No. 868,110. PATENTED OCT. 15, 1907.

A. P. McARTHUR.

ELECTRIC LAMP.

APPLICATION FILED OCT. 9, 1905.

2 SHEETS—SHEET 1.

Fig. 1.

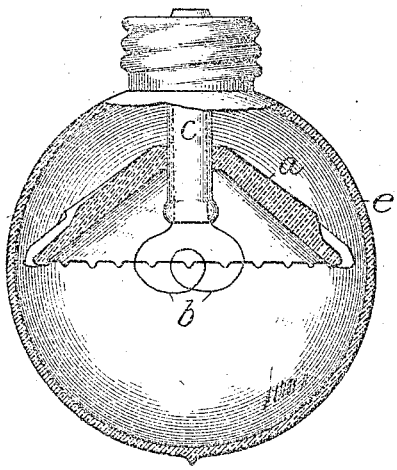


Fig. 3.

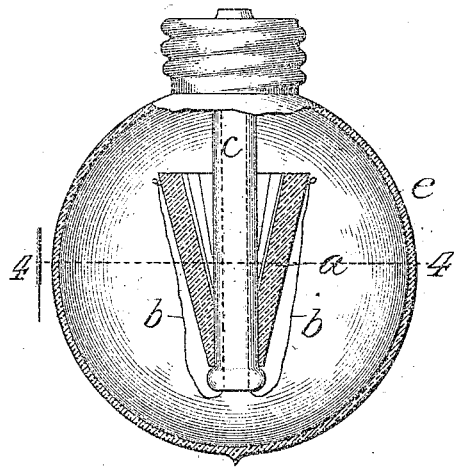


Fig. 2.

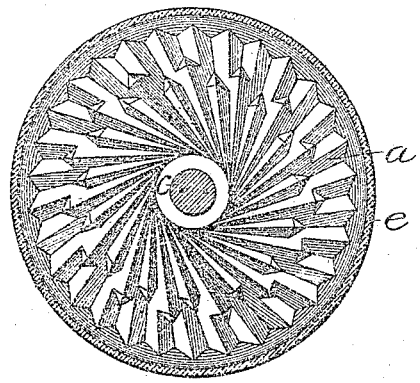
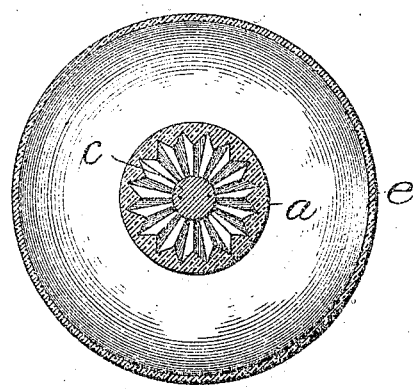


Fig. 4.



Witnesses:
Chas. E. Gaylord.
John Endere.

Inventor:
Alexander P. McArthur
By Thomas F. Sheridan,
Atty.

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2 SHEETS—SHEET 2.

Fig. 5.

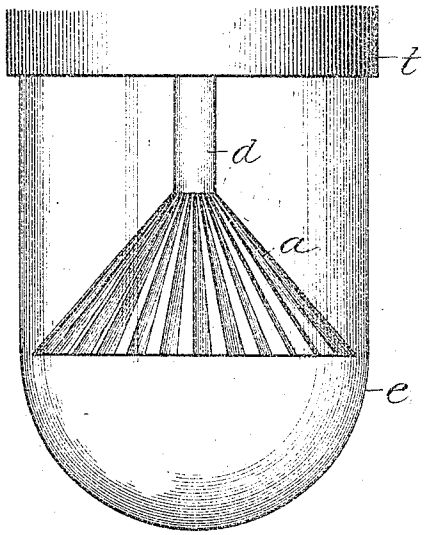
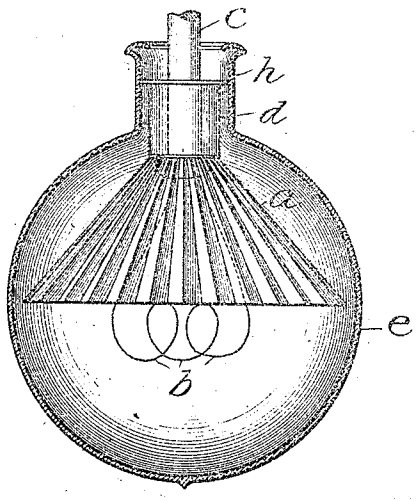


Fig. 6.



Witnesses:
E. E. Gaylord
John Enders

Inventor:
Alexander P. McArthur.
By Thomas F. Sheridan,
Atty.

UNITED STATES PATENT OFFICE.

ALEXANDER P. McARTHUR, OF ORANGE, NEW JERSEY.

ELECTRIC LAMP.

No. 868,110. Specification of Letters Patent. Patented Oct. 15, 1907.

Application filed October 9, 1905. Serial No. 281,911.

To all whom it may concern:

Be it known that I, ALEXANDER P. McARTHUR, a citizen of the United States, residing at Orange, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Electric Lamps, of which the following is a specification.

