

July 7, 1931.

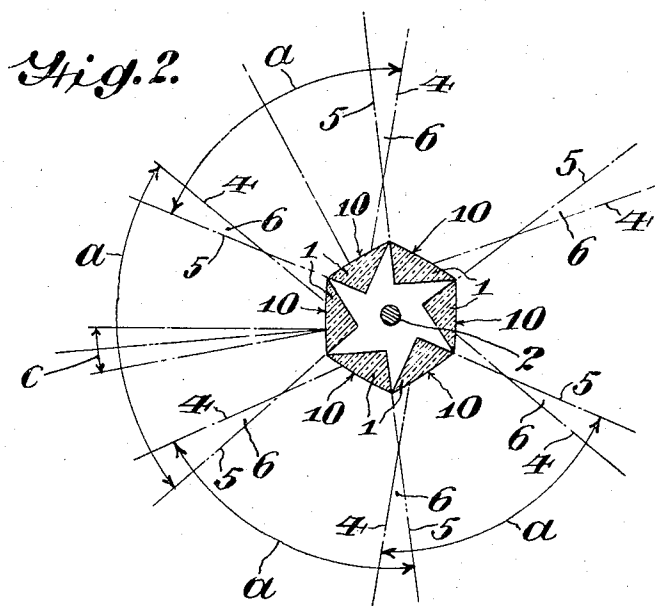
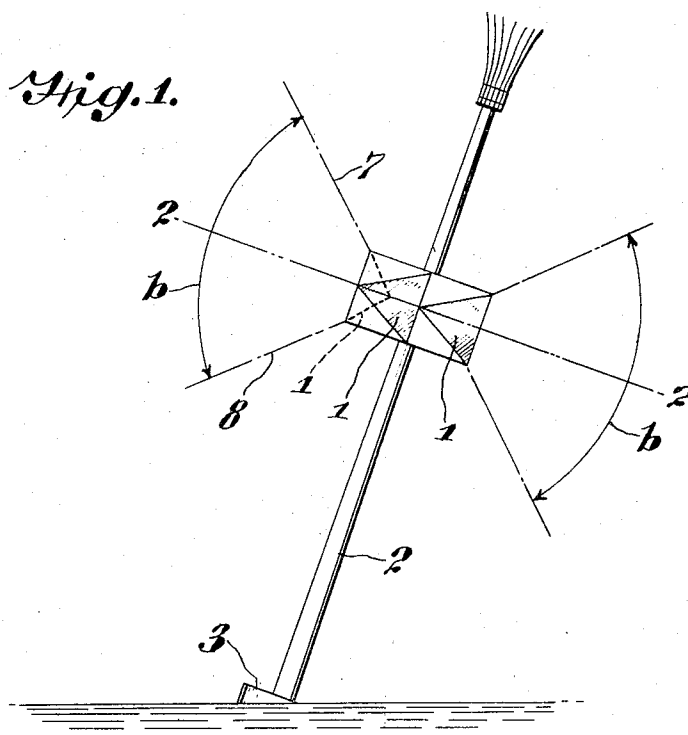
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MARINE LIGHT SIGNAL REFLECTOR

Filed Dec. 21, 1928

2 Sheets-Sheet 1



Inventor

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July 7, 1931.

