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G. M. MARR

2,389,266

BUOYANT SAFETY LIGHT

Filed June 5, 1944

2 Sheets-Sheet 1

Fig. 1.

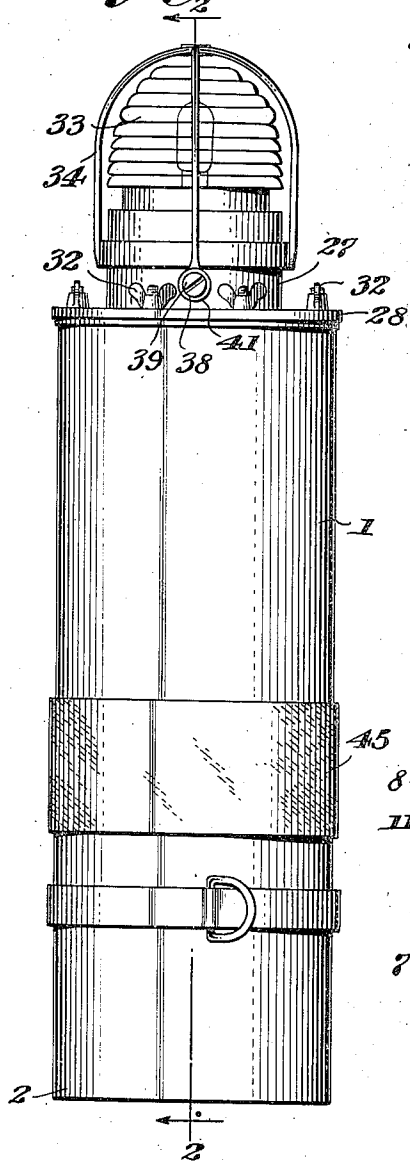


Fig. 3.

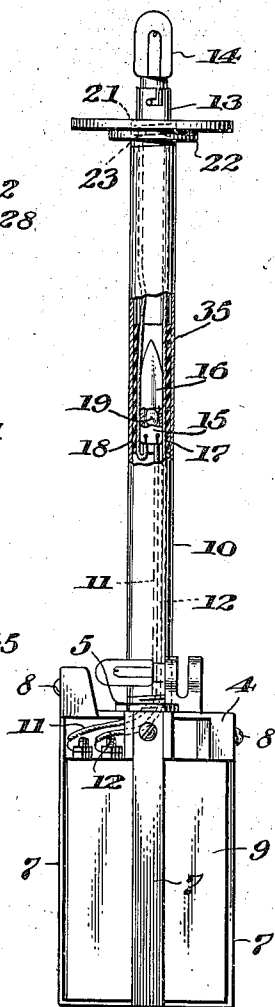


Fig. 2.

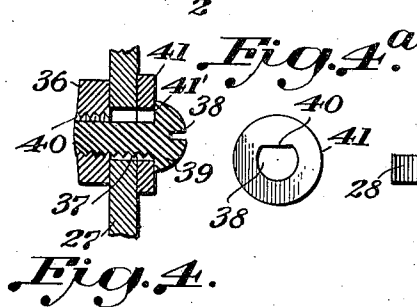
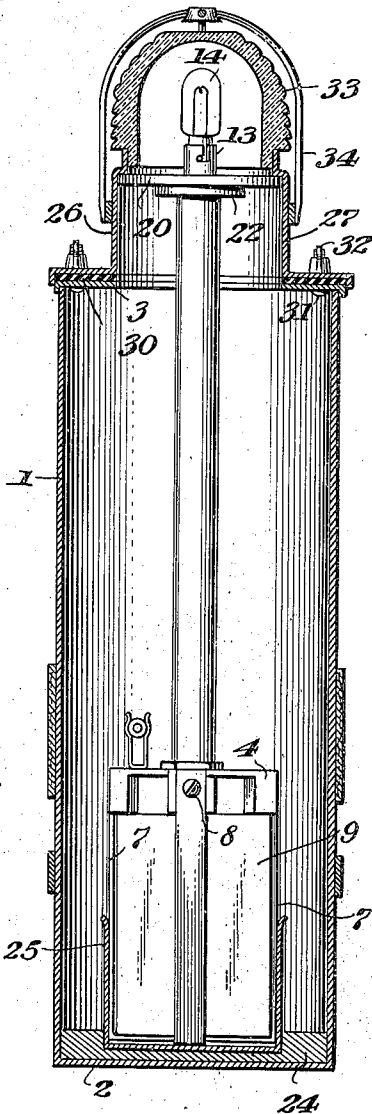
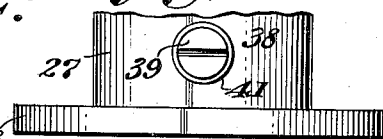


