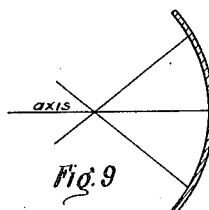
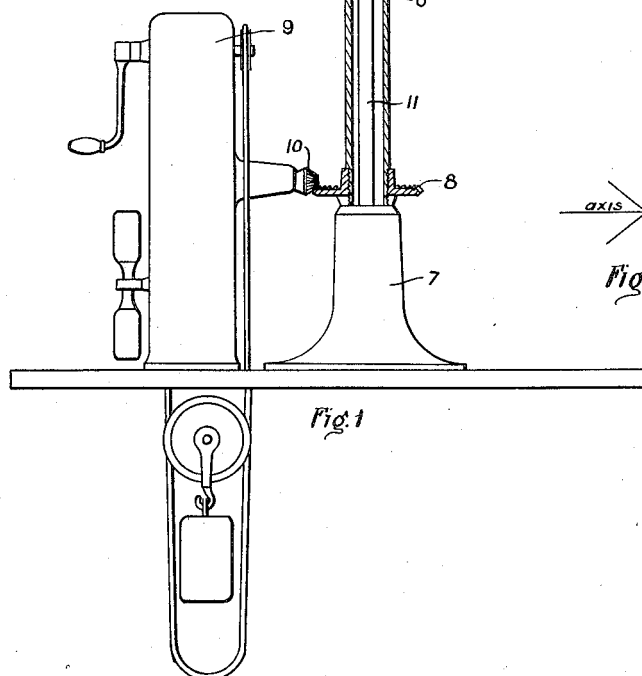
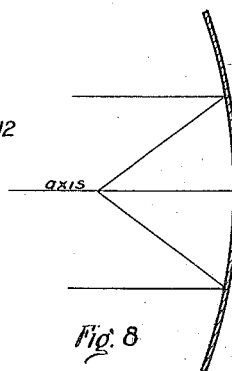
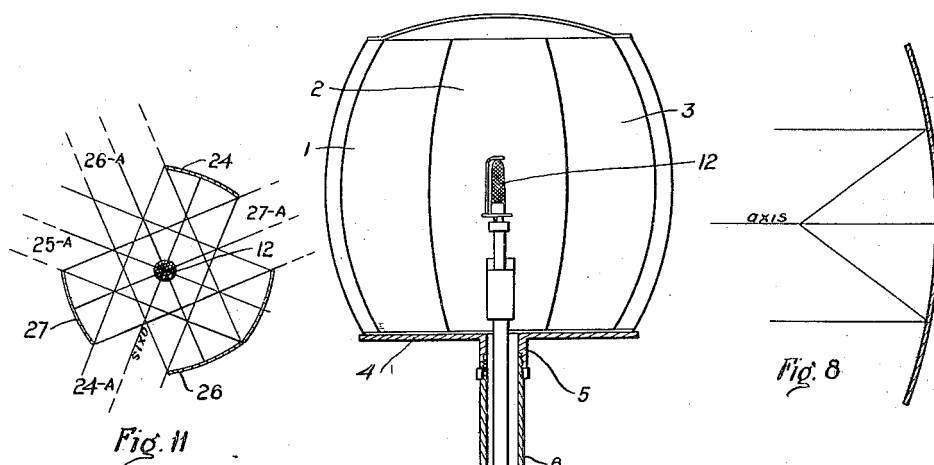
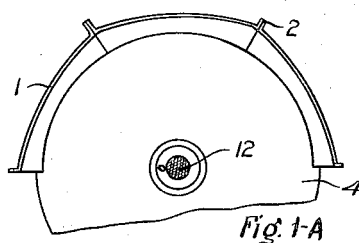
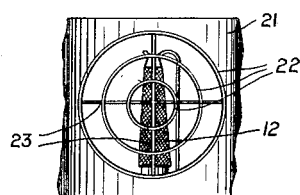


1,101,683.

