

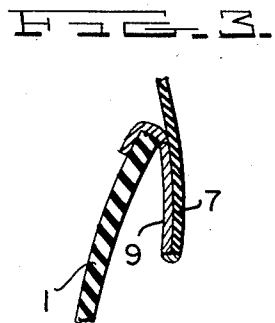
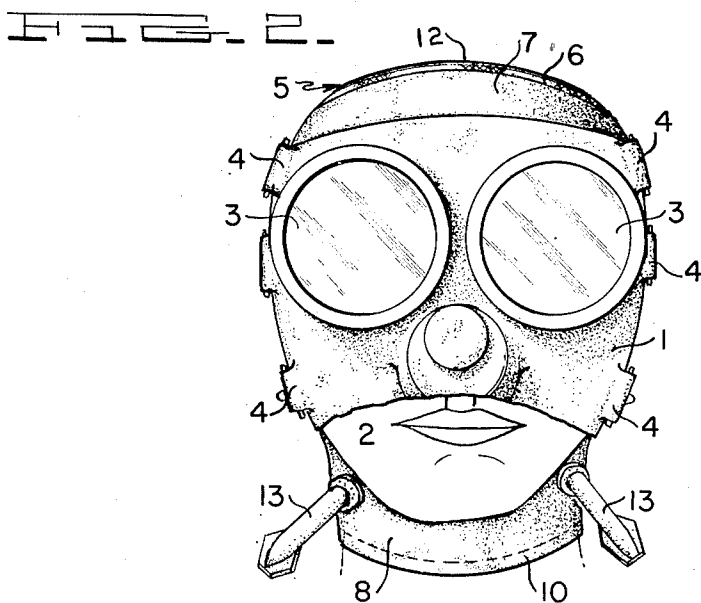
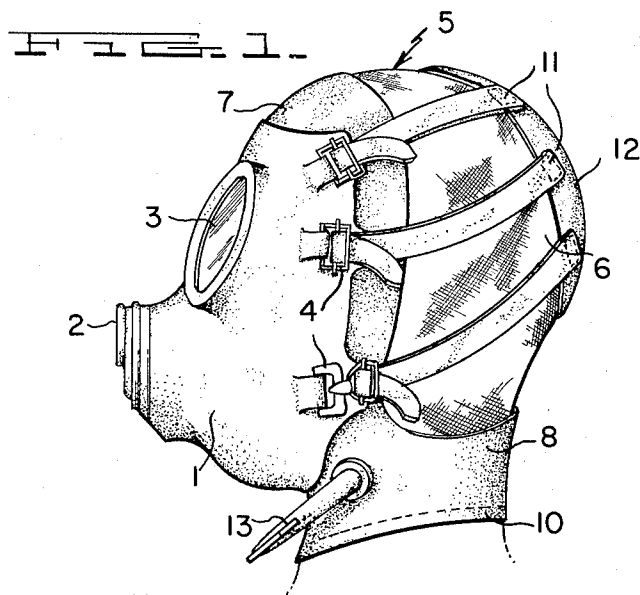
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HOOD FOR DIVERS' SUITS

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HOOD FOR DIVERS' SUITS

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7 Claims. (Cl. 128—141)

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This invention pertains to masks for underwater divers and more particularly has reference to such masks adapted for use with light waterproof fabric diving suits designed for shallow water diving.

Heretofore masks of this character have generally been applied only over the face of the diver and were usually entirely separate from the diver's suit. While such masks exclude water from the diver's face and, when connected to a compressed air supply line, permit satisfactory breathing when submerged, they do not protect the rest of the diver's head and ears from direct contact with the water, with the result that divers frequently suffer from exposure of the head to cold water, inflammation of the inner ear and injury to the ear drum from the pressure of the water thereon.

Another disadvantage of such prior art diving masks is that they afford no means whereby the diver's suit may be inflated with compressed air from the air supply line and the diver's body is therefore subjected to the full hydrostatic pressure of the surrounding water.

An object of this invention is to overcome these defects in prior art diving masks by providing a mask which will fully protect the diver's head and ears from direct contact with water.

Another object of this invention is to provide a diving mask which will afford means for supplying the diver's suit with compressed air from the supply line attached to the mask.

With these and other objects in view which may be incident to my improvements, my invention consists in the combination and arrangement of elements hereinafter described and illustrated in the accompanying drawing in which:

Fig. 1 shows a side elevational view of my improved mask,

Fig. 2 shows a front elevational view of the same, and

Figure 3 shows a fragmentary section through a portion of the mask where the face-piece is joined to the hood.

In the drawing, the reference numeral 1 denotes the face-piece of the mask which is made of relatively stiff molded rubber and to which is attached with water-tight joints an air inlet connection fitting 2, a plurality of transparent eye-pieces 3, and buckles 4 on the attachment of head straps. Fitting 2 carries inwardly of the face-piece an air tube, the free end of which is held in the driver's mouth, and the exterior of the fitting is adapted for the attachment of a compressed air supply line. These elements of

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the face-piece are of conventional design and do not enter into the novelty of my invention.

Around its entire rear periphery, face-piece 1 is attached by molded joint to an elastic hood 5 which comprises a head cap 6, with a front head-piece 7 and a neck-piece 8. The neck-piece 8 and front head-piece 7 are made of one piece of thin, highly elastic rubber which is molded to the face-piece 1 by an integral inner fold 9, as shown in Figure 3, and to the head cap 6 by a conventional overlapping seam. The head cap 6 is made of rubberized fabric in a shape to conform generally to the contour of the top and back of the head. The elasticity of the neck-piece 8 is such that it can be stretched sufficiently to pass over the head when donning the mask and cling tightly around the neck and over the upper edge 10 of the diver's suit, so as to form a water-tight connection therewith when in wearing position, as shown in Figure 1.

