G. E. & G. A. FELL.

SUBMARINE LIFE PRESERVER.

APPLICATION FILED NOV. 30, 1915.

1,197,115.

Patented Sept. 5, 1916.

2 SHEETS—SHEET 1.

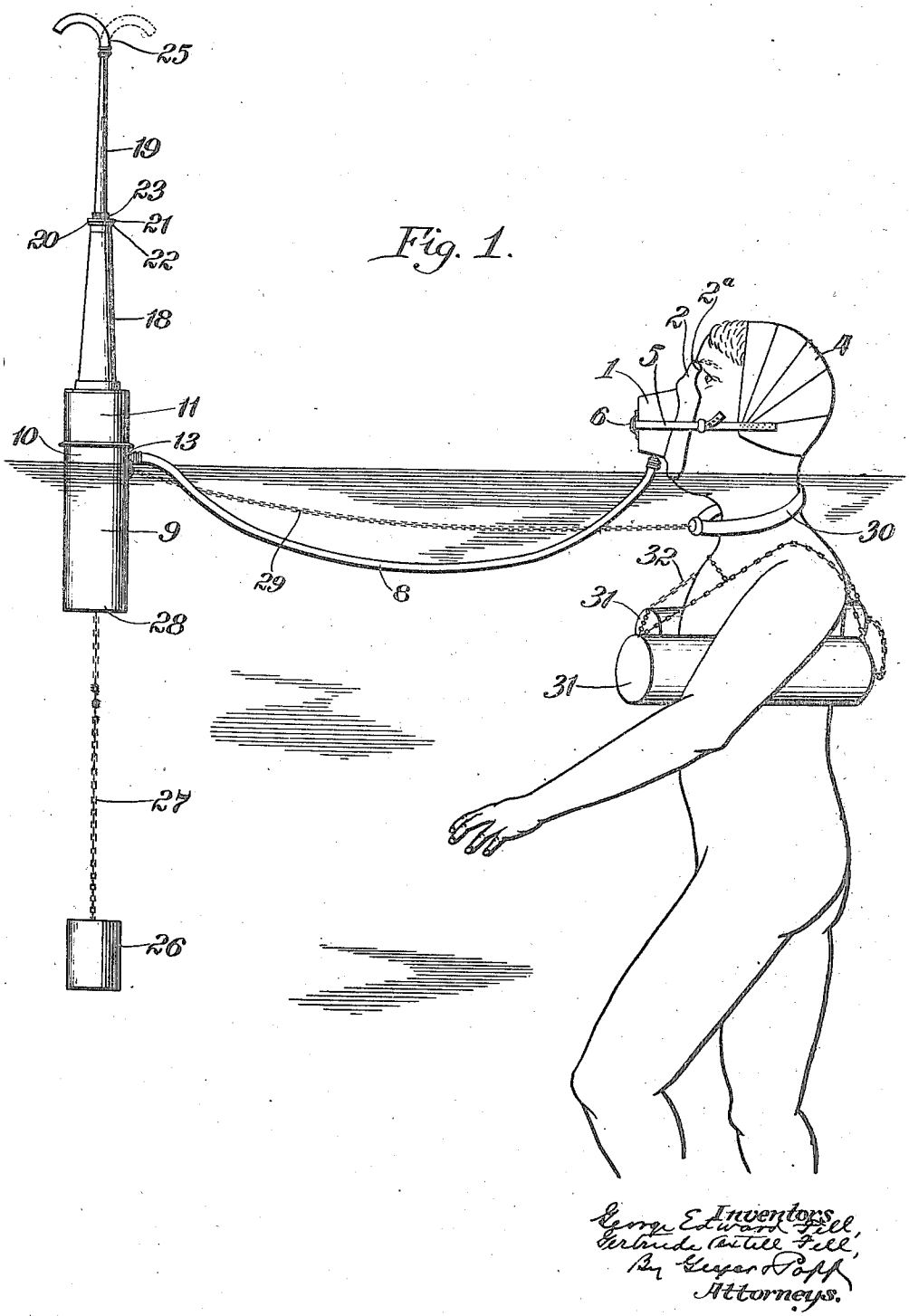


Fig. 1.

