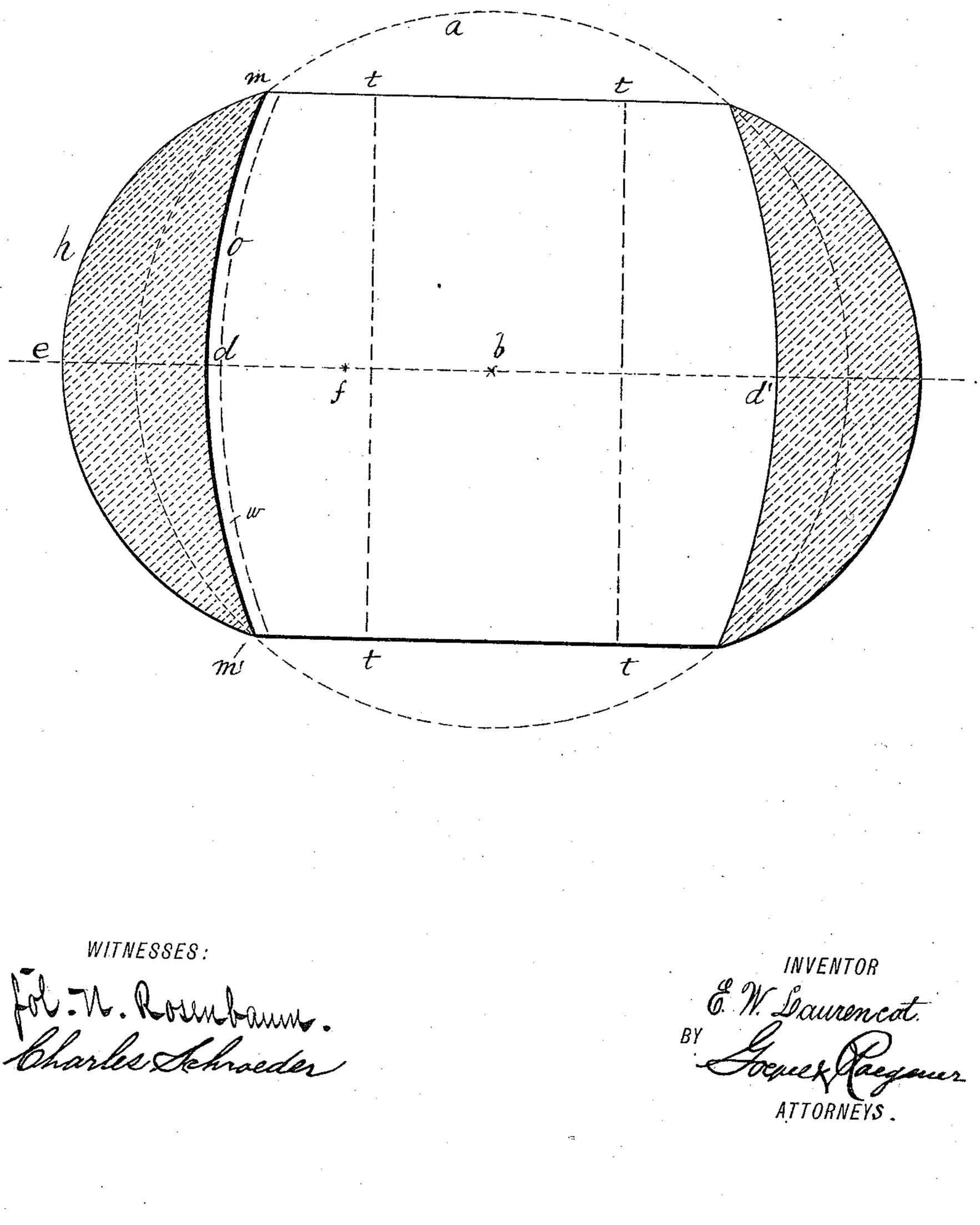
(No Model.)

E. W. LAURENÇOT.

ANNULAR LENS.

