J. A. REY.

CATOPTRIC LANTERN.

APPLICATION FILED AUG. 30, 1911.

1,066,419. Patented July 1, 1913.

2 SHEETS—SHEET 1.

Fig. 1.

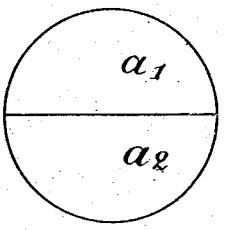


Fig. 3.

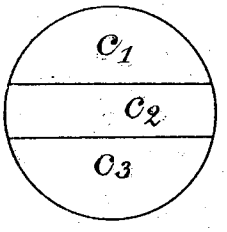


Fig. 2.

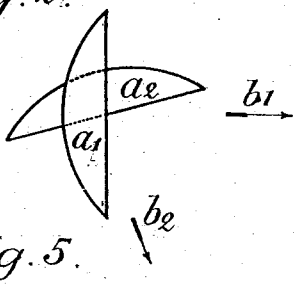


Fig. 4.

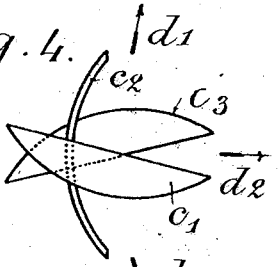


Fig. 5.

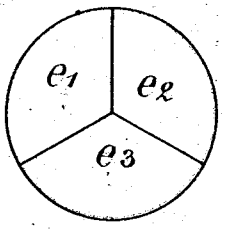


Fig. 6.

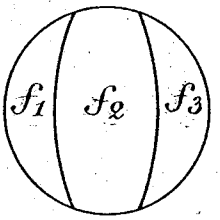


Fig. 7.

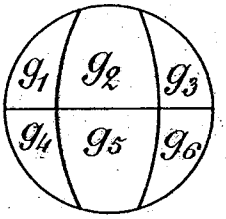


Fig. 9.

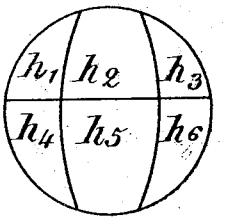
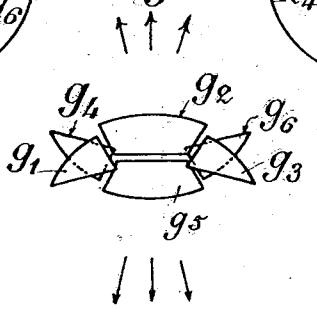


Fig. 8.



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by Max George
his Atty.

J. A. REY.

CATOPTRIC LANTERN.

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1,066,419.

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2 SHEETS—SHEET 2.