This invention relates particularly to electric lamps in which a reflecting device is arranged adjacent to the filament or other light-giving translating device, as will be hereinafter more fully set forth.

The object of this invention is to produce a simple and economical lamp of great efficiency.

To this end the invention consists in the features of construction hereinafter described and claimed.

In the accompanying drawings—Figure 1 is a side elevation, partly in section, of a lamp embodying my invention; Fig. 2 a plan view, partly in section, of the lamp shown in Fig. 1; Fig. 3 a view similar to Fig. 1, showing another form of my improved lamp; Fig. 4 a transverse section, taken on line 4—4 of Fig. 3; and Figs. 5 and 6 are side elevations of one form of my lamp showing the process of manufacture.

In the drawings I have shown my invention as applied to an ordinary form of incandescent lamp; but it is not limited in its application to a lamp of this type, since, as may be readily understood, it may be applied to an arc lamp or to any other form of lamp—it being only necessary to arrange the reflecting devices and the light-giving element in proper relation, as will be hereinafter described.

As is well known, a great part of the light rays in the ordinary form of lamp are lost through dispersion. Attempts have been made to collect and concentrate the rays by various means, such as shades and reflectors applied to the lamp, exterior to the globe or bulb. It has also been proposed to place a reflector within the globe or bulb. Both of these devices, as hitherto employed, are open to serious objections—the first due to the loss of light, owing to the distance between the reflector and the light-giving element and the consequent necessity of employing polished or otherwise specially prepared reflecting surfaces, together with the loss in efficiency arising from the accumulation of dust and dirt on these surfaces. The second form is also objectionable, because of the small reflecting surface which is rendered necessary by reason of the location of the reflector within the globe or bulb, and the consequent inefficient correction of the evil of dispersion.

Coming now to my invention—in the drawings *e* represents an ordinary incandescent globe; *c* is the stem of the lamp supporting the filaments *b*; *a* is a reflecting device supported upon the stem of the lamp and in close proximity to the filament *b*, or other light-giving translating device.

Although it is preferable ordinarily to support the reflector on the stem of the lamp, I do not wish to be limited to this precise form, for the reason that it may be supported at the bottom or side of the lamp in any desired manner for the purpose of directing the rays of light in different directions.

The reflector is usually made of pressed glass, and may be made of a flaring shape—as shown in Fig. 1—or in the shape of an inverted cone, as shown in Fig. 3. It will of course be understood that it may be made in other shapes if desired. It will be observed that one surface of this reflector is smooth, while the other surface is provided with a series of prisms. These prisms may be arranged spirally and in staggered relation, as shown in Fig. 2, or in any preferred form. In Figs. 3 and 4 I have shown them as straight. It will be further observed that the filament, or light-giving translating device, is arranged adjacent the smooth surface of the reflector. It is in this particular relation of the reflector and the light-giving element that the gist of my invention lies.

One very important advantage arising from this arrangement is that I am enabled to dispense with the lining forming a reflecting surface, ordinarily employed in lamps of this type. At the same time the efficiency of the lamp is very highly increased by placing the smooth surface next to the light-giving element, since the greater part of the rays are refracted by the prismatic surfaces and turned back in the right direction. This result does not follow when the prismatic surfaces are placed next the light-giving element; and it will be readily understood by one skilled in optics that it cannot follow from such arrangement, because the light will be dispersed by the prisms, as if no reflector were present. By placing the reflector within the lamp, the rays are collected and turned in the useful direction prior to any dispersion taking place by reason of the rays of light having to pass and re-pass through the glass bulb, as is necessary with all shades. This very materially increases the efficiency as the rays pass through the glass but once. I have found in actual practice that the gain in efficiency from the use of my device is such that an eight candle power lamp containing this device will do the work of a sixteen candle power lamp of ordinary form.

In constructing my lamp, I first blow a bulb of a diameter sufficient to permit the reflector to be placed within it and held in position, and then press the end of the bulb while hot around the neck of the reflector. This operation is clearly shown in Figs. 5 and 6 of the drawings. In Fig. 5 *t* is the end of a blow pipe of a diameter sufficiently large to admit the reflector; and *e* is the bulb, which is shown in Fig. 5 before being pressed around the neck *d* of the reflector and in Fig. 6 after this operation has taken place and the neck *h* formed thereon.

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

1. In an electric lamp, the combination of a bulb or inclosing transparent shade, a refracting body having opposed prism and smooth surfaces within the bulb, and a light-giving filament device arranged adjacent the smooth surface of the reflecting body and in proximity thereto, substantially as described.

2. In an electric lamp, the combination of a bulb or inclosing transparent shade, a refracting body having opposed prism and smooth surfaces within the bulb, the prism surface being formed of staggered prisms having their ends terminating at different radial distances from the center of the refractor, and a light-giving filament arranged adjacent to the smooth surface of the reflecting body, substantially as described.

3. An incandescent lamp, comprising a bulb, a stem for the leading in wires, and a reflector inside of the bulb, said reflector being provided with an opening to receive the stem.

ALEXANDER P. McARTHUR.

Witnesses:
THOMAS F. SHERIDAN,
EDWARD E. BABCOCK.