

Aug. 6, 1963

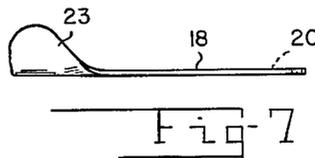
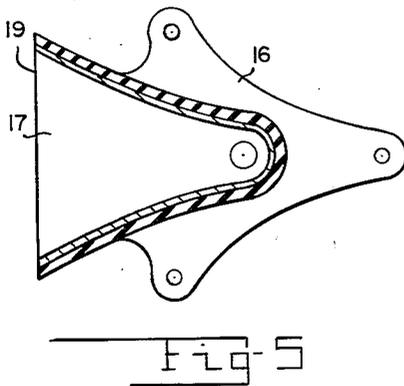
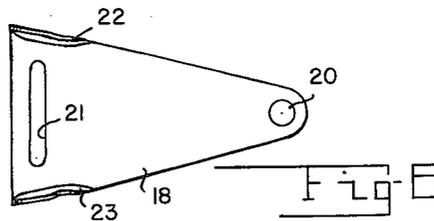
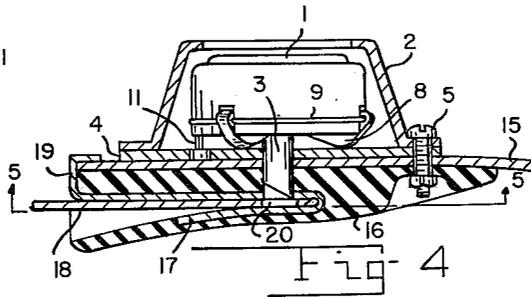
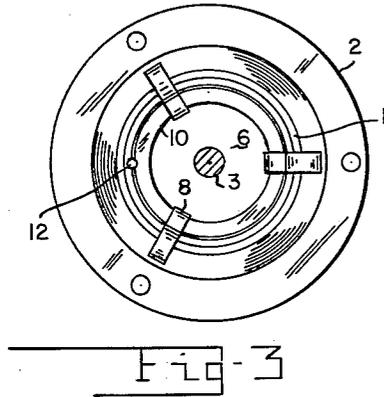
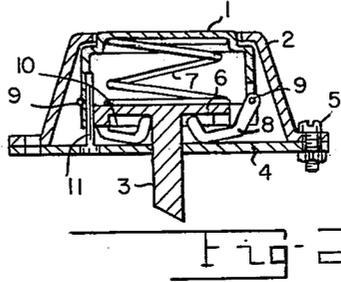
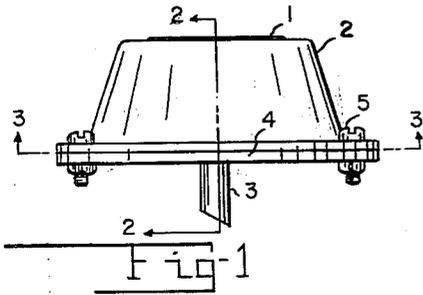
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3,099,870

