April 20, 1943. C. H. WILEN 2,317,237

SWIMMER'S MASK

Filed Nov. 16, 1940 2 Sheets-Sheet 1

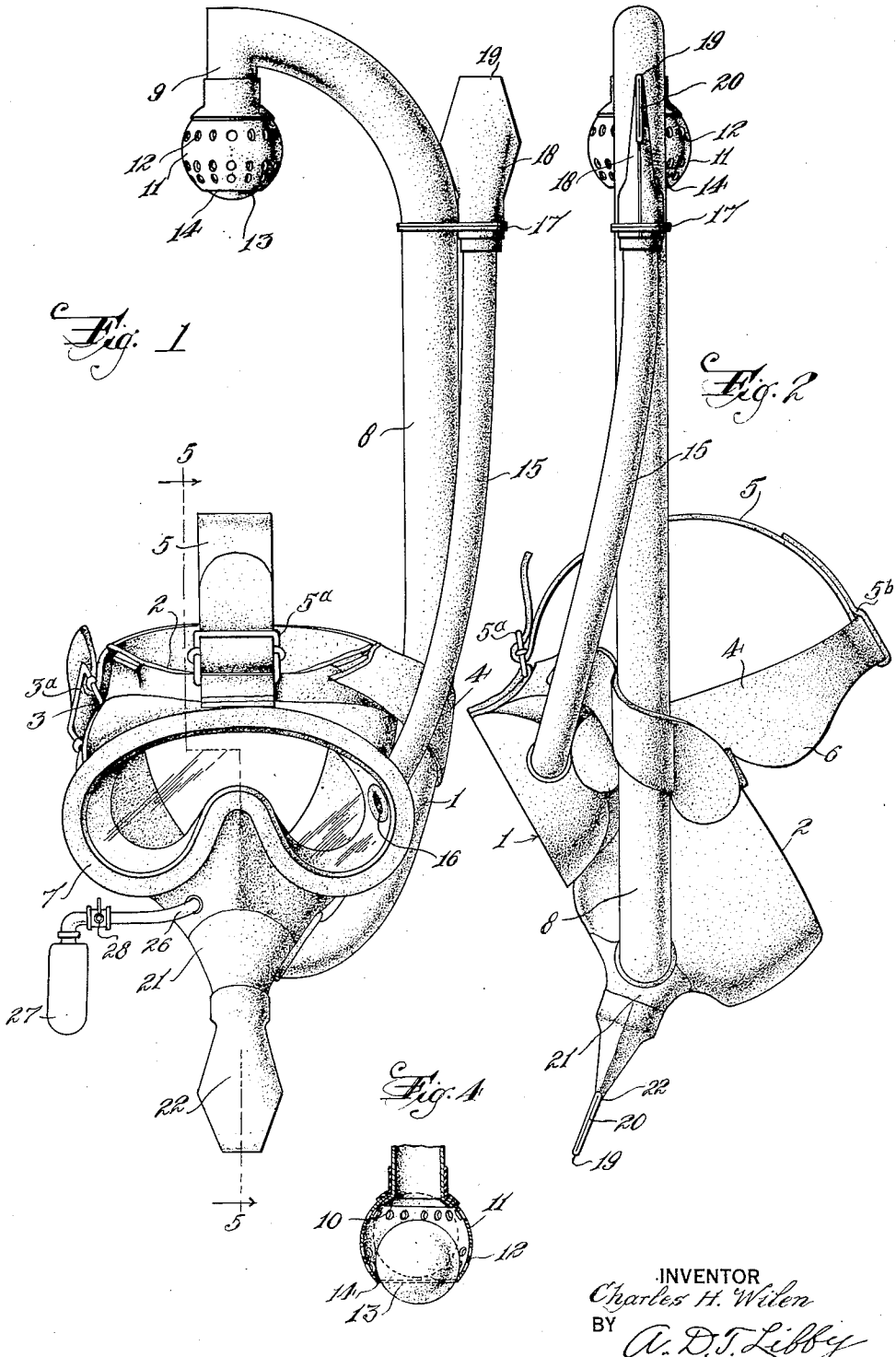

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Fig. 5

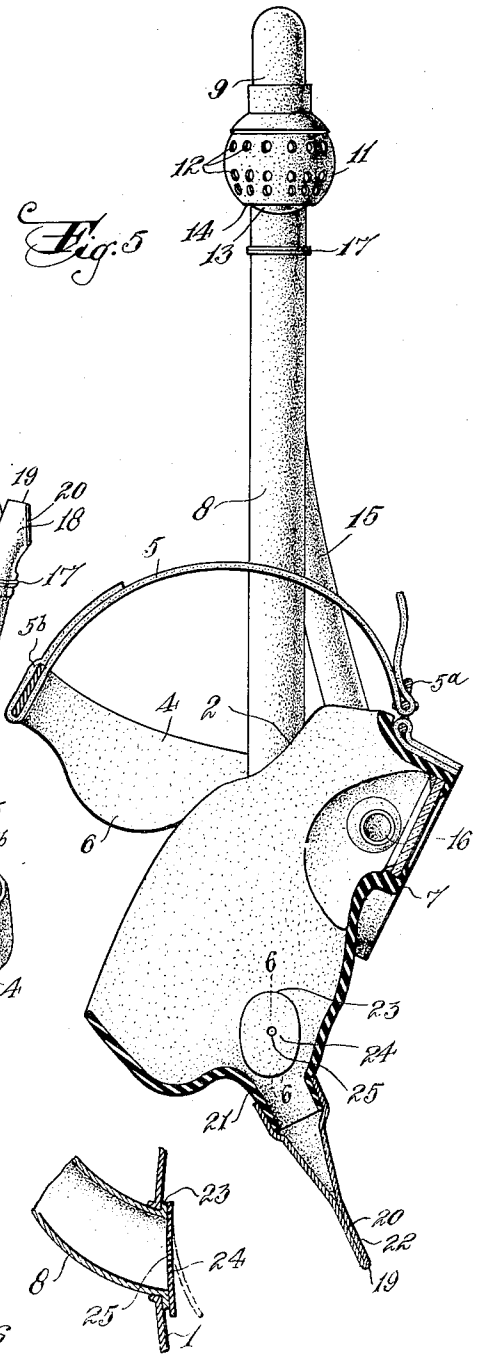

Fig. 3

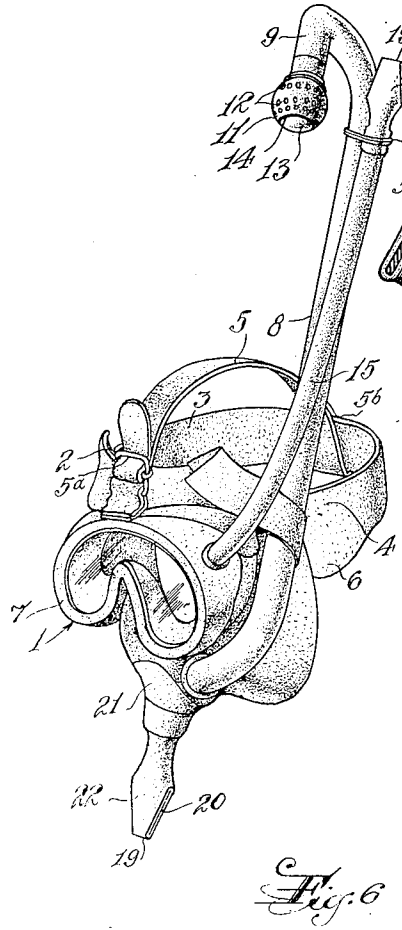

Fig. 6

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SWIMMER'S MASK

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Application November 16, 1940, Serial No. 365,915

6 Claims. (Cl. 9—20)

This invention relates to a mask especially adapted for use by a swimmer whereby he may breathe while having at least his face below the surface of the water.

The apparatus covered by the present application is in certain respects a combination of certain features found in my joint patent with Alexandre Kramarenko, No. 2,182,104 issued December 5, 1939; and also certain features included in our joint application Serial No. 326,684, filed March 29, 1940.

The above-mentioned patent illustrates a type of goggle which has been found to be very satisfactory in use, while the subject matter of the above-identified application relates to a breathing apparatus for use by a swimmer and especially for under-water shooting of fish. The breathing apparatus shown in said application requires that the mouthpiece, comprising part of the structure, must be held in the mouth of the swimmer, which action I have found to be very tiresome and objectionable. A further objection is that of forcing the swimmer to always breathe through his mouth and at the same time not always getting fresh air, as will be later pointed out.

It is therefore the principal object of my present invention to provide a combination apparatus which will materially simplify the general style and cost of construction. The apparatus to be described herein has the advantage that it provides a possibility of breathing normally either through the nose or mouth, or both at the same time; it also eliminates the tiresome effect of gripping any device in the swimmer's jaws.

A further advantage is that an arrangement of tubes and valves is provided which will allow the swimmer to take in fresh air through one valve and tube, while the vitiated air is expelled through another tube and valve.

