

G. A. MACBETH.  
LIGHTING DEVICE.  
APPLICATION FILED JAN. 15, 1910.

979,181.

Patented Dec. 20, 1910.

2 SHEETS—SHEET 1.

Fig. 1.

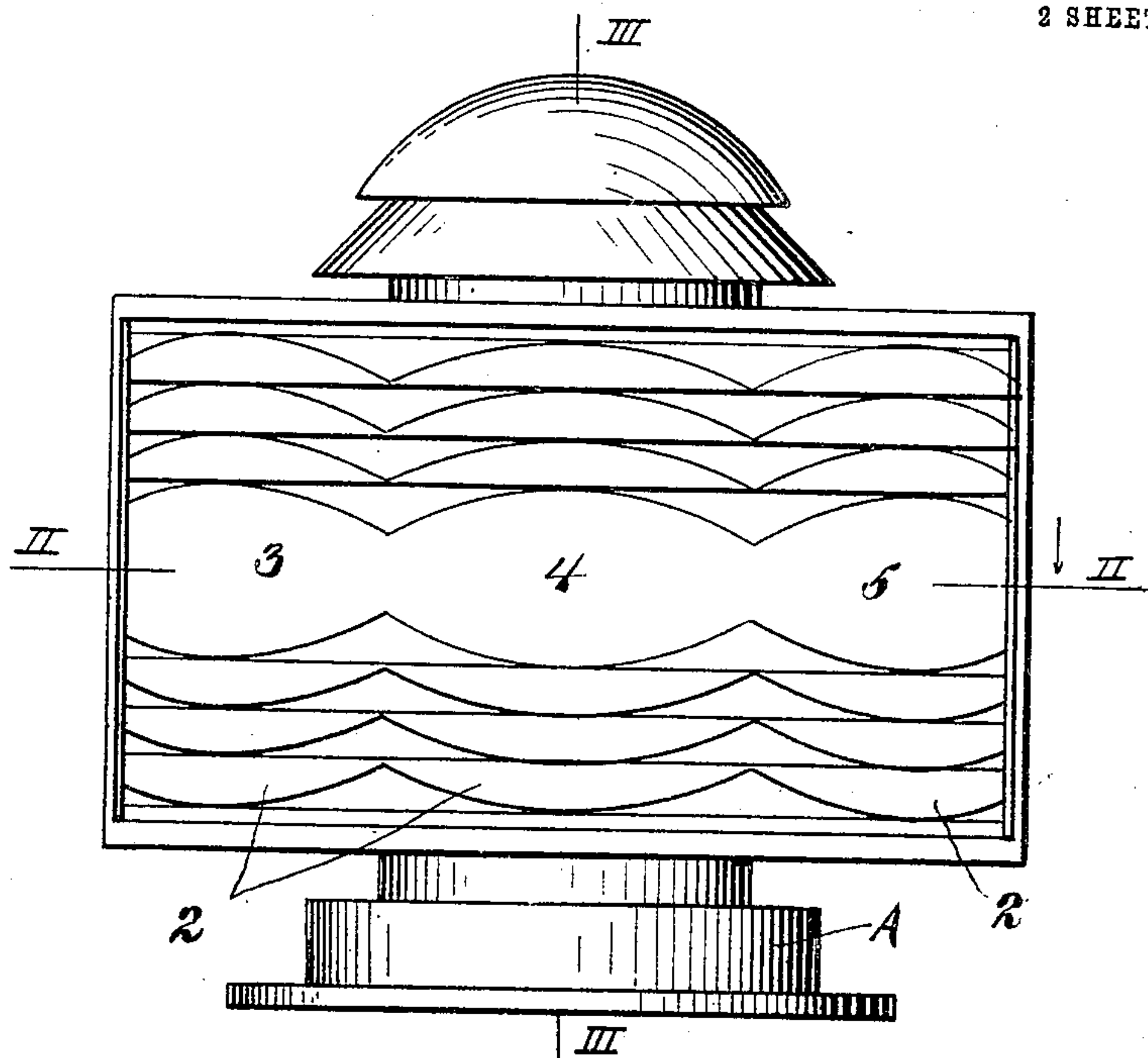
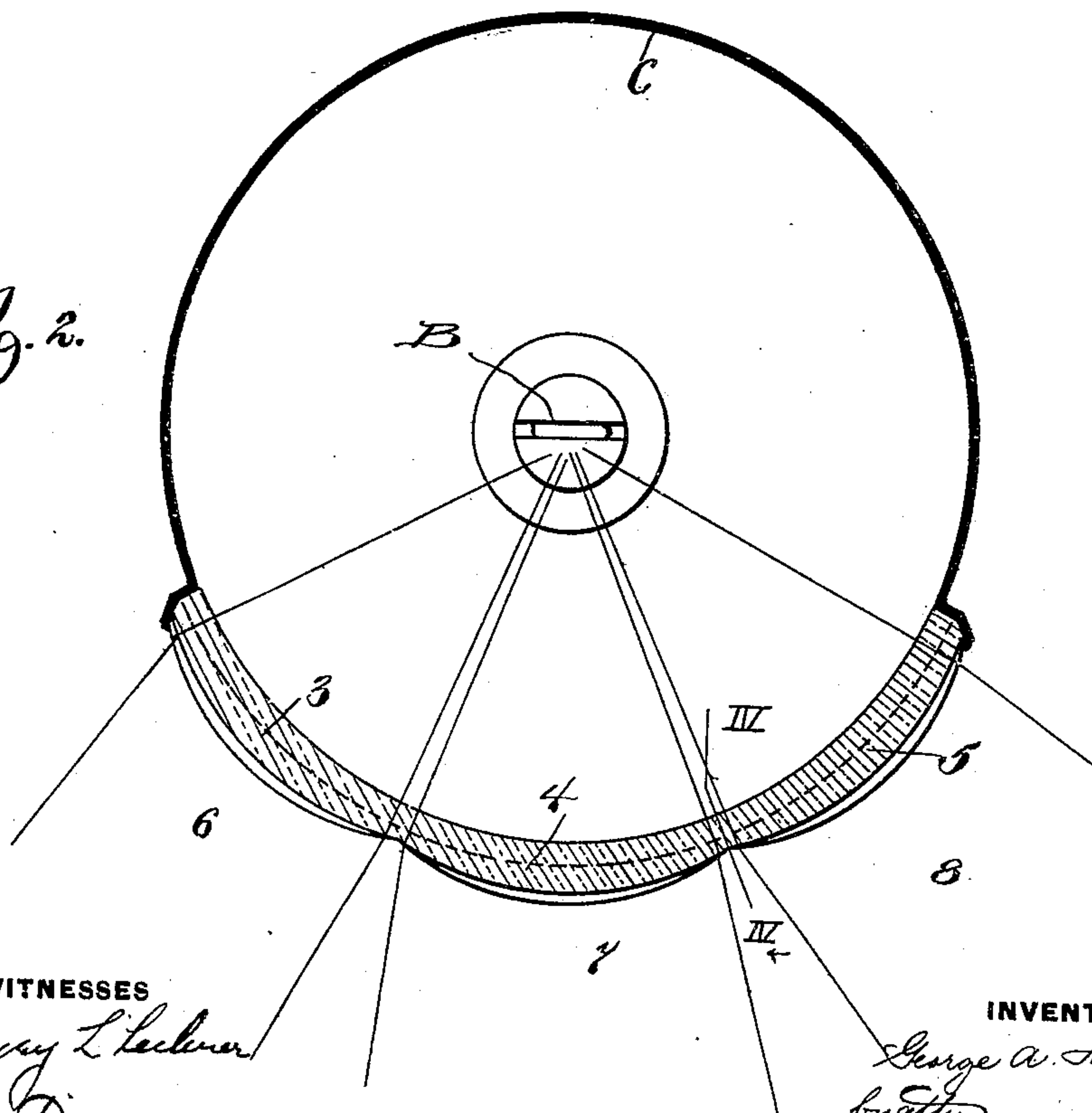