No. 451,330. Patented Apr. 28, 1891.



WITNESSES:

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ANNULAR LENS.

SPECIFICATION forming part of Letters Patent No. 451,330, dated April 28, 1891.

Application filed January 7, 1891. Serial No. 376,985. (No model.)

To all whom it may concern:

Be it known that I, EDWARD W. LAURENÇOT, of Hoboken, in the county of Hudson and State of New Jersey, a citizen of the United States, have invented certain new and useful Improvements in Annular Lenses, of which the following is a specification.

This invention relates to annular lenses to be used as shades for lamps, electric lights, gas, or any other source of light for the purpose of increasing the illuminating power of the lamp by throwing all the rays in radial direction but in parallel planes one above the other.

The invention consists in an annular spherocylindrical convex and sphero-cylindrical concave lens, made as will be fully described hereinafter.

In the accompanying drawing, a vertical sectional view of my improved annular lens is shown.

The outlines for my improved lens are obtained in the following manner: A circle *a* is described, having the point *b* as its center. On the horizontal diameter of said circle the points *d* and *e* are marked off, which points *d* and *e* are arranged, respectively, inside and outside of the circle at the same distance from the circumference of the circle on said horizontal diameter. The distance from *b* to *d* is taken as the radius of a circle, the central point *f* of which circle is located on the horizontal sectional diameter of the large circle *a*, the point *f* being located from the point *e* a distance equal to the radius, so that the arc *h* made with said radius passes through the point *e* on the central horizontal diameter and intersects the circumference of the circle *a* at the points *m m'*. Double the length from *b* to *d* is taken as the radius of the circle, the center of which circle is a distance to the right of the center *b* equal to said length *b d*—that is, at *d'*—and with the said line *d d'* equal to twice *d b* as a radius the arc *o* is struck, which arc passes through the point *d* and intersects the circle *a* at the points *m m'* at the ends of the arc *h*. The arc *h* forms the outer convex surface of the lens and the arc *o* the inner concave surface of the lens. As the meniscus-shaped figure *m e m' d* thus formed is carried around in the circle forming the annular lens it is evident that the same figure will appear on the right-hand side of the central line of the lens, as shown in the drawing. A lens thus formed is a perfect annular concavo-convex lens, and if the plane of a luminous body is placed in the center of the same the rays of light will be projected radially, but in a series of parallel horizontal planes. The illuminating power of the luminous body placed in the center of the annular lens is thus increased, as the rays of light are not concentrated nor dispersed, but are directed, as stated, radially in a series of superimposed planes.

A certain portion of the interior surface of the circular lens may be provided with a coating of silver or amalgam, as indicated by the dotted lines *t t t t*, and serves as a reflector to throw the light rays more effectively in one direction.

Part of the inner surface of the annular lens may be provided with a covering of colored glass, as indicated by the dotted lines *w w*, in case the lens is to be used for ships, lights, signals, &c.

I am aware that lamp-shades having lenses of various shapes have been made and used heretofore, and I do not claim, broadly, to be the inventor of a lamp-shade having the properties of a lens.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. An annular lens having the following characteristics: the cross-section of the annular body being meniscus-shaped and the radius of the circle forming the outer convex contour of the meniscus-shaped figure having less radius than the circle, a segment of which forms the inner concave contour of the meniscus-shaped body, the ends of said exterior convex contour and inner concave contour intersecting each other on the circumference of a circle having its center in the center of the annular lens, substantially as set forth.

2. An annular lens having a certain por-

tion of its inner surface provided with a reflecting-coating to act as a reflector for the rays passing through the non-coated portions of the annular lens, substantially as set forth.

3. An annular lens provided on its inner surface with a covering of colored glass, substantially as set forth.

In testimony that I claim the foregoing as my invention I have signed my name in presence of two subscribing witnesses.

EDWARD W. LAURENÇOT.

Witnesses:

OSCAR F. GUNZ,

CHARLES SCHROEDER.