Fig. 5.



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Fig. 6.

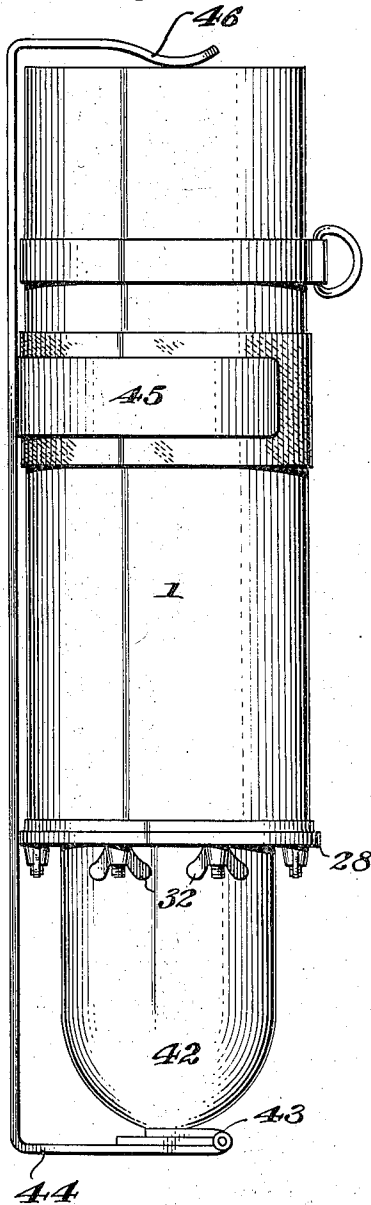
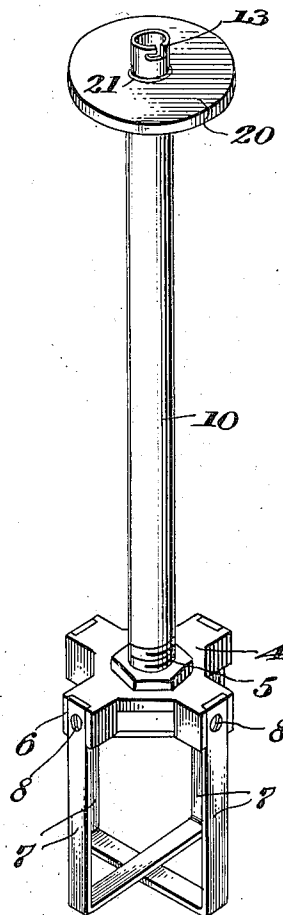


Fig. 7.



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UNITED STATES PATENT OFFICE

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BUOYANT SAFETY LIGHT

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Application June 5, 1944, Serial No. 538,853

8 Claims. (Cl. 9—8.3)

This invention is directed to an improvement in a safety light, which, while adapted for many other uses, is primarily designed for use in connection with water-borne life boats, life rafts, life preservers and other life saving apparatus.