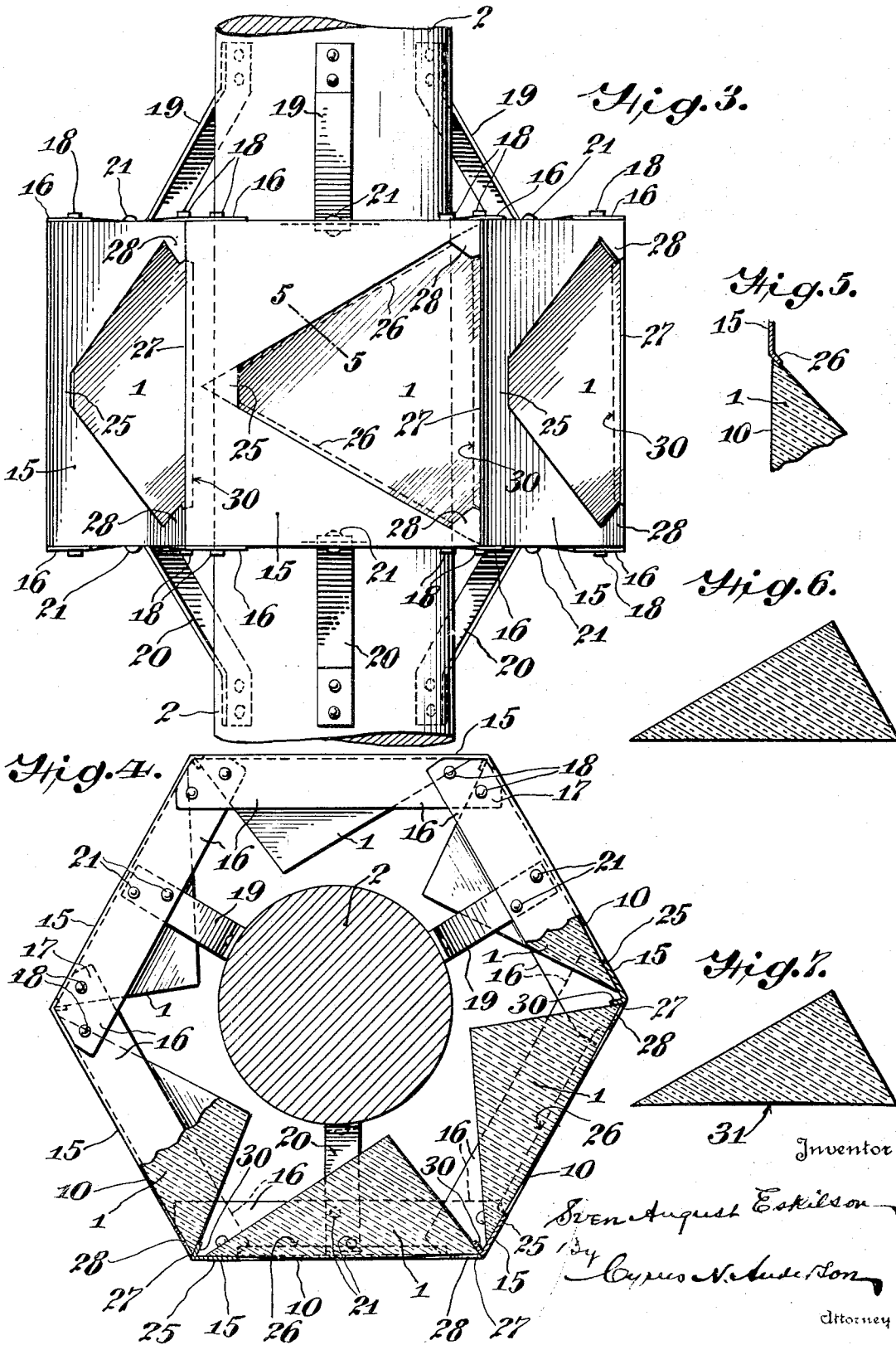
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UNITED STATES PATENT OFFICE

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MARINE LIGHT SIGNAL REFLECTOR

Application filed December 21, 1928, Serial No. 327,514, and in Sweden December 30, 1927.

My invention relates to reflector signals adapted for marine use wherein the reflectors employed are of a character to reflect rays of light back toward the source of light. Reflectors of that character may be variously constructed but that type of reflector comprising three reflecting surfaces converging to a point and in which the surfaces are arranged either at right angles or approximate right angles with respect to each other is that most generally employed at the present time. Such reflectors may be of solid or hollow type and I have chosen to illustrate an embodiment of my invention as comprising solid reflectors in substantially the form of tetrahedrons.