A further advantage is the possibility of floating indefinitely upon the surface of the water due to the increased volume of air contained within the mask. This additional amount of air carried within the chamber formed between the face of the user and the mask lowers the specific gravity of the swimmer, and the additional air held within the mask is sufficient to keep him afloat, provided he has an inexhaustible supply of air. In other words, so long as the air-tube or pipe leading from the mask is above the water, it is impossible for the swimmer to sink. In this respect the mask is especially useful to beginners who are learning to swim. It not only allows them to keep their eyes open and obviates the annoyance of water getting into their eyes, but keeps them from sinking. Drowning is not due to the body sinking, but to the lungs filling with water instead of air. Once the lungs are filled and the air is expelled, the body loses volume in comparison to its weight and sinks.

Since the mask to be described has an air intake positioned above the head of the swimmer, a supply of air is constantly assured and involuntary sinking becomes impossible. As a matter of fact, to get the mask entirely below the surface of the water, it is necessary to perform what is known as a surface dive—a very difficult feat for expert swimmers and almost an impossibility for a beginner. However, a good swimmer using the mask can dive with it to a considerable depth from the surface of the water. When such a dive is made, the valves to the mask close and remain shut until the swimmer regains the surface of the water; hence the mask is especially useful in shooting fish under the water as the swimmer, when he does have to come up for air, need not bring his face above the surface of the water and thereby interrupt his line of vision with the fish, assuming that he is in sight of one at the time he has to come up for air.

The advantages above enumerated will more fully appear from a reading of the following specification in which:

Figure 1 is a front view of the combination apparatus.

Figure 2 is a view of Figure 1, looking from right to left.

Figure 3 is a perspective view looking from the side of the apparatus as it is applied to the head of the user.

Figure 4 is a part-sectional and part-elevational view of the valve shown at the free end of the main air tube indicated at the top part of Figure 1.

Figure 5 is a sectional view about on the line 5—5 of Figure 1.

Figure 6 is a sectional view on the line 6—6 of Figure 5.

In the various views, wherein like numbers refer to corresponding parts, 1 is a mask made of soft rubber or any other equivalent material, the thin edges 2 of which adhere closely to the contour of the user's face. The mask is held in this position by suitable straps 3, 4 and 5. The side straps 3 and 4, which may be of one piece as shown, preferably have enlargements 6 to cover the ears of the user. The strap 5 is looped

at 5b around the strap 3, 4 at one end, and when the mask is in place and the straps properly adjusted by suitable buckles 3a and 5a for the particular user, the face is hermetically sealed within the mask due to the resilience of the edges of the mask, the tension of the straps and the pressure of the water on the thin edges of the mask which engage the face.

The front of the mask has a goggle portion 7, a single piece of glass being preferably used, all as set forth in my joint patent heretofore referred to. The goggles serve to enclose the mask over the eyes and help to form an interior chamber over the nose and mouth of the user. Extending from this chamber are a pair of tubes. The tube 8, which I prefer to call the air tube, is made of any satisfactory light material such as aluminum. The upper or free end of the tube 8 terminates in a downwardly extending portion 9 having a flanged seat 10. Fitting over the flange 10 is a cap or container 11 preferably of soft rubber vulcanized to a certain degree of hardness and having holes 12 therein to allow water to circulate freely within the cap 11.

Positioned within the cap 11 is a light ball-valve 13 which may be made of cork, sponge rubber or an inflated soft rubber ball. The cap 11 has an opening 14 therein opposite the valve seat 10 to allow water to move freely into and out of the cap, but this opening 14 is smaller than the diameter of the ball 13. The construction of this valve is the same as in the joint application heretofore referred to.

A second tube 15 having an opening 16 into the interior of the mask chamber extends upwardly in the direction of the tube 8 and is attached to the tube 8 at its upper end in any satisfactory manner as by a suitable clamp 17. The tube 15 may be made of any satisfactory material such as soft rubber. The upper end of the tube 15 is provided with a valve 18 of soft rubber or equivalent material and terminates in two relatively flat portions having their ends vulcanized together at 19 so as to leave oppositely disposed openings 20. The tube 15 may be termed an expiration tube as the valve 18 only opens when pressure is applied from the interior of the mask.

Extending from the lower portion of the mask is a projection 21 which is also provided with a valve 22 similar to the valve 18. Where the tube 8 enters the mask, the peripheral edge 23 is spun over to form a seat for a flap-type valve 24 which is made of soft rubber or other suitable material. Only the upper part of the valve 24 is fastened to the flange 23 of the tube 8; also, the valve 24 is provided with a small hole 25 whose purpose will be presently described.

In operation, when a swimmer is equipped with the mask, and assuming that he is in the water with the goggle portion of the mask just below the water line, air is taken in through the tube 8 by way of the ball-valve which, under the above condition, is in open position as shown in Figure 4; and through the valve 24 which will open on the inspiration impulse, but the valve 18 in the tube 15 will close. As the swimmer expels the air from his lungs, the valve 24 closes. However, a very small amount of air may pass through the hole 25 in the valve 24, but the majority is expelled through the pipe 15 and the valve 18. This will insure the swimmer getting a supply of fresh air.

