Jan. 25, 1927. 1,615,358

R. N. CHUBB

METHOD FOR MANUFACTURING REFLECTORS

Filed August 25, 1924 2 Sheets-Sheet 1

Fig. 1.

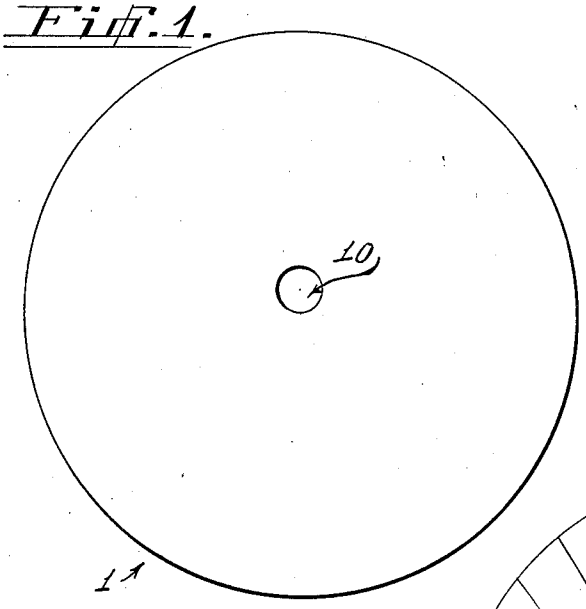


Fig. 2.

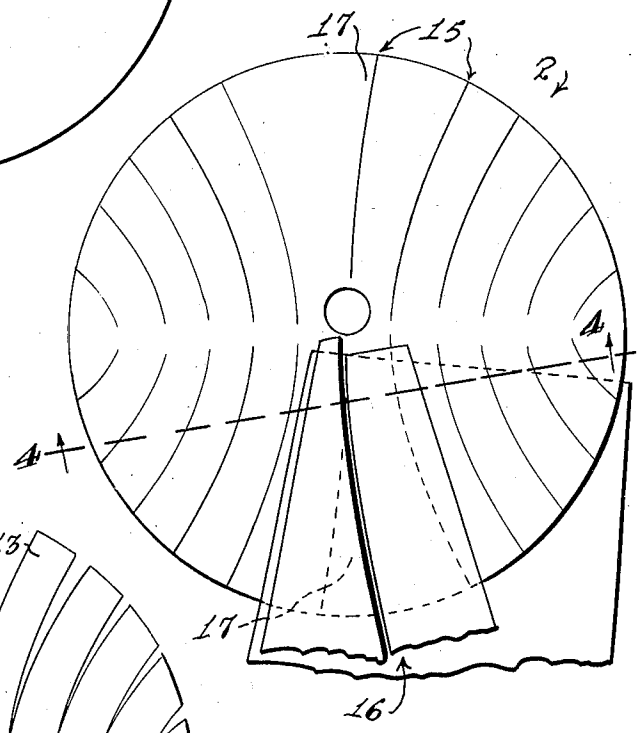
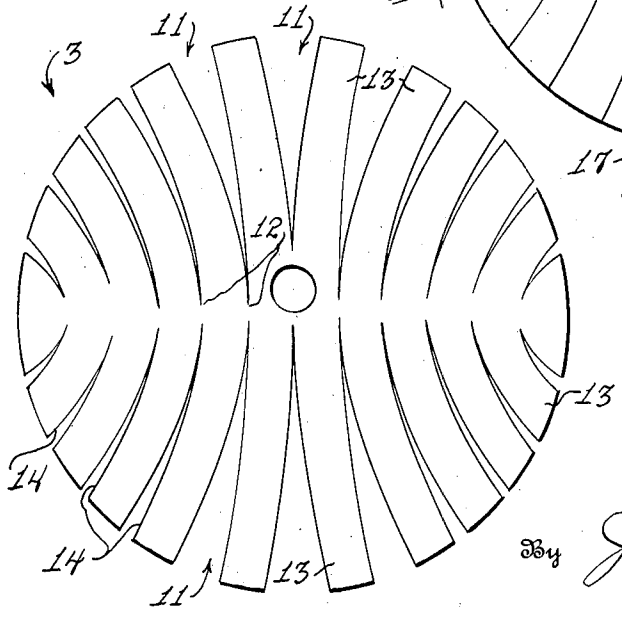


Fig. 3.