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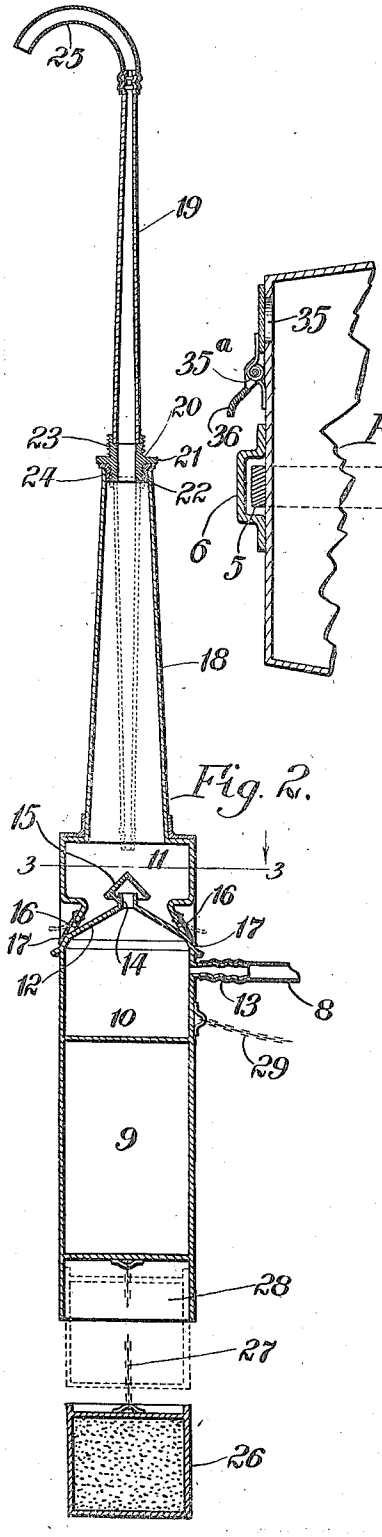


Fig. 2.

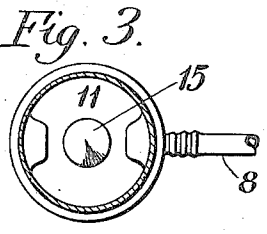


Fig. 3.

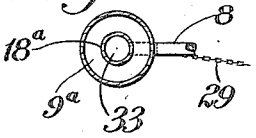


Fig. 6.

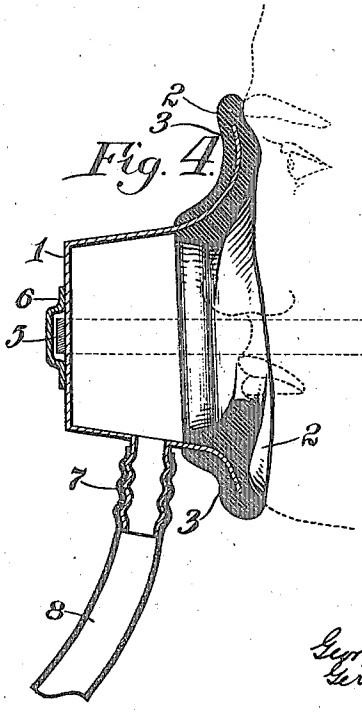


Fig. 4.

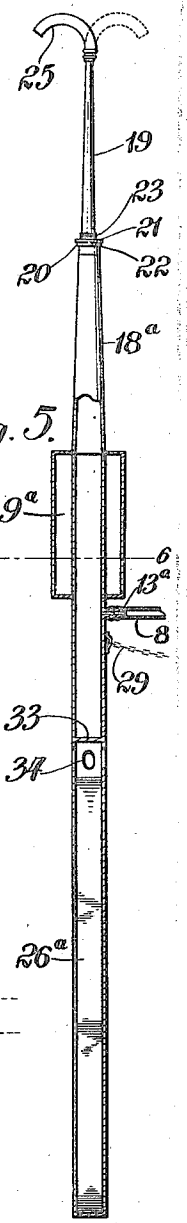


Fig. 5.

Fig. 7.

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UNITED STATES PATENT OFFICE.

GEORGE EDWARD FELL AND GERTRUDE AXTELL FELL, OF BUFFALO, NEW YORK; SAID GEORGE EDWARD FELL ASSIGNOR TO SAID GERTRUDE AXTELL FELL.

