

Jan. 28, 1930.

R. W. LUCE

1,744,907

METHOD OF PRODUCING REFLECTORS

Original Filed May 18, 1927

Fig. 1.

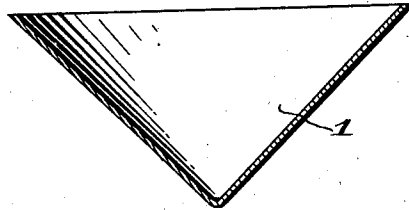


Fig. 2.

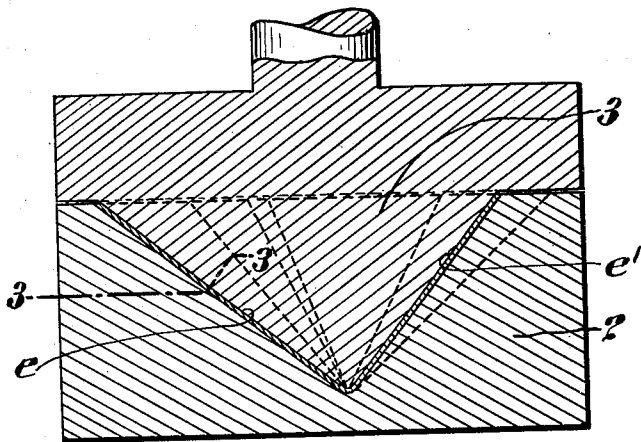
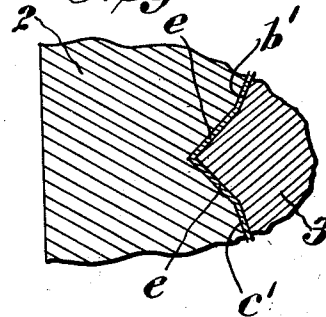
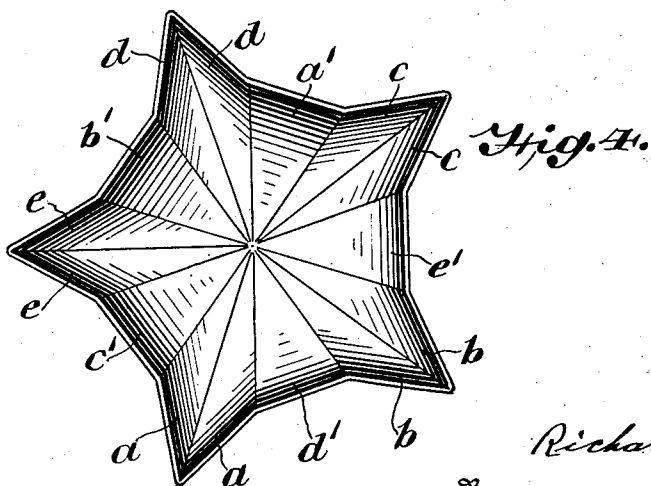


Fig. 3.



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METHOD OF PRODUCING REFLECTORS

Original application filed May 18, 1927, Serial No. 192,173. Divided and this application filed March 26, 1928. Serial No. 264,781.

This invention relates to methods of forming reflectors from sheet metal, and while capable of use in the production of a large variety of articles having reflecting surfaces, it is of especial utility when used in the production of reflectors employed in connection with traffic control, such, for instance, as is disclosed in my copending application No. 192,173, filed May 18, 1927, of which this application is a division.

The general object of the invention is to provide a method of making reflectors from sheet metal whereby the surfaces of the same may readily and easily be rendered light-reflecting before the metal is given its final shape.

Heretofore the practice has been to produce reflectors having angularly related reflecting surfaces by first forming the metal sheets into final shape and subsequently polishing those surfaces which are intended to be light-reflecting. But such a procedure has been found to be unsatisfactory in most cases because of the difficulty of access to portions of the surfaces.

Various attempts have been made to produce reflectors from sheet metal by giving the metal a high polish prior to the bending or shaping operation; but such a procedure generally has not been successful because the stretching of the metal resulting from the bending operation has caused the polished surface to check and crack.

By the employment of my invention the above difficulties are overcome. I have provided a method whereby a metal sheet blank is first given a shape approximating that of the completed article. The even surface of the blank is then rendered light-reflecting by polishing or otherwise. Thereafter the blank is formed into its final shape by subjecting it to compressive pressure to form angularly related light-reflecting portions. By polishing the blank while the surface of the metal is even and regular I am able to reduce the expense of production very greatly, and as a result of first giving the blank its approximate shape the metal is not materially stretched when the blank is pressed and

shaped into its final form and therefore the highly polished surface is preserved.

In a reflector for use in traffic control it is desirable that a large reflecting area be provided so that the reflecting light may be seen from widely varying angles, and it is a further object of this invention to provide a novel method whereby a unitary structure having the dimensions desired may be produced from a single sheet of metal, the said reflector comprising a plurality of reflecting surfaces so related to one another as to effect the desired result.

A more specific object of the invention is to provide a method of making a reflector from a single sheet of material by shaping the said material into a plurality of couples of tapered sides, the sides of each of the couples being arranged at right angles to each other and the line of intersection thereof forming a right angle with the opposing surface of a tapered side constituting a portion of the reflector structure.

Other objects and advantages of the invention will be pointed out in the following detailed description or will be apparent therefrom. In order to fully comprehend the principle of the invention reference should be had to the accompanying drawing in which I have illustrated one embodiment thereof, but it is to be expressly understood that the mechanism disclosed is for purposes of illustration only and that various changes may be made therein without departing from the principle of the invention.