Inventor:
R. N. Chubb,
By J. W. Sheeley
Attorney

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Fig. 4.

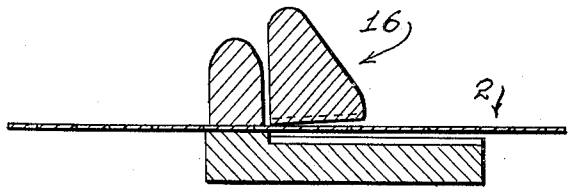


Fig. 6.

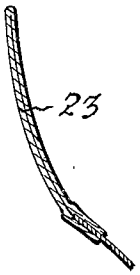


Fig. 5.

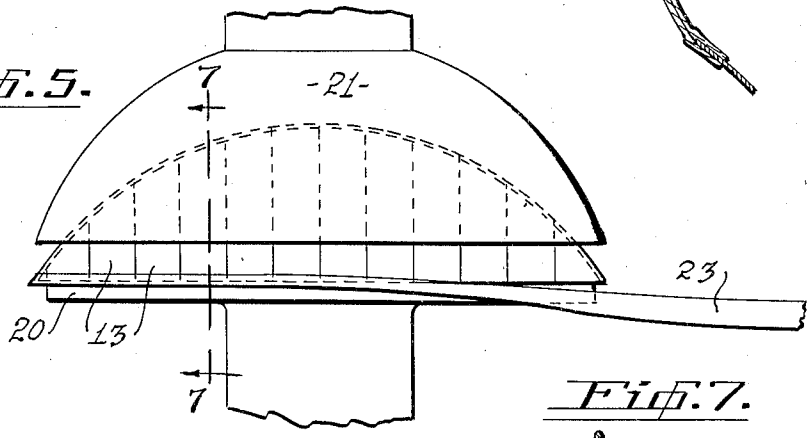


Fig. 7.

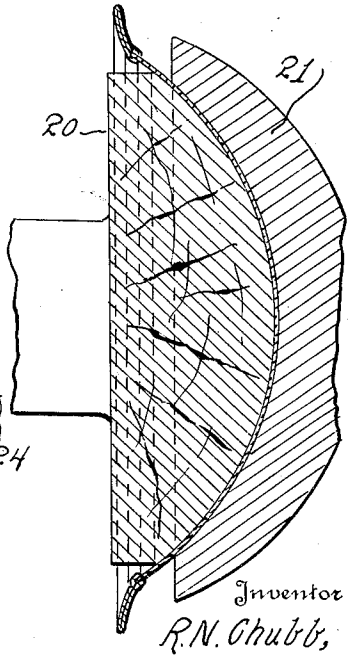
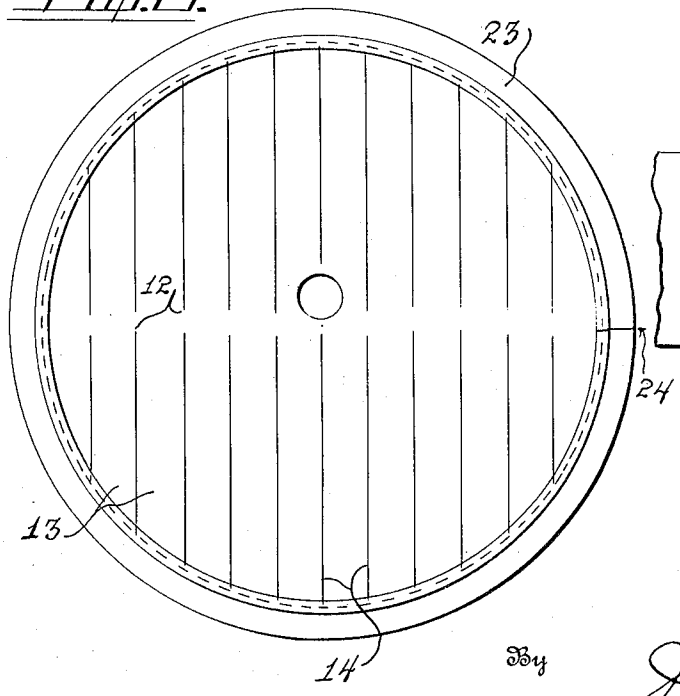


Fig. 8.



