

May 6, 1969

E. R. STELTZER ET AL

3,443,085

BUOY LIGHT

Filed April 6, 1967

Sheet 1 of 3

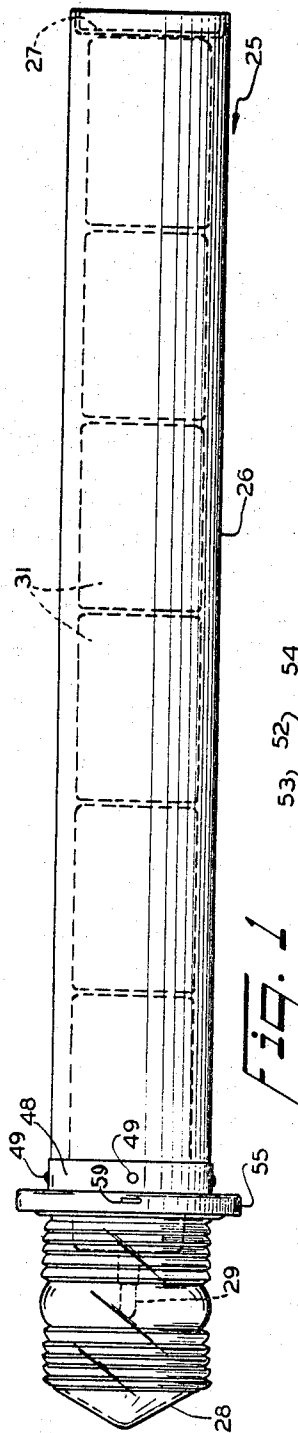


FIG. 1

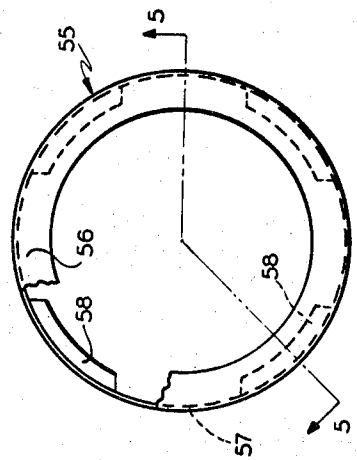


FIG. 4

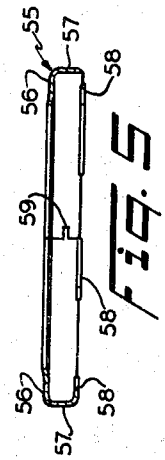


FIG. 5

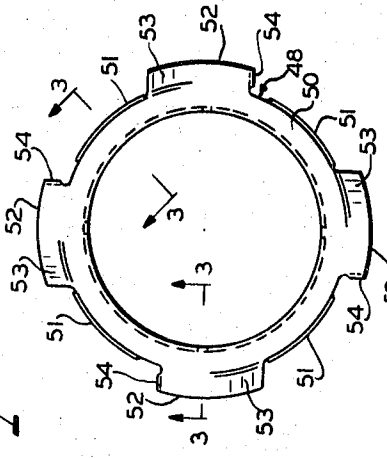


FIG. 2

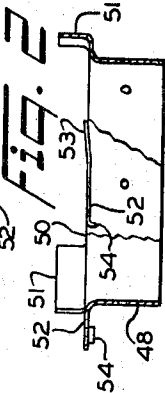


FIG. 3

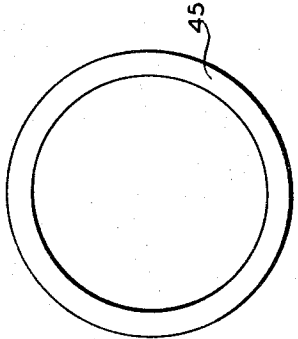


FIG. 6

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Sheet 2 of 3

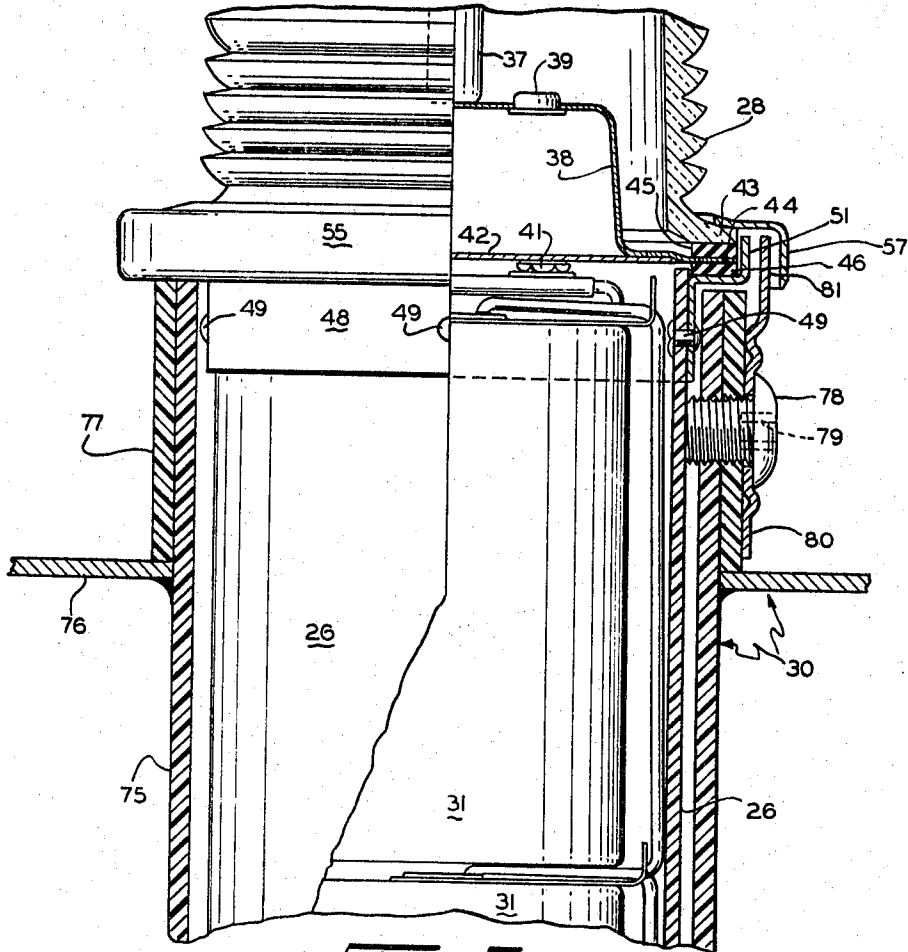


Fig. 7

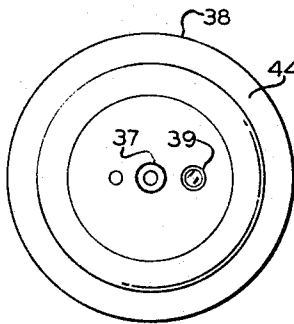


Fig. 8



Fig. 11

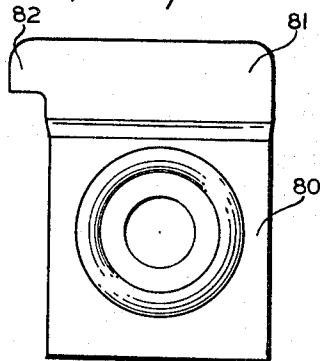


Fig. 12

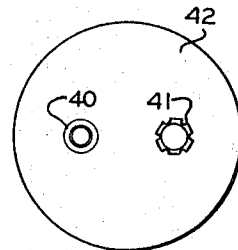


Fig. 9



Fig. 10

May 6, 1969

E. R. STELTZER ET AL

3,443,085

BUOY LIGHT

Filed April 6, 1967

Sheet 3 of 3

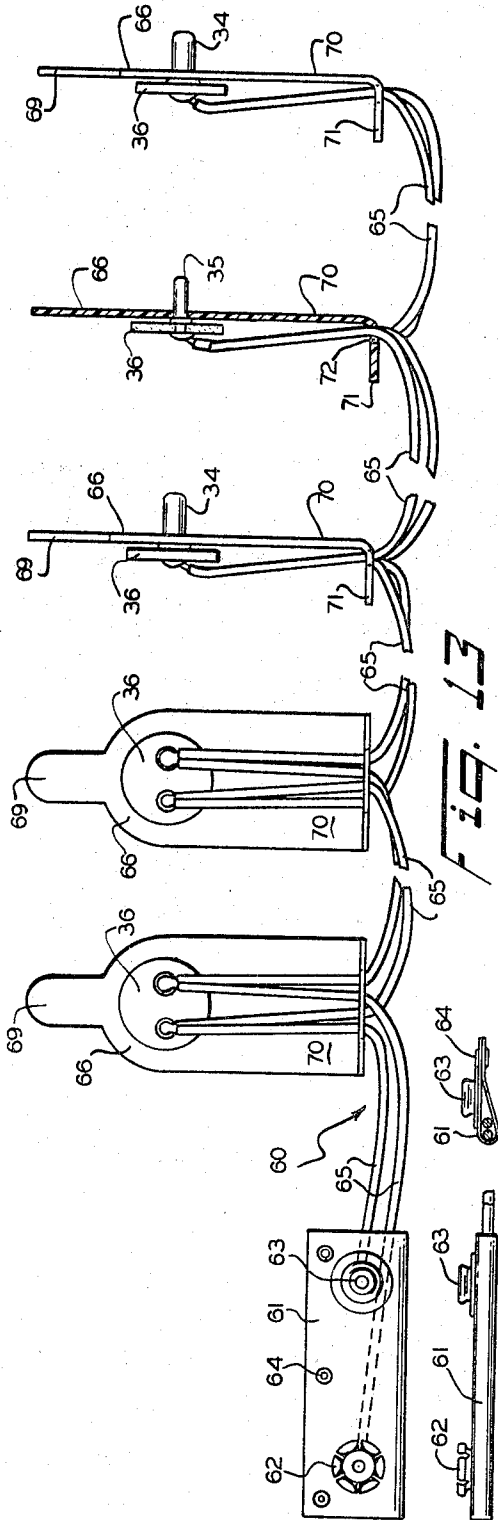


FIG. 13

FIG. 14

FIG. 15

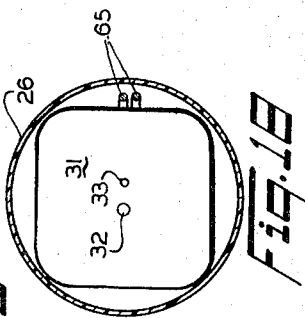


FIG. 16

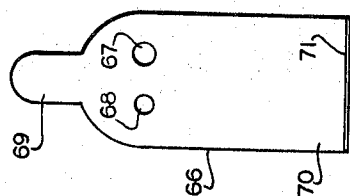


FIG. 17

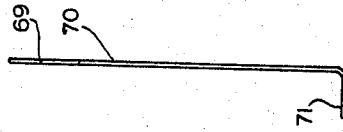


FIG. 18

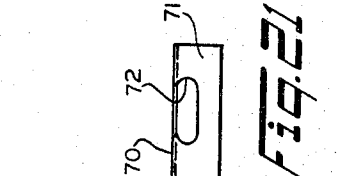


FIG. 19

