Dec. 11, 1951 P. J. AMBROSE 2,578,030

MARINE SAFETY LIGHT

Filed Aug. 2, 1948 3 Sheets-Sheet 1

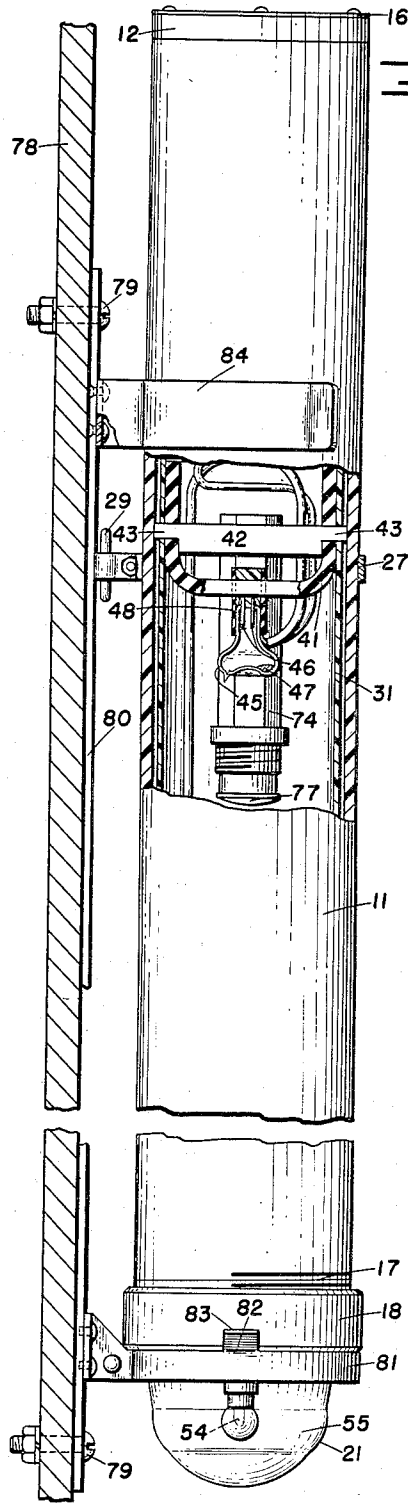


Fig. 1

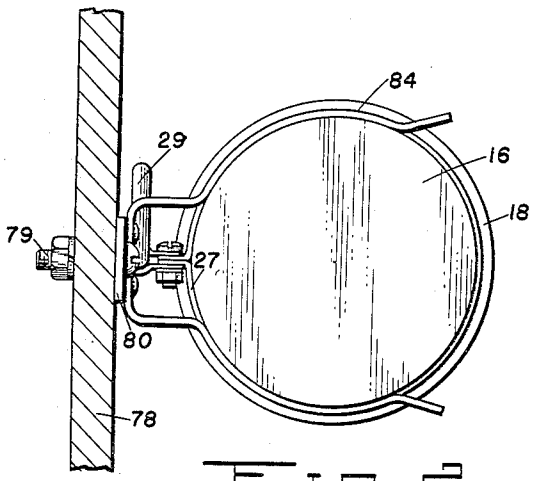


Fig. 2

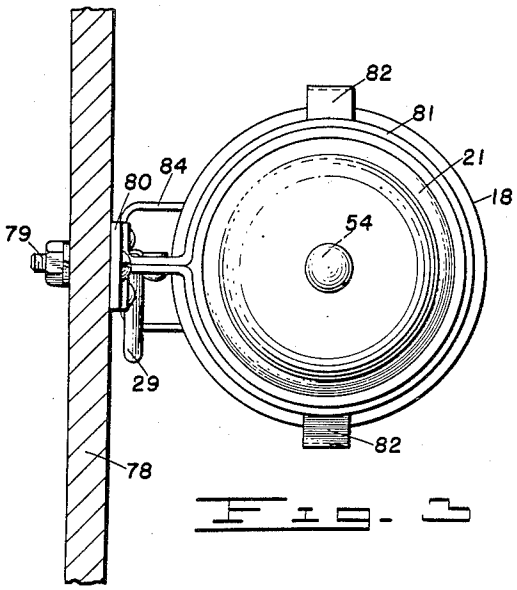


Fig. 3

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Dec. 11, 1951 P. J. AMBROSE 2,578,030