2 SHEETS—SHEET 1.



L. Huber  
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by

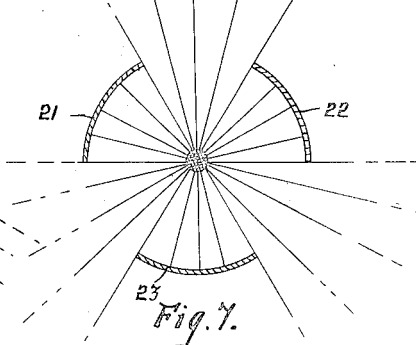
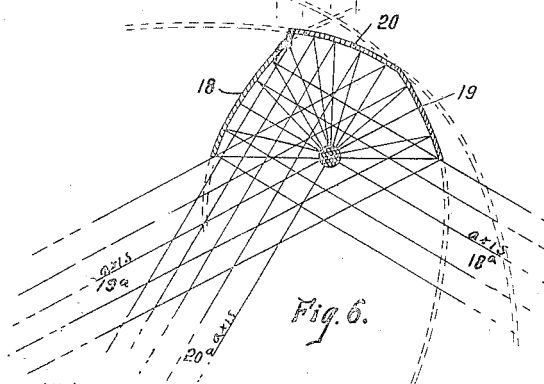
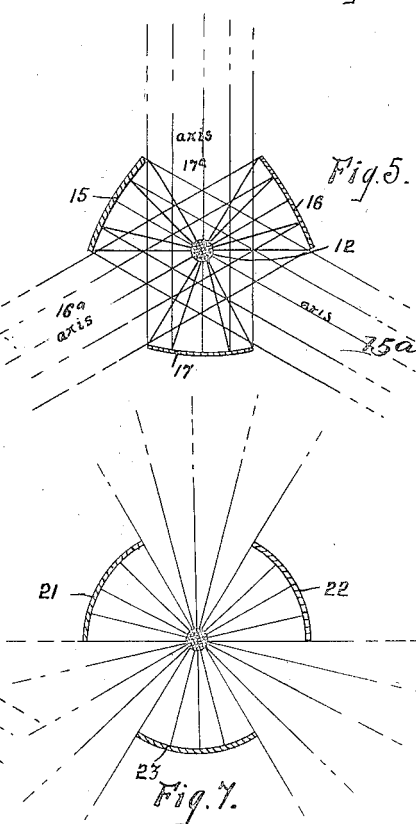
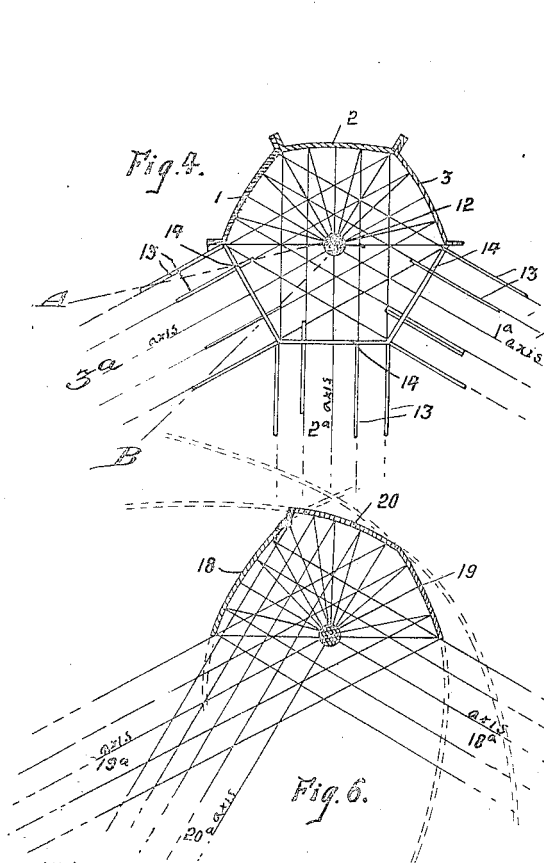
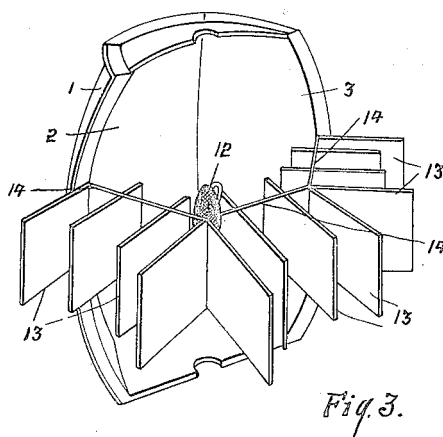
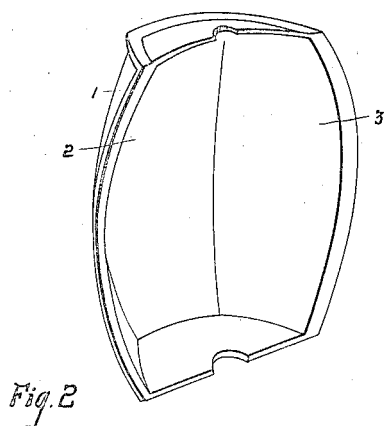
Lloyd Blackmore Atty.