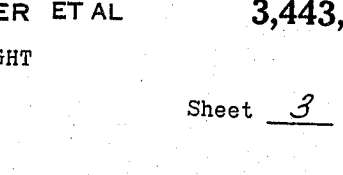


FIG. 20

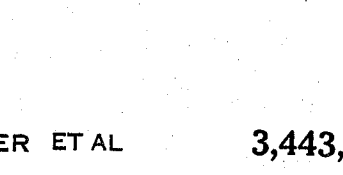


FIG. 21

1

3,443,085  
BUOY LIGHT

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U.S. Cl. 240—10.66

4 Claims

## ABSTRACT OF THE DISCLOSURE

A battery-powered light adapted to be supported upright in a buoy, the upper end of the light being a 360 degree lens. The lens and an elongated tubular battery case are secured together by interlocking lugs on a retainer ring around the lens and a collar secured to the top of the case. The electrical components are contained in a dish-shaped container supported between suitable gaskets and lens and collar. A locking tab secured to the buoy is associated with the ring and collar for securing the light to the buoy and for preventing pilferage.

### *Background of the invention*

This invention relates to battery operated buoy lights and more particularly to a unitary light having a cupped lens locked in sealed relation to a tubular battery case, together with cooperating locking means to prevent unlocking of the light and removal of the light from the buoy.

Heretofore, battery operated lights have been provided as sealed units, with or without anchoring means, which can be thrown in the water to float thereon. Such lights had switch means operable from outside the light for turning the light on and off which required sealing means unsuited for long immersion.

### *Summary of the invention*

The present invention contemplates a sealed unit light for an anchored buoy, such as along an inland waterway. A photoelectric cell is provided within the hollow lens for automatically turning the light on at dark and turning it off after dawn when visibility is good. Since many of these lights would be provided along a marked channel it is a requisite that the light operate with the minimum of service or repair and provision must be made for a long lasting and efficient sealing of all the parts within a water proof container. Provision must also be made for locking the light to the buoy and for preventing tampering with or pilferage of the components of the light.