In donning the mask, underfold 9 on front head-piece 7 is unfolded which permits entrance of the head into the head cap 6 after passing through the neck-piece 8. After donning the mask, the face piece 1 and the hood 5 are held in adjusted position on the head by a plurality of head straps 11 which are permanently attached to a crown-piece 12 and adjustably engage the buckles 4 on the face-piece 1, as clearly shown in Figure 1. Before drawing up the straps 11 to hold the mask and hood in adjusted position, the inner fold 9 of the front head-piece 7 is tucked in under the edge of the face-piece 1, as indicated in Figure 3, and is held in this position by the pressure of the head straps.

Instead of mounting the air exhaust valves in the face-piece as is generally the case in prior art diver's masks, I mount these valves, denoted by the reference numeral 13, on either side of the neck-piece 8, so as to extend downwardly and outwardly at angles of approximately 45°, as shown in Figures 1 and 2. These valves are of the conventional rubber check valve type and their only novelty in my invention is in their location and the fact that they are calibrated to open at a carefully predetermined air pressure, so as to always maintain the pressure of the air inside the mask higher than the water pressure outside the mask by a differential of 30-40 mm. of water.

This pressure differential is sufficient to force air from the face-piece of the mask through the neck-piece and into the suit of the diver and thus maintain an air pressure inside the hood and suit greater than the outside water pressure. This

positive air pressure not only prevents water seeping through the joint between the neck-piece 8 and suit 10, but serves also to inflate the hood and suit and thus interpose a cushion of air between the surface of the diver's head and body and the inside of the hood and suit. This air cushion serves to prevent the hood and suit from chafing the skin of the diver and also to reduce the heat loss from the diver's body into the surrounding colder water. The hood 5 also protects the diver's ears from the entrance of water therein.

In order to insure that air does not escape through the joint between the neck-piece 8 and the suit 10, the elastic pressure of the neck-piece is made such as to maintain a differential pressure of from 70-80 mm. of water.

The operation of my improved diving mask is as follows. With the mask, hood and suit adjusted in position shown in Figures 1 and 2, and a compressed air line attached to the fitting 2 of the face-piece 1, the diver slowly submerges. As his depth increases he permits some of the compressed air he is breathing to escape from his mouth-piece into the face-piece. This air passes into the hood and suit and at once neutralizes the external pressure of the water, not only around the diver's head and ears, but also around his body. The tension of the head-straps 11 is sufficient to prevent over-inflation of the hood 5 and consequent excess stress on the thin, elastic neck-piece 8 and the front head-piece 7. The excess pressure is also regulated by the exhaust valves 13 which automatically open when the air pressure differential exceeds 30-40 mm. of water.

When the diver's depth of submersion is decreasing, the differential air pressure in the mask and hood is automatically prevented from increasing by the discharge of air through the exhaust valves 13, which however always maintain a differential pressure of from 30-40 mm. of water at the level of these valves, while the pressure differential in the hood is always slightly higher by reason of the difference in hydrostatic pressure between the level of the valves 13 and the top of hood 5.

If any water should occasionally seep into the mask, it will collect by gravity in the lower part of the face-piece 1 and the cap 6, from which it can be readily discharged into the neck-piece 8 and blown out through the exhaust valves 13 by the diver holding his head up, raising by hand one of the lower head straps 11, and permitting some compressed air from his mouth piece to escape into the mask and cap and thus expel the water collected in the neck-piece 8. This is an additional advantage in the novel location of my exhaust valves in the neck-piece instead of the face-piece of the mask.

While I have shown and described the preferred embodiment of my invention, I desire it to be understood that I do not limit myself to the constructional details disclosed by way of illustration, as these may be changed and modified by those skilled in the arts without departing from the spirit of my invention or exceeding the scope of the appended claims.

I claim:

1. A diver's mask comprising a unitary face-piece and hood which covers the entire head and neck of the diver and maintains an elastic, water-tight seal around the neck, means to receive compressed air from a supply line connected to the face-piece and means to maintain such air within the mask at a higher, substantially constant, differential pressure with respect to the hydrostatic pressure on the outside of the mask, and one or more air exhaust valves which are adapted to open at said differential pressure.

2. A diver's mask according to claim 1, wherein the exhaust valves are located near the lower edge of the hood.

3. A diver's mask according to claim 1, in which the exhaust valves are directly downwardly and outwardly at angles of approximately 45° with respect to the hood.

4. A diver's mask comprising a rubber face-piece and elastic hood which covers the entire head and neck of the diver and maintains an elastic, water-tight seal around the neck, said face-piece being adapted to receive compressed air from a supply line connected thereto and said hood being provided with air escape valves adapted to maintain air within the mask at a higher, substantially constant, differential pressure with respect to the hydrostatic pressure on the outside of the mask.

5. A diver's mask comprising a rubber face-piece and elastic hood which covers the entire head and neck of the diver and maintains an elastic, water-tight seal around the neck, said hood being permanently attached to the face-piece by an elastic inner fold between the hood and face-piece.

6. A diver's mask comprising a rubber face-piece, an elastic hood which covers the entire head and neck of the diver and maintains an elastic, water-tight seal around the neck, and a flexible head cap adapted to fit snugly over and protect said hood from external damage and also limit the inflation of said hood when subjected to internal air pressure.

7. A diver's mask comprising a unitary rubber face-piece, a hood which covers the entire head and neck of the diver, said hood including an elastic neck portion which is adapted to maintain a water-tight seal with the upper edge of an inflatable diving suit worn by the diver, and a crown-piece having a plurality of straps adapted to engage buckles attached to the face-piece and hold said face-piece in adjustable wearing position.

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