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CATOPTRIC FLASH LIGHT.  
APPLICATION FILED AUG. 24, 1911.

1,101,683.

Patented June 30, 1914.

2 SHEETS—SHEET 2.



Witnesses.  
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# UNITED STATES PATENT OFFICE.

LOUIS EUCLIDE CÔTÉ, OF OTTAWA, ONTARIO, CANADA.

## CATOPTRIC FLASH-LIGHT.

1,101,683.

Specification of Letters Patent.

Patented June 30, 1914.

Application filed August 24, 1911. Serial No. 645,874.

*To all whom it may concern:*

Be it known that I, LOUIS EUCLIDE CÔTÉ, of No. 424 Bank street, Ottawa, Ontario, Canada, a subject of the King of Great Britain, have invented certain new and useful Improvements in Catoptric Flash-Lights, of which the following is a specification.

The invention relates to improvements in catoptric flash lights, as described in the present specification, and illustrated in the accompanying drawings that form part of the same.

The invention consists essentially of the novel arrangement and construction of parts, whereby intersecting beams of light are projected from reflector elements arranged about a common source of light.

The objects of the invention are to devise a catoptric flash light of simple construction, which shall utilize the one source of light to throw several distinctive beams of full intensity, and thereby minimize the cost of manufacture for such lights, as also the cost of maintenance and operation.

A further object of the invention is to so arrange the light that the rotation of the flashing elements therearound will be simple and of inexpensive design.

In the drawings, Figure 1 is an elevation, part sectional, view of the invention. Fig. 1<sup>A</sup> is a plan projection of the reflector, as shown in Fig. 1. Fig. 2 is a perspective detail view of the reflector, as shown in Fig. 1. Fig. 3 is a perspective detail view of the reflector, shown in Fig. 1, with screens arranged therearound to effectually cover the source of light between the flashes. Fig. 4 is a diagrammatic plan view of the arrangement of reflector, as shown in Fig. 1, with the screens attached thereto. Fig. 5 is a diagrammatic plan view of a modified arrangement of the reflector elements to project a different combination of flash beams. Fig. 6 is a diagrammatic plan view, showing a further modification of the reflector elements to project a different arrangement of flash beams. Fig. 7 is a diagrammatic plan view of the arrangement of reflectors, showing the manner in which an occulting light may be obtained from the one source. Fig. 8 is a diagrammatic vertical sectional view of the type of reflector preferably used for an occulting light, as shown in Fig. 7. Fig. 9 is a diagrammatic horizontal sectional

view of the type of reflector preferably used for an occulting light, as shown in Fig. 7. Fig. 10 is a front elevation of a light, showing a modified arrangement of the screens, and the support therefor partially broken away. Fig. 11 is a diagrammatic plan view of an arrangement of reflectors for projecting four beams of light.

Like numerals of reference indicate corresponding parts in each figure.

Referring to the drawings, and more particularly Figs. 1, 1<sup>A</sup> and 2 thereof, 1, 2 and 3 are reflectors secured one next the other on the table 4.

5 is a central orifice through the table 4, and into which the tube 6 is secured, said tube at the lower end thereof turning freely in suitable bearings in the hollow base 7.

8 is a bevel gear secured to the tube 6 at the lower end thereof.

9 is a suitable clockwork, having the pinion 10 secured to a power shaft thereof, and intermeshing with the gear 8.