One of the essential and important features of the present invention is the use together with the hermetically sealed casing of means for automatically equalizing the internal and external pressure of such casing, to avoid a rupture or collapse of the casing from time to time, with the advantage of maintaining and providing for an extended life. When the safety light is manufactured, the contained air is of a definite pressure resulting from temperature conditions, and when in position on shipboard or the like ready for use with the life saving apparatus the air contained in the casing is obviously subjected to varying ranges of extremely different temperatures. This may well follow from the actual use of the light when in the water but primarily results from the change in the atmospheric temperature in the different localities visited by the ship before the light is brought into use. These temperature variations will obviously change the internal air pressure of the casing, and this change may be sufficient, in extreme cases to open a seam or seams of the casing under excessive internal pressure or cause collapse of the casing under excessive external pressure. An automatic equalization of the internal and external pressure of the casings, functioning under any and all conditions will obviously relieve stresses incident to extreme temperature changes. This provision constitutes an important feature of the present invention.

A further and important object of the invention is the utilization of the vital parts in a unit assembly, permitting such parts to be conveniently removed from or applied to the casing as a single unit. This materially facilitates the initial assemblage of such vital parts and equally facilitates their removal and replacement for adjustment, repair or removal.

The invention is illustrated in the preferred form in the accompanying drawings, in which:

Figure 1 is an elevation showing the improved light in actual use.

Figure 2 is a section of same on the line 2—2 of Figure 1.

Figure 3 is a detail view of the battery, lamp and connections.

Figure 4 is a detail sectional view of the safety valve.

Figure 4a is an end view of the bolt forming part of the safety valve.

Figure 5 is a detail view showing the position of the safety valve.

Figure 6 is an elevation of the improved light when in storage position.

Figure 7 is a detail perspective view of the battery, lamp and connections.

The improved light comprises a casing *f*, which preferably but not necessarily is circular in form and has a greater length than diameter. The casing is closed by rigid bottom 2 and is open at the top for its full diameter except for the provision of an inner extending marginal flange 3 of relatively narrow width and serving to secure the head in place on the body of the cylinder, as will later appear.

The vital elements of the light, that is, the illuminating means per se, the energy source therefor, and the switch for controlling the flow of current are for the purpose of the present invention assembled as a unit. Such assembly involves a battery plate 4 preferably of cruciform shape in plan centrally formed with an internally threaded opening 5. The ends of the arms of the plate are recessed at 6 to receive the ends of straps 7 removably secured by screws 8 taking into the plate. The straps 7 are utilized to removably support a source of electrical energy as a battery 9, the straps extending from the plate down and around the battery and upwardly relative thereto to be removably secured to the plate. The battery is thus supported in close contact with the plate, certain of the arms of the plate extending below the surface of the plate to space the plate proper from the upper surface of the battery connection when the parts are assembled.

A tube 10 is designed to be removably secured in the opening 5 and to extend vertically above the plate for an appropriate length. The current conductors 11 and 12 are terminally secured to the points of the battery and are passed upwardly through the tube 10. At the upper end of the conductors 11 and 12 are connected in an appropriate manner to a lamp socket 13, the conductors being of sufficient length to permit the lamp socket to extend about the upper end of the tube 10. In order that the apparatus may remain in such relation that the lamp 14 to be removably placed in the socket 13 would remain dark while the safety light is not in actual use and yet be automatically energized when the safety light is inverted for use, an automatic switch 15 bridges a break in one of the conduc-

tors 11, and is of a character to permit it to be readily and conveniently housed in the tube 10. The switch is here shown as an insulating tube 16, preferably of glass, sealed at both ends with one end carrying in spaced relation the terminals 17 and 18 of the interrupted conductor 11. A globule of mercury 19 is placed in the tube from which it would be obviously apparent that when the safety light is in inverted position as indicated in Figure 6, as is its position when not in actual use, the mercury globule will be free of the terminals 17 and 18 and no current will flow to the lamp 14. When, however, the safety light is inverted or placed upright the mercury globule bridges the spaced terminals 17 and 18 and closes the circuit to the lamp 14, maintaining a constant light as long as the battery is effective, as shown in Figures 1 and 3.

