Dec. 10, 1963 R. E. KOLLER 3,113,729

STERN LIGHT REFLECTOR

Filed July 17, 1961

Fig. 2

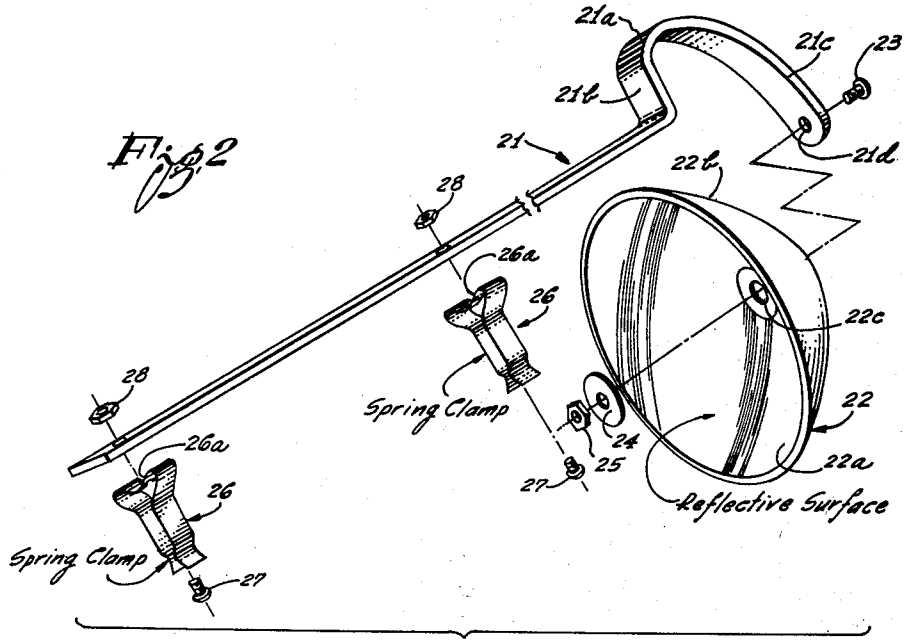


Fig. 1

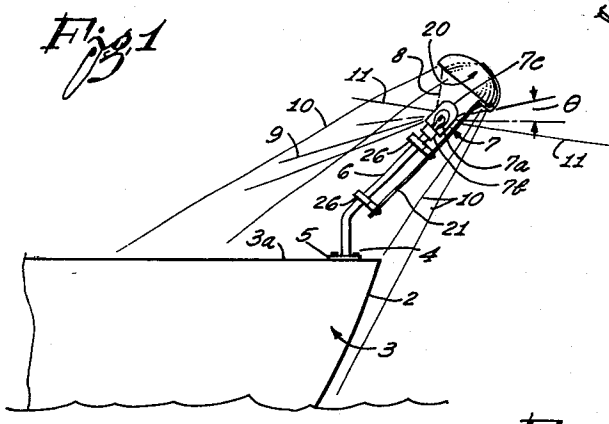


Fig. 3

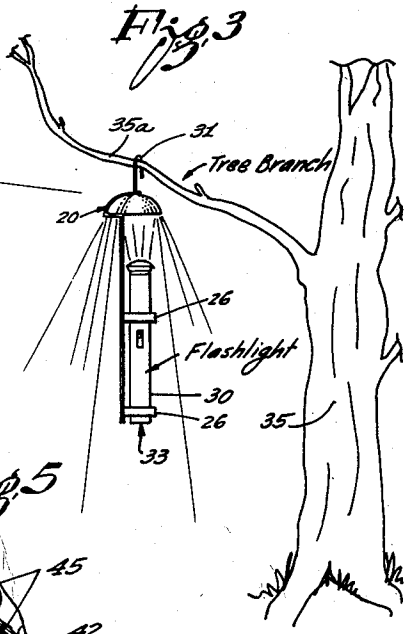


Fig. 4

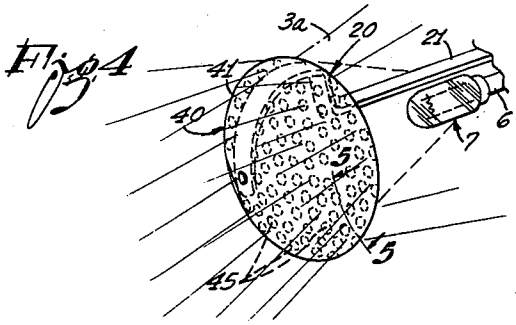
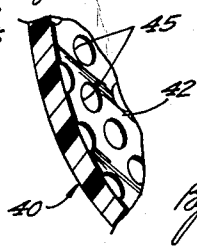