11 is a pipe connected to a suitable gas supply, and extending upwardly through the center of the hollow base 7 and the tube 6.

12 is a burner preferably of the incandescent bunsen type mounted on the top of the pipe 11, the mantle of said burner being in the common focus of the reflectors 1, 2 and 3, whereby a number of distinct and direct beams of light are reflected as shown diagrammatically in Fig. 4, that is, the reflector 1 throws the beam 1<sup>a</sup>, the reflector 2 the beam 2<sup>a</sup>, and the reflector 3 the beam 3<sup>a</sup>. These beams are each of a full measure of intensity; that is, each beam is as intense as the beams which would be projected by individual lights with corresponding single reflectors, and as a consequence the reflectors must be arranged so that the different beams reflected therefrom intersect one another.

It is preferable, in order to clearly define the beams, to hide the light from all directions from which a reflected beam does not emanate, and this is accomplished by the screens 13, as shown in Figs. 3 and 4. These screens are shown supported in the paths of the beams of light, and parallel therewith, and from the wire rings 14 secured to the front face of the reflector, though it must be understood that they may be supported from the table 4, or in any convenient manner.

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In the operation of the invention, the table 4 is rotated through the connection of the gear 8 and pinion 10 with the clock mechanism 9, and as the said table rotates  
 5 around the light 12, a person standing at a given point will see three distinct flashes of light at close intervals, following which there will be a dark interval of a longer  
 10 period, during the time the backs of the reflectors are turning past the person. It will be thus seen that a distant signal of three distinct flashes occurring at set intervals of time is given by the one light, which will make the signal of particular advantage in  
 15 lighthouse work, wherein the reflector with the light, is inclosed in a large lantern, as customary with such lights to protect the same from the weather inclemencies.

In Fig. 5 the reflectors 15 and 16 are  
 20 placed in the same position as the reflectors 1 and 3 hereinbefore described, and will throw the beams 15<sup>a</sup> and 16<sup>a</sup>. A third reflector 17 is placed diametrically opposite the position in which the reflector 2 has  
 25 been hereinbefore described, and throws the beam 17<sup>a</sup>, as clearly shown in Fig. 5 of the drawings. With this arrangement of the reflectors three flashes will be given at regular intervals by the rotation of the table.

In Fig. 6 a modification of the reflectors is shown to project two quick flashes and a  
 30 third flash after a short interval of time, then after a longer interval, the two quick flashes are again projected. In this modification the reflectors 18 and 19 correspond  
 35 to the reflectors 1 and 3 in Fig. 4, but the reflector 2 as shown in the said Fig. 4 is replaced by an unsymmetric portion of a parabolic reflector 20, as shown by the  
 40 dotted lines in Fig. 6, whereby the reflectors 18 and 19 projecting the beams 18<sup>a</sup> and 19<sup>a</sup> are the midportions of the parabolic reflectors, and have the dotted lines indicating the continuance thereof on each side, while  
 45 the reflector 20, in order to project the diverted beam 20<sup>a</sup>, has the reflecting surface entirely on one side of a vertical plane passing through the axis, and the dotted line, which would balance the parabolic curve on  
 50 each side of the axis, is shown extended on one side only, the dotted lines in this figure being used to more clearly indicate the portion of the surfaces used, showing a few  
 arrangements of reflectors.

The hereinbefore described modifications, showing a few arrangements of reflectors  
 55 will clearly indicate other arrangements which may be resorted to for projecting different combinations of flashes, the essential feature of the invention residing in the novel  
 60 arrangement of reflectors of any type or curvature to project intersecting beams or rays of light.

In Fig. 7 an occulting light is shown dia-  
 65 grammatically. In this figure the reflectors

21, 22 and 23 are spaced similar to the reflectors 15, 16 and 17 in Fig. 5, but instead  
 70 of being parabolic in horizontal section, they are circular, whereby the rays of light are reflected directly back in vertical planes passing through the focus, and diverge, as shown in Figs. 7 and 9. This type of reflector is peculiar to the plain occulting  
 75 light, which does not project sharp flashes as in the previously described types, but rather periodically hides the light at predetermined intervals, and this is ordinarily effected by screens, but to secure the full  
 80 intensity of the light, the reflectors are made parabolic in vertical section, as shown in Fig. 8, which projects all the rays from the focus in a horizontal direction, and eliminates the necessity of a lens for this purpose, as would be necessary were ordinary  
 85 screens used, the increased efficiency being obtained by reflecting the light, and having the various rays intersect in this particular case at points on a vertical line passing through the common focus of the reflectors.