The principal object of the invention, accordingly, is to provide a sealed unit which will remain substantially upright and visible from all directions with provision for locking the light closed and locking the light to the buoy.

Another important object is to provide locking means which may be easily and quickly unlocked for repairs and in which the components are adapted for quick and easy replacement.

A further object is to provide a buoy light which is completely sealed but which may be quickly unsealed by the removal of a single part and in which all the parts are then accessible for quick removal and replacement and which may thereafter be quickly resealed.

Other objects and advantages will become apparent from the following description in conjunction with the appended drawings, in which:

### *Brief description of the drawings*

FIGURE 1 is a side elevational view of a light according to the invention;

2

FIGURE 2 is a plan view of the locking collar portion of the light;

FIGURE 3 is a side elevational view of the locking collar of FIGURE 2, partly in section along the lines 3—3, 3—3 thereof;

FIGURE 4 is a plan view of the locking ring of the light of FIGURE 1, a portion being broken away;

FIGURE 5 is a sectional view on the line 5—5 of FIGURE 4;

FIGURE 6 is a plan view of a gasket;

FIGURE 7 is an enlarged fragmentary sectional view of the light of FIGURE 1 secured to a buoy, a portion of the light being shown in side elevation;

FIGURE 8 is a plan view of the circuit container portion shown in FIGURE 7;

FIGURE 9 is a plan view and FIGURE 10 is a side elevational view of the circuit container cover portion shown in FIGURE 7;

FIGURE 11 is a plan view and FIGURE 12 is a side elevational view of the locking tab portion shown in FIGURE 7;

FIGURE 13 is a fragmentary view of the battery harness portion of the light of FIGURE 1, some of the battery tabs and tab pullers being shown in plan, some in elevation, and one of each in section;

FIGURE 14 is a side elevational view and FIGURE 15 is an end elevational view of the light connector tab portion shown in FIGURE 13;

FIGURE 16 is a front elevational view and FIGURE 17 is a side elevational view of a battery tab portion shown in FIGURE 13;

FIGURE 18 is a sectional view through the tubular battery case of the light of FIGURE 1, showing a battery therein in plan;

FIGURE 19 is a plan view, FIGURE 20 is a side elevational view, and FIGURE 21 is an end elevational view of one of the battery connector pullers shown in FIGURE 13.

### *Description of the preferred embodiment*

The light 25 shown in FIGURE 1 comprises a tubular battery case 26 of plastic material having a sealed bottom 27, and a 360 degree lens 28, inside of which is supported the usual lamp bulb 29.

Light 25 is adapted to be locked to a buoy 30, shown fragmentarily in FIGURE 7, by means hereinafter described.

A plurality of batteries 31, shown as six in FIGURE 1, provide a source of electricity for the bulb 29. Batteries 31 are conventional 6-volt dry-cell batteries having holes 32 and 33 in their upper surface for receiving positive and negative post-type terminals 34 and 35, respectively, which are conventionally mounted on a circular paper battery tab 36 as shown in FIGURES 13, 16 and 17.

The lamp bulb 29 is mounted in a conventional socket 37, shown in FIGURE 7, secured on the top of an inverted-dish-shaped metal circuit container 38, FIGURES 7 and 8. A photoelectric cell 39 is also mounted on container 38 for turning on and shutting off the circuit to bulb 29 in accordance with absence or presence of daylight. Conduit wires for a conventional circuit, not shown, including a flasher device, are enclosed in container 38 connecting socket 37 and photoelectric cell 39 with conventional male and female snap type connectors 40 and 41 mounted on a container cover 42 of relatively stiff plastic sheet material cemented or otherwise secured to the bottom of circuit container 38.

Lens 28 is provided with an outwardly flaring annular flange 43 at its bottom and container 38 has a radially outward projecting flange 44 outward of cover 42. Identical annular gaskets 45 and 46 are provided for either side

of flange 44 as part of a novel arrangement for locking the lens to the battery casing and supporting the electrical parts within the lens.

The tubular battery casing 26 is provided at its upper open end with a metal locking collar 48 secured to the casing by rivets 49, or otherwise, and sealed to the casing as by a drive fit or by cementing. Collar 48 is provided at its upper end with a radially outward projecting flange 50 best seen in FIGURES 2 and 3. Flange 50 terminates in alternating angularly spaced turned up gasket centering tongue portions 51 and radially outward projecting locking lugs 52. Viewing the collar 48 in side elevation, each locking lug 52 terminates in an upwardly sloped camming portion 53 at the right, and in a downwardly turned stop tongue 54 at the left.