QUICK RELEASE MECHANISM

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2 Sheets-Sheet 1



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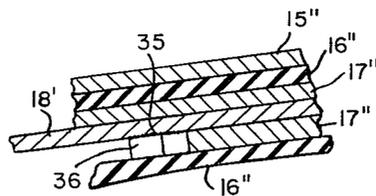
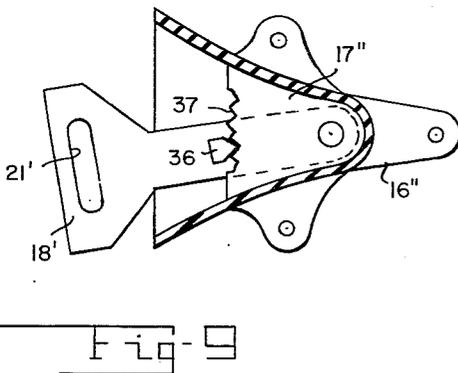
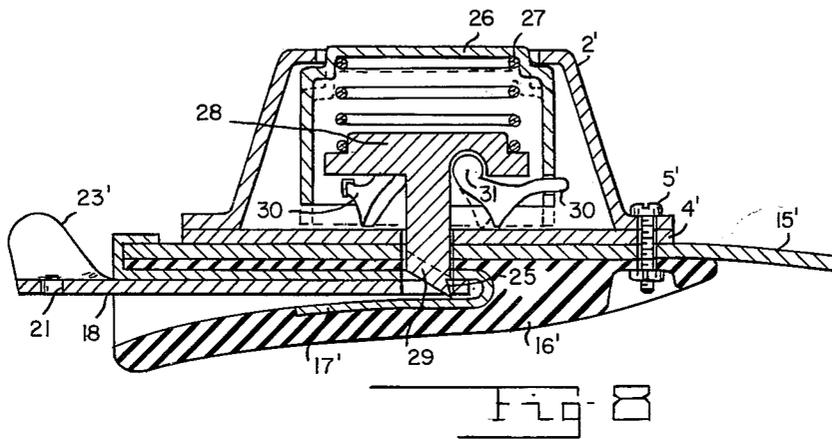
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QUICK RELEASE MECHANISM

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2 Sheets-Sheet 2



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1

3,099,870

**QUICK RELEASE MECHANISM**

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8 Claims. (Cl. 24—230)

(Granted under Title 35, U.S. Code (1952), sec. 266)

The invention described herein may be manufactured and used by or for the United States Government for governmental purposes without the payment to me of any royalty thereon.

This invention relates to a new and improved quick release mechanism that is particularly useful when it is mounted adjacent the edge of a helmet or the like, as a mask securing device for a bayonet that is releasably engaged by the mechanism.

In the past, mechanisms for attaching straps between masks and helmets have commonly been somewhat cumbersome and under tension opened the mask-to-skin seal. Modern oxygen masks are lightweight; they have thin walls and consequently they are more comfortable to wear than were previously available heavier masks. Heavy release mechanisms suspended on the outside of the helmet and with bayonets engaging the mechanism outside of the helmet, as applied to lightweight, thin-walled, oxygen masks drag on the masks and when the bayonets are inserted into or are removed from the mechanisms the action objectionably opens the seal between the mask and the face by pulling the mask apart and permitting the loss of gas.

Previously available quick release mechanisms have consisted of unnecessarily complicated hook arrangements, both with and without safety locks. The devices have not been foolproof when used with lightweight masks and have not been as dependable in operation as is desirable.

The object of this invention is to provide a simple, lightweight, foolproof, dependable and rapidly functioning push button operated, quick release mechanism of improved design as compared with previously available pieces of apparatus, for the same or for comparable service.

The quick release mechanism that is disclosed herein is small, lightweight and compact and is conveniently mounted to extend through the wall of a helmet to which it is attached, such that the mask to skin seal is not broken by moderate stresses and is not opened with the attaching or the releasing of straps that secure the mask or helmet in place on the wearer. This improvement is of particular importance with modern, lightweight, comfortable masks which harnesses are stretching the mask seal away from their contact with the wearer's face by the earlier, more cumbersome and more heavy quick release mechanisms instead of keeping the harness close to the face, as accomplished in the subject invention.

Illustrative and successfully operating embodiments of the present invention are shown in the accompanying drawings wherein:

FIG. 1 is a side elevational view of a mechanism that embodies the present invention;

FIG. 2 is a sectional, elevational view of the mechanism, taken along the line 2—2 of FIG. 1;

FIG. 3 is a plan view from below, with the bottom plate removed, of the mechanism that is shown in FIG. 1, taken about from the line 3—3 in FIG. 2;

FIG. 4 is a fragmentary, partly sectioned, depressed button view of the mechanism shown in FIG. 1, mounted adjacent the edge of a helmet to attach to the helmet a modern lightweight oxygen mask, with the strap at-

2

taching bayonet inside of the helmet released and ready for being withdrawn from its funnel or socket in the edge of the helmet.

FIG. 5 is a sectional view of the funnel taken along the line 5—5 of FIG. 4;

FIG. 6 is a plan view from above of the bayonet in FIG. 4;

FIG. 7 is an edge elevational view of the bayonet in FIG. 6;

FIG. 8 is a fragmentary, enlarged, elevational and sectional view of a modified type of mechanism that embodies the present invention, shown in full lines in its bayonet retaining condition and in dash lines in its bayonet releasing condition;

FIG. 9 is a plan view from below, partly in section, of a ratchet type of bayonet in its funnel or socket; and

FIG. 10 is an enlarged, fragmentary edge, sectional view of the rack and ratchet modification shown in FIG. 9.

The quick releasing device that is shown in FIGS. 1 to 4, inclusive, of the drawings comprises a push button 1 that may be depressed down into its housing 2 to raise a centrally positioned bayonet retaining post 3 up out of its engagement with a bayonet that is attached to the end of a strap.

The housing 2 terminates downwardly in a flanged edge and is closed by a lever supporting fulcrum plate 4 that is secured to the housing flange by a desired number of screws, rivets or bolts 5.

The post 3 terminates upwardly in a cap 6 that is yieldingly depressed by a coil spring 7. The post 3 terminates downwardly in a friction face that is inclined to the axis of the post. The coil spring 7 is interposed between the lower or inner surface of the push button 1 and the top of the post cap 6. The push button 1 terminates downwardly in a skirt portion that is inside of the housing 2 and outside of the post cap 6.

The lower edge of the push button skirt is slotted to accommodate a desired plurality of lever arms 8. Each lever arm 8 is of substantially splayed J-shape, with a longer arm apertured to be journaled on a steel wire ring 9. The wire ring 9 seats in a groove in the outer surface of the push button skirt. The ends of the wire ring 9 are secured together. Each lever arm 8 extends through a slot in the downwardly extending flange 10 of the post cap 6.

A locator pin 11 has its base end secured firmly in the lever supporting fulcrum plate 4 and extends upwardly between the push button skirt and the post cap edge. The pin 11 aligns both the push button 1 and the post cap 6 by being positioned in a pair of registering slots in the inner surface of the button skirt and in the outer surface of the flange 10 of the post cap 6, as indicated at 12 in FIG. 3.

The push button operated mechanism in FIG. 1 is shown in FIG. 4, partly in section mounted adjacent to the edge of a helmet by bolts 5 that extend through the helmet wall 15. The side of the helmet 15 that is to contact the wearer's head beneath the quick release mechanism has connected thereto a comfortable material 16 of sponge rubber or the like. The rubber material 16 houses a metal bayonet scabbard or funnel 17 of slot-shape into which the bayonet 18 makes sliding entry. The bayonet is commonly attached to a mask strap, not shown. The funnel is mounted inside the helmet between the helmet wall and the head of the wearer, which provides a good seal between the wearer's face and his mask.

The funnel 17 is of rigid material such as a firm plastic, spun glass metal or the like, and is adhered firmly to the cushioning rubber material 16. The funnel 17 has a flange portion 19 that overlaps both the rubber 16 and the edge of the helmet material 15 and is firmly bonded to

both. The funnel preferably has a wide mouth to make it easy to slip the bayonet into the funnel without looking. The funnel 17 is apertured for the uninhibited insertion through the funnel wall of the tip of the post 3. The tip of the post 3 serves as a bayonet detent by extending into an aperture 20 in the attaching end of the bayonet 18. The funnel 17 firmly supports the lower side of the bayonet 18 at the remote end of the funnel and forwardly well beneath the post 3 so that the retention of the post 3 within the bayonet post receiving aperture 20 remains assured. The bayonet 18 has a slot 21 remote from the post receiving aperture 20 to receive the mask attaching strap, not shown, and between a pair of upstanding ears 22 and 23 for use in handling the bayonet. The bayonet 18 is positively retained within its scabbard or funnel 17 as long as the post 3 projects into the bayonet aperture 20.