Reflectors of tetrahedral shape as illustrated may be constructed with such perfection that the rays of light from a source of light located within the angle of action of the reflector are reflected back in exact parallel relation to the incident ray and to the light source so that anyone located even a short distance from the light source may not be able to see the reflected light. When reflectors of this type and character are employed it is desirable for practical reasons that there shall be a requisite amount of light dispersion. Such dispersion may be effected in various ways. For example, the rays may be dispersed by roughening one or more of the light reflecting surfaces; or if the reflector consists of a solid tetrahedron then the dispersion of the light may be effected by roughening the surface through which the incident and reflected light rays enter and leave the solid tetrahedral body; or by having the said surface spherical; also dispersion may be effected by placing in front of the reflector, whether solid or hollow, a light dispersing means.

By the angle of action to which I have previously referred I mean that angle in front of a reflector within which a source of light must be located in order that the light rays from a source of light may be reflected back in a direction toward such source.

In order that a reflector device of the character above indicated shall be suitable for marine use it is necessary that it be so

constructed as to reflect light rays back toward a source of light from any position occupied by such source at any point radially of the reflector and in a substantially horizontal direction therefrom.

The general object, therefore, of my invention is to provide a light reflector signal with the reflectors thereof so constructed and arranged as to reflect light rays from a source of light back in the direction of the same no matter in what position such light source may be located radially and horizontally with respect thereto.

It also is an object of the invention to provide means of novel construction for supporting the reflector units of such a reflector in such relation to each other as to accomplish the result hereinbefore set forth as the general object of the invention.

To these and other ends the invention comprehends the construction and arrangement as hereinafter described in detail and particularly pointed out in the claims.

In order that the invention may be understood readily and its practical advantages fully appreciated reference should be had to the accompanying drawings wherein I have illustrated an embodiment of the invention in the form at present preferred by me, but it will be understood that the invention may be embodied in forms other than that illustrated and that changes in the details of construction may be made within the scope of the claims without departing from the invention or the principle thereof.

In the drawings:

Fig. 1 is a view in side elevation illustrating in more or less diagrammatic form a structure embodying the principle of my invention;

Fig. 2 is a similar view showing the same in transverse section taken on the line 2—2 of Fig. 1;

Fig. 3 is a view in side elevation of a structure embodying the invention, including the means for supporting the reflector units;

Fig. 4 is a view in transverse section of a supporting column and showing the reflectors and the means for supporting the same upon the said column in top plan;

Fig. 5 is a view in transverse section taken on the line 5—5 of Fig. 3 showing a fragmentary portion of the structure;

Fig. 6 is a view showing a solid reflector in section, the front face thereof being flat or plane; and

Fig. 7 is a similar view in which the front face is slightly spherically concaved.

In the drawings I have shown reflectors 1 which in the construction as illustrated consist of solid tetrahedrons the surfaces of which converge to a point in known manner, and being reflecting constitute what are called central triple reflectors. As already has been indicated, the reflectors need not of necessity be of the solid character or type as illustrated but may be of hollow character or type.

The reflectors in Figs. 1 and 2 are shown in association with a post or column 2 by which they are supported, the means for connecting the same and effecting their support upon the said column being omitted from the said figures. The said post or column 2 is in turn mounted or supported upon a floating buoy 3 of any known preferred construction.

As will be observed by reference to Fig. 2, the reflectors are arranged about the axis of the post or column 2 and broadly may be stated to be located in a plane extending at right angles to the axis of said column. The reflectors are located in contiguous relation to each other, an acute angle of each front surface thereof being located in adjoining relation to the middle point of the base of the front surface of the adjoining reflector. Such relationship is clearly shown in Fig. 1 of the drawings and also in Fig. 4.

In Fig. 2 of the drawings I have indicated by the dash and dot lines 4 and 5 the angles of action of the respective reflector units 1 in a plane extending transversely of the support 2, which may be a plane coincident with a plane bisecting the reflector units and extending at right angles to the axis of the supporting post of column 2. These angles I have indicated at α .

By what has been stated already it will be understood that the rays of light from a source of light located within an angle formed by the dash and dot lines 4 and 5 of any unit are reflected back in a direction toward the said source and if the requisite amount of dispersion is present they will render the reflector visible to persons located at points a distance from the source of light. In the case of reflectors of the character of those indicated the angle of action may be sixty degrees or even greater. It will be noted that the angles α of adjoining reflectors overlap each other as indicated at 6.