fig. 4a

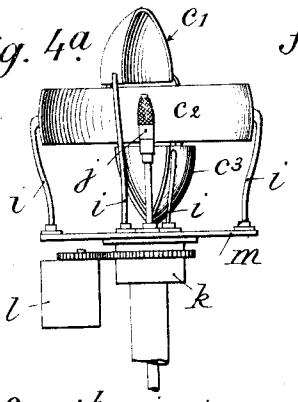


fig. 5a

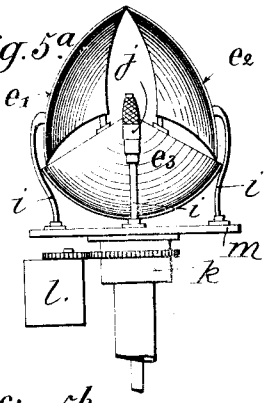


fig. 4b

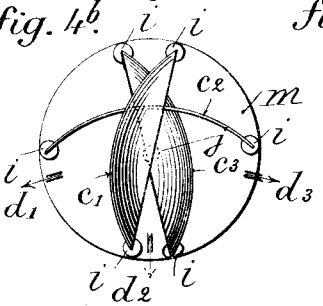


fig. 5b

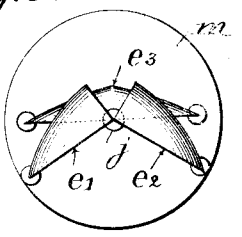


fig. 6a

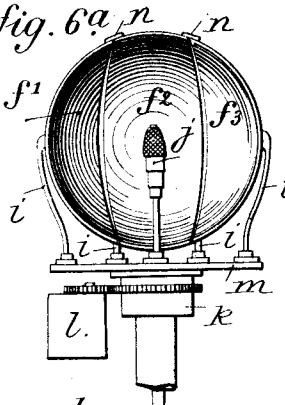


fig. 7a

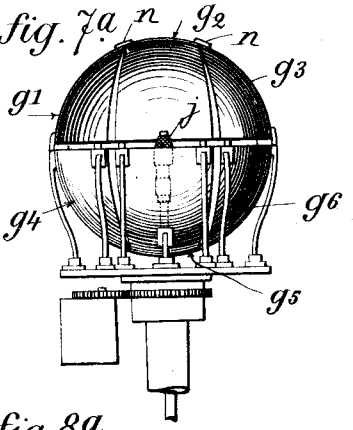


fig. 6b

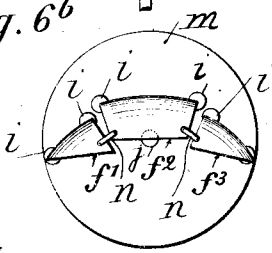
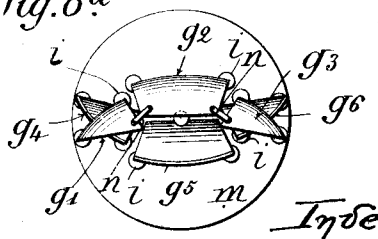


fig. 8a



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UNITED STATES PATENT OFFICE.

JEAN ALEXANDRE REY, OF PARIS, FRANCE.

CATOPTRIC LANTERN.

1,066,419. Specification of Letters Patent. Patented July 1, 1913.

Application filed August 30, 1911. Serial No. 646,906.

To all whom it may concern:

Be it known that I, JEAN ALEXANDRE REY, of 26 Avenue de Suffren, Paris, France, engineer, have invented a new and useful Improvement in Catoptric Lanterns, which improvement is fully set forth in the following specification.

This invention consists in improvements on the invention of catoptric apparatus for rotating lanterns for lighthouses and the like, for producing a number of flashes with a single source of light, described in the specification of French Patent No. 415,987 of July 26th 1909 and of the corresponding British Patent No. 26,477 of 1909.

The invention described in the said specification consists substantially in combining for the said purpose a source of light with a certain number of reflectors each of which is adapted to furnish one of the desired beams of light and is segmented in such a manner as not to intercept the beams furnished by the other reflectors. In the examples of such apparatus described in the said specification, circular reflectors are employed which are segmented by a diametral plane dividing them into two halves, or by two diametral planes dividing them into four quarters.

Now the present invention has for its object to provide an improved method of segmenting and arranging the reflectors for use in widely different cases occurring in practical work, for producing flashes and groups of flashes.

Instead of segmenting the reflectors by one or two diametral planes intersecting each other at right angles as described in the aforesaid specification, the reflectors are segmented, according to the present invention, by a number of parallel horizontal planes or by planes inclosing any desired angles with one another. The dimensions of the reflector segments thus formed may be the same for all the segments of one and the same reflecting group. Certain segments however (for instance the segments from which the light is partially shut off by the body of the lamp) may have slightly greater dimensions than the other segments in order that all the reflector segments of one and the same group shall have the same useful effect.

Various ways of carrying out this invention are illustrated by way of example in the accompanying drawings.