The bayonet 18 is instantly released on the depression of the button 1. The depression of the button 1 against the yielding resistance of the coil spring 7 and acting through the steel wire ring 9, applies force to the attached end of the U-shaped lever arm. This force is applied by the lever fulcrum to the fulcrum supporting plate 4 and the applied force is delivered by the load end of the lever 8 against the lower surface of the post cap 6 where it lifts the post 3 up out of the aperture 20 in the bayonet 18, as indicated in FIG. 4 of the drawing.

The bayonet 18 is engaged by the mechanism upon the insertion of the bayonet into the funnel 17 and pressing the tip of the bayonet against the inclined face on the lower end of the post 3 with sufficient force to raise the post against the yielding resistance of the spring 7 until the tip of the post 3 slips into the aperture 20 of the bayonet 18. The lining comprising the funnel 17 must be of ample strength and dimensions to support the lower surface of the bayonet during this procedure and to thereafter positively support the bayonet securely over the post 3. This function may be assisted by a notch in the post 3 at its lower end and on its side remote from its inclined face if desired, as is shown by the notch 25 in FIG. 8 of the drawings.

Modifications of the present invention are shown in FIGS. 8, 9 and 10 of the drawings. Parts of these modifications that correspond with parts in FIGS. 1 to 7, inclusive, are primed or double primed.

The device in FIG. 8 comprises a push button 26 within a housing 2 that is secured by bolts 5' to the helmet 15' adjacent the edge thereof, with a soft rubber cushion 16' interposed between the helmet and the wearer's head.

The push button 26 is shouldered to rest upwardly against the upper flange of its housing 2' under the expansion of a coil spring 27 that rests downwardly on the top of the cap 28 of the post 29. The post 29 terminates downwardly in an inclined face against which the tip of the bayonet 18 is pressed in elevating the post 29 against the resilience of the spring 27 until the lower end of the post 29 enters the aperture 20 of the bayonet. The lower tip of the post 29 substantially contacts the inner surface of the funnel 17' so that the bayonet is restrained from slipping over the end of the post 29.

The release of the bayonet 18 is accomplished by the depression of the push button 26, as indicated in dash lines in FIG. 8. The depression of the push button 26 lowers its depending skirt portion and the force end of each of a desired plurality, such as three, of levers 30. The force end of each lever 30 is positioned within an aperture in the push button skirt. The lever fulcrum rests on the fulcrum supporting plate 4' and slides on the plate 4' as the lever force end is depressed to raise the lever weight end 31. The lever weight end 31 illustratively is of cylindrical shape in a correspondingly shaped socket in the post 29 at its junction with its cap 28.

Force from the push button 26 applied downwardly lowers the force end of the lever and raises the tip of the post 29 up out of the aperture 20 in the bayonet 18 and thereby permits the release of the bayonet and the strap

to an end of which the bayonet is connected. The expansion of the coil spring 27 returns the push button 26 and the post 29 to their extended and rest positions. The pin 11 may if preferred, again be resorted to in FIG. 8 to positively arrest the rotation of the push button 26 and post 29 with respect to the plate 4'.

A modification in the bayonet 18 and its funnel or scabbard is illustrated in FIGS. 9 and 10 of the drawings. In this modification the bayonet 18' has welded thereto at 35 in FIG. 10 a rack 36 with a wedge-shaped end that fits between a pair of teeth of a ratchet 37 that is a part of the funnel 17". This rack and ratchet modification of the device adjusts it for comfortable use with different faces that are round, long, fat, narrow or the like with a minimum of up or down adjustment and with an assured strap attaching dependability and a mask that maintains an unbroken air seal against the face at all times.