Inventor
R. N. Chubb,

By J. W. Shelley Attorney

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UNITED STATES PATENT OFFICE.

ROWLAND N. CHUBB, OF LOS ANGELES, CALIFORNIA.

METHOD FOR MANUFACTURING REFLECTORS.

Application filed August 25, 1924. Serial No. 734,054.

This invention relates to the manufacture of polished reflectors, and pertains more particularly to a new, economical method for manufacturing headlight reflectors, as well as other reflectors for various purposes.

It will be understood, in the consideration of the invention, that the inner surface of a reflector, which is almost invariably concave in general form, must be provided with a highly reflective surface. In manufacture, the metal of which the reflector is to be made is struck out of a flat sheet and drawn into form. Were the metal to be provided with a highly reflective finish before being shaped, there would be no finish left by the time the reflector was shaped. The loss of finish would be due very largely to the great distortion and displacement which takes place in metal during drawing and similar power press operations.

The principal object of the invention is to provide method and means whereby the metal of which a reflector is to be made may be finished first and shaped afterward without affecting the finish.

Another object of the invention is to provide for using metal which has a suitable stock finish, without damaging the finish.

Another object of the invention is to provide methods for manufacturing reflectors whereby the metal of which the reflector is made may be first blanked out in a flat shape, subsequently finished and polished and finally put through a shaping operation without destroying the finish.

It will be realized that the polishing of the inner surfaces of a concave reflector is a difficult and costly task, whereas the act of polishing a flat blank of metal is quite simple and inexpensive. The polishing is particularly costly in the cast of those types of reflectors which are polygonal on one or both dimensions; or, in other words, those reflectors which have a plurality of flat surfaces arranged in a general parabolic arrangement. In such reflectors, it is particularly difficult to finish the metal adjacent the intersections of the flat surfaces.

Another object of the invention is to provide a method for manufacturing any and all types of reflectors for any and all purposes regardless of whether the surfaces are to be disposed on true curves, composite curves, theoretical parabolas, polygonal parabolas, or a combination of two or more of the above.

Still other objects and advantages of my invention will appear hereinafter. I have illustrated by the accompanying drawings a preferred manner of carrying out my invention, and I have shown the invention applied to the manufacture of a reflector which is truly parabolic on one median line and polygonal on the other line, although it is anticipated that modified ways of carrying out the method will suggest themselves to the minds of those skilled in the art, and it will be obvious hereinafter that the method may be applied to the manufacture of any shape of reflector, or similar object whatsoever, and, therefore, it is to be understood that I am not to be confined to the specific method of manufacture about to be described or to the shape of reflector to which it is applied, and may alter the method and apply it to the manufacture of any shape, within the appended claims.

In the said drawings—

Figure 1 is a view in elevation of the blank;

Figure 2 is a plan view illustrating an intermediate operation required in the blanking of some of the more difficult shapes of reflectors;

Figure 3 is a view of the finished blank;

Figure 4 is a view in section seen on a line 4—4 of Figure 3;

Figure 5 is a view in elevation of a form such as may be employed in carrying out my method;

Figure 6 is a view in enlarged detail section of the rim of a finished reflector;

Figure 7 is a view in section seen on a line 7—7 of Figure 5;

Figure 8 is a view in front elevation of a completed reflector.

In carrying out my improved method in the preferred manner, I provide the blank 1, which is preferably silvered and polished before any of the succeeding steps of manufacture are accomplished. In forming said blank, the usual lamp aperture 10 is provided, this aperture being located slightly above the true center of the blank.

Where metal is employed, the upper surface is silvered and polished. I have made the discovery, however, that a very good reflector may be made from celluloid which

is silvered on the under side so that the finish is protected by the celluloid. The material used must of necessity be quite transparent. It will be apparent hereinafter that the method now being described is applicable to manufacturing reflectors from metal finished upon the upper side, or from a pliant translucent material silvered on the under side.

The reflector illustrated is that type which is parabolic on the vertical median line and parabolically polygonal on the transverse median line. The blank shown in Figure 3 is provided with a plurality of substantially vertical parallel slots 11, 11, etc., which increase in width outwardly as well as curving slightly outward. All slots terminate, as at 12, close to the transverse median line of the blank. The slots divide the blank into a plurality of strips 13, 13, etc., which are slightly connected to each other at points adjacent the transverse median line. The strips may be each and all made separate, but the act of assembling them and joining them together becomes more expensive. By leaving all the fingers connected to each other, the result is actually a single piece of metal.