In Fig 1 of the drawings I have indicated by the dash and dot lines 7 and 8 the angle of action in vertical directions of the respective units, the angles between the said lines 7 and

8 being designated by the letter β . These angles β may be sixty degrees or even greater.

By arranging the reflectors in a circle around the axis of the support or column 2 it will be apparent that the rays from a source of light located anywhere radially of the reflector signal and within an angle β will be reflected back toward the source of light, and if the requisite dispersion thereof be effected the reflector will be visible to a person located laterally of the said source.

Such dispersion may be effected by constructing the front surface through which the incident and reflected rays enter and leave the reflector of spherical shape, either convex or concave. In Fig. 2 I have indicated the said surfaces as being convex, as indicated at 10.

The angle between the incident and reflected rays from a source of light is called the angle of dispersion. The radius of curvature of the front surface should be small so as not to effect too great a dispersion of the light. A curvature which will produce an angle of dispersion of approximately three degrees, as indicated at c in Fig. 2, has been found to be very satisfactory.

Although both the buoy 3 and the source of light probably will be located upon the surface of a body of water and therefore may be described broadly as occupying the same horizontal plane, yet the relation between the source of light and the reflectors 1 of the reflector structure may vary very substantially with respect to each other, as is indicated in Fig. 1 of the drawings. In that figure the support 2 is shown as occupying a substantial inclination with respect to a horizontal plane, which indicates one way in which the relation of the light source to the reflector units 1 may be varied.

For the purpose of supporting the reflector units 1 in substantially the relationship to each other as illustrated in Figs. 1 and 2 of the drawings I have provided a supporting frame comprising a number of plates 15 arranged in edge to edge relation with relation with respect to each other and extending in parallel relation to the axis of the supporting post or column 2. There are six of these plates, as illustrated, which when placed edge to edge as shown produce a figure of hexagonal shape, as is clearly apparent from Fig. 4. The upper and lower ends of each of these plates are provided with inwardly turned flanges 16, the ends of adjoining flanges being overlapped as indicated at 17 and secured together by means of screws 18. Any other suitable removable or detachable means may be employed for securing together the overlapping end portions of the flanges 16. For supporting the plates 15 and the reflectors mounted thereon upon the post or column 2 I have provided upper and lower metal supports or braces 19 and 20.

The upper ends of the braces 19 and the lower ends of the braces 20 are secured to the post or column 2 while the opposite ends thereof are secured by a suitable fastening means, such as screws 21, to the flanges upon the upper and lower ends of the plates 15.

Each of the plates 15 is provided with an opening, which may be described generally as of triangular shape, within which openings the reflector units 1 are mounted. The upper and lower sides of the openings converge toward each other, as indicated in Fig. 3 of the drawings, but terminate before they reach their point of convergence so as to provide a portion at 25 under which one end of a reflector may be located. Each of the converging edge portions of each opening is provided with an inwardly turned flange, as indicated at 26. These flanges are inclined toward the opening, as is clearly shown in Fig. 5 of the drawings, and are adapted to engage the inclined edge portions of the adjoining surfaces of the reflector 1 which may be located in the said opening. Although the opening of each plate 15 is cut through to one edge thereof, as indicated at 27 in Fig. 3 of the drawings, the upper and lower converging edges thereof do not extend through to the edge but terminate inwardly from said edge so as to provide projections 28 at the upper and lower corners of the said openings. These projections are adapted to overlie the adjoining corners of a reflector which may be mounted upon a plate.

It will be seen by reference to Fig. 3 that the portion 25 of each plate and the corners 28 thereof overlie the reflector which may be mounted therein so that it cannot be removed toward the front, neither can it be removed by a movement inwardly or toward the axis of the support because such movement is prevented by the flanges 26. The edge portion of the reflector at the base of the front surface thereof is seated against an inwardly and slightly laterally extended flange 30 of an adjoining plate so that when a reflector has been placed within an opening of one plate and the plate adjoining the base edge of the front surface of the said reflector has been placed in position, it is then impossible to remove a reflector without first removing the last mentioned plate.