In the drawing:

Fig. 1 is a vertical sectional view of a blank of sheet metal which has been given a shape approximating that of the completed article in accordance with the first step of my process;

Fig. 2 is a view in vertical section illustrating the manner in which pressure may be applied to the blank of Fig. 1 by means of a matrix and punch to produce a reflector of desired form and character;

Fig. 3 is a transverse sectional view taken on the broken line 3—3 of Fig. 2 showing an angular portion of the metal blank pressed

between the opposing portions of the matrix and punch; and

Fig. 4 is a view in front elevation of one type of reflector which may be produced by the method of the present invention.

In the drawing I have shown a blank 1 of suitable metal, which has been given the general shape of the completed article produced by this method, which in this case is conical. The metal is thus formed by spinning or in any other manner known in the art. The interior of the said cone is now polished or burnished in known manner. It will be understood that the exterior of the cone may be polished instead of the interior, if desired. The conical blank 1 is now given its final shape by subjecting it to pressure between the matrix 2 and the punch 3 both of suitable metal, provided respectively with complementary intaglio and cameo surfaces. The shapes or configurations of these surfaces may be changed so as to produce a reflector of any shape or configuration desired. For the sake of illustration I have shown the said matrix and punch in Figs. 2 and 3 as being provided with complementary surfaces corresponding to those of the completed reflector illustrated in Fig. 4. In the said figure the sides $a-a$, $b-b$, $c-c$, $d-d$ and $e-e$ are arranged in pairs, and the sides of each pair are at right angles to one another. The pairs are also arranged about a common center alternately with the flat sides or reflecting surfaces a' , b' , c' , d' , and e' , as is clearly shown. The flat sides a' , b' , c' , d' , and e' are at right angles to the lines of intersection between each opposing pair of sides $a-a$, etc. I have shown five couples of right angularly related surfaces and five flat surfaces, making a total of ten reflecting elements in the structure. This number may be increased or diminished if desired, but in practice there should be an even number of reflecting elements in order to obtain the result desired.

Since the metal blank as shown in Fig. 1 approximates the size and shape of the completed reflector of Fig. 4, it will be apparent that there will be very little, if any, stretching of the metal when the blank is subjected to pressure between the matrix and the punch. The pressing action results in the forming of the metal into the shape desired, and any slight stretching which may accompany the said folding action is not sufficient to cause the polished surface to check or crack. The highly polished surface of the metal therefore is preserved.

Explaining the principle of reflection with reference to Fig. 4 it may be noted that if a ray of light impinges for example upon one of the reflecting surfaces of one of the sides a , it is reflected to the other of the sides a and from the latter to the reflecting surface of the side a' from which latter side

it is reflected or projected back along a line parallel or substantially parallel with the impinging ray. If the ray should impinge upon the reflecting surface of the side a' it is reflected forward to the reflecting surface of one of the sides a , thence to the reflecting surface of the other side a and from the latter is reflected or projected back along a line parallel or substantially parallel with the impinging ray. The same operation of reflection is effected or takes place in connection with each couple of cooperating elements; that is, with each group of reflecting surfaces formed by the fragmentary portions of central triple reflectors of which the reflector as a whole is composed, as previously stated.

In the present construction the fragmentary portions of five central triple reflectors are embodied. As has been indicated, the number of fragmentary portions may be increased or diminished within reasonable limits.

It will be seen that by my invention I am enabled to produce from a single metal sheet a light reflector which is the equivalent of a plurality of separate reflectors secured together, thereby effecting a great saving of labor and of material.

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

1. The method of making reflectors, which consists in forming a metal blank into a shape approximating that of the finished product, rendering a surface of the same light-reflecting, and thereafter subjecting the blank to pressure to produce a reflector having the desired shape.
2. The method of making reflectors, which consists in forming a metal blank into the shape of a cone, rendering a surface of the same light-reflecting, and thereafter subjecting the blank to pressure to produce a reflector having the desired shape.
3. The method of making reflectors, which consists in forming a metal blank into a shape approximating that of the finished product, rendering a surface of the same light-reflecting, and thereafter subjecting the same to pressure between a matrix and punch to produce a reflector having a plurality of plane angularly related reflecting surfaces.
4. The method of making reflectors, which consists in forming a metal blank into the shape of a cone, rendering the inner surface of the cone light-reflecting, and thereafter subjecting the blank to pressure to produce a structure having a plurality of tapered sides.
5. The method of making reflectors, which consists in forming a metal blank into the shape of a cone, rendering the inner surface of the said cone light-reflecting, and thereafter subjecting the blank to pressure to pro-

duce a structure having a plurality of tapered sides in right angular relation to one another.

5 6. The method of producing a reflector of sheet metal, which consists in forming the same to produce a cone-shaped member, rendering the inner surface of the member light-reflecting, and thereafter subjecting the same to pressure to produce a structure of sheet
10 metal having a plurality of tapered sides including a plurality of couples of sides in right angular relation to each other, and a plurality of flat sides in alternate relation to the said plurality of couples of sides.

15 7. The method of making a metal reflector from a single sheet of metal, which consists in spinning a metal blank into the shape of a cone, rendering a surface of the said blank light-reflecting by polishing, and subsequent-
20 ly pressing the said blank to produce a reflector having the desired shape.

8. The method of making a metal reflector from a single sheet of metal, which consists in spinning a metal blank into the shape of a
25 cone, rendering a surface of the cone light-reflecting by polishing, and thereafter pressing the said cone between a punch and a matrix having complementary flat tapered surfaces formed thereon.

30 In testimony that I claim the foregoing as my invention I have hereunto signed my name this 23rd day of March, A. D. 1928.

RICHARD W. LUCE.

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