

Nov. 27, 1962

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3,065,747

MASK RETAINING DEVICE FOR A HELMET

Filed Aug. 20, 1959

Fig. 1.

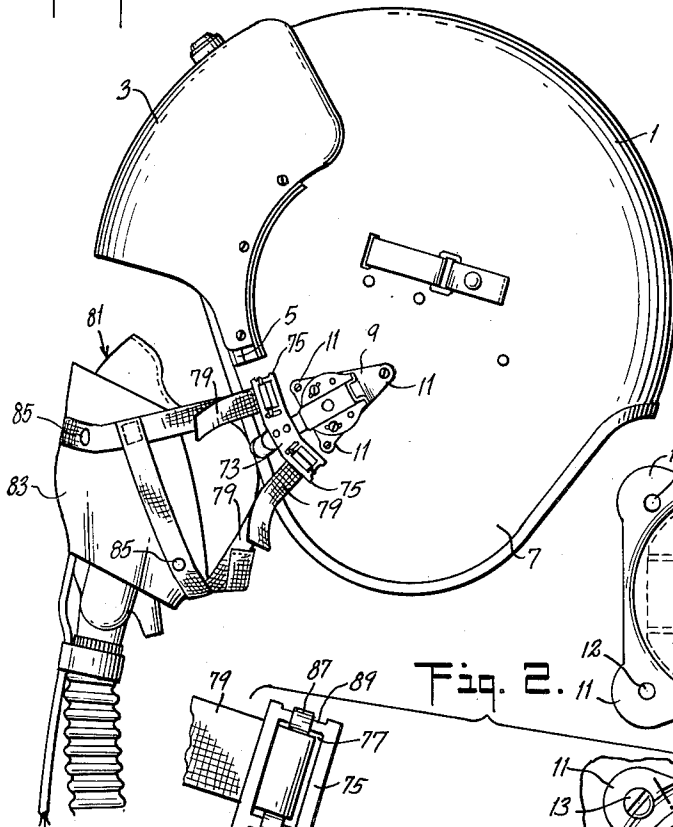


Fig. 6.

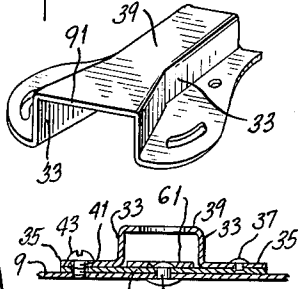


Fig. 4.

Fig. 5.

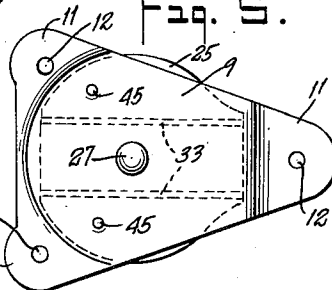


Fig. 2.

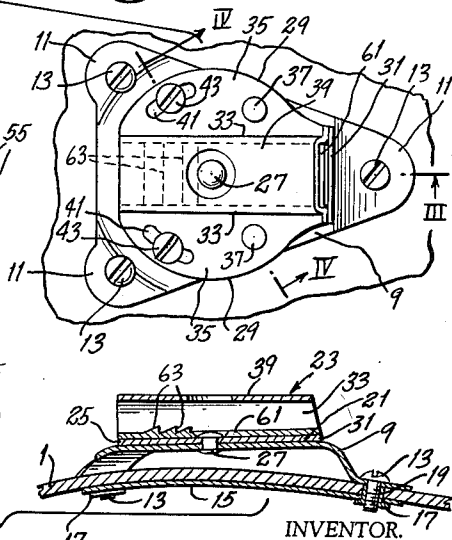
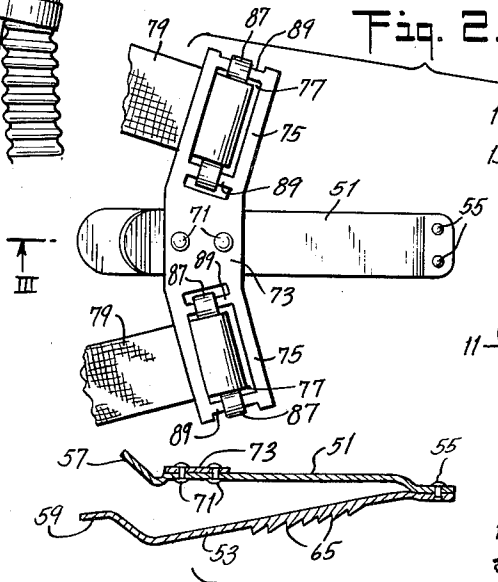


Fig. 3.