Fig. 5



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3,113,729

Patented Dec. 10, 1963

3,113,729

STERN LIGHT REFLECTOR

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Filed July 17, 1961, Ser. No. 124,678
5 Claims. (Cl. 240—41.1)

A marine light fixture embodying this invention fulfills simultaneously the dual functions of navigation light and deck luminaire. These results are achieved through use of a novel fixture structure generally comprising a source of illumination having at least a hemispherical radiation pattern, an elongated fixture support for supporting the light source in an elevated position relative to the deck, and a unique light reflector unit secured to the fixture support in a position above the light source. This arrangement permits horizontal and downward radiation of light, but collects enough of the normally-wasted, upwardly-directed light and deflects it generally downwardly to reinforce the intensity of the light falling on the deck. Hence, the marine light fixture of this invention provides deck illumination while the boat is anchored in port as well as while underway.

Notwithstanding the long history of pleasure, residential, and commercial boating, and the demand for a single fixture combining the functions of navigation and deck luminaire, the prior art apparently has been unable to satisfy this need. In the past, a typical elevated navigation light for small boats has been formed merely by mounting a light source, usually electric, on or near the upper end of the stern post. The radiation pattern of the light source ordinarily was semi-spherical. Hence, the light radiated outwardly at angles approaching the vertical, contributed nothing to the signal utility of the light; it never reached the eyes of other mariners and was wasted. Moreover, the light normally radiated downwardly on the deck area beneath the light source was insufficient for most visual tasks.

It has been found, however, that collection and redirection of the normally-wasted, upwardly-directed light will increase the intensity of the deck illumination level sufficiently to enable the performance of many recreational and working activities requiring perception of small details. Furthermore, this salutary result can be achieved inexpensively, and without diminishing the usefulness of the light source as a navigation signal to other mariners.

A first embodiment of this invention comprises a light source affixed to one end of an elongated support, and a light reflector unit having a concave reflector positioned above the source to collect the normally-wasted, upwardly-radiated light and reflect it downwardly onto the deck of the vessel. The light reflector unit includes the concave reflector and a bracket for securing the reflector detachably to the elongated support.

A second embodiment of this invention comprises a light source mounted on one end of an elongated support, a reflector unit having a concave reflector body made of light transmissive material, disposed above the light source. The reflector unit includes a detachable mounting bracket, and the reflector body has a perforated layer of light reflecting material disposed over at least a portion of its concave surface. Like the first embodiment, the reflector is supported above the light source on the detachable bracket in order to collect the normally-wasted, upwardly-radiated light, and reflect it onto the deck of the vessel. The perforations in the layer of reflecting material permit light from the source to pass into the light transmissive body. The resulting glow enhances the signal utility of fixtures embodying this modification of the invention, while reflecting downwardly enough light to illuminate the deck beneath. The reflector body may be

made of clear or colored plastic to provide desirable aesthetic or signal effects.

The aforedescribed reflector unit is especially unique, for it may be detached from the fixture and utilized separately for diverse applications. For example, it may be attached to the elongated body of a flashlight to form a camplight, which can be hung from a tree branch or set on a table top to provide properly distributed illumination for various visual tasks. This feature would be of particular interest to boating enthusiasts who may desire to camp ashore during overnight trips.

The foregoing paragraphs are intended to summarize and explain the significance of this invention in relation to the problems which it resolves, and should not be construed to narrow the scope of protection delineated by the claims set forth below. For a more complete understanding of the structure and novel features of the preferred embodiments, consider the following description with reference to the drawing wherein:

FIGURE 1 is a side elevation of a novel marine light fixture of this invention installed on the stern post of a boat;

FIGURE 2 is a perspective view representing in exploded relation the essential structural components of a first embodiment of this invention;

FIGURE 3 illustrates an alternative application of the unique reflector and bracket structure utilized in the marine fixture of this invention;

FIGURE 4 is a perspective view of the unique reflector utilized in a second embodiment of this invention; and

FIGURE 5 is a perspective and partial cross-section of a segment of the reflector of FIGURE 4 viewed along the plane 5—5.

In FIGURE 1, the novel marine light fixture 1 of this invention is depicted in a typical installation on the stern 2 of a small boat 3. The fixture 1 is secured in position on the afterdeck 3*a* of boat 3 by bolts, or screws 4 through the base member 5. The elongated support 6 of fixture 1 preferably is inclined rearwardly as shown so that the light source 7 will occupy a position beyond the scope of normal activities on the afterdeck 3*a*. This minimizes the possibility that light source 7 may be damaged accidentally, and insures that it will not obstruct movement in the space above the deck.