MARINE SAFETY LIGHT

Filed Aug. 2, 1948 3 Sheets-Sheet 2

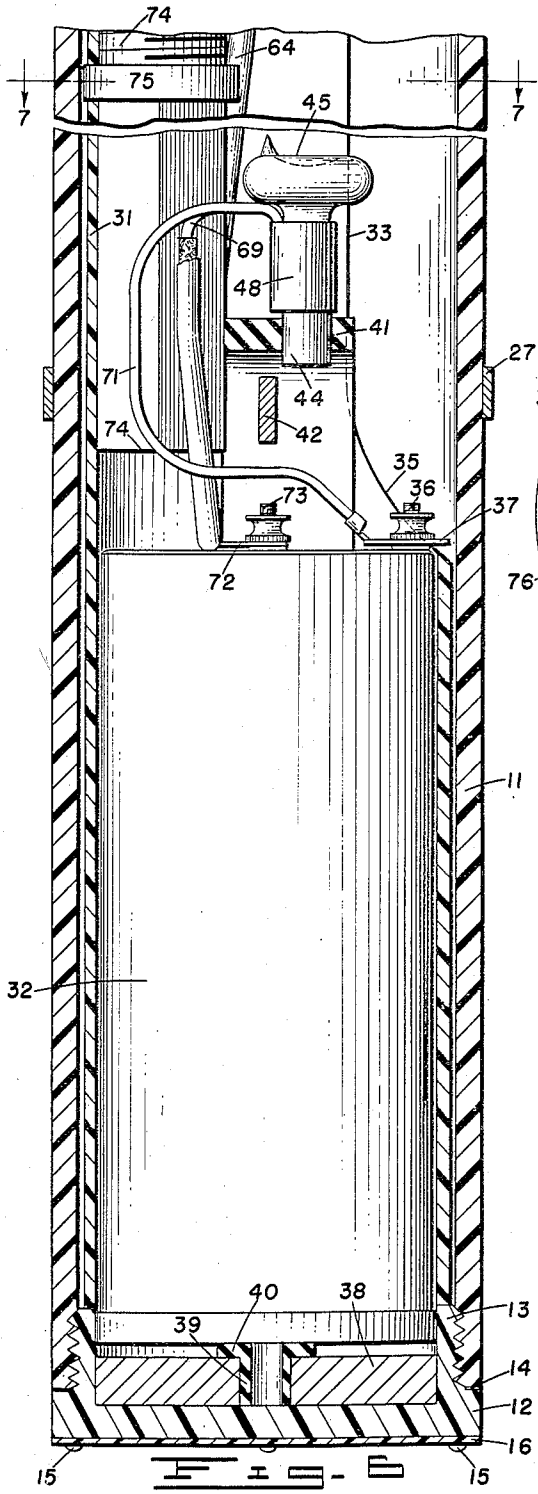


FIG. 6

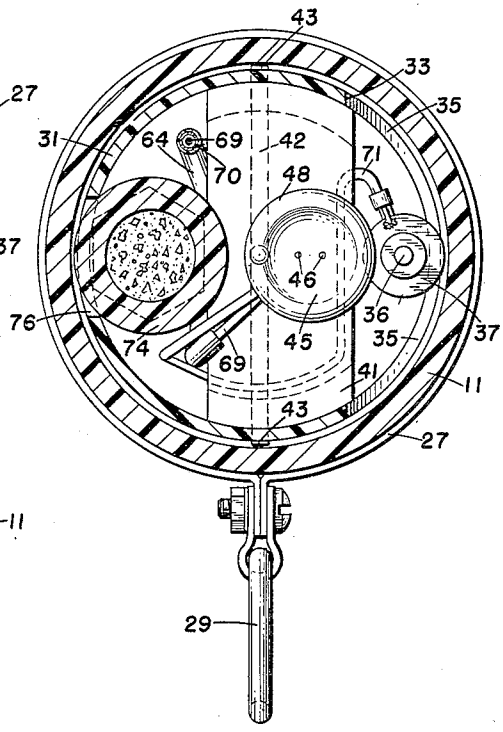


FIG. 7

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Dec. 11, 1951 P. J. AMBROSE 2,578,030

MARINE SAFETY LIGHT

Filed Aug. 2, 1948 3 Sheets-Sheet 3

Fig. 4

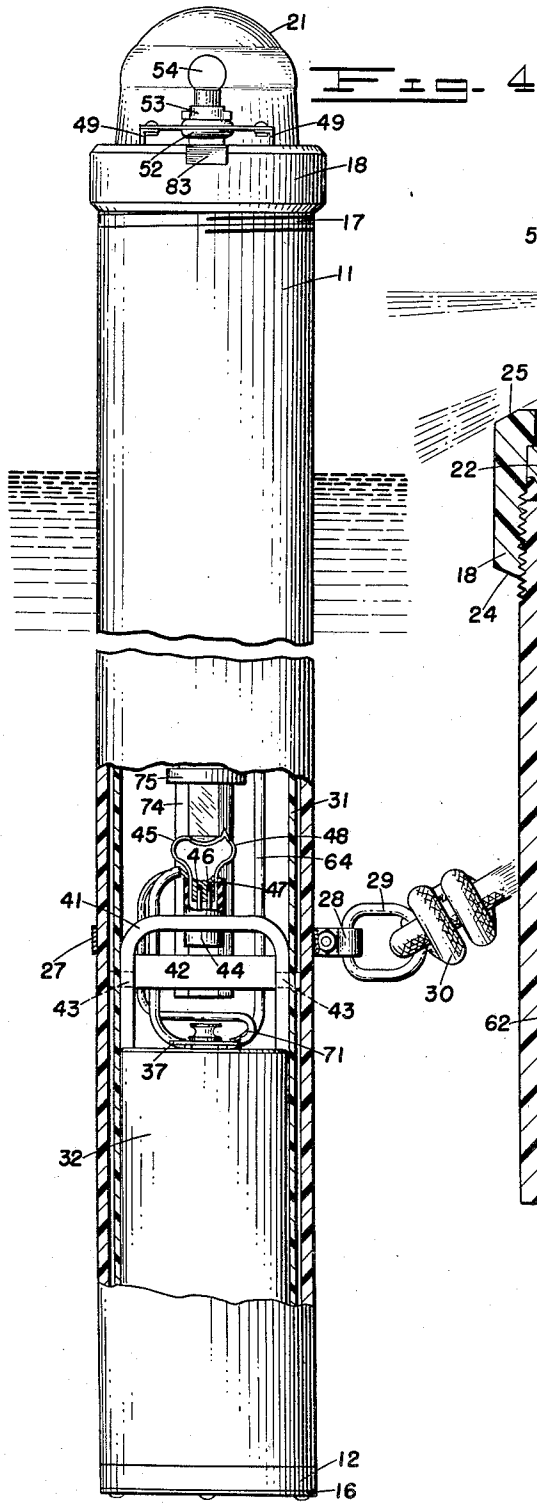
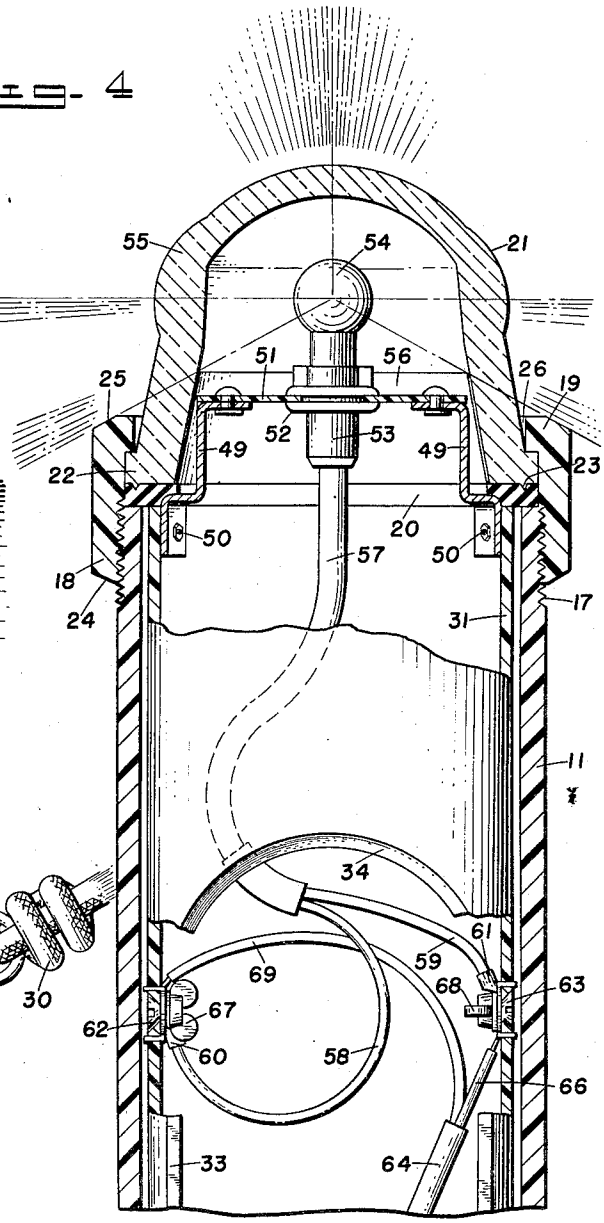


Fig. 5



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MARINE SAFETY LIGHT

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8 Claims. (Cl. 9—8.3)

1

This invention relates to marine safety lights of the buoyant type, and more particularly to an electric safety light primarily intended as a marker for use in indicating the position of persons compelled to abandon a ship due to disaster and serving to direct aid to such persons.

A main object of the invention is to provide a novel and improved buoyant marine safety light which is very simple in construction, highly resistant to corrosion by sea water, and leakproof.

A further object of the invention is to provide an improved marine safety light which is very rugged in construction, which is capable of being stowed aboard ship in an inverted position, and which becomes illuminated automatically when thrown into the water.

A still further object of the invention is to provide an improved electric marine safety light which is waterproof, vapor-proof, and which is completely self-contained, said light assuming an upright position when thrown into the water and becoming energized automatically when such a position is assumed, the light providing a beam having a highly concentrated horizontal distribution in all directions around the horizon, whereby it may be detected at great distances.

A still further object of the invention is to provide a marine safety light unit which will meet the extremely rigorous weathering and operational requirements now set forth by the United States Coast Guard and other authorized governmental agencies in their specifications for this type of equipment, no previously devised light unit having been successful in meeting these requirements.

A still further object of the invention is to provide an improved marine safety light unit which is highly resistant to salt spray and outdoor weather conditions and which is able to withstand severe shocks without damage thereto, said light being very easy to assemble and being very easy to take apart for inspection or renewal of parts, yet at the same time being completely waterproof and vapor-proof when assembled.

A still further object of the invention is to provide an improved marine safety light and mounting means for supporting the light in a normally extinguished inverted position, the mounting means aiding in the dismantling of the light when internal parts thereof are to be inspected or replaced, and also aiding in the reassembling thereof when the servicing of the light has been completed.

A still further object of the invention is to provide an improved marine safety light of the

2

self-contained battery-operated type which provides a high light output all around the horizon and which is internally cushioned so that internal parts thereof are protected against damage from shock and vibration, whereby the light will be instantly available for use in an emergency even after being stowed aboard ship for a very long period of time prior to use.

A still further object of the invention is to provide an improved electric marine safety light wherein the light bulb, wiring, battery, and other components are very easy to examine and replace, wherein risks of open circuits or short circuits in the wiring are minimized, and wherein the resistance in the circuit is held to a minimum, so that when the light is thrown into the water a maximum amount of lamp energization will be obtained.

A still further object of the invention is to provide an improved marine safety light which also acts as a reflective signal device, so that a light beam from an approaching vessel will be reflected from the safety light, providing a marker signal even when the battery of the safety light has become exhausted.

Further objects and advantages of the invention will become apparent from the following description and claims, and from the accompanying drawings, wherein:

Figure 1 is a side elevational view, partly in cross-section, of a marine safety light constructed in accordance with the present invention, shown mounted in its normal inverted position on its mounting bracket as it would be stowed aboard ship.

Figure 2 is a top plan view of the structure of Figure 1.

Figure 3 is a bottom plan view of the structure shown in Figure 1.

Figure 4 is a side elevational view, partly in cross-section, of the safety light of Figure 1 in upright floating position in the water.

Figure 5 is an enlarged vertical cross-sectional detail view taken through the lens and adjacent body portion of the safety light of Figures 1 and 4.

Figure 6 is an enlarged vertical cross-sectional detail view taken through the intermediate and lower body portions of the light.

Figure 7 is a horizontal cross-sectional view taken on line 7—7 of Figure 6.

Referring to the drawings, and more particularly to Figure 4 which shows the light in upright floating position, 11 designates the outer casing of the light, said outer casing being generally

cylindrical in shape and being provided with a bottom closure plug 12. As shown in Figure 6, plug 12 has a reduced threaded portion 13 which is threaded into the lower end of casing 11, a suitable layer of cement 14 being employed between the casing 11 and plug 12 and extending over the threads there-between, to provide a completely moisture-tight and vapor-tight joint between the casing and the plug. Secured to the bottom of plug 12 in any suitable permanent manner, as by securing pins 15, is a plastic disc 16 on which instructions for the use of the light may be printed.

The top end of casing 11 is formed with external threads, shown at 17, and threaded thereon is a ring nut or bezel 18 formed with an inwardly directed top flangle 19. Positioned on the top rim of casing 11 is a deformable annular gasket 20 of rubber or similar resilient material, and mounted on said gasket is the rim of a dome-like transparent lens 21, the lens rim being formed with an outwardly extending annular flange 22 underlying the flange 19 of nut 18 and clamped thereby against the gasket 20. The bottom of the lens rim is further formed with an annular sealing rib 23 which is forced into the gasket 20 by the clamping pressure exerted by nut 18 and which improves the seal between the lens and the gasket. The outer edge portions of nut 18 are annularly bevelled, as shown at 24 and 25, the lower bevel 24 acting to allow moisture to drain off the unit when it is mounted in its stowed inverted position, as will be presently described, thereby reducing the possibility of moisture entering the threads 17. A clearance space 26 is provided between the nut 18 and the outer surface of lens 21 which blocks the creeping of moisture upwardly into the nut when the light is stowed in its above-mentioned inverted position.

The casing 11, plug 12 and nut 18 are preferably fabricated of sturdy corrosion-resistant material, such as thermo-setting plastic material, and these parts are preferably of the same material so that they will expand and contract in unison under variations in temperature conditions, thereby preventing leaks due to differential expansion and contraction from occurring.

Encircling the casing 11 and rigidly secured thereto below the center of gravity of the unit in its floating upright position illustrated in Figure 4 is a band 27 of corrosion-resistant metal, said metal band being formed with a loop 28 in which is secured a ring 29. A lanyard 30 may be fastened to ring 29.

Designated at 31 is a cylindrical inner shell member telescopically positioned within casing 11. Shell member 31 is supported at its lower end on the rim of reduced plug portion 13 and abuts the gasket 20 at its upper end. Said shell member is formed of corrosion-resisting material, preferably of the same thermo-setting plastic material employed for casing 11. As shown in Figure 6, the internal diameter of shell member 31 is such as to slidably receive a standard dry cell 32 in its lower portion. The intermediate body portion of shell member 31 is formed with a vertically elongated slot 33 of substantial width terminating in arcuate top and bottom portions 34 and 35. As shown in Figure 6, the outer binding post 36 of dry cell 32 is provided with a large washer 37 which overlaps the lowermost section of the arcuate bottom slot portion 35 and supports the dry cell 32 against long downward movement. Seated in the plug 12 is an annular ballast block 38 in the center of which is fitted a rubber sleeve 39 having a top flange 40 which underlies the bottom of the dry cell and acts as a cushioning support therefor.

Designated at 41 is an inverted U-shaped member of relatively thick rubber bar stock, or similar resilient bar material, which is secured within shell 31 by a rigid transverse bar member 42 disposed between the depending legs of the U-shaped member and formed with reduced end portions 43, 43 passing through said legs and the adjacent wall portions of the shell 31. The ends of the legs of the U-shaped member 41 engage the top end of the dry cell 32 and act as cushioning abutments which prevent said dry cell from moving upwardly in the shell 31. As shown in Figure 4, the rigid bar member 42 is of substantial vertical height and acts as a spreader to maintain the legs of the resilient U-shaped member 41 in contact with the inside wall surface of the shell 31. Said U-shaped member 41 is of substantial thickness so that the legs thereof will resist substantial upward force exerted by the dry cell. Since the member 41 is held in its bowed configuration by the member 42 and the surface of shell 31 engaging its legs, the member 41 is stressed so that its legs would move outwardly to restore member 41 to a straight bar-like configuration if all restraint on the member 41 were removed. This pre-stressed condition of the member 41 prevents its legs from buckling inwardly when a heavy upward force is applied to said legs by the dry cell 32.

Designated at 43 is a mercury switch having a reduced base portion 44 frictionally secured in an aperture provided in the horizontal top portion of the inverted U-shaped rubber spring 41. The bulb portion of the switch is shown at 45 and the electrodes of the switch, shown at 46, 46, project upwardly from the switch base, so that the mercury 47 covers said electrodes when the light is in its upright position shown in Figure 4. When the light is in its inverted position, shown in Figure 1, the mercury 47 is contained in the bulb portion 45 of the switch and the electrodes 46, 46 are open-circuited.

Designated at 49, 49 are inwardly offset vertically extending angle brackets secured at 50, 50 to the inside of the top end portion of shell member 31 at diametrically opposite locations on said top end portion. Secured to the top flanges of the angle brackets 49, 49 is a rigid disc 51, preferably of white reflective plastic material, formed with a central opening. Designated at 52 is a rubber grommet which is seated in said opening, and frictionally secured within said grommet is the lamp socket 53. Mounted in lamp socket 53 is the lamp 54. As shown in Figure 5, the lens 21 is formed with an annular horizontal Fresnel portion 55 and the lamp 54 is positioned with its filament located substantially at the focal point of said Fresnel portion. This provides a very high ratio of beam candlepower of the unit in a horizontal direction to mean spherical candlepower of the lamp.

The lower inside surface portion of lens 21 is provided with an outwardly facing silvered coating 56 which extends upwardly to the imaginary conical surface defined by the filament of the lamp as a vertex and the annular bevel 25. Light passing through the lens between the top edge of coating 56 and the Fresnel portion 55 is therefore allowed to strike the surface of the water around the unit when it is in its floating position, shown in Figure 4, and a substantial portion of this light is reflected off the water surface in the general direction of the main beam concentration, that is, substantially horizontally,

and reinforces the horizontal beam distribution of the unit. In a specific design of the unit, an angle of 30° between the above defined conical surface subtended by bevel 25 and the horizontal plane through the lamp filament was employed, and was found to provide a substantial reinforcement of the ratio of the horizontal beam candlepower of the unit to the mean spherical candlepower of the lamp when the unit was floating in the water in the position of Figure 4.

The outwardly facing silvered coating 56, being of substantial height, provides a reflective marker for picking up a light beam from an approaching vessel, so that the device may be detected by the crew of said vessel even when lamp 54 is extinguished.

The lamp socket 53 is internally wired in a conventional manner, and extending downwardly from said socket is the cable sheathing member 57, of suitable flexible insulating material, which contains the lamp socket lead wires 58, 59. As shown in Figure 5, the ends of lead wires 58 and 59 are provided with terminal eye lugs 60 and 61 which are connected to respective binding posts 62 and 63 secured to the shell member 31 at diametrically opposite points adjacent the arcuate top end section 34 of the slot 33. The binding posts 62 and 63 have inwardly directed threaded shanks on which the eye portions of lugs 60 and 61 are respectively received.

Designated at 64 is a cable having an inner core conductor 69 and a sheath conductor 70 arranged coaxially around inner conductor 69 and suitably insulated therefrom. The cable 64 has an outer covering of suitable insulating material. The inner conductor 69 is connected at one end to binding post 62 and is connected at its other end to one of the electrodes of the mercury switch 48. The other electrode of switch 48 is connected by an insulated wire 71 to the washer 37 engaged on binding post 36 of the dry cell 32. The outer conductor 70 of cable 64 terminates at one end in a lead wire 66 which is connected to binding post 63. Outer conductor 70 is connected adjacent the lower end of cable 64, as viewed in Figure 6, to an eye lug 72 secured on the center binding post 73 of the dry cell 32. Respective wing nuts 67 and 68 detachably secure the lugs 60 and 61 on the shank portions of the binding posts 62 and 63.