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MASK RETAINING DEVICE FOR A HELMET
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Filed Aug. 20, 1959, Ser. No. 835,049
5 Claims. (Cl. 128—146)

This invention relates to helmets and more especially to means for removably attaching an auxiliary device to the helmet. The invention particularly relates to such means for attaching a face mask to the helmet.

Safety helmets heretofore have been proposed for protection of the head of the wearer which have been provided with means for holding in proper position relative to the face of the wearer a mask, usually a gas mask for supplying oxygen when the wearer of the helmet otherwise would be required to breathe a rarified or a contaminated atmosphere. Such masks are designed with elements which are intended to conform to the facial contour and to be held in close contact therewith. It, therefore, is important that means be provided for securely holding the mask in pressing relation to the face. In some helmet constructions it also is necessary that the mask shall cooperate with the helmet to secure the requisite gas tightness to prevent leakage of the oxygen or other gas for respiration. These purposes are required to be accomplished while providing for adjustments due to the differences in facial contour or the mechanical form and relation of the mask and of the helmet with respect to each other.

It is an object of the invention to provide a mask retaining device for a helmet which easily may be actuated for effecting attachment of the mask to and removal from the helmet.

It is another object of the invention to provide a mask retaining device which provides for easy adjustment of the mask with respect to the face and to the helmet.

It is a further object of the invention to provide a retaining device providing means for attaching the conventional connections or straps of the gas mask.

It is a still further object of the invention to provide a retaining device which may be actuated by the fingers of one hand of the wearer of the helmet.

It is an additional object of the invention to provide a mask retaining device providing for adjustment of the mask to different angularly related positions with respect to the helmet so as to secure the desired close contact of the mask with the face and proper distribution of the pressure over the contact area.

The mask retaining device of the invention comprises means which provides a pocket, this means being adapted to be secured to the helmet, and a latch means which is insertable in this pocket. The latch means has two portions which are connected adjacent a given point on the latch means and extend from this point of connection in the same general direction and are resiliently biased to move one away from the other transversely of the lengths thereof toward separated positions, these portions being movable one toward the other against the bias to a releasing position with respect to the means which provides the pocket. The latch means is of such form that it may be inserted in and removed from the pocket when the two portions are disposed toward each other in a latch releasing position.

The two portions of the latch means may be provided by two like extending elements which are mechanically connected relative movement adjacent the given point referred to. These elements at their ends therealong from the point of connection may be actuated by the finger and thumb of one hand of the wearer of the

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helmet to press the two elements together to secure release of the latch means which then may be removed from the pocket by the fingers without aid of the other hand or other assistance to release the latch means. The mask then may be removed from the face of the wearer. Attachment of the mask to the helmet by insertion of the latch means in the pocket is similarly accomplished upon pressing the elements together.

The removable latch means provides for connection directly thereto of the straps or other conventional connecting means of the gas mask, strap receiving apertures preferably being provided spaced apart transversely of the length of the elements of the latch means above mentioned. It is a feature of the invention that this arrangement for attaching the mask removes from the field of view through the eye shield or the opening of the helmet all parts serving to hold the mask in place.

It is another feature of the invention that the means providing the pocket in which the elements of the latch means are insertable may be carried upon a base which is securely fastened to the wall of the helmet, the pocket means being supported on this base for pivotal movement thereof on an axis transverse to the lengthwise extent thereof and transverse to the helmet wall. This pivotal support makes possible the disposition of the length of the pocket and, therefore, the length of the elements inserted therein in such angular relation to the helmet and to the mask to be attached thereto as to secure the equalization of the forces transferred through the straps or connections and the proper distribution of the pressure of the mask on the face of the wearer. When the desired angular position is determined the pocket means may be fastened in position on the base.

In order further to secure adjustment of the mask with respect to the helmet, detent means is provided within the pocket which is engageable by means carried by the latch means, particularly by an element of the latch means, when inserted in the pocket to prevent withdrawal of the elements from the pocket when the pressure of the fingers on the elements is removed. The means carried by one of the elements may provide a plurality of projections or teeth for engagement of the detent means in different positions of the elements.

Other objects and features of the invention will be understood from a description of the drawings in which:

FIG. 1 shows in elevation a helmet and a gas mask secured thereto by the retaining device of the invention;

FIG. 2 shows in elevation to enlarged scale the retaining device of the invention with the latch means separated from the means providing the pocket;

FIG. 3 shows a section on line III—III of FIG. 2;

FIG. 4 shows a section on line IV—IV of FIG. 2;

FIG. 5 shows a view of the pocket means of the device at the face of the base thereof which is disposed adjacent the helmet surface;

FIG. 6 shows a modified form of the pocket means.

In FIG. 1 the helmet shell 1 carries a cover 3 for a visor movable on track 5 to and from a retracted position beneath the cover 3. The retaining device of the invention in this embodiment is attached to the upper part of the ear covering portions 7 of the helmet in such position as not to interfere with the visor in its movement along the track 5. This disposition of the retaining device also is such that it easily may be reached by the fingers on one hand of the wearer for effecting attachment and release and adjustment of the mask. It will be understood that a similar retaining device is carried at the opposite side of the helmet.

The retaining device of the invention in the embodiment shown in the drawing includes a base plate 9 which may be of sheet metal die formed from a generally triangular flat blank to an arched section, as shown in FIG.

3, and providing flanges 11 apertured at 12 to receive screws 13 passing through corresponding holes in the shell 1 of the helmet. Preferably a backing plate 15 is provided at the inner side of the shell 1, the screws 13 passing through the plate 15 and threaded in suitable nuts 17 which in the embodiment as disclosed in FIG. 3 provide ferrules 19 which constitute bushings for the holes in the wall of the shell 1.

Upon the upper generally flat surface 21 of the base 9 is disposed the pocket means 23. This pocket means may consist of a flat plate 25 in engagement with the surface 21 of the base plate 9 and held thereon by rivet 27 so as to be pivotally movable on the axis of the rivet. The plate 25 in this embodiment has a circular arcuate outline 29 for the major portion of its extent but also provides, as shown in FIG. 2, a portion 31 extending toward the right somewhat beyond the outline of the circumference of the circle, if extended.

The pocket means of the device also comprises a wall 33 upstanding from the plate 25 and connected to two arcuate flanges 35 which bear upon the upper face of the plate 25 and are riveted thereto by rivets 37. The pocket means also provides the wall 39 extending parallel to the plate 25 and connecting the upstanding walls 33. It will be understood that the walls 33 and 39 and the arcuate flanges 35 may be formed in one piece by a die-forming operation and, when the flanges 35 are riveted to the plate 25, that the pocket means as a whole is pivotally movable on the axis of the rivet 27 relative to the base 9 and that the lengthwise extent of the pocket formed between the walls 33, 39 and the plate 25 may be disposed in different angular positions with respect to the base plate 9.

As shown in FIG. 2 the arcuate flanges 35 and the corresponding portions of the plate 25 may be provided with arcuate slots 41 about the axis of the rivet 27 for receiving adjusting screws 43 which are threaded in holes 45, FIG. 5, in the base plate 9. When the pocket means carried on the plate 25 is pivotally moved to the desired position with respect to the base plate 9, the screws 41 may be tightened to hold the pocket means securely in the desired position with respect to the helmet 1.