With the light fixture 1 rearwardly inclined as portrayed in FIGURE 1, the unique reflector unit 20 will collect the normally-wasted upwardly-directed components 8 of light radiated from the light source 7, and redirect and distribute them over the surface of afterdeck 3*a*. As a result, the comparatively weak components 9 of light radiation emanating directly from light source 7 toward afterdeck 3*a* will be reinforced by the reflected components 10, and the intensity of illumination will be increased sufficiently to enable the performance of many visual activities which otherwise would be difficult if not impossible.

The design of reflector unit 20 and the relationship between the latter and the light source 7 are such that light rays 11 having principal horizontal components may be radiated directly from light source 7 without obstruction from reflector unit 20. The elevation angle θ between the horizontal plane through the light source 7 and the inclined plane intercepting the closest edge of reflector unit 20 is made large enough to prevent obstruction of rays 11 in the horizontal plane for any likely degree of roll and pitch of the boat 3. As a consequence, the rays 11 always should be visible to other mariners in the vicinity.

From the foregoing, it should be apparent that the marine light fixture 1 utilizes nearly all of the light radiated from light source 7 in fulfilling its dual function as navigation light and deck luminaire.

The light source 7 is comprised of a lamp 7*a* and lamp

holder 7b of conventional design. The radiation pattern of source 7 is at least hemispherical but preferably semi-hemispherical. The lamp 7a is designed to withstand moisture and other deleterious agents encountered in marine use. Moreover, the lamp 7a may be provided with a protective globe 7a and may be coupled to a source (not shown) of electric power via wires (not shown) which may be carried, preferably, within the hollow interior of the elongated support 6.

The interrelationship of the components of a first embodiment of the unique reflector unit 20 is represented in the exploded view of FIGURE 2. As depicted in this figure, the reflector unit 20 is made up principally of an elongated bracket 21, a reflector 22 having a concave reflecting surface 22a, and two resilient spring clamps 26 for removably recurring the bracket 21 to the elongated support 6.

The elongated bracket 21 has an offset bend 21a having a transverse segment 21b and an arcuate segment 21c. The curvature of arcuate segment 21c approximates the curvature of the convex surface of reflector 22, and is provided with a hole 21d adjacent to its terminus at the end of bracket 21.

The offset bend 21a makes it easy to secure reflector 22 firmly in position on bracket 21. When the edge 22b of reflector 22 is positioned in the bend 21a between transverse segment 21b and arcuate segment 21c, the bolt 23 may be inserted through coaxially-aligned holes 21d of bracket 21 and hole 22c of reflector 22, and secured firmly in place with washer 24 and nut 25.

The cup-shaped reflector 22 has a concave reflecting surface 22a and a mounting hole 22c. The reflecting surface 22a is designed to distribute reflected light from light source 7 over at least a portion of the afterdeck 3a of the vessel 3 when the reflector is positioned on the elongated support 6 in the manner represented in FIGURE 1. In accordance with optical principles well known in the art, the distribution of light on the afterdeck 3a will be a function of the curvature of the reflecting surface 22a, the size of light source 7, and the distance between the light source and reflecting surface 22a. According to one of the important features of this invention, the distance between reflector 22 and light source 7 may be adjusted easily merely by sliding the spring clamps 26 up or down the elongated support 6. In this manner, the area covered by the light reflected from reflecting surface 22a may be varied as desired.

The U-shaped resilient spring clamps 26 are secured at the center of their respective transverse segments 26a to bracket 21 in spaced-apart relation with bolts 27 and nuts 28.

The unique reflector unit 20 may be removed from the elongated support 6 for storage or other applications merely by pulling the spring clamps 26 away from elongated support 6.

A separate application of reflector unit 20 in providing a camp light is illustrated in FIGURE 3. Here, a flashlight 30 is positioned between the resilient leaves of spring clamps 26 where it is held firmly, with light rays directed upwardly onto the reflecting surface of reflector 22. A hook 31 may be provided at the apex of reflector 22 to make it possible to hang the resulting flashlight-reflector assembly from any convenient spot above the area to be illuminated.

In FIGURE 3, for example, the flashlight-reflector unit assembly is shown suspended from a branch 35a of tree 35. Alternatively, the flashlight-reflector assembly may be emplaced on a flat surface by balancing it on its lower end 33. For example, the flashlight-reflector assembly could be utilized in this way to illuminate the top of a camp table.

In FIGURES 4 and 5, a second embodiment of the novel marine light fixture of this invention is represented. This embodiment is characterized by the use of a light transmissive reflector 40 having a concave reflector body 41 made, for example, of molded plastic. The concave surface of reflector body 41 is covered with a reflective layer 42 having a plurality of perforations 45 for passing at least a portion of the light from source 7 into the light transmissive reflector body 41. The perforated reflecting layer 42 may be disposed over all or only a portion of the concave surface of reflector body 41, and the reflector 40 may be mounted on bracket 21 in the same manner described above in connection with FIGURES 1 and 2.

The perforations 45 in the reflector surface 42 allow a portion of the incident light to pass into the light-transmissive reflector body 41. This feature makes it possible to provide adequate light for signal purposes regardless of the spacing between the reflector body 41 and light source 7, while, at the same time, providing enough reflected light to reinforce adequately the light rays 10 normally falling on afterdeck 3a. Furthermore, the use of a monochromatic light transmissive material for body 41 will enable compliance with any local rules and regulations regarding the color of signal lights, and will enhance the aesthetic appearance of the light fixture. Hence, the light-transmissive reflector body 41 and the perforations 45 effectively illuminate the convex side of reflector 41, and this makes it possible to reduce the distance between light source 7 and the reflecting surface 42 to an extent sufficient to compensate for the light passed by perforations 45, and without resulting in obscuration of signal light in any direction.

It should be noticed, of course, that the reflector 22 of FIGURE 2 also may be made of molded plastic or other material which either is inherently corrosion resistant or is provided with a suitable corrosion-resistant coating. The reflector surface 22a for a plastic reflector 22, and the reflective layer 42 of the reflector body 41 could be made of any suitable material bonded, or otherwise fastened adhesively or mechanically, to cover the concave surface. Moreover, the bracket 21 and various other components of the novel fixture also could be made of plastic. The bracket 21 could be secured to reflector 22 or reflector body 41 in many ways, the one described being used merely for illustrative purposes.

The reflector body 41 of the second embodiment may be fabricated either of transparent material or translucent material, the latter being especially desirable if a glow effect is desired and the former being desirable if maximum light transmissivity from the convex surface is of major importance.

To collect and control the distribution of reflected light 10, it is essential only that the reflector 22 of FIGURE 1, and the reflector body 41 have concave surfaces of sufficient curvature. However, if it is desired that the reflected light be concentrated to provide maximum brightness on a comparatively small portion of the afterdeck 3a, the curvature of the concave surfaces is made to conform to a paraboloid of revolution, and the reflector unit 20 is adjusted on support 6 so that light source 7 is at or near the focus of the reflector.

The representations in the drawing and the foregoing text are intended merely to facilitate the practice of this invention by persons skilled in the art, not to restrict its scope. It is obvious that many variations may be made with the respect to the described embodiments while remaining within the ambit of the following claims.

I claim:

1. A lighting fixture comprising an elongated supporting bracket including a body having a front side and a rear side and including a transversely extending portion at one end thereof extending rearwardly from the rear side of the body of said bracket, said bracket including an arcuate-shaped upper end portion integral with the said rearwardly and transversely extending portion and extending upwardly away from the said rearwardly and transversely extending portion and thence laterally forwardly from the front side of said supporting bracket and

providing a space between the body of said supporting bracket and the said transversely and rearwardly extending portion thereof, and a light reflector unit including a body having a portion arranged within the said space, and means for detachably attaching the said light reflector unit to the said arcuate-shaped upper end portion of said supporting bracket in position such that the longitudinal axis of said light reflector unit is generally parallel to the longitudinal axis of said supporting bracket but forwardly of the said front side thereof.

2. A lighting fixture as defined in claim 1 which is adapted to be attached to a generally upright supporting member and which includes clamping units attached to the said body of said supporting bracket in spaced relationship axially the said body thereof for attaching the said supporting bracket to said generally upright supporting member in parallel relationship thereto, and in which a light source is attached to the said supporting member at the upper end thereof and in axial alignment with said reflector unit for directing light against the said reflector unit.

3. A lighting fixture as defined in claim 1 which includes clamping units attached to the said body of said supporting bracket in spaced relationship axially therealong, and in which a light source is carried by said clamping units below and in axial alignment with said reflector unit for directing light against said reflector unit.

4. A lighting fixture as defined in claim 1 which said reflector unit includes a body having a lower concave reflecting surface.

5. A lighting fixture as defined in claim 1 which said reflector unit includes a reflector body of light-transmissive material and has a concave reflecting surface, and in which a layer of light-reflective material is arranged over at least a portion of the said concave reflecting surface of said reflector body and has a plurality of perforations formed therein to enable light to pass from the said light source through the said perforations against the said concave reflecting surface of said reflector body.

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