Cooperating with collar 48, an annular metal locking ring 55, shown in FIGURES 4 and 5, fits down around lens 28 and has a portion bearing down on the flange 43 of the lens. Outwardly of the flange 43, ring 55 is provided with a radially outward projecting annular flange 56 which terminates in a downwardly projecting annular portion 57. Portion 57 terminates in a plurality, here four, of angularly spaced, radially reentrant portions 58 adapted to pass down between locking lugs 52 of the collar. When the ring is placed downward on the collar and turned clockwise, the reentrant portions 58 are cammed down by the camming portions 53 of locking lugs 52 and are prevented from passing from under lugs 52 by the pendant stop tongues 54.

One or more slots 59 may be provided in the downwardly projecting portion 57 of ring 55 for engagement with a spanner-type wrench or lever for tightening and loosening ring 55.

For connecting the batteries 31 in parallel with the circuits of container 38 a novel harness 60 is provided as shown in FIGURE 13.

A light tab 61 is provided with female and male snap type connectors 62 and 63 for connection with connectors 40 and 41 on container cover 42 in conventional manner. Tab 61 is folded over as shown in FIGURE 15 and secured together by rivets 64. Conduit wires, denoted generally as 65 throughout the harness, are joined to connectors 62 and 63, as shown.

Each battery is provided with a battery tab 36, as described above, and between the tab and battery a tab puller 66 of tough resilient sheet material, such as fish paper, is provided. Five tabs 36 and five pullers 66 are shown in FIGURE 13. The post-type connectors 34 and 35 from each tab 36 pass through appropriate holes 67 and 68 in the puller 66 and the puller is provided with a pull tab 69 which projects out radially of the battery beyond tab 36. Diametrically opposite the pull tab, the puller has a portion 70 projecting radially beyond the battery and at the end of portion 70 a portion 71 is turned up and provided with an elongated hole 72, as shown, through which conduit wires 65 pass. Pull tab 69 provides a convenient finger grip to assist in withdrawing the connectors of battery tab 36 from the battery and the portion 71 holds wires 65 in position spaced from the center of the battery.

In assembling the light 25 the harness 60 may be secured to the batteries and the batteries then lowered into the case 26. Wires 65 are spaced from the center of each battery by the puller portion 70 so that by grasping the light tab 61 the batteries hang suspended substantially in position for easily inserting them in proper order in the case. Harness 60 may likewise be used to pull the batteries from the case for replacement.

When gasket 46 has been placed within the centering tongues 51 on flange 50 of collar 48, the snap connectors on light tab 61 may be snapped together with the connectors on cover 42, and the circuit container 38 placed in position with flange 44 in place on gasket 46. Gasket 45 is then put in place on flange 44 and lens 28 put in place with its flange 43 resting on gasket 45. Ring 55 is then

placed downward around lens 28 with the reentrant flange portions passing between locking flanges 52. When the ring is rotated clockwise by hand or by means of a spanner, ring 55 and collar 48 are locked together. Ring 55 compresses flange 43 of the lens against gasket 45, flange 50 of the collar is compressed against gasket 46, and flange 44 of the circuit container is compressed between gaskets 45 and 46.

All the parts of light 25 are thus sealed in a body comprising case 26 and lens 28. Furthermore all the circuit parts in container 38 including socket 37 and photoelectric cell 39 are easily removable as a unit for replacement by loosening and removing the ring 55. Batteries 31 may likewise be quickly removed for replacement by pulling them out of the case by the harness 60.

The locking device comprising ring 55 and collar 48 is also utilized to lock light 25 to a buoy 30 by a device which also secures the locking device against pilferage.

Buoy 30 is conventional except that a well is provided therein by cementing, or otherwise securing, a tubular plastic light receiver 75 to the deck 76 of the buoy (FIGURE 7). A relatively short portion of the tube 75 projects about deck 76 and a relatively long portion projects below the deck. A collar 77, also of plastic material, is cemented or otherwise secured around the portion of tube 75 projecting above the deck and a conventional anti-theft locking screw 78 is provided in a threaded hole through collar 77 and tube 75. Screw 78 has a round head provided with an axially disposed hexagonal socket 79 for engagement with an allen-head type of wrench or key, not ordinarily carried by passers-by.