SUBMARINE LIFE-PRESERVER.

1,197,115. Specification of Letters Patent. Patented Sept. 5, 1916.

Application filed November 30, 1915. Serial No. 64,241.

To all whom it may concern:

Be it known that we, GEORGE EDWARD FELL and GERTRUDE AXTELL FELL, citizens of the United States, residing at Buffalo, in the county of Erie and State of New York, have invented new and useful Improvements in Submarine Life-Preservers, of which the following is a specification.

This invention relates to a submarine life-preserver designed more particularly for the use of passangers and troops on ships and transports, although the same may also be used at bathing resorts and other places. Its object is the production of a safe, reliable and convenient device of this character which can be manufactured at comparatively small cost.

To that end the apparatus consists essentially of a water-tight mask adapted to cover the nose and mouth of the user and a floating air-supply device or chamber connected with said mask by an air tube but free to rise and fall independently of the user, so that its air-inlet always remains above the surface of the water in order to furnish an adequate and uninterrupted supply of respiratory air to the user, even though he be submerged at times.

In the accompanying drawings: Figure 1 is a side elevation of the apparatus showing the same in use. Fig. 2 is a longitudinal section, on an enlarged scale, of the air-supply device. Fig. 3 is a transverse section on line 3—3, Fig. 2. Fig. 4 is an enlarged vertical section of the face-mask. Fig. 5 is a sectional elevation of a modified construction of the air supply device. Fig. 6 is a transverse section on line 6—6, Fig. 5. Fig. 7 is an enlarged vertical section showing a modified construction of the face-mask.

Similar characters of reference indicate corresponding parts throughout the several views.

1 indicates the face-mask which is approximately cup-shaped and constructed of any suitable material, such as galvanized iron, tin, aluminum, or hard rubber. The mask is closed at its front end and on all sides and its face-edge or open end is covered with a suitable sealing material 2 which will readily mold or conform to the contour of the wearer's face, by its warmth or by pressure, or both, so as to form a practically water-tight joint between the mask and the face when secured in place. Wax or any other suitable plastic material or composition may be used for this purpose. In order to form an extensive bearing or attaching surface for the sealing rim or material 2, the mask may be provided at its face-edge with an outwardly-extending flange 3. The wax-covered edge of the mask preferably extends upwardly to about the bridge of the nose and the portions of this upward extension on opposite sides of the nose are notched or recessed, as shown at 2^a to give the wearer an unobstructed vision. The mask may be fastened to the head by any suitable means. The preferred devices shown in the drawings consist of a flexible cap 4 of the proper dimensions to cover the ears as well as the top and back of the head, and a strap 5 fastened to the sides of the cap and passing around the front and sides of the mask on which it is confined by a loop 6. The mask is comparatively deep to form an air chamber which receives the nose and mouth of the wearer, and it is provided with a hollow supply-nipple 7 to which is attached one end of a flexible air-tube or conduit 8 of rubber or other suitable material. The other end of this tube is connected with the air-supply device which is constructed as follows:

9 indicates a float or air-tight float-chamber which may be cylindrical or of other desired form. Carried by this float and preferably surmounting it is an air-supply chamber which may consist of a single compartment but which in the construction shown in the drawings comprises two compartments, viz: a lower air-compartment 10 and an upper compartment or bailing chamber 11 separated from the lower one by a diaphragm 12 preferably of conical form, as shown in Fig. 2. The lower compartment 10 is provided at or near its top with a hollow nipple 13 to which the air tube 8 is attached. These compartments communicate with each other through an air passage or tube 14 arranged in the high central portion of the diaphragm 12. To the upper end of this tube is applied a conical cap 15 which prevents any water which may enter the bailing compartment from falling through said tube into the air supply compartment 10. The base of this cap is separated from the tube 14 by an intervening space through which the air is free

to pass from the upper to the lower compartment, and vice versa. In order to permit the escape of water from the upper compartment 11, the same is provided in its side at or near its bottom with one or more discharge openings 16 to which are applied automatic or check valves 17 of any suitable construction which permit the free discharge of the water from the compartment while preventing the entrance of water through said openings. In the construction shown in the drawings, the portions of the compartment-walls containing the discharge openings are depressed or recessed and flexible check valves are applied to the outer sides of the openings, the valves being free at their lower edges and fastened to the walls of said compartment at their upper edges.