Upon reference to Figs. 3 and 4 the relation of the plates 15 to each other and of the reflectors to each other and to the said plates will be quite apparent.

As has been pointed out already, the front surface of each reflector unit may be concave and spherical as indicated at 31 in Fig. 7 instead of spherical and convex as has been described in connection with Figs. 1 to 4 of the drawings.

It will be understood also that the front surface of the respective reflector units may be flat or plane, as indicated in Fig. 6 of the

drawings, in which event some other known means may be employed for producing the required dispersion of the reflected rays of light.

It will be seen that my invention is especially adapted for use as a marine light reflector signal particularly in positions where it is likely to be approached from any direction radially of a vertical axis, but conditions might arise which would adapt it for use for other purposes. I desire it to be understood, therefore, that the invention is not limited for use as a marine signal alone but that it may be used for other purposes for which it may be found to be adapted.

Having thus described my invention, what I claim and desire to secure by Letters Patent is:

1. A light reflecting device of the character described comprising a plurality of solid reflectors of tetrahedral shape, an upright support, means for mounting the said reflectors in a circle around said support in contiguous relation to each other, the front faces of said reflectors being of triangular shape and each front face having an acute angle in adjoining relation to the middle point of a side of the front face of an adjoining reflector.

2. A light reflecting device of the character described comprising a plurality of solid light reflecting units the light reflecting surfaces of each of which converge to a point and are arranged in right-angular relation to each other and the front surface of each of which reflectors is spherical, a supporting column, and means for mounting the said reflectors in a circle around the said column with the axes of the said reflectors converging toward the axis of the said supporting column, the said reflectors being located in contiguous relation to each other, and the front surfaces of said reflectors being of triangular shape, an angle of one surface being in adjoining relation to the middle point of a side of the front surface of an adjoining reflector.

3. A reflector signal device comprising a plurality of supporting elements arranged in edge to edge relation to each other around an upright axis, reflector units mounted in the said supporting elements, means provided upon each element for retaining the reflector unit mounted thereon against movement either inwardly or outwardly, and the said unit being engaged by an adjoining supporting element to prevent removal thereof from its supporting element laterally.

4. A light reflecting device adapted for marine signaling comprising an upright supporting column, a plurality of plates arranged in edge to edge relation around the said column, the said plates forming a figure of hexagonal shape, means for supporting said plates upon said column, each of the said plates having triangular openings therein two of the converging edges of which are

provided with inwardly extending flanges, the said edges terminating in advance of the point toward which they converge, the plate at the other edge of said opening being cut away so as to leave projections at the outer ends of the first named edges, and the edge of a plate adjoining the open portion of said opening being provided with an inwardly extending flange, and a central triple reflector mounted in said opening with its corners located underneath the said projections and underneath the portion of the said plate in adjoining relation to the point to which the first named sides of the said opening converge, and the said reflector being retained against inward movement by the said flanges.

5. Means for supporting a plurality of reflectors in a circle around an upwardly extending axis comprising an upright supporting member, a plurality of plates arranged in edge to edge relation around the said supporting member, which plates are provided with inwardly extending flanges at their opposite ends, the ends of which flanges overlap each other, means for securing the said flanges together, means for supporting the plates thus united upon the said upwardly extending supporting member, and the said plates being provided with means for supporting the said reflectors in contiguous relation in a circle extending around the said supporting member.

6. A light reflecting device of the character described comprising a plurality of light reflector units, each unit comprising three reflecting surfaces arranged in approximate right angular relation to each other, the front ends of said reflector units being of triangular shape, a supporting column, and means for mounting the said reflector units on the said supporting column in a circle extending around the same with the axes of the said reflector units converging toward the axis of the said supporting column, the said reflector units being located in contiguous relation to each other and the front ends of the said reflector units being of triangular shape, an angle of the end of one reflector unit being in adjoining relation to the middle point of a side of the end of an adjoining reflector unit.

In testimony that I claim the foregoing as my invention, I have hereunto signed my name this 4th day of December, A. D. 1928.

SVEN AUGUST ESKILSON.