In Fig. 4 the dotted lines A and B indicate direct rays from the burner 12, and  
 90 show the same intercepted by the screens 13, whereby the light is entirely hid from all directions with the exception of the three beams 1<sup>a</sup>, 2<sup>a</sup> and 3<sup>a</sup>, thereby clearly defining  
 95 the signal flashes given as the table 4 rotates.

In Fig. 10 a modified arrangement of the screens is shown, as also the manner of supporting the same, wherein 21 is a cylindrical  
 100 casing which may encircle the light outside the reflectors, suitable openings being cut therein, through which the beams of light from the reflectors may be projected. These openings will be protected by the cylindrical  
 105 shaped screens 22 concentrically arranged and supported from the wires 24 extending diametrically across said opening. It will be readily seen that the surfaces of these screens are parallel with the beam of light which  
 110 would be projected through the opening in which they are secured. Furthermore, it will be readily understood that these screens may be made square in cross section, and will effectually meet the requirements in anticipating the rays of light which would extend  
 115 in angular directions to the beams.

It has been hereinbefore mentioned in the specification that many arrangements of the  
 120 reflectors may be resorted to, and it may also be mentioned that any number of reflectors may be used, as two or more.

To illustrate the arrangement of four, the reflectors 24 to 27 inclusive are shown in  
 125 Fig. 11, projecting the beams 24<sup>a</sup> to 27<sup>a</sup> inclusive.

What I claim as my invention is:

1. A catoptric flash light, comprising a plurality of parabolic reflectors including  
 130 the apices thereof and having a common focus each reflector being limited on two

sides by vertical planes passing through said focus and a source of light located at said focus.

2. A catoptric flash light, comprising a source of light and a plurality of parabolic reflectors having a common focus, said reflectors projecting intersecting beams of light and each reflector being limited on two sides by vertical planes passing through the focus and said source of light.

3. A catoptric flash light, comprising a plurality of parabolic reflectors including the apices thereof and having a common focus and a source of light located at said focus, said reflectors projecting intersecting beams of light and each reflector being limited on two sides by vertical planes passing through the focus.

4. A catoptric flash light, comprising a plurality of reflectors having a common focus and a source of light localized at such focus, said reflectors being so arranged that the chords of their horizontal sectors on a plane passing through the focus co-incide with the sides of a regular polygon having the common focus for center.

5. A catoptric flash light, comprising a plurality of reflectors having a common focus and a source of light localized at such focus, said reflectors being so arranged that the chords of their horizontal sectors on a plane passing through the focus co-incide with the sides of a regular polygon having the common focus for center and the number of said reflectors being equal to half the number of sides of said polygon.

6. A catoptric flash light, comprising a plurality of reflectors having a common fo-

cus, each reflector being limited on two sides by vertical planes passing through the focus and so arranged that the chords of their sectors on any horizontal plane co-incide with the sides of a regular polygon.

7. A catoptric flash light, comprising a plurality of reflectors having a common focus each reflector being limited on two sides by vertical planes passing through the focus and so arranged that the chords of their sectors on any horizontal plane co-incide with the sides of a regular polygon and the number of said reflectors being equal to half the number of sides of said polygon.

8. In a catoptric flash light, a plurality of parabolic reflectors having a common focus, and a source of light located at said focus, each reflector being limited on two sides by vertical planes passing through the focus and the sum of the dihedral angles included between said limiting planes being equal to 180 degrees and all the reflectors being arranged out of the path of the reflected beams and embracing all the available space between said beams.

9. A catoptric flash light, comprising a fixed source of light, a plurality of reflectors including the apices thereof and having a common focus and having the outside edges thereof co-inciding with the outside rays of reflected beams and means for revolving said reflectors around said light.

Signed at the city of Ottawa, Canada, this 27th day of July, 1911.

LOUIS EUCLIDE CÔTÉ.

Witnesses:

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