P. KLEBER.

REFLECTOR.

APPLICATION FILED JAN. 22, 1910.

983,241.

Patented Jan. 31, 1911.

2 SHEETS—SHEET 1.

Fig. 1

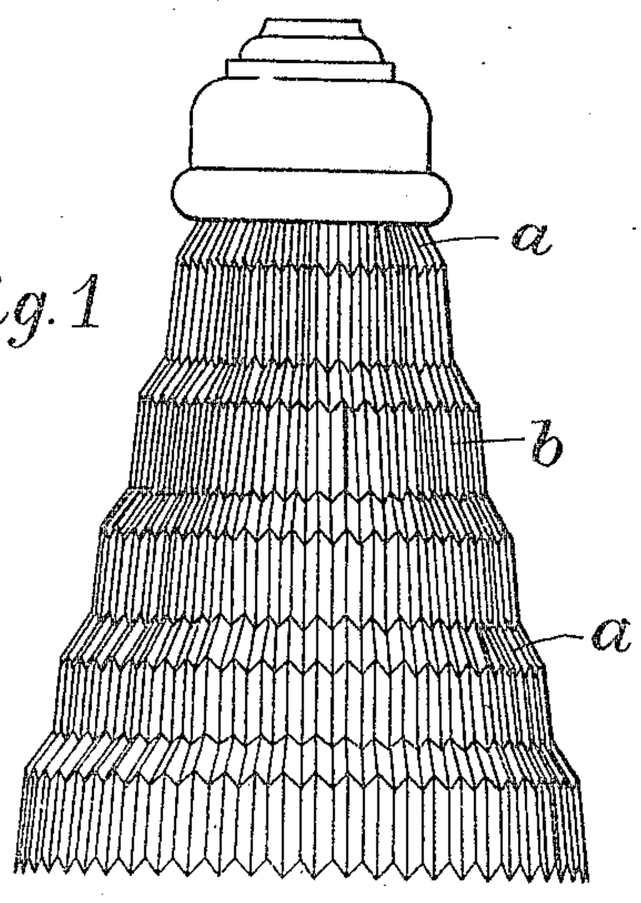


Fig. 3

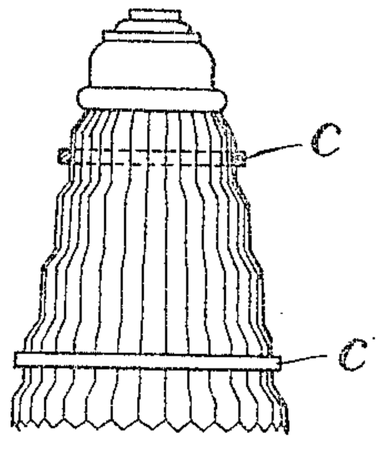


Fig. 2

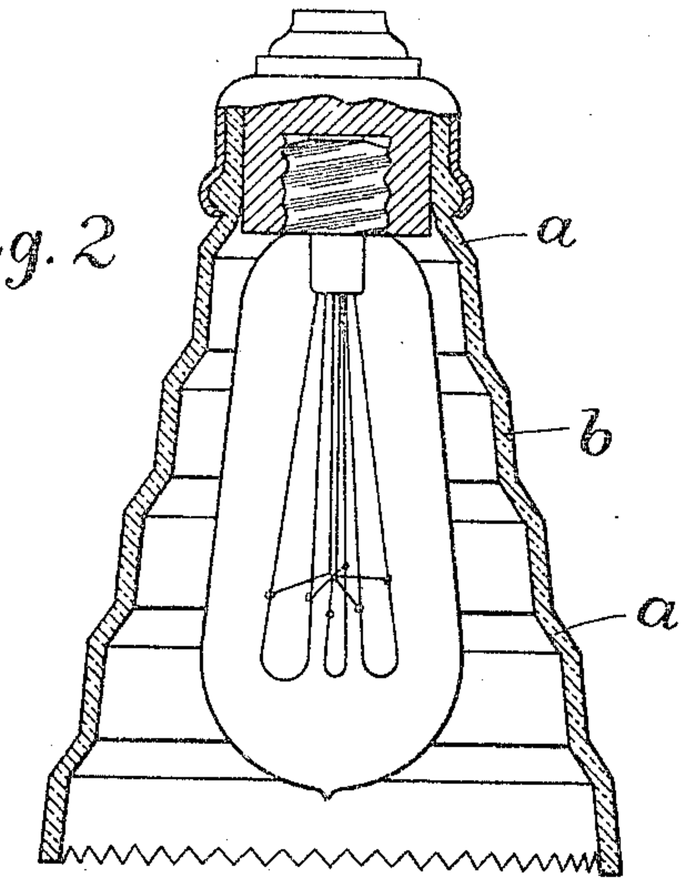


Fig. 4

WITNESSES:

David J. Walsh

Henry Girvas.

INVENTOR

Peter Kleber

BY

Albert Stetson

ATTORNEY

P. KLEBER.

REFLECTOR.