Leading to and rising from the bailing compartment 11 is an upright air-pipe or conduit 18 which extends a suitable distance above said compartment, so as not to be submerged in the upright position of the said tube and the float. To render the apparatus more compact for transportation and storage, this air pipe may be provided with a detachable extension 19 which, when the apparatus is not in use, may be inverted or reversed and housed within the pipe 18, as shown by dotted lines in Fig. 2. For this purpose, the extension may be provided at its lower end with a double screw nipple 20 having a stop-flange 21 adapted to bear against an internally threaded bushing 22 in the pipe 18 and externally screw threaded portions 23 and 24 above and below said flange, either of which may be screwed into the bushing 22 to secure the extension in its normal or its telescoped position. As shown in the drawings, the extension may be provided at its upper end with a downwardly-curved or laterally-extending tip or movable inlet portion 25 of rubber or other suitable material to prevent ready access of water into the extension.

In order to retain the float in a substantially upright position and prevent submersion of the air-inlet pipe and its extension 19, the float is provided with a weight or righting device 26 of any suitable construction. That shown in the drawings consists of a can or receptacle filled with sand, lead or other heavy material and connected with the bottom of the float by a chain or other flexible connection 27. To facilitate carriage and compact storage of the apparatus, the float is preferably provided in its lower end with a socket or housing 28 adapted to receive the chain 27 and the upper portion of the weight 26, as shown by dotted lines in Fig. 2. The float is of sufficient capacity to prevent its sinking in case the air supply and bailing chambers 10, 11 and the air inlet pipe 18 and its extension 19 should become filled with water, while the weight 26 is of the proper heft to keep the float upright, with the bailing chamber, said air inlet pipe and extension well out of the water and said pipe above the wash of the waves in a sea way.

For the purpose of relieving the air tube 8 from undue strains and preventing its separation from the face-mask 1 or the air-supply chamber 10, a safety-connection, preferably consisting of a light but strong chain 29 may be employed. This chain is somewhat shorter than the tube 8 and may be fastened at one end to the float 9 or the side of the air chamber 10 and attached at its opposite end to the body of the user, for example by means of a neck-band or collar 30.

In addition to this improved respiratory apparatus, it is advisable to use a life preserver of any ordinary construction, that shown in the drawings comprising a pair of air-tight cylinders 31 having attaching chains 32 which pass over the shoulders of the wearer.

The air supply element of the apparatus may be of uniform size and construction for different persons, but each person or passenger requires an individual face-mask shaped to the contour of his face by means of the plastic sealing rim 2, hereinbefore described, in order that the mask may be as nearly water tight as possible.

In the normal unused condition of the apparatus, the face-mask is connected with the air-supply chamber 10 ready for prompt service, and the weight 26 is confined in the socket of the float 9. When the apparatus is to be used, this weight is withdrawn from the float and the user fastens the face-mask in place, as shown in Figs. 1 and 4, applies the safety collar 30, and enters the water with the apparatus. The weight rights the float and its superposed parts, holding the air supply pipe 18 with its extension 19 in a substantially upright position and above the surface of the water, thus insuring the free entrance of the air into the extension and the pipe, the air passing thence through the bailing chamber 11 and passage 14 into the air supply chamber 10 and thence through the air-tube 8 into the chambered mask, furnishing an ample supply of pure air to the user, even though he may be submerged from time to time by a heavy sea. The inspired air passes out through the same course or series of chambers and conduits. At each inspiration, fresh air is taken in, so that the air respired is always fresh and fit for respiratory purposes. By using an ordinary life preserver in connection with this respiratory apparatus, the body is supported so that the face-mask under ordinary conditions is out of the water, as shown in Fig. 1.

Although the air supply chamber and the float are connected with the face-mask by the flexible air-tube 8, they are not fastened to the body of the user like an ordinary life

preserver. The air supply device is therefore free to float at a distance from him and rise and fall with the waves independently of him so that if he should be submerged temporarily, the air-supply device will not be drawn down with him far enough to submerge its air inlet pipe and extension. Should any water enter said pipe, it will drop into the bailing chamber 11 and be shed away from the air passage 14 by the cap 15, being discharged through the outlet openings 16, as already described.