To lock the light 25 in the well of the buoy and to prevent unauthorized loosening of ring 55, a metal tab 80, having a hole therein for the screw 78, is provided. Tab 80 is arcuate as shown in FIGURE 11 so that it fits flush against collar 77. The upper portion 81 of tab 80 is elongated so as to extend up within ring 55 between a pair of adjacent lugs 52 of the collar 48, and, as viewed from the right in FIGURE 7 has a hooked portion 82 projecting to the left, as shown in FIGURE 12, so as to extend circumferentially of collar 48 above one of the locking lugs 52 to prevent withdrawal of light 25 from the buoy well.

The light 25 is thus locked to prevent removal of the light and tab 80 is of sufficient width to prevent unauthorized removal of the ring 55. For maintenance personnel provided with a suitable key for the locking screw 78, however, the screw may be quickly removed for withdrawal of the light or for access to the interior of the light.

As will be apparent to those familiar with the art, the invention may be embodied in other specific forms without departing from the spirit or essential characteristics thereof. The embodiment disclosed therefore is to be considered in all respects as illustrative, rather than restrictive, the scope of the invention being indicated by the appended claims.

What is claimed is:

1. A buoy comprising a tubular plastic battery case sealed at its bottom end for holding a plurality of square 6-v. batteries adapted to receive post-type connectors, a locking collar secured in sealed relation to the upper end of the case and having a radially outward projecting annular flange terminating in a plurality of angularly spaced and outwardly projecting locking lugs, a hollow 360 degree lens having a radially outwardly flaring annular flange at its lower open end, an inverted-dish-shaped circuit container having a flat annular flange therearound and bearing a light bulb socket on its top within the lens, a pair of annular gasket members each adapted to sealingly contact an opposite side of the circuit container flange, and an annular locking ring adapted to fit over the lens flange, the locking ring having an annular flange which projects radially outward and terminates in a downwardly projecting annular portion, the

5

downwardly projecting portion bearing a plurality of radially reentrant portions adapted to fit down between the lugs of the collar and to engage the under side of the lugs when the ring is turned with respect to the collar, the locking lugs each having an inclined portion for camming the reentrant portions of the ring downward for compressing the lens flange against one gasket, compressing the collar annular flange against the other gasket, and compressing the container flange between the gaskets when the locking ring is turned with respect to the collar thereby sealing the lens to the battery case.

2. The buoy light defined in claim 1 and including a photoelectric cell mounted on the top of the circuit container within the lens for turning the light on and off, and a cover secured to the bottom of the circuit container and having snap-type electrical connectors secured to the bottom thereof in proximity to batteries in the tube, the snap-type connectors being connected in a circuit including the photoelectric cell and the light bulb socket by conduit wires enclosed within the container.

3. The buoy light defined in claim 2 and including a battery harness comprising a light tab having snap-type electrical connectors mounted thereon engageable with the connectors on the container cover, a battery tab for each battery having post-type connectors mounted thereon, a connector puller for each battery adapted to be mounted between the battery tab and the battery, each puller having holes therethrough for passage of the connector posts and having a pull tab adapted to project radially of the battery beyond the battery tab, each puller also having a wire guide tab adapted to project radially of the battery and project beyond the battery, the guide tab having a wire orifice through the latter projecting portion, and conduit wires connecting the light tab connectors and the battery tab connectors for connecting the batteries in parallel, the wires passing through the guide tab orifices for supporting the wires alongside the batteries, whereby the batteries may be lowered by the harness into the tubular case.

6

4. A buoy and buoy light in combination, the light having an elongated tubular battery case, a hollow 360 degree lens having an outwardly flared annular bottom flange, a collar secured to the top of the case and having a radially projecting annular flange terminating in a plurality of angularly-spaced radially-projecting locking lugs, and a locking ring having an annular portion engaging the lens bottom flange and projecting radially of the ring and terminating in a downwardly projecting annular flange, the downwardly projecting flange bearing a plurality of angularly-spaced radially-reentrant locking portions adapted to pass down between the lugs of the collar and to engage the under side of the lugs when the ring is turned to locked position with respect to the collar; the buoy having a deck and a vertically-extending light-receiving tube secured to the deck and projecting a comparatively short distance above the deck and a comparatively long distance below the deck; a metal locking tab removably secured alongside the upper end of the buoy tube and having a hooked portion extending up into the light locking ring between adjacent collar locking lugs when the ring is in locked position; and a theft-proof-type bolt threaded into the buoy tube through a hole in the locking tab thereby securing the locking tab to the tube for preventing unlocking the ring from the collar and removal of the light from the buoy tube.

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U.S. Cl. X.R.

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