A reflector element 20 is centrally provided with an opening 21 through which in the association of the parts of the assembly unit the lamp socket 13 passes. An insulating disc 22 is secured to the reflector element on the lower surface of the latter formed with an opening 23 concentric with the opening 21 which opening 23 is interiorly threaded to permit the removable association therewith of the upper tube 10. The upper surface of the reflector element 20 is inherently formed or provided to insure a desirable reflection of the light of the lamp 14.

It will thus be seen that the vital parts of the safety light are when assembled, a connected unit including the battery, the battery plate, the tube, the reflector element, the conducting wires, the lamp socket and the controlling switch. This unit may be assembled and removed from the casing 1 in a single movement to facilitate ready and convenient access to the various parts of the unit for repair or replacement. It is, of course, obvious that the opening in the upper end of casing 1 is of sufficient diameter to permit the passage of the battery 9 therethrough.

The bottom 2 of the casing is weighted at 24 to insure that when in the water or in other operative position the casing will remain upright and this weighted terminal of the casing is interiorly provided with an upstanding, preferably insulated framing 25 of a size and shape to more or less accurately receive the bottom of the battery 9, center the latter in the casing and prevent its movement in the active use of the safety light to disturb the connections.

The cylinder is provided with a head 26 in the form of a circular wall 27 having an outstanding flange 28 at its lower end. The head is applied to the upper end of the casing by placing the flange 28 over a flange 3 of casing 1, with an interposed gasket 30. Bolts 31 rigid with flange 3, extend through gasket 30 and flange 28 and are provided with thumb nuts 32 beyond flange 28 to provide a rigid sealed juncture at this point. The upper end of the head or particularly the wall 27 is provided with a Fresnel lens 33 for the dispersion of the light, the juncture of the lens and wall 27 being, of course, sealed. A guard 34 may be carried by the wall 37 to overlie and protect the lens. If preferred and as desired the tube 16 of the switch may have a protective coating 35, the sole requirement here being that the switch in its entirety may be of such a diameter as to readily fit within the tube 10 while avoiding interference with the conductors.

An essential and particularly important detail of the present invention is the means for automatically compensating for variation in internal

and external pressures of the casing thus in order to avoid rupture of the casing under undue expansion or contraction of the internal air pressure relative to the external pressure resulting from temperature changes. This compensating means is in the form of a valve which is mounted in a wall 27 of the head in a position to be conveniently accessible when required. The valve is of a simple type and includes an element 36 in the form of a nut which is welded or otherwise secured in the wall 27 and arranged in line with an opening 37 in the wall, that is, from the interior to the exterior of the casing. A threaded bolt 38 is designed to cooperate with the nut, the head 39 of the bolt having a screw kerf for convenient turning of the bolt. The bolt 38 below the head is cut away throughout its length to provide a flat margin 40. A flexible disc 41 preferably of fabric is fitted over the bolt 38 and bears between the head 39 of the bolt and the outer surface of the wall 27. The opening of the disc 41 corresponds to the normal diameter of the bolt so that when the disc is in place there is an opening 41' between the inner margin of the disc opening and the cutaway portion of the bolt. The disc acts to seal the margin between the head of the bolt and the nut but under excessive pressure on either side of the valve the air will flow to the area of lesser pressure by passing through the opening afforded between the bolt hole in the disc and the flat face of the bolt forcing its way inwardly or outwardly between one or both surfaces of the disc and the adjusting surface of the bolt head or the nut.

Under this construction if during long storage on shipboard or the like of the safety light temperature conditions of the areas in which the ship may move are such as to tend to a variation of the pressure of the air in the otherwise hermetically sealed safety light, the valve will immediately and automatically compensate for this variation in pressure and either permit the internal pressure of the casing to be raised or lowered in accordance with the external pressure by permitting the free interchange of the air as previously described.