Should a small quantity of water leak into the mask-chamber, the same can be emptied into the lower portion of the air supply compartment 10 by simply depressing the float sufficiently to bring the air nozzle 13 below the level of the nozzle 7 of the mask, when any such water will gravitate into said compartment. Should this compartment 10 become filled by such leakage into the mask, it can be readily emptied by tilting or inverting it to discharge the water into the bailing chamber 11, whence it will escape through the openings 16 or the air-pipe 18 and its extension. The extension 19 of the air inlet tube is not indispensable and may be omitted, if desired. It will be observed that air will be supplied to the inlet pipe 18 whether this extension be in its normal position, as shown by full lines in Figs. 1 and 2, or inserted into the pipe, as shown by dotted lines in Fig. 2.

While the bailing chamber 11 is desirable, it is not an absolute necessity and may be omitted without departing from our invention as defined in some of the appended claims.

As shown, the float with the air supply chamber 10 and the bailing chamber 11 is comparatively narrow or of small diameter, in order to offer a minimum resistance to the seas in rough weather and prevent it from being tossed about by them; thus avoiding the strain on the air conduit and the mask which occurs when the float is relatively large or wide and presents an extensive surface to the waves. At the same time, the float is comparatively long or deep, so as to have the necessary buoyancy to prevent its sinking in case the chambers 10 and 11 should become filled with water. The loose weight, by hanging some distance below the float, steadies it and retards drifting thereof under the action of the seas.

In the modified construction of the apparatus shown in Fig. 5, the air-supply tube 18^a passes centrally through the air-tight float chamber 9^a and extends some distance below the float to form a righting chamber or weight 26^a which forms the equivalent of the weight 26 of the first-described apparatus. This righting chamber is separated from the upper air-supply chamber of the tube by an imperforate partition 33. The portion of the tube below this partition is provided with openings 34 for the entrance of water by which that portion of the tube is weighted or ballasted. If desired, however, the lower chamber of the tube may be filled with sand, lead or other weighting material. The portion of the tube above the partition 33 is provided adjacent to the float 9^a with a hollow nozzle 13^a for the attachment of the air-tube 8 leading to the face-mask. The operation of this modified form of the invention is substantially the same as that of the apparatus first described.

If desired, the face-mask may be provided with an auxiliary valve-controlled air passage 35 independent of the air tube 8, through which the wearer may breathe directly in calm weather, instead of through the floating air supply device. Such a construction is shown in Fig. 7. For this purpose, the valve is normally closed by a suitable spring 35^a and provided on the exterior of the mask with an arm or lever 36 by which the wearer may open it.

We claim as our invention:

1. A life-saving apparatus, comprising a face-mask, a float containing an air supply-chamber and an air inlet arranged to extend above the surface of the water, a flexible air conduit connecting said mask with said air chamber, a righting weight, and flexible means connecting the weight with the bottom of the float.

2. A life-saving apparatus, comprising a float provided in its lower end with a socket, a righting weight suspended from said float and adapted to enter said socket, an air-supply chamber carried by said float and having an inlet arranged to extend above the surface of the water, and an air conduit connecting the face-mask with said air-supply chamber.

3. A life-saving apparatus, comprising a floating air supply chamber having an air-inlet pipe arranged to extend above the surface of the water, said pipe having a detachable extension constructed to telescope into it, a face-mask, and an air conduit connecting the face-mask with said air-supply chamber.

4. A life-saving apparatus, comprising a face-mask, a floating air-supply device having an inlet arranged to extend above the surface of the water, a flexible air conduit connecting the mask with said air-supply device, and a safety-connection shorter than said air conduit, attached at one end to the air-supply device and provided at its other end with means adapted to engage the user's body.

5. In a life-preserving apparatus, a face-mask having a connection for an air supply conduit, and a sealing rim of plastic material.

6. In a life-preserving apparatus, a face-

mask having a connection for an air supply conduit, an out-turned flange at its face-edge, and a sealing rim of plastic material applied to said flange.

7. In a life-preserving apparatus, a face-mask having a connection for an air supply conduit and provided at its face-edge with a sealing rim of plastic material, said rim having an upward extension conforming to the bridge of the wearer's nose and provided in opposite sides with eye-recesses.

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Witness: