

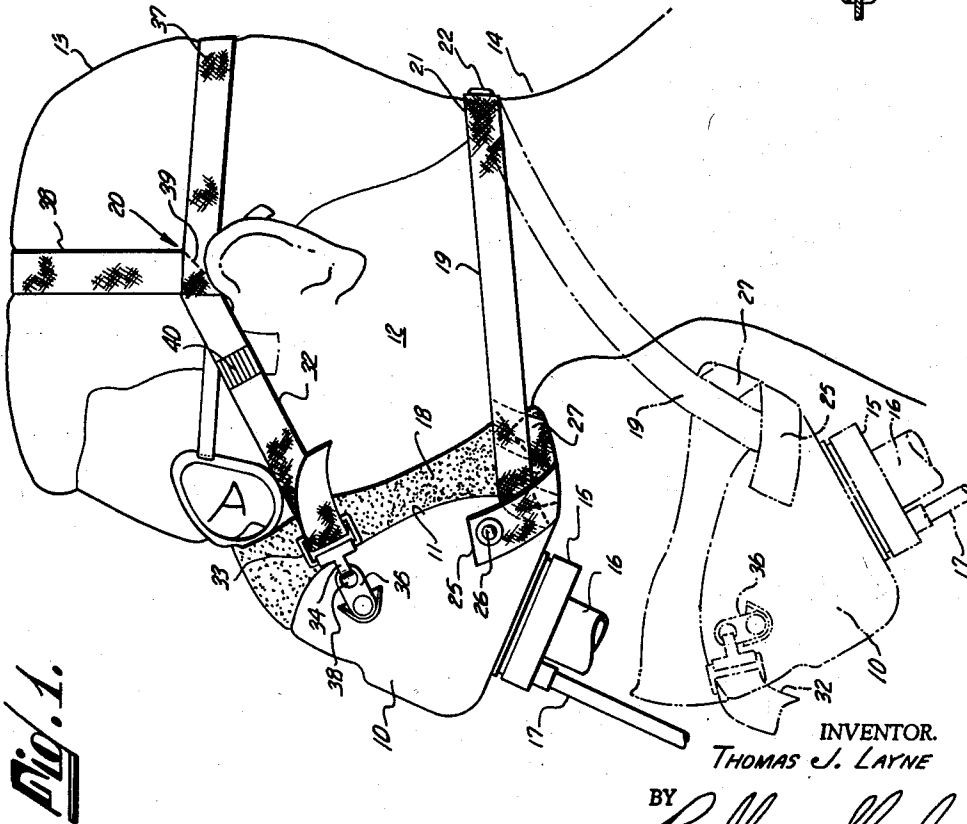
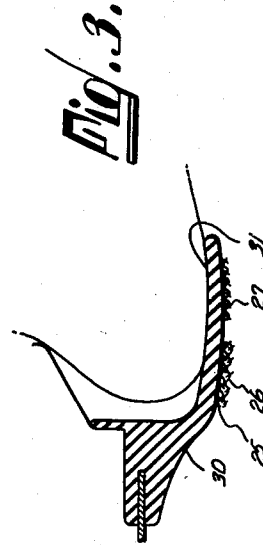
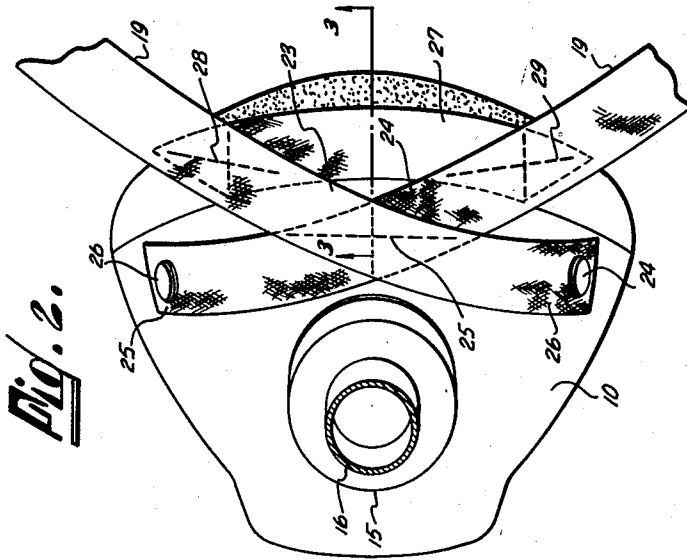
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QUICK DONNING MASK ASSEMBLY

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## QUICK DONNING MASK ASSEMBLY

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4 Claims. (Cl. 128—141)

The invention relates to a breathing and anesthesia mask and has particular reference to a type of mask which finds ready acceptance as a pilot's high altitude breathing mask to which may be attached an oxygen line together with sundry microphone leads. It is also noted that applicant's invention has particular reference to the type of mask worn by pilots in high altitude flying, but may be used also by other wearers for the same purposes, and the term "pilot" is here used as an example term throughout.

In the design and construction of breathing masks, considerable attention has been given to head harnesses for the mask which when in place endeavor with considerable success to hold the mask in proper position upon the face in all bodily attitudes, and under circumstances where the wearer, usually a pilot, finds it necessary to move about to a considerable extent at his station.

Although connections of the kind heretofore used have found considerable favor by reason of their security, the harness, as a rule, has been of such nature that it cannot be adjusted to the face on a moment's notice. Indeed, those harnesses currently available for this type of apparatus have been built with a sufficient number of adjustable straps to make the donning of the mask a somewhat time consuming operation. Occasions arise, however, where either because of an emergency, or because of the necessity of the wearer simultaneously attending to other functions, a mask needs to be applied in proper position to the face in a very minimum length of time, which may, on occasions, be no more than a fraction of a second. Occasions arise, also, where the wearer may be already wearing spectacles or goggles and the time within which the mask must be adjusted is insufficient to permit removal of the spectacles or goggles before the mask is applied.

It is therefore among the objects of the invention to provide a new and improved quick donning harness for breathing and anesthesia masks which can be virtually instantaneously applied to the wearer by use of only one hand.

Another object of the invention is to provide a new and improved quick donning harness for breathing and anesthesia masks of a character which enables the mask to be conveniently and comfortably carried close to the oro-nasal portions of the face, although not necessarily immediately in front of the face, thereby enabling the mask to be applied over the oro-nasal portion of the face with the least possible loss of time.

Another object of the invention is to provide a new and improved quick donning mask assembly which, in addition to enabling the mask to be applied to the face of the wearer in virtually a minimum amount of time, further assures a comfortable, well-sealed connection between the mask and the face which is productive of an increased degree of convenience during the entire interval while it is being worn. The mask being further such that

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it can be adjusted to draw snugly and tightly into place without uncomfortable binding.

Still further among the objects of the invention is to provide a new and improved simple and inexpensive quick donning harness for a breathing and anesthesia mask assembly which in no way interferes with hose and electric lead attachments to the mask, and which is sufficiently simple in its construction and arrangement to preclude any tangling of parts during critical stages where the instantaneous application of it might be extremely requisite.

With these and other objects in view, the invention consists in the construction, arrangement and combination of the various parts of the device whereby the objects contemplated are attained, as hereinafter set forth, pointed out in the appended claims and illustrated in the accompanying drawings.

In the drawings:

Figure 1 is a side elevational view of a wearer with the mask in place and showing in broken lines the position of the mask when released.

Figure 2 is a bottom view of the quick donning mask assembly, showing the manner of attachment of the neck straps.

Figure 3 is a fragmentary sectional view.

In an embodiment of the invention chosen for the purpose of illustration, there is shown a breathing and anesthesia mask comprising an oro-nasal shell 10, having a shape such as to provide an ample space forward of the nose and mouth of a wearer, the shell having an edge 11 around the opening with the edge somewhat contoured relative to adjacent portions of a face 12 of a wearer whose head is indicated by the reference character 13, and whose neck is indicated by the reference character 14.

At the lower portion of the oro-nasal shell 10, there is provided a fitting 15 by means of which there may be attached to the shell an oxygen hose 16 and a microphone lead 17. Surrounding the edge 11 is a resilient pad 18 which may be of sponge or foam rubber or other appropriate soft, plastic material, sufficiently firm and impervious to provide a necessary face gasket seal between the oro-nasal shell and the face of the wearer.

For attaching the shell and the gasket to the wearer, there is provided a set of harness consisting, in particular, of a pair of neck straps 19 and a head harness indicated generally by the reference character 20.

The neck straps 19 are attached together at rearward ends 21 by means of a releasable connection which may, for convenience, be a snap fastener 22. The neck straps, when worn, extend around the sides of the neck in the area of the lower jawbone, forwardly to a position of engagement with the shell.

The neck strap 19 which lies on the left side of the wearer, as viewed in Figure 1, has a forward portion 23 which passes beneath the lower portion of the oro-nasal shell 10, and connects to the shell on the opposite side by means of an attachment 24 which may be a snap fastener. Similarly the neck strap 19 which lies on the right side of the wearer has a forward portion 24 which crosses the forward portion 23, and is attached thereto by stitching 25. The forward portion 24 terminates in a forward end 25 which is attached to the shell by means of an attachment 26, which likewise may be a snap fastener. The end 25, as clearly shown in Figure 2, is on the opposite side of the shell from an end 26 of the other neck strap.

Extending between the forward portions 23 and 24, is a chin supporting strap or strap section 27. This is attached by stitching 28 to the left side neck strap and likewise stitching 29 to the right side neck strap.

The oro-nasal shell at the lower portion thereof may be constructed with a chin ledge 30, at that portion of the edge 11 which lies immediately adjacent to chin

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when in use. Rearwardly of the chin ledge, the resilient pad 18 is specially formed to provide a chin receiving hollow 31 in which the chin may rest as illustrated in Figure 3. It is significant that the chin receiving hollow be formed to comfortably enclose the chin and be so located as to be capable of quickly and effectively catching the chin as the mask is pulled upwardly when donned.

The head harness already identified by the reference character 20 comprises side straps 32, one on each side, which include a take-up adjustment 33 and a hook 34 which is adapted to engage an eye 35 of a swivel bracket 36 which is attached to the appropriate side of the shell.

Attached to the side straps is a head engaging loop 37 which is designed to extend over the ears of the wearer, and thence around the rear of the head. A head strap 38 is attached by stitching 39 to the side strap on each side at the mid-area which should be at a location which will be adjacent the top of the ear of the wearer when the apparatus is in place. Preferably, the loop 37, head strap 38, and perhaps a portion of the side strap 30 should have an elastic character, which on occasions may be achieved by making use of an elastic joint 40.

When the mask is not being worn over the face, it can be permitted to hang in the position illustrated by the broken lines in Figure 1. This may be a position immediately below the front of the face, if that is comfortable, or the position may be well toward one side or the other, nearly as far back as the shoulder. As promptly as the mask is to be donned, the wearer moves his chin into position above the chin receiving hollow 31 whether it be at the side or immediately in front. Simultaneously, and with a single motion, the wearer grasps the head harness, either by the loop, the head strap or both, and draws the mask upwardly over the forepart of the face pulling the chin receiving hollow snugly upwardly so that the appropriate portion of the resilient pad snugly engages the chin. By having the neck straps previously in proper adjustment as to length, this portion of the donning operation will readily move the lower part of the mask into precisely the right location with respect to the chin and the face. Continuing the motion, the operator then places the loop 37 over the head and toward the rear, to the solid line position illustrated in Figure 1, and at the same time, the head strap 38 falls into place. By reason of the fact that there is elasticity and resiliency in the head harness, this part of the apparatus will draw the resilient pad 18, throughout its perimeter, snugly and comfortably against the face along a line surrounding the mouth, the sides of the nose, and bridge of the nose as well as beneath the chin.

As is clearly indicated, the donning can be achieved even though the wearer be wearing spectacles or goggles, since the construction and resiliency of the head harness permits the head harness to be readily applied over such appurtenances without dislodging them and without interfering with the application of the head harness to the wearer. Obviously, further the neck straps are in such close proximity to their final position that there is no interference with their proper location during the donning operation. Furthermore, because of the locations where the head harness and neck straps are attached to the shell, the oxygen hose and microphone lead may dangle freely and without interference in a convenient position. By having the head harness hang over the forepart of the shell when not in use, the head harness hangs free of the oxygen hose and microphone lead and thereafter when the mask is to be quickly donned, there is no interference of these parts with each other.

By reason of the arrangement of the fastening means shown and described, it will be clear that the critical oxygen supplying mask may be hung conveniently and comfortably as close to the wearer's oral and nasal passages as need be and that being hung in such close proximity, the mask can be donned in a small fraction of a

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second with but one hand. The simplicity of construction and ruggedness of arrangement is such that a substantially maximum degree of security of the mask in position on the face is achieved.

While I have herein shown and described my invention in what I have conceived to be the most practical and preferred embodiment, it is recognized that departures may be made therefrom within the scope of my invention, which is not to be limited to the details disclosed herein, but is to be accorded the full scope of the claims so as to embrace any and all equivalent devices.

Having described my invention, what I claim as new and desire to secure by Letters Patent is:

1. A quick donning breathing mask assembly comprising an oro-nasal shell having a face-receiving opening at one side, a pad around the edge of said opening forming a face gasket seal, and a service attachment on the shell, a lower portion of said pad having a chin receiving hollow, a neck attachment for the mask assembly including a forward portion secured to the mask assembly beneath the chin portions and extending rearwardly of the wearer and a releasable connection between portions of said neck attachment, a head harness comprising side straps having forward ends secured to upper sides of said mask assembly, said side straps being joined at rearward ends forming a head-engaging loop, and a head strap joined at opposite ends to said side straps, said mask when hanging on a wearer by the neck attachment being adjustable to operating position on the wearer by the passing of the head harness over the head while the chin-receiving hollow is engaged under the chin.

2. A quick donning breathing mask assembly comprising an oro-nasal shell having a face-receiving opening at one side, a resilient pad around the edge of said opening forming a face gasket seal, and a service attachment at a lower portion of the shell, a lower portion of said pad having a chin receiving hollow, a neck attachment for the mask assembly including a forward portion secured to the mask assembly beneath the chin receiving hollow, side portions attached to the forward portion and extending rearwardly of the wearer, and a releasable connection between portions of said neck attachment, a head harness comprising adjustable side straps having forward ends secured to upper sides of said mask assembly, said side straps being joined at rearward ends forming a head-engaging loop, a head strap joined at opposite ends to said side straps substantially at mid-portions, said straps including elastic sections, said mask when hanging by the neck attachment being adjustable to operating position on the wearer by the passing of the head harness over the head while the chin-receiving hollow is engaged under the chin.

3. A quick donning breathing mask comprising an oro-nasal shell having a face-receiving opening at one side, a resilient pad around the edge of said opening forming a face gasket seal, and a service attachment at a lower portion of the shell for an oxygen tube and microphone leads, said shell having a chin ledge at the lower portion thereof between the attachment and an edge portion of said opening, a lower portion of said pad having a chin receiving hollow adjacent said ledge, a neck strap having forward portions forming a reinforcement beneath said hollow and having ends attached to said shell on opposite sides, a chin supporting portion of the strap attached to said neck straps rearwardly of the area of intersection and secured against said lower portion of the pad, side portions connected to the forward portions and a releasable attachment between ends of said side portions, a substantially elastic head harness comprising adjustable side straps having forward ends secured to upper sides of said shell, said side straps being joined at rearward ends forming a head-engaging loop, and a head strap joined at opposite ends to said side straps substantially at mid-portions thereof, said mask when hang-

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ing on a wearer by the neck strap being adjustable to operating position on the wearer by the passing of the head harness over the head while the chin-receiving hollow is engaged under the chin.

4. A quick donning breathing mask comprising an oronasal shell having a face-receiving opening at one side, a resilient pad around the edge of said opening forming a face gasket seal, and an attachment at a lower portion of the shell for an oxygen tube and microphone leads, said shell having a chin ledge at the lower portion thereof between the attachment and an edge portion of said opening, a lower portion of said pad having a chin receiving hollow adjacent said ledge, a neck strap having side portions crossed forming an intersection beneath said hollow and having ends attached to said shell on opposite sides, a chin supporting strap portion attached to said side portions rearwardly of the area of intersection and secured against said lower portion of the pad, and a

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releasable attachment at rearward ends of said side portions, a head harness comprising adjustable side straps having forward ends secured to upper sides of said shell, said side straps being joined at rearward ends forming a head-engaging loop, elastic sections in said side straps and a head strap including an elastic section joined at opposite ends to said side straps substantially at mid-portions adjacent the ears of a wearer when worn, said mask when hanging free by the neck strap being movable to adjusted position on the wearer by the passing of the head harness over the head while the chin-receiving hollow is engaged under the chin.

#### References Cited in the file of this patent

#### UNITED STATES PATENTS

2,353,643 Bulbulian ----- July 18, 1944