When not in use the safety light is held on shipboard or other place in a manner permitted to be conveniently grasped and thrown overboard with the lifeboat, lift raft or the like. In inactive position the safety light is supported in an inverted position that is, with the Fresnel lens lowermost and in which position the switch 15 prevents energization of the lamp, and in this inverted position the head of the safety light is inserted in an elongated cap 42 pivotally supported on an angle arm 43 of an upstanding bracket 44 secured to the ship or other fixture. The bracket above the cap is provided with spring arms 45 in which the case may be moved and temporarily secured and the upper end of the bracket has a lateral arm 46 which when the light is in place overlies and bears rather snugly on the bottom 2 of the light. When required for use the safety light may be readily withdrawn from the holder by swinging the upper end of the casing out of the spring arms 45, with the cap 42 swinging in accordance with the safety light movement, whereupon the safety light may be readily lifted from the cap and thrown overboard or otherwise put in use.

It is to be particularly noted that the elongated cap 42 forming part of the bracket for supporting the light on shipboard or the like has an additional and important function.

It will be apparent that with cap 42 in place, that is, when the light is supported on shipboard or the like, the light-emitting source of the safety light is completely covered. It not infrequently happens that when the safety light is in inoperative position on the ship or other carrier the vibration of the ship may have a tendency to cause the mercury 19 of the switch 15 to be intermittently jarred to a position to bridge the terminals 17 and 18 and thus energize the lamp. With the cap 42 in place this intermittent energization of the lamp is not exteriorly visible and thus the possible flashing of the lamp even when in inoperative position and while inverted does not permit exterior visibility of the lamp.

What is claimed is:

1. A buoyant safety light, including a hermetically sealed casing arranged to float partly submerged, a source of light carried by and visible above the upper end of the casing, a source of energy for said light source and service connections between the light source and energy source, and an automatic and adjustable air relief means carried by the casing above its normal submergence line to equalize air pressure internally and externally of the casing to avoid collapse of the housing under atmospheric changes.

2. A buoyant safety light including a casing closed at the bottom and open at the top, a lens at the upper end of the casing, means for connecting the lens to the upper end of the casing for closing and sealing such upper end, and a unit in assembly including a battery, a reflector disc, and a tubular member formed at one end to receive the battery and provide a battery carrier and at the other end engaging the reflector disc, said tubular member above the battery serving to house the electrical connections between a battery to be held in the carrier and a light source to be held above the reflector, the assembly to be removable as a unit into and out of the casing proper through the open top thereof when freed from the sealing means.

3. A construction as defined in claim 2 wherein the battery carrier is of skeleton form separable from the unit to permit the application of a battery.

4. A construction as defined in claim 2 wherein the unit assembly houses an automatic switch to energize the light source from the battery in one position of the safety light and to deenergize the light source in another position of such light.

5. A construction as defined in claim 2 wherein the closure includes a cylindrical wall, and wherein an automatic relief means is mounted in said wall for equalizing internal and external pressures of the casing.

6. A construction as defined in claim 2 wherein the closed bottom of the casing is provided with a guide to receive and center the lower end of the battery carrier.

7. A construction as defined in claim 2 wherein the battery carrier includes a head centrally formed to removably receive the tube and a plurality of straps removably secured to the head and depending below the same to receive and prevent independent movement of a battery.

8. A safety light including a casing, a light diffusing member carried by the casing, a light source within said member, a battery in the casing, a circuit connecting the battery and light source, a switch to automatically close and open the circuit when the safety light is in the upright and inverted positions respectively, and a frame to support the safety light in an inverted position when on shipboard or the like and not in use, said frame including spring arms to grip the casing of the safety light and a hingedly-connected cap to receive the light source and providing a swinging base on which the light may be swung outwardly from the frame, said cap being of a size to prevent any rays from the light source being visible.

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