In these drawings—Figure 1 represents diagrammatically the reflector divided into equal segments; Fig. 2, a diagrammatic plan thereof, showing the two segments set in operative position; Fig. 3, a view similar to Fig. 1, showing a reflector divided into three segments; Fig. 4, a diagrammatic plan view showing the segments set in operative position; Fig. 4ª, an elevation of a lantern embodying the arrangement of reflectors shown in Fig. 4; Fig. 4ᵇ, a plan view thereof; Fig. 5, a diagrammatic elevation of a modified form of a divided reflector; Figs. 5ª and 5ᵇ, an elevation and a plan view respectively, of a lantern embodying the modified form of divided reflectors of Fig. 5; Fig. 6 a diagrammatic elevation of another modified form of divided reflectors; Figs. 6ª and 6ᵇ, an elevation and a plan view, respectively, of a catoptric lantern embodying the said modified form of divided reflectors; Figs. 7 and 8, a diagrammatic elevation and a diagrammatic plan, respectively, of another modified form of divided reflectors; Figs. 7ª and 8ª, an elevation and a plan of a catoptric lantern embodying said latter modified form of reflectors; Fig. 9, a diagrammatic elevation of still another form of divided reflectors, embodying my invention.

Fig. 1 is an elevation of a reflector segmented by a horizontal diametral plane in the manner described in our aforesaid specification, the halves a_1, a_2 of which may be arranged in the manner shown in plan in Fig. 2, that is to say, set in any desired different azimuths b_1, b_2.

In the reflector shown in elevation in Fig. 3, the segmentation is effected in two horizontal planes neither of which is diametral. The segments c_1, c_2, c_3, of the reflector which are thus formed, may be arranged in the manner shown in plan in Fig. 4, that is to say, they may likewise be set in any desired different azimuths d_1, d_2, d_3. This however does not apply in cases where the horizontal segmenting planes are situated at a great distance from the center of the reflector.

In Figs. 4ª and 4ᵇ is shown a catoptric lantern embodying this form of divided reflectors. As will be seen by reference to

these figures, the sectional reflectors are supported by standards *i*, rising from the table or platform *m*, the source of light *j* being arranged at the proper focal point with respect to the reflectors. This part of the apparatus is supported upon a mercury bath *k* on which it floats. The motor for rotating the apparatus in the usual manner is represented at *l*.

Figs. 5 and 6 illustrate reflectors the segmentation of which is effected, not by horizontal planes, but by planes which inclose any desired angles between them and produce segments indicated respectively by the reference letters e_1, e_2, e_3, and f_1, f_2, f_3, in the two reflectors.

In Figs. 5^a and 5^b is shown a catoptric lantern embodying the use of a divided reflector as indicated in Fig. 5. In these figures the standards *i* for supporting the reflector sections, the platform *m* from which they rise, the mercury bath *k* and the motor for rotating the apparatus *l*, are of substantially the same form and operation as in Figs. 4^a and 4^b.

In Figs. 6^a and 6^b the form of divided reflector indicated diagrammatically in Fig. 6 is embodied. In these figures, in addition to the supporting standards *i*, there are shown the connecting links *n* which unite the various sections of the reflector and, in cooperation with the standards *i*, maintain them in their proper relative positions with respect to each other.

In such cases it is not possible to set the different segments of a reflector in any desired azimuths. However if the segments are moved slightly away from one another and thus set in adjacent azimuths, a group of three flashes will be formed. If the distance between these segments be increased, the angle formed between the azimuths will be increased. If however this is carried too far, the risk would arise of one of the segments intercepting the beam that is reflected by one of the two other segments.

It is only in certain special cases that it can be ascertained by trial whether it is possible to adopt for equidistant flashes a segmentation other than that effected by horizontal planes. Such segmentations (by planes which inclose any desired angles between them) are very well adapted for producing groups of flashes as hereinbefore shown.

If the reflector segments are placed only a very small distance apart, the angle formed between the azimuths becomes very small. It is even possible to select such an angle that beams of light will not be separated from one another and will contact one another at their edges. By this means instead of a group of a number of flashes, there will be produced a single flash of multiple duration, for instance in the construction shown, a single flash of threefold duration, instead of a group of three flashes. Such an arrangement allows thus of increasing the width of a beam and, consequently, duration of a flash and may have great advantages for practical work.

It is obvious that the reflectors may be subdivided into more than three segments, without their operation departing in any essential respect from that described with reference to the arrangements shown in Figs. 5 and 6.

The segmentation may be effected otherwise than along planes for instance along any desired lines. It is also possible to combine segmentation along horizontal planes, as shown for example in Figs. 1 to 4, with a segmentation along non-horizontal lines, as shown for example in Figs. 5 and 6. Segmentation for instance along a horizontal plane and two vertical planes (which are not parallel), produces a construction such as that indicated in Fig. 7, in which the segments g_1, g_2, g_3, g_4, g_5, g_6, may be arranged in the form shown in plan in Fig. 8, which is especially suitable for producing two groups of three flashes.

In Figs. 7^a and 8^a I have shown a catoptric lantern involving the use of reflectors divided as indicated in Figs. 7 and 8. In these figures, the supporting standards *i*, the connecting links *n*, the table or platform *m*, the mercury bath *k* and the motor *l* are of the same construction and serve the same purposes as in the forms shown in the preceding figures.

It sometimes happens that the body of the lamp intercepts the light from a portion of the reflector and thereby reduces the useful effect of one or more of the lower segments of the reflector. Now in order that these reflector segments shall have the same useful effect as the other segments, they may be made of slightly greater dimensions. For instance in the preceding case of segmentation (Fig. 7) the reflector may be cut off by a horizontal plane situated slightly above the center line. By this means there is produced the construction shown in Fig. 9 in which the segments h_1, h_2, h_3, situated above the horizontal plane are of smaller dimensions than the corresponding segments h_4, h_5, h_6, situated below that plane.

Claims—

1. In catoptric lanterns, a group of reflector-sections adapted to rotate concurrently around a source of light, said reflector-sections being parts of a concave reflector formed by dividing the same along lines one at least of which is non-diametral.

2. In catoptric lanterns, a group of reflector-sections adapted to rotate concur-

rently around a source of light, said reflector-sections being parts of a concave reflector, formed by dividing the same along horizontal and non-diametrical lines, and being shifted horizontally with respect to each other.

3. In catoptric lanterns, a group of reflector-sections adapted to rotate concurrently around a source of light, said reflector-sections being parts of a concave reflector, formed by dividing the same along vertical and non-diametrical lines, and being shifted horizontally with respect to each other.

4. In catoptric lanterns, a group of reflector-sections adapted to rotate concurrently around a source of light, said reflector-sections being parts of a concave reflector, formed by dividing the same along non-diametrical lines, and being shifted horizontally with respect to each other in such a manner that the several light beams have common generating lines for the purpose of obtaining a single flash of increased duration.

5. In catoptric lanterns, a group of reflector-sections formed as parts of a concave reflector formed by dividing the same along vertical planes and a horizontal plane.

6. In catoptric lanterns, a group of reflector-sections formed as parts of a concave reflector formed by dividing the same along vertical planes and a horizontal non-diametrical plane.

7. In catoptric lanterns, a group of reflector-sections, formed as parts of a concave reflector formed by dividing the same along vertical planes and a horizontal plane, said sections being shifted horizontally with respect to each other.

8. In catoptric lanterns, a group of reflector-sections formed as parts of a concave reflector formed by dividing the same along vertical planes and a horizontal non-diametral plane said sections being shifted horizontally with respect to each other.

9. In catoptric lanterns, a group of reflector-sections formed as parts of a concave reflector formed by dividing the same along vertical planes and a horizontal plane, said sections being shifted horizontally with respect to each other, the group of sections above the horizontal plane of section being arranged at an angle with respect to the group of sections below such plane.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

JEAN ALEXANDRE REY.

Witnesses:
DEAN B. MASON,
FRÉDERIC HARLÉ.