It is to be understood that the parts and their arrangement and operation of the quick release mechanism that is disclosed herein are submitted as a successfully operable device under all normal service conditions and that similarly functioning modifications may be made therein without departing from the spirit and scope of the present invention.

I claim:

1. A quick release mechanism comprising a push button positioned inwardly of a rigid housing means, a post having a cap portion that is structurally continuously integral with a shaft portion, expansible spring means interposed between the push button and the post cap portion, lever means interposed between the push button and the post cap portion and actuated by the push button for causing the displacement of the post with respect to the push button, and the housing means protectively substantially inclosing the mechanism.

2. The mechanism defined by the above claim 1 wherein the depression of the push button displaces the post toward the push button.

3. The mechanism defined by the above claim 1 wherein the lever means applies force to the post cap portion on the depression of the push button.

4. The mechanism defined by the above claim 1 wherein the lever means is of a splayed J-shape with one end attached to a part of the push button.

5. The mechanism defined by the above claim 1 wherein the lever means has one end disposed in an aperture in a part of the push button.

6. A quick release mechanism comprising a push button having a depending skirt and positioned within a downwardly closed housing disposed protectively outwardly of the push button, a lever fulcrum supporting plate closing the lower end of the housing and apertured centrally, a spring means supporting the push button, a post terminating upwardly in a cap portion that supports the spring at its end remote from the push button and the post terminating downwardly in a friction face that is inclined to the axis of the post and the post moving through the central aperture in the lever fulcrum supporting plate, a plurality of levers that each consists of a force end remote from a weight end and with a fulcrum part between the two ends of each lever such that force applied by the skirt portion of the push button to the force end of the lever and applied by the lever fulcrum to the lever fulcrum supporting plate that closes the lower end of the housing is transmitted by the lever weight end to the post cap and causes the post to approach the push button.

7. A quick release mechanism comprising a mechanism operating push button, a housing down into which the push button may be depressed, means securing the housing to a mounting therefor, a lever means within the housing and having an applied force end to which force is applied by the push button and having a fulcrum part and having a load end, a housing bottom lever supporting fulcrum plate with its peripheral edge attached to the edge of the housing remote from the push button

5

and the bottom plate supporting the lever means fulcrum on the depression of the push button, an inner post having a cap portion with a mating socket in the lower side thereof for engagement by the load end of the lever means on the depression of the push button in applying a lifting force to the inner post on the depression of the push button, spring means interposed between the lower side of the push button and the upper side of the inner post cap portion in yieldingly maintaining the push button and post separated from each other, and a funnel overlying the end of the post remote from the push button and adapted for receiving a bayonet apertured adjacent to its unattached end for entering the funnel and being engaged by the lower end of the post and retained thereby within the funnel.

8. The quick release mechanism for being attached to a rigid support that comprises a rigid housing for attaching the mechanism and for providing protection against the unintentional actuation of the release of the mechanism, a centrally apertured lever fulcrum supporting plate attached along its periphery to and closing the lower part of the housing, a push button hollow shell upwardly removably closing the housing and having a depending skirt portion terminating downwardly in a peripheral edge and inclosed within the housing, a post within the push button with a shaft portion that extends downwardly

6

through the central aperture in the lever fulcrum supporting plate and with an upwardly disposed cap portion, a coil spring interposed between and yieldingly maintaining separated the push button shell and the cap portion of the post, a plurality of lever arms secured at one end to the skirt of the push button hollow shell remote from a lever end bearing against the lower face of the post cap portion and each lever arm portion intermediate its ends bearing slidingly against the upper face of the lever fulcrum supporting plate, a rubber material attached to the side of the rigid support remote from the lever fulcrum supporting plate and apertured for the passage of the push button post shaft portion, and a funnel having a flange portion secured to the rigid support and firmly bonded to the rubber material and with one side adjacent the rigid support apertured for the insertion of the end of the push button post shaft portion into the aperture in the funnel.

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