It will be seen from Figure 5 that access to the wing nuts 67 and 68 is provided through the arcuate top section 34 of the slot 33 in shell 31. It will be further apparent that when wing nuts 67 and 68 are removed from their respective binding post shanks, the conductors 58 and 59 may be detached from the binding posts 62 and 63 and the entire assembly comprising the lamp 54, socket 53, and cable 57 may be removed from the device as a unit by pulling the socket 53 free of the grommet 52 and pulling the cable upwardly through the grommet. Since these parts may be handled as a single unit, the lamp is preferably permanently soldered or otherwise rigidly fastened in the socket 53 by any suitable means providing positive low-resistance contact of the lamp terminals with the socket terminals.

Designated at 74 is a capsule containing silica gel or other suitable dehydrating material. Capsule 74 is secured within shell 31 opposite slot 33 in any suitable manner, as by an annular rib 75 formed thereon which is force-fitted into a slot 76 formed in the wall of shell 31. Capsule 74 is of conventional construction and has a perforated end wall normally covered by a detachable plastic cap 77, so that the capsule commences its drying action only after the cap 77 is removed. As will be subsequently explained, the cap 77 is not removed until the safety device is made ready for stowing aboard ship.

Referring now to Figures 1 to 3, it will be seen that the safety device is stowed abroad ship in an inverted position. Designated at 78 is a vertical wall member of the ship and secured thereto by top and bottom bolts 79, 79 is a vertical bar member 80. Secured to the lower portion of vertical bar member 80 is a horizontal rigid ring bracket 81 in which the lens portion 21 of the light is receivable. The ring portion of bracket 81 is formed with diametrically opposed upwardly and outwardly extending lugs 82, 82 which engage in diametrically opposed recesses 83 formed in the bezel ring nut 18. Secured to the upper portion of vertical bar member 80 is a horizontal resilient generally U-shaped clamp member 84 receiving the body portion of the light between its resilient fingers.

In taking the light apart for inspection or replacement of parts, the casing 11 may be rotated while the light is still supported as shown in Figure 1, the lugs 82, 82 holding the bezel nut 18 against rotation. This loosens the bezel nut from the threads 17, permitting said bezel nut to be thereafter easily removed. The light is of course lifted out of its supporting bracket as soon as the bezel nut 18 has been thus loosened.

When the bezel nut 18 has been removed, the lens 21 and gasket 20 are then removed and the shell 31 is slipped out of the casing 11. The elongated slot 33 allows the interior of the shell 31 to be visually inspected and also allows access to the wing nuts 67 and 68, as above described. To remove the dry cell 32 for replacement, the thumb nuts on the binding posts 73 and 36 are removed. The removal of the thumb nut on binding post 36 allows the large washer 37 to be lifted out of engagement with the arcuate end section 35 of slot 33 and allows the dry cell to be slipped out of the end of shell 31.

The parts are reassembled in a reverse manner. After the ring nut 18 has been engaged on the threads 17, the light is placed on its support in the position of Figure 1 with the lugs 82 engaged in the recesses 83. The casing 11 is then rotated with respect to the ring nut 18 to a tight position wherein the ring nut exerts firm clamping pressure on the flange 22 of the lens 21.

Immediately prior to reassembling the light for stowage in its support aboard ship, the sealing cap 77 of the dehydrating capsule 74 is removed, allowing the drying action thereof to commence.

In the stowed position shown in Figure 1 the mercury 47 of the switch 48 will be positioned in the bulb 45 of the switch, out of contact with the electrodes 46, 46. When it is desired to place the light in operation, it is removed from its support and thrown overboard, assuming the upright floating position shown in Figure 4. The mercury 47 then flows into the base portion of the switch, bridging the electrodes 46, 46 and causing the lamp 54 to be energized.

While a specific embodiment of a marine safety light has been disclosed in the foregoing description, it will be understood that various modifications within the spirit of the invention may occur to those skilled in the art. Therefore it is intended that no limitations be placed on

the invention except as defined by the scope of the appended claims.