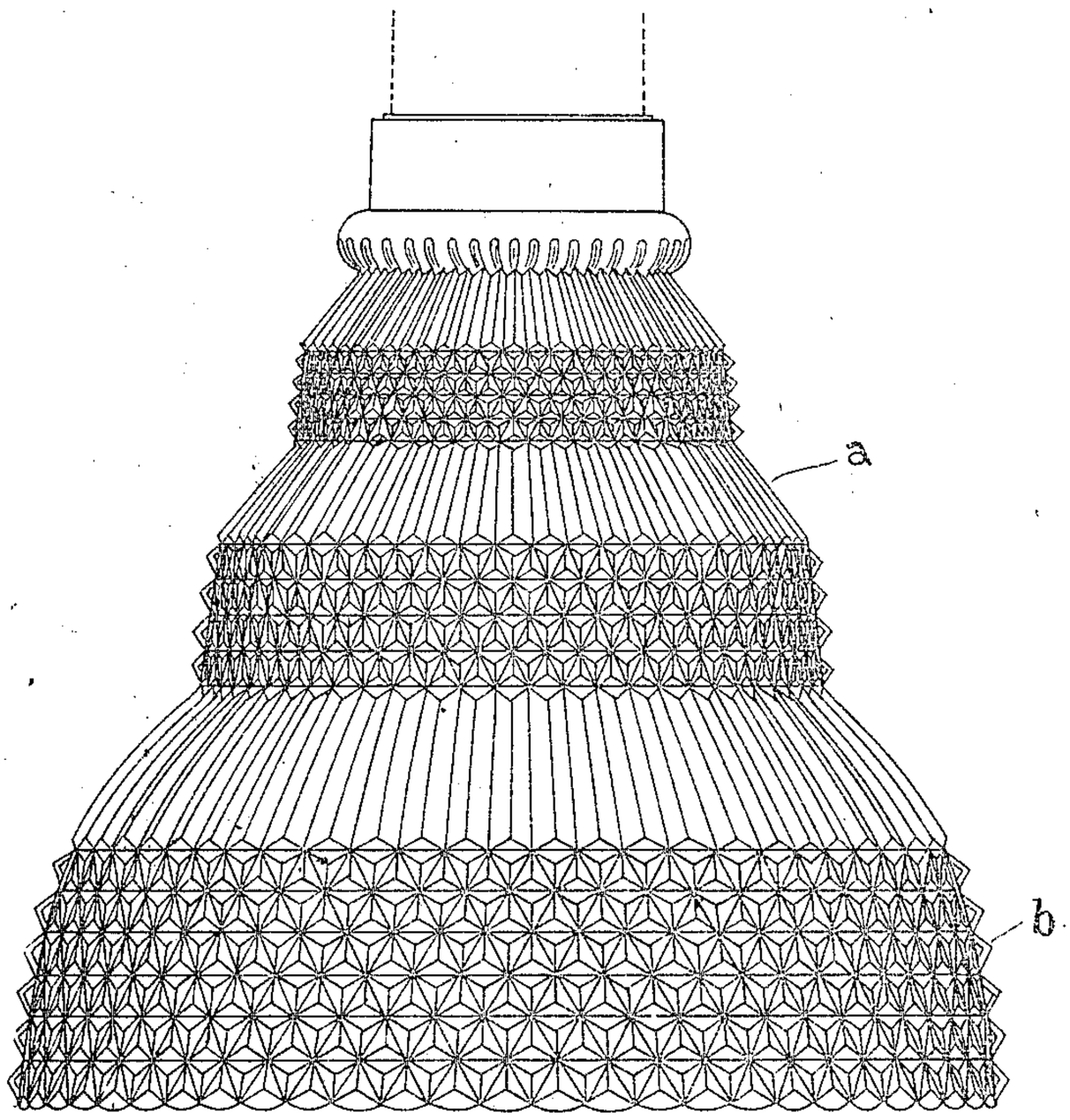
APPLICATION FILED JAN. 22, 1910.

983,241.

Patented Jan. 31, 1911.

2 SHEETS—SHEET 2.

Fig. 5



WITNESSES:

David J. Walsh

Henry Givens.

INVENTOR

Peter Kleber

BY

Albert Stetson.

ATTORNEY

UNITED STATES PATENT OFFICE.

PETER KLEBER, OF WIESBADEN, GERMANY, ASSIGNOR OF ONE-HALF TO HENRY ZIRWAS, OF YONKERS, NEW YORK.

REFLECTOR.

983,241. Specification of Letters Patent. Patented Jan. 31, 1911.

Application filed January 22, 1910. Serial No. 539,492.

To all whom it may concern:

Be it known that I, PETER KLEBER, a subject of the German Emperor, residing at 9 Schlachthausstrasse, Wiesbaden, Germany, have invented a new and useful Improvement in Reflectors; and I do hereby declare the following to be a full, clear, and exact description of the same.