By curving all the fingers or strips properly, the adjacent edges 14, 14, etc., may be brought into juxtaposition, as will appear hereinafter.

Theoretically, at least, the slots should decrease in width inwardly and terminate at the true transverse medial line of the blank; if so, however, the fingers would be separated. However, I am able to approach the theoretical requirement very closely by continuing the slots quite close to the said medial line. Therefore, the slots should be of extremely minute diameter at their terminations, and it will be apparent to those skilled in the art of blanking sheet metal that a single die to make the blank 3 might be somewhat impractical to build and use.

Therefore, the next most practical step in the operation is to provide the blank 2 with single slots 15 made simply by shearing the metal but without removing any metal. Then with the aid of a shear, such as 16, metal 17, adjacent said slot, may be cut away first from one side of the adjacent metal and then from the other side. The operation is illustrated particularly in Figure 2, where I have shown the blank 2 undergoing the action of the shear. Thus the slots 11 are best formed and may be made to approach to extremely minute diameters at their terminations.

During the shearing operations there is ordinarily little or no tendency to mar the finish and there is no tendency to draw the metal sufficiently to cause the finish to check or peel. However, if the metal or finish is such as to make it advisable, or if the manufacturer so desires, the plating and polishing of the blank may be done after it has reached the shape shown in Figure 3, in which case it is still flat and quite easy to plate and polish. The foregoing applies to metal or to silvered celluloid or the like.

To carry out the next step of my method, I employ a suitable form or block such as 20. This block is preferably made of suitable wood, or rubber or other material not presenting a very hard surface to mar the polished surface of the reflector. In fact, very little effort is required to form the blank to the required shape, and while I have shown the block 20 and other parts as of substantial weight such is done merely to illustrate the mode more clearly.

The blank 20, in making any size, type or form of reflector, should be the shape of the finished reflector ordinarily. Coacting with the forming block there is provided a die member 21. Said member is shown as quite substantial in construction to insure its holding its form indefinitely, but it is a fact that the blank 3 may be shaped over the block by the simplest of suitable means, even, in fact, by the human hand.

Now the blank 3 is suitably arranged over the block and the die member is then moved into place, as shown in Figure 7. Now the blank is in the correct shape. It will be apparent now that the act of shaping the reflector resolves itself into merely putting a slight curvature into a plurality of slightly connected strips of metal simultaneously.

Thereby the corresponding edges of adjacent strips are brought into contact with each other and the complete concave reflector is formed. While held over the form a metal binder 23 of U cross section may be shaped over the edges of the metal to provide a complete annulus or rim serving as a rim for the reflector and a permanent means of holding the metal in correct shape. During the act of bending the respective strips of metal, the finish will obviously be unharmed, it being known that highly plated and polished strips of metal may be bent into moderate curvatures many times without harming the surface, and the foregoing is applicable to all objects of a semi-spherical nature, and while I have shown the slots as being substantially parallel it will be apparent that a radial arrangement of slots, as well as a great variety of other arrangements of slots, may be resorted to in the manufacture of various shapes of concave objects.

I claim as my invention:

1. The method for manufacturing a concavo-convex object, of sheet material, said method including; providing a flat blank of sheet material with a plurality of slots intersecting the perimeter thereof, and ranging generally and normally to said median line in both directions from the transverse

median line of the blank; said slots being of decreasing width inwardly and all terminating close to, and substantially equi-distant from, the transverse median line of the blank, and subsequently bringing opposed margins of each slot in to close proximity to each other.

2. The method for manufacturing a concavo-convex object, of sheet material, said method including; providing a flat blank of sheet material with a plurality of slots intersecting the perimeter thereof, and ranging generally and normally to said median line in both directions from the transverse median line of the blank; said slots being of decreasing width inwardly and all terminating close to, and substantially equi-distant from, the transverse median line of the blank, providing the blank, while flat, with a highly reflective surface, and subsequently bringing the opposed margins of each slot into close proximity with each other.

ROWLAND N. CHUBB.