ready to receive the spring 20 and to hold it back when the eye shield is opened. The plate 26 is arranged to be acted on by a pair of barometric capsules 30 and 31 arranged to act in series beneath a domed cover 32. In addition, a plunger 33 controlled by a wire cable 34 is arranged to act on the upper surface of the plate 24.

If under the action of a decrease in pressure, the barometric capsules 30 and 31 expand, the plate 26 is rocked about its pivot 27 and forces the arm 24 of the bell-crank lever downwardly, moving the latch 21 so as to free the spring 20. This then snaps over into the position shown in Figure 3, striking a cross bar 35 of the gate 9 and forcing the eye shield down into the closed position. The latch 21 may also be released by means of the wire cable 34, which is operated as part of the normal sequence of operations when the airman is to be ejected from the aircraft. Thus in either type of emergency, i.e., due to a pressure drop or need for ejection of the airman, the eye shield is automatically closed to maintain the pressure within the suit and to complete the protection of the airman's face.

In the modification shown in Figures 4 and 5, the construction of the eye shield 4 is the same and part only is shown. It is again pivoted at 10 to a gate member 39. A bar 40 constituting part of the gate 39 is pivoted in brackets 41 to a plate 42 secured to the crown of the

headgear. The bar 40 is encircled by a pair of springs 43, the free ends of which act on a further cross bar 44 of the gate 39 and serve to press this into a position corresponding to the closed position of the eye shield.

In the open position of the eye shield shown in Figure 5, the gate 39 is held back against the action of the springs 43 by means of a pair of latches 45 pivoted to brackets 46 secured to the plate 42. The latches are controlled by rods 47 passing through guides 48 and which form part of a common member having a central portion 49. Springs 50 encircling the rods 47 act between the guides 48 and the cross member 49 forcing the rods 47 forwardly and biassing the latches 45 into the forward position, where they are ready to engage the cross bar 44. The cross member 49 passes through the two halves of a spring catch 51 corresponding to the catch 17 of Figure 1, and which is held closed by the springs 50.

A solenoid 55 is wound in an oval shape and has a correspondingly shaped armature 56 connected to the cross member 49. Thus when the solenoid 55 is energised, it attracts its armature, compresses the springs 50 and rocks the latches 45 backwardly to release the cross bar 44 and thus allow the eye shield to close under the action of the springs 41.

The operating circuit of the solenoid 55 is shown in Figure 6. It will be seen that the supply from the positive terminal 60 passes alternatively through a switch 61 and a switch 62 so that the solenoid is energised if either of these two switches is closed. The first switch 61 is closed as part of the emergency ejection operation for the airman so that the eye shield is automatically closed before the airman is ejected. The switch 62 is controlled by means of a barometric capsule illustrated diagrammatically at 63, which closes the switch when the pressure drops below its predetermined value. In series with the switches 61 and 62 is a further switch 64, which is normally closed when the eye shield is open. As may be seen from Figures 4 and 5, the switch 64 is held closed by the cross bar 44 when this is in engagement with the latches 45. As soon, however, as the solenoid 55 has been energised to close the eye shield 4, the switch 64 opens by means of a spring and the solenoid 55 is thereupon de-energised allowing the springs 50 to close the catch 51 so as to re-engage the eye shield immediately it closes.

The barometric capsule 63 may be located at any convenient point in the aircraft and it is then only necessary for the electric leads seen at 65 to pass to the airman's headgear for the purpose of energising the solenoid 55.

Although a source of warm air for de-misting and de-icing purposes has been shown in the drawings, other methods may be used such as the electrical resistance heating of a transparent metallic film on the surface of the eye shield.

I claim:

1. Headgear for an airman's suit comprising in combination, a face mask formed with an eye aperture, a transparent eye shield shaped to seal said aperture, means mounting said eye shield on said headgear for movement towards and away from said aperture, mechanical means carried by said headgear and operatively connected to said shield for moving said eye shield into sealing relationship with said aperture, a barometric capsule carried by said headgear, and means operatively connecting said barometric capsule to said mechanical means to operate the same to move said eye shield to sealing position when the pressure drops below a predetermined value.

2. Headgear for an airman's suit comprising in combination, a face mask formed with an eye aperture, a transparent eye shield shaped to seal said aperture, means mounting said eye shield on said headgear for movement towards and away from said aperture, spring means carried by said headgear and operatively connected to said shield for moving said eye shield into sealing relationship with said aperture, latch means carried by said headgear and operatively connected to said spring means for holding said eye shield against the action of said spring means, barometric means carried by said headgear, means operatively connecting said barometric means to said latch means to release said latch means when the pressure drops below, a predetermined value, and manually-operated means for alternatively releasing said latch means.

3. Headgear for an airman's suit comprising in combination, a face mask formed with an eye aperture, a transparent eye shield shaped to seal said aperture, means mounting said eye shield on said headgear for movement towards and away from said aperture, spring means carried by said headgear and operatively connected to said shield for moving said eye shield into sealing relationship with said aperture, latch means carried by said headgear and operatively connected to said spring means for holding said eye shield against the action of said spring means, barometric means mounted on said headgear, and means operatively connecting said barometric means to said latch means to release said latch means in response to a drop of pressure below a predetermined value.

4. Headgear for an airman's suit comprising in combination, a face mask formed with an eye aperture, a transparent eye shield shaped to seal said aperture, means mounting said eye shield on said headgear for movement towards and away from said aperture, spring means carried by said headgear and operatively connected to said shield for moving said eye shield into sealing relationship with said aperture, latch means carried by said headgear and operatively connected to said spring means for holding said eye shield against the action of said spring means, barometric means carried by said headgear, electric circuit means carried by said headgear, an electric switch in said electric circuit means, means operatively connecting said electric switch to said barometric means to operate said switch when the pressure drops below a predetermined value, and means operatively connected to said electric circuit means and to said latch means and controlled by said electric circuit means for releasing said latch means.

5. Headgear for an airman's suit as claimed in claim 4 and comprising electro-magnetic means connected in said circuit means, and means operatively connecting said electro-magnetic means to said latch means whereby said latch means is released when said switch is operated.

6. Headgear for an airman's suit comprising in combination, a face mask formed with an eye aperture, a transparent eye shield shaped to seal said aperture, means associated with said headgear for supplying heat to said eye shield, means mounting said eye shield on said headgear for movement towards and away from said aperture, spring means carried by said headgear and operatively connected to said shield for moving said eye shield into sealing relationship with said aperture, latch means carried by said headgear and operatively connected to said spring means for holding said eye shield against the action of said spring means, means carried by said headgear and operatively connected with said latch means for releasing said latch means, a barometric capsule carried by said headgear, means operatively connecting said barometric capsule to said release means for said latch means to release said latch means when the pressure drops below a predetermined value, and manually-operated means carried by said headgear for alternatively operating said release means.

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