My invention relates to reflectors for incandescent lamps.

It relates particularly to a form of reflector, which is so divided into steps or stages that the greater portion of the light coming from the light sources is reflected downward.

It relates further to a form of reflector which is adapted to be used with equal efficiency with lamps of various sizes and the reflector is especially suitable for use with metal filament lamps.

The object of the invention is to provide a reflector which shall be economical in construction, efficient in its action, and which shall economize to the greatest possible extent the light rays, while maintaining the diameter of the reflector within practicable limits.

To carry out my invention, I construct a reflector divided into parts, the surface of some of the parts being at an angle to the source of light while other surface portions lie parallel, or practically so, to the light source.

In the drawings accompanying and forming part of the present specification: Figure 1 is a side elevation of one form of the reflector; Fig. 2 a vertical section through the reflector and light source; Fig. 3 a reflector built up of separate prisms held together by metal bands; Fig. 4 is a detail showing a cross-section through the prisms forming Fig. 3; Fig. 5 shows a form of reflector in which the vertical portions are fashioned into pyramids lying in the angle of total reflection.

Referring to the drawings *a* represents the inclined surfaces, and *b* the prismatic surfaces parallel to the rays of light.

The reflectors hitherto known, provided on their outer surface with prisms aimed at throwing the light coming from the light source, by refraction in the prisms, back inwardly. In practice it has been shown that, especially in the use of metal filament lamps, or the like, as the light source in reflectors of that kind, only single parts of the reflector effect a reflection of the light rays downward, and then only those that have a particular situation to the source of light. This phenomenon appears especially in the use of different lamp sizes in one and the same reflector.

The object of the present invention is, therefore, to avoid the disadvantage mentioned, and produce a reflector in which all the light possible coming from the source of light is reflected downward. For this purpose the reflector is provided with inclined surfaces, which lie at an angle to the source of light, equal at least to the limiting angle of total reflection. If now one should form the reflector so that its cross-section forms such an angle with straight sides, the under part of the inclined surface thus produced would lie at a great distance from the source of light, and a great part of the light rays would no longer be reflected. Moreover, the lower diameter of such a reflector would be so large that the attaching of decorative reflectors, or the so-called outer globes, would not be possible.

In accordance with the present invention, therefore, the inclined surface of the light shade is so subdivided and arranged in steps in such a manner that circular inclined surfaces alternate with surfaces practically parallel to the lamp axis. This does away with the necessity of procuring a specially constructed reflector for each lamp. Moreover, by this arrangement the diameter of the reflector is kept so small that decorative shades, or the like, can be put on over the reflector, in order to conceal their frequently plain appearance. The reflector serves, therefore, only to increase the light and protect the easily broken lamp, while the outer shade is only provided for decorative purposes. The reflector, if made of glass, is preferably provided on its entire external circumference with prisms, whose abutting surfaces advantageously form an angle of 90°.

In the prisms shown in Fig. 5, the external surfaces of the reflector that lie parallel to the source of light are formed in prisms or pyramids, which preferably on their abutting surfaces inclose an angle of 90°. The inner surface of the reflector is preferably smooth and flat. The inclined surfaces *a* arranged approximately in the

angle of total reflection, commence preferably immediately above the source of light and alternate downward with the almost vertical or slightly conical surfaces *b*. The light from the light source is, by the prismatic surfaces, thrown inward, and then by the inclined surfaces, pressed as close as possible to the source of light by the arrangement of the reflecting surface, the light is thrown downward.

Photometric tests have shown that a reflector made in accordance with the present invention gives, for instance with a metal filament lamp, a larger percentage of reflected light than that given by the ordinary reflector.

It is evident that the step-wise construction of reflectors is not limited in its benefits to glass reflectors, but that the shape affords a great improvement over existing metal and opaque shades.

Having thus fully described and illustrated my invention, what I claim, is:—

1. A glass reflector having its outer surface formed of zones substantially parallel to the source of light alternating with zones inclined to the light source at substantially the angle of total reflection.

2. A reflector having on its outer surface zones substantially parallel with the light source alternating with zones inclined to the light source at substantially the angle of total reflection, the outer surface of the reflector being provided with longitudinal reflecting prisms.

3. A glass reflector having a flat smooth inner surface and its outer surface composed of zones substantially parallel with the light source alternating with zones inclined to the light source at substantially the angle of total reflection, the entire outer surface being covered with longitudinal total reflecting prisms.

4. A reflector built up of detachable separate prisms, which are divided longitudinally into surfaces inclined to the source of light at substantially the angle of reflection, alternating with prism portions parallel to the source of light, in combination with means for holding the separate prisms with the edges abutting.

5. A reflector having on its outer surface zones substantially parallel with the light source alternating with zones inclined to the light source at substantially the angle of total reflection, the outer surface of the reflector being provided with reflecting prisms.

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

PETER KLEBER.

Witnesses:
HERMAN PLISCHKE,
MAX ZIESCHE.