I have found, from tests I have made on the apparatus herein shown and described, by using the valve 24 without any hole therein, that under certain conditions a vacuum may be set up in the 8 and close the valve 13 so that the swimmer will get no air. If the swimmer—as I did one day in testing the apparatus—inadvertently takes an inspiration stroke while under water, the air is drawn out of the tube 8 and forms a vacuum in the tube so that in coming to the surface of the water the valve 13 will not open, and the swimmer, as was the case with me, is forced immediately to remove the mask in order to get air. A similar condition may be brought about even with the swimmer on top of the water, if he happens to take an inspiration stroke at the time a passing wave closes the ball valve 13. To overcome this difficulty, I have provided an opening 25 in the valve 24 which will pass just enough air to prevent a vacuum being formed in the tube 8 and will allow the ball 13 to function as intended.

Saliva or any water which may accidentally get into the mask can be emptied by the swimmer through the valve 22. This is done by emerging the head from the water to relieve the water pressure from the flaps of the valve 22 so that the gravity will allow the water to run out of the mask through this valve; or, without fully emerging the head from the water, the swimmer may reach up with one hand and close the valve 18 and then blow violently. This additional pressure from the interior of the mask will expel the water through the valve 22.

In some cases it may be desirable to provide the apparatus with an auxiliary air intake 26. This intake or tube runs to a container 27 of compressed air carried by the swimmer, so that he can regulate the amount of auxiliary air which he takes into the mask by a valve 28. This auxiliary supply of air enables him to remain under water at considerable depth much longer, as the conditions may warrant. Since the opening 16 into the tube 15 is of considerable size as compared with the exit opening 25 in the valve 24, and in addition, because of the presence of the relief valve 22, this auxiliary air passed into the mask will not open the valve 13. While I have mentioned the fact that the tube 8 and the ball container 12 are made of separate pieces, they may be all made in one piece of suitable plastic material.

From what has been said, it will be readily perceived that I have provided a combination apparatus having numerous advantages over the individual pieces of apparatus shown and described in the patent and application heretofore identified.

What I claim is:

1. A combination seeing and breathing apparatus for a swimmer including a mask adapted to fit tightly around the face of the swimmer, with means for holding it in such position, the mask having a goggles portion located in front of the eyes of the swimmer and forming part of an air chamber, a pair of independently operating tubes extending from spaced openings leading from the interior chamber of the mask and terminating in free ends at a location above and beyond the back of the head of the swimmer when the swimmer's head is partly or just going fully under the water, one of said tubes acting primarily as an air tube and having a valve at its free end normally open in the air but adapted to be closed by water pressure, while the other tube acts as an expiration tube, the free end of which has a one-way outwardly operating valve

which is closed except when pressure is applied from within the interior of the mask as by an expiration on the part of the swimmer.

2. A seeing and breathing apparatus for a swimmer as defined in claim 1, further characterized in that the valve at the free end of the air tube is of the float ball type responsive to contact with water to close the tube entrance and exclude water from the mask chamber when the swimmer dives under the water, while the one-way expiration valve on the expiration tube is adapted to be closed by the water and also by the inspiration of the swimmer, but will open on an expiration impulse.

3. A seeing and breathing apparatus for a swimmer as defined in claim 1, further characterized in that the air tube has a valve at its opening into the mask chamber which is adapted to close on an expiration impulse.

4. A seeing and breathing apparatus for a swimmer as defined in claim 1, further characterized in that the air tube has a valve at its opening into the mask chamber which is adapted to close on an expiration impulse, and further characterized in that this valve for said opening into the mask is of the flexible type and has a small hole therein for the purpose described.

5. A seeing and breathing apparatus for a swimmer as defined in claim 1, further characterized in that the valve at the free end of the air tube is of the float ball type, while the valve at the free end of the expiration tube is of the double-flap type, and further characterized in that the air tube has a single flap type of valve over its opening into the mask chamber, this last-mentioned valve having a small hole therein as and for the purpose described.

6. An apparatus for a swimmer comprising a mask adapted to fit tightly over the face of the swimmer and forming a frontal chamber thereover, with means for holding the mask securely to the head of the swimmer, the mask having goggles and a pair of tubes extending from the chamber and terminating in free ends in a manner and at a distance so when the swimmer has his head in some stage of being submerged under the water line, the free ends of said tubes will be in the air, each tube having a valve at its free end, the valve on one tube being normally closed, while the other tube has its free end valve normally open when out of water and has another valve within the mask chamber, the latter valve having a small opening therein, and a projection from the lower part of the mask having an exit valve.

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