Fig. 2.



WITNESSES

Harvey L. Leckner  
J. C. Bradley

INVENTOR

George A. Macbeth  
by atty  
Paul Synnestvedt

979,181.

G. A. MACBETH.  
LIGHTING DEVICE.  
APPLICATION FILED JAN. 15, 1910.

Patented Dec. 20, 1910.  
2 SHEETS—SHEET 2.

Fig. 3.

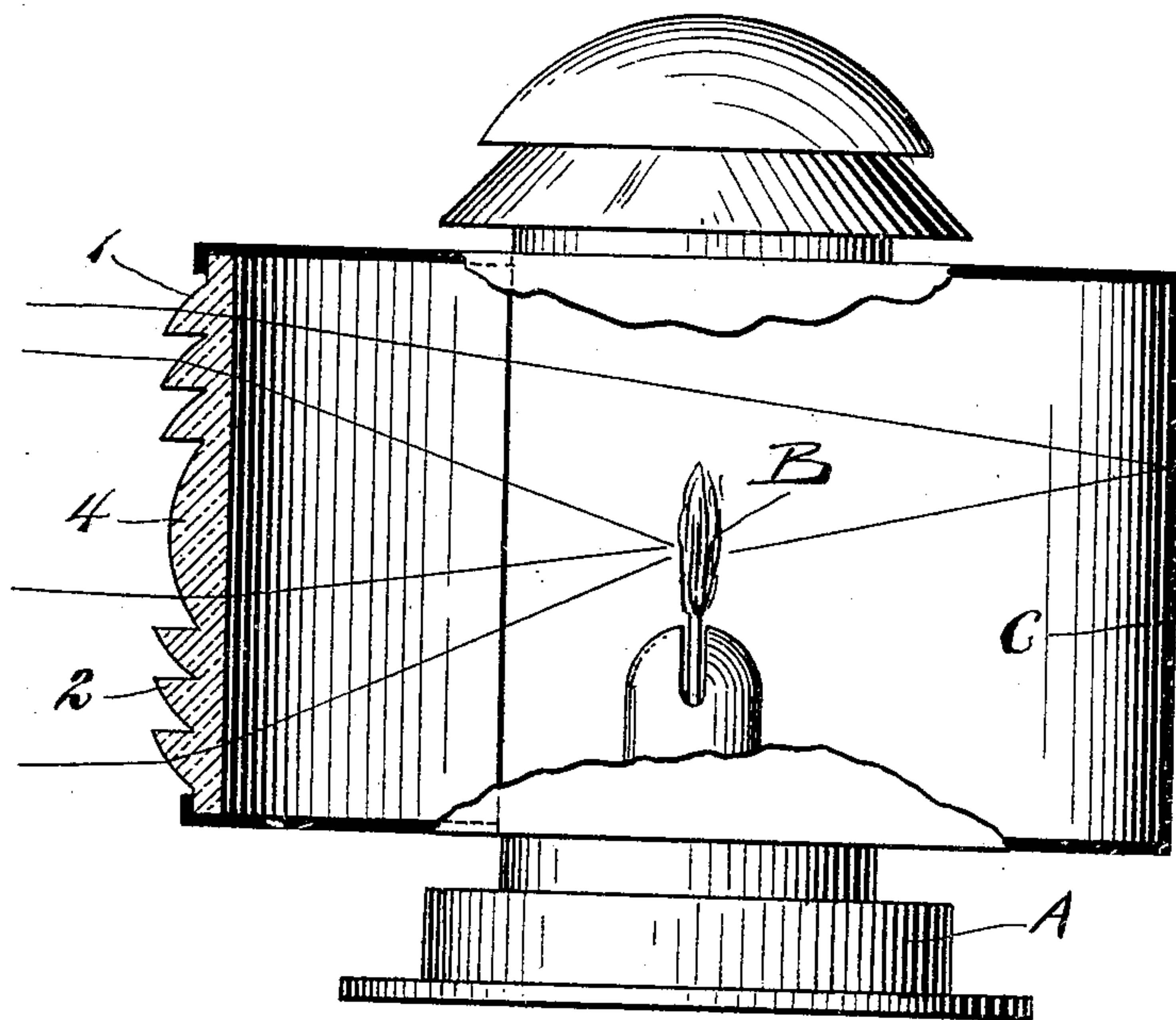
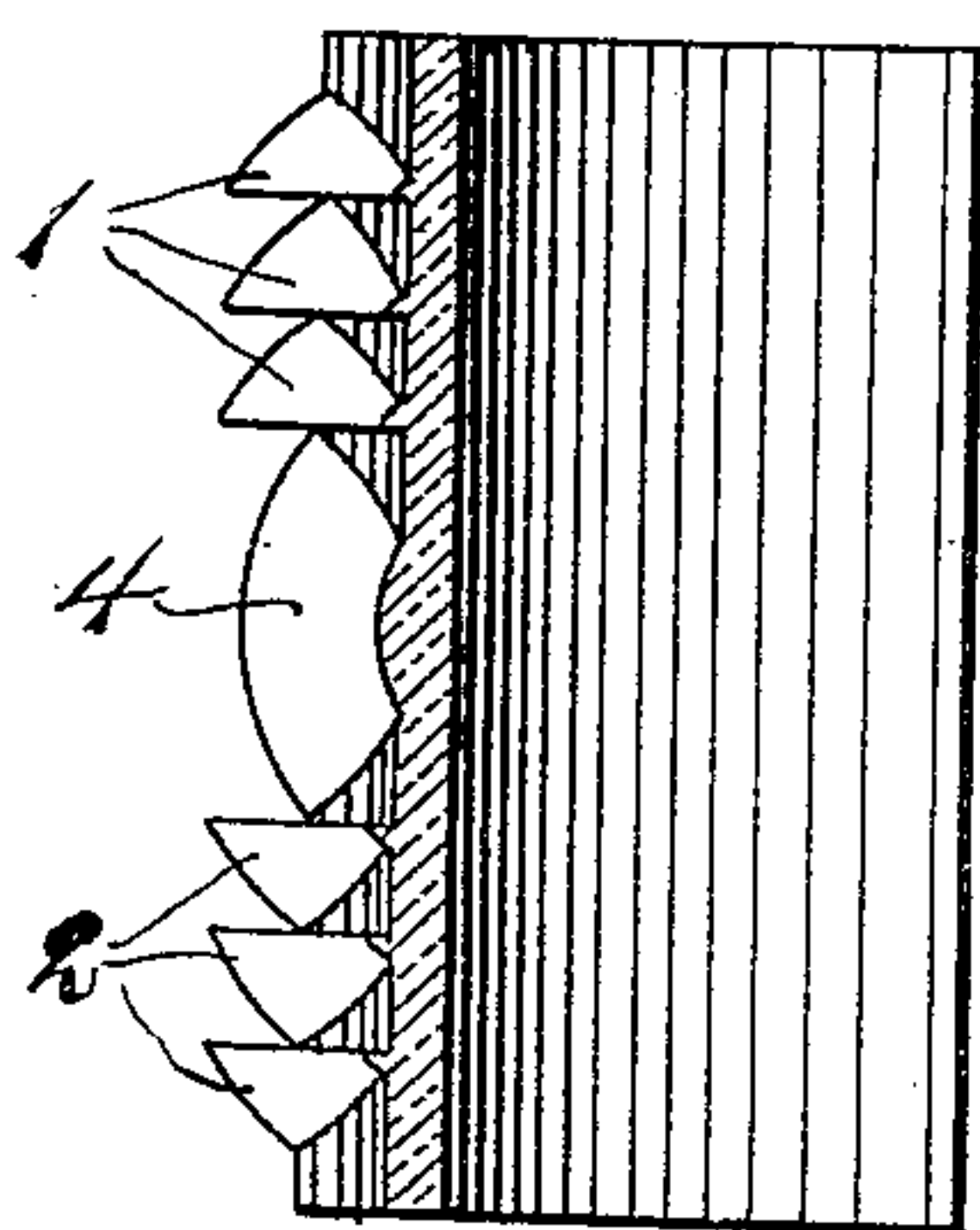