At the left of FIGS. 2 and 3 is shown the latching means insertable in the pocket defined by the walls 33, 39 and the plate 25. In the embodiment disclosed the latching means comprises two elements 51 and 53 in the form of strips or flat elongated plates which at their right hand ends in FIGS. 2 and 3 are riveted together by rivets 55 to hold the flat faces of the elements 51, 53 in engagement with each other. These elements formed as shown are of such resilience, being made, for example, of spring steel, that they are biased away from each other in the direction parallel to the paper in FIG. 3. At the left hand end of the elements are finger and thumb projections 57, 59 which may be actuated by the finger and thumb of one hand for pressing the elements 51, 53 toward each other against the bias thereof. It will be understood from a consideration of FIG. 3 that these elements may be brought to a position close together so as to be substantially parallel to each other and that when thus held by the finger and thumb of the hand these elements of the latching means may be inserted in the pocket between the walls 33 and beneath the wall 39. The elements thus pressed together may be moved through the pocket until they are disposed fully within this pocket.

Within the space defined by the walls 33, 39 and secured as by welding to the plate 25 is a detent strip 61 disposed with its flat bottom surface against the flat top surface of the plate 25. The strip 61 is formed by suitable means with teeth 63 upstanding therefrom within the pocket. These teeth are engageable with teeth 65 carried on the outer surface of the element 53, the rake of the teeth 63 and 65 being opposite to each other so that the teeth will engage and hold the elements within the pocket when the pressure of the finger and thumb is re-

moved from the projections 57, 59. Movement of the elements toward the left in FIGS. 2 and 3 from within the pocket, therefore, is prevented when the elements under their bias are in their separated positions. When, however, it is desired to remove the mask from the helmet, by pressing the projections 57, 59, the teeth 65 are withdrawn from the teeth 63 and the latching means elements 51, 53 may be withdrawn from the pocket.

Secured to the element 51 by rivets 71 is a transverse member 73 having arms 75 which extend laterally symmetrically with respect to the element 51 and inclined forwardly toward the ends of the elements 51, 53 that are connected by the rivets 55. This inclined disposition of the arms 75 makes possible the provision therein of apertures 77 for receiving the straps 79 of a gas mask 81, FIG. 1. Conventionally these straps 79 extend in separated relation to each other from the saddle 83 of the gas mask to which they may be secured, as by fasteners 85, toward a securing means carried by the helmet or by other supporting device. In the device of the invention these straps are directly connected to the latching means and are adjustable in relation thereto as about to be described. The angle of inclination of the arm 75 relative to the elements 51, 53 may be varied for different types of masks and helmets but may be such in a given construction as to be suitable for the usual angularity of the straps 79, having regard to the dimensions of the gas mask to fit the face of the average wearer of such helmet.

In order easily to adjust the length of the straps 79, slide pieces 87 are provided the ends of which suitably engage cross bars 89 extending transversely of the apertures 77 of the arm 75, so that the pieces 87 are slidable along the cross bars 89. It will be understood that the straps 79 may be inserted in the apertures 77 and carried about the slide pieces 87 and again inserted in the aperture in contact with the part of the strap extending from the mask and that the pull on the strap brings the slide piece 87 into engagement with the adjacent longitudinal portion of the arm 75 between cross bars 89. Thus the retaining device of the invention provides for adjustment lengthwise with respect to the straps and lengthwise with respect to the latching element. In view of the angular adjustment of the latching means with respect to the helmet above described, the straps connected to the latching means may be adjusted with respect to the helmet so that the pull thereof is transferred to the gas mask to secure the desired distribution of the pressure thereof on the face of the wearer.

It will be understood that variations may be made in the dimensions of the parts shown in order to provide for suitable disposition of the pocket means on the helmet and to bring the projecting ends 57, 59 of the latch elements to positions conveniently disposed and preferably outwardly of the edge of the ear covering portions of the helmet so as easily to be reached by the finger and the thumb of one hand of the wearer. These projections, moreover, may extend beyond the member 73 and its arms 75 sufficiently to be conveniently reached whatever may be the extent to which the elements 51, 53 are inserted in the pocket. It will be noted that a plurality of teeth 65 is provided disposed along the element 65 to effect latching in various positions of the elements. Several teeth 63 also are provided to insure engagement of the teeth in any position of the elements within the pocket.