What is claimed is:

1. In a marine safety light of the character described, a sleeve member, a lamp carried by said sleeve member, said sleeve member being formed with an opening, a dry cell telescopically positioned in said sleeve member, means secured to said dry cell engaging the edge of said opening and limiting axial movement of the dry cell in one direction, abutment means secured in the sleeve member and engaging the dry cell to limit axial movement of said cell in the opposite direction, a gravity-operated switch mounted on said abutment means, and circuit means, including said gravity-operated switch connecting said lamp to the dry cell.

2. In a marine safety light of the character described, a sleeve member, a lamp carried by said sleeve member, said sleeve member being formed with an opening, a dry cell telescopically positioned in said sleeve member, an outer binding post on said cell, outwardly projecting means secured to the outer binding post of said dry cell and engaging the edge of said opening to limit axial movement of the dry cell in one direction, an abutment member secured in the sleeve member and engaging the dry cell to limit axial movement thereof in the opposite direction, a gravity-operated switch carried in said sleeve member, and circuit means, including said switch, connecting said lamp to the dry cell.

3. In a marine safety light of the character described, a sleeve member, a lamp carried by said sleeve member, said sleeve member being formed at its intermediate portion with an opening, a dry cell telescopically positioned in said sleeve member, an outer binding post on said cell, an outwardly projecting washer secured to the outer binding post of said dry cell and engaging the edge of said opening to limit axial movement of the dry cell in one direction, a U-shaped abutment member secured transversely in the sleeve member with the ends of its leg elements engaging the top of the dry cell to limit axial movement of said cell in the opposite direction, a gravity-operated switch mounted on said abutment member, and circuit means, including said switch, connecting said lamp to the dry cell.

4. In a marine safety light of the character described, a sleeve member, a lamp carried by one end of said sleeve member, said sleeve member being formed at its intermediate portion with an opening, a dry cell telescopically positioned in the other end of said sleeve member, an outer binding post on said cell, an outwardly projecting washer secured to the outer binding post of said cell and engaging the edge of said opening to limit axial movement of the dry cell toward said other end of the sleeve member, a resilient bridging member secured transversely in said sleeve member above said dry cell and having depending legs engaging the top of the dry cell to limit axial movement of said dry cell away from said other end of the sleeve member, a gravity-operated switch mounted on said resilient bridging member, and circuit means, including said switch, connecting said lamp to the dry cell.

5. In a marine safety light of the character described, a sleeve member, a lamp carried by one end portion of said sleeve member, said sleeve member being formed at its intermediate portion with an elongated slot, a dry cell telescopically positioned in the other end of said sleeve member, an outer binding post on said cell, an outwardly projecting washer secured to the outer binding post of said cell and engaging the end of the slot to limit axial movement of the dry cell away from said slot, a resilient bridging member secured transversely in said sleeve member above said dry cell and having depending legs engaging the top of the dry cell to limit axial movement of the cell toward said slot, a mercury switch mounted on said resilient bridging member, and circuit means, including said switch, connecting said lamp to the dry cell.

6. In a marine safety light of the character described, a sleeve member carrying at one end thereof a lamp, a dry cell telescopically positioned in said sleeve member at its other end, a resilient bridging member secured transversely in said sleeve member and having depending legs engaging said dry cell, a gravity-operated switch mounted on said bridging member, and circuit means, including said switch, connecting said lamp to the dry cell.

7. In a marine safety light of the character described, a sleeve member, a dry cell telescopically positioned in said sleeve member, an abutment member secured transversely in said sleeve member and having depending legs engaging said dry cell, a gravity-operated switch mounted on said abutment member, and circuit means connecting said switch to said dry cell.

8. In a marine safety light of the character described, a sleeve member, said sleeve member being formed with an opening, a dry cell telescopically positioned in said sleeve member, means secured to said dry cell engaging the edge of the opening and limiting axial movement of the dry cell in one direction, abutment means secured in the sleeve member and engaging the dry cell to limit axial movement of said cell in the opposite direction, a gravity-operated switch mounted on said abutment means, and circuit means connecting the switch to the dry cell.

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