Fig. 4.



WITNESSES

Harvey L. Lechner  
J. C. Bradley

INVENTOR

George A. Macbeth  
by atty  
Paul Synnestvedt



# UNITED STATES PATENT OFFICE

GEORGE A. MACBETH, OF PITTSBURG, PENNSYLVANIA.

## LIGHTING DEVICE.

979,181.

Specification of Letters Patent.

Patented Dec. 20, 1910.

Application filed January 15, 1910. Serial No. 533,326.

*To all whom it may concern:*

Be it known that I, GEORGE A. MACBETH, a citizen of the United States, residing at Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Lighting Devices, of which the following is a specification.

The invention relates to lamps and particularly to the lenses employed therein. It has for its primary objects; the provision of a lens of the echelon type wherein the ridges are so formed as to secure a broader band of light; the provision of a lens of the echelon type wherein the ridges are divided transversely so as to secure a plurality of fields or bands of concentrated light; and the provision of a lens having this latter characteristic and in which the rays through the side portions of the lens are bent inwardly thereby reducing the field of illumination and increasing the intensity of such field. These and such other objects as may hereinafter appear I attain by means of a device shown in preferred form in the accompanying drawings, wherein

Figure 1 is a front elevation of a lamp provided with my improved lens,

Figure 2 is a section on the line II—II of Figure 1,

Figure 3 is a side elevation partially broken away on the line III—III of Figure 1, and

Figure 4 is a section through the lens on the line IV—IV of Figure 2.

On reference to the drawings it will be seen that the lens employed is, in general, of the echelon type, and is shown applied to a switch lamp A of ordinary construction provided with illuminating means B and a reflector C, which may be of any desired type. In the echelon lenses heretofore employed the refracting ridges were continuous across the lens and were formed on the same radius of curvature as the lens, the visual effect of which is a thin vertical strip of light. One of the chief objects of my invention is to broaden this strip or band of light, thereby increasing the lighting power and utility of the lamp. I accomplish this by providing sets or series of refracting portions or ridges 1 and 2, and 3, 4 and 5, each of which is formed on a radius smaller than that of the lens in general, and constitutes in effect a lens in itself. This construction shortens the focus and thereby broadens

the band of light, the increased illumination secured therefrom being particularly useful in switch lighting in heavy weather, and in lights for vessels. Another result obtained by thus dividing the refracting ridges into sets of lenses is the formation of a plurality of fields or bands of concentrated light 6, 7 and 8, as indicated diagrammatically in Figure 2. This arrangement has been found to give a better illumination in front as well as at an angle and gives the lamp a distinctive appearance. The construction is also desirable in that the outermost rays of light (Figure 2) are bent inwardly, thus giving a more restricted field of illumination for each portion, but providing a more intense field more nearly in front of each portion and at a point where it is of greatest advantage. It is of course immaterial insofar as the broad invention is concerned whether or not the particular configuration of the ridges be as illustrated, or whether the ridges be placed upon the outer face of the lens, or glass.

Having thus described my invention and illustrated its use, what I claim as new and desire to secure by Letters Patent is the following:—

1. A curved lens provided with a plurality of horizontal ridges having such ridges divided vertically into sets, the sections of each set of the ridges being convex horizontally.

2. An echelon lens having a plurality of substantially horizontal parallel ridges, each separated into sections thickest at the centers of the sections and tapering inwardly to the ends, corresponding sections of different ridges being in substantially vertical alinement.

3. A lens having on its face a plurality of vertical rows of convex refracting ridges, the refracting ridges in adjacent vertical rows being end to end and in substantially horizontal alinement.

4. A lens having on its face a plurality of horizontal rows of elongated convex refracting portions arranged in series one above the other, each row comprising a plurality of portions placed end to end and the corresponding portions in the various rows being in vertical alinement.

5. In combination in a lamp having a source of illumination, a parti-cylindrical lens having a substantially plane rear face and a front face having a central refracting

portion, and side refracting means each comprising a series of horizontal ridges in substantially vertical alinement and having the thickest portions at the center and decreasing in thickness from the center to the ends.

6. In combination in a lamp having a source of illumination, a parti-cylindrical lens having a central portion and refracting means at each side thereof, each of such refracting means comprising a series of hori-

zontal ridges in substantially vertical alinement and having the thickest portions at the center and decreasing in thickness from the center to the ends.

In testimony whereof I have hereunto signed my name in the presence of the two subscribed witnesses.

GEO. A. MACBETH.

Witnesses:

HARVEY L. LECHNER,  
DOERING BELLINGER.