The pocket means also may be formed with a flared portion 91, FIG. 6, adjacent the opening into which the elements 51, 53 are inserted, the walls 33, 39 each being flared to enlarge the opening for easier insertion and withdrawal of the elements while retaining the confining action of the walls 33, 39 in engagement with the elements to secure latching engagement of the teeth 63, 65.

Other variations and modifications may be made within the scope of the invention while providing for the adjust-

ments which have been described and for the easy engagement and release of the latching means and ready adjustment of the mask with respect to the helmet and face. All such variations and modifications are intended to be included within the scope of the attached claims.

I claim:

1. The combination with a protective helmet and a face mask having tension means connected thereto for connecting said mask to the helmet, of means defining a pocket having an opening, latch means adapted to be inserted in said pocket through said opening thereof, detent means disposed within said pocket, detent engaging means carried by said latch means and engaging said detent means when said latch means is within said pocket for preventing withdrawal of said latch means, means supported by said latch means and operable for effecting release of said detent engaging means from said detent means for withdrawing said latch means from said pocket, a base member secured to the helmet, means supporting said pocket means on said base member for pivotal movement of said pocket means to different angularly related positions with respect to said base member upon an axis transverse to the surface of said helmet, and means carried by said latch means and engaging said tension means for connecting said tension means to said latch means, said pocket means upon said pivotal movement thereof providing for adjusting the angular relation of said pocket means and said latch means inserted therein to the helmet and to the face mask so as to adjust the force transferred through said tension means to distribute the pressure of the mask on the face of the wearer.

2. The combination with a protective helmet and a face mask having a strap connected thereto for connecting said mask to the helmet, of means including a wall extending about and defining an elongated pocket having an open end, latch means having an elongated portion adapted to be inserted in said pocket through said open end thereof and to be disposed in said pocket lengthwise thereof, detent means disposed within said pocket, detent engaging means carried by said elongated portion of said latch means and engaging said detent means when said latch means is within said pocket for preventing withdrawal of said latch means, means supported by said latch means and operable for effecting release of said detent engaging means from said detent means for withdrawing said latch means from said pocket, a base member secured to a side portion of said helmet, means supporting said pocket means on said base member for pivotal movement of said pocket means to different angularly related positions with respect to said base member upon an axis transverse to the surface of said helmet, said pocket means being disposed with said open end toward the front of the helmet and with the length of the pocket extending from said open end generally rear-

wardly along the side of the helmet, and means carried by said latch means and engaging said strap for connecting said strap to said latch means, said pocket means upon said pivotal movement thereof providing for adjusting the angular relation of said pocket means and said latch means therein to the helmet and to the face mask so as to adjust the force transferred through said strap to distribute the pressure of the mask on the face of the wearer.

3. The combination as defined in claim 2 in which said elongated portion of said latch means comprises two elongated elements disposed with their lengths extending in the same general direction and connected together adjacent a given point thereon, said elements being resiliently biased to move one away from the other transversely of their lengths toward separated positions, said elements being movable one toward the other against said bias to latch means releasing position for insertion of said connected elements in and removal thereof from said pocket, said detent engaging means being carried by one of said elements and under said bias being brought into engagement with said detent means within said pocket.

4. The combination as defined in claim 3 in which said face mask is provided with two straps connected thereto at a side thereof, said strap engaging means carried by said latch means comprising a member carried by said latch means and disposed thereon along said elements from said point of connection of said elements together, said member having an extent transverse to the length of said elements and providing a pair of apertures respectively oppositely offset laterally from said elements along said extent of said member, said straps being inserted in said apertures for connecting said member to said mask, said member carrying means respectively associated with said apertures for engaging said straps and releasably holding said straps against movement out of said apertures.

5. The combination as defined in claim 1 which comprises fastening means for selectively securing said pocket means to said base member in said different angularly related positions of said pocket means with respect to said base member about said pivotal axis.

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