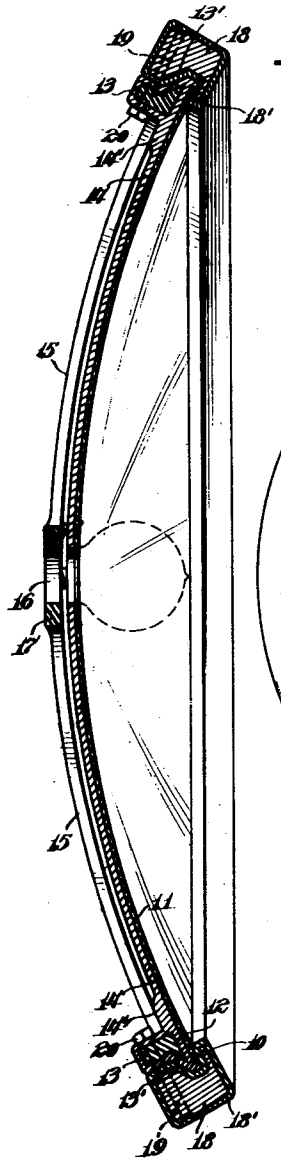
Aug. 5, 1924. 1,503,743

B. BART

METHOD OF REENFORCING REFLECTORS

Filed June 10 . 1920

Fig. 1.



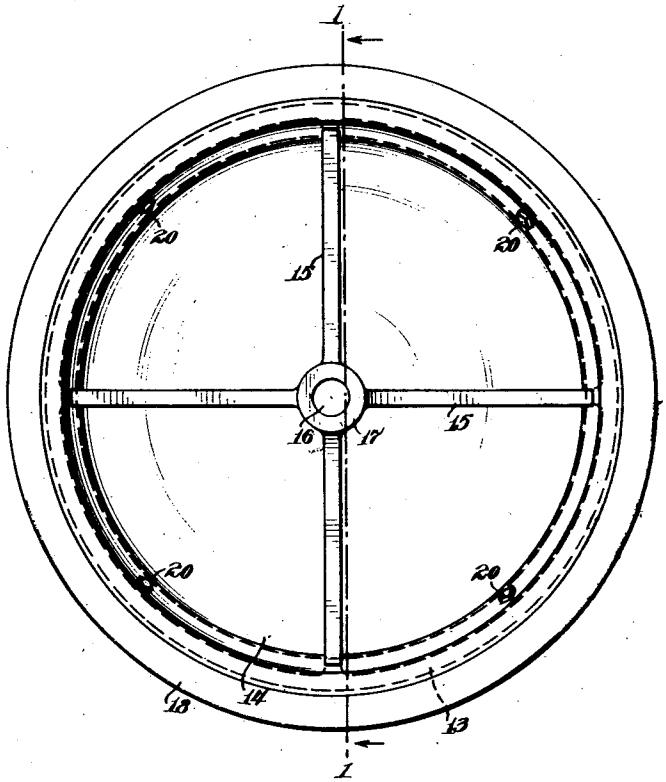


Fig. 2.

Inventor
Blasius Bart
By his Attorney
Warren S. Oston.

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UNITED STATES PATENT OFFICE.

BLASIUS BART, OF NEWARK, NEW JERSEY.

METHOD OF REENFORCING REFLECTORS.

Application filed June 10, 1920. Serial No. 387,975.

To all whom it may concern:

Be it known that I, BLASIUS BART, a citizen of the Republic of Switzerland and resident of Newark, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Methods of Reenforcing Reflectors, of which the following is a specification.

The invention relates in general to a method for reenforcing electrolytically deposited thin sheet metal articles which do not possess a rigidity sufficient to maintain their configuration under the distorting effect of their own weight and the invention relates specifically to a method of forming a reinforced reflector of a straight or curvilinear form.

The invention also relates to an improved form of reflectors most conveniently formed by the method herein featured. Reflectors of the type under consideration are usually formed of a thin film of reflecting metal, such as silver, with a thin backing sheet of some strengthening material, such as copper. Considerations of economy as well as other factors require that the combined films be of the least possible thickness of material. Such reflectors when of relatively small diameter, say four or five inches can be made of thickness of material to provide a rigidity in the backing layer sufficient to maintain the configuration of the article but when the reflectors are made of large diameter, say six to ten feet, it is obvious that to produce a backing sufficient to give the rigidity necessary to defeat distortion, would be prohibitive especially in those cases where the backing is made of an expensive metal such as the electrolytic copper deposit usually employed.

The present disclosure features a means for reenforcing the frail, thin double sheet reflector so as to withstand any tendency on the part of the reflector to sag by its own weight or to become distorted under the variable temperature conditions incidental to the use of a reflector in search lights or other situations where intense heat is present.

One of the primary objects of the invention is to attain a simple mode of procedure to provide economically a reinforcement for a device of the class outlined which will act to maintain the desired configuration to the object under the variable conditions of use, and at the same time secure the reenforcing element to the reflector securely and positively but without the use of any fastening means.

Broadly, I attain this object first by depositing the layer of the reflecting material, such as metallic silver, on the usual glass mould; then by depositing a backing of stiffening material, such as copper, on the rear face of the reflecting layer, all as is usual in the manufacture of metallic mirrors as at present practiced.

The disclosure features a rigid and preformed reenforcing element of suitable form which is placed against the partially formed backing and the electroplating operation continued until the element is securely embedded in the backing sheet.

Considering the article phase of the disclosure the primary object of the invention is to provide a well braced reflector in which the use of metal has been reduced to a minimum and the necessary strength provided by relatively inexpensive structural parts.

Still another object of the invention is to provide a simple means for armouring the periphery of the formed reflector so that it may be moved about on the armouring means utilized as a rim and so that the armouring means may be utilized as a mounting frame for securing the reflector in place.

Still another object of the invention is to provide a metallic reflector which can be made of unusually large size and which need not have any greater thickness of metal parts than is necessary for a small reflector.

Various other objects and advantages of the invention will be in part obvious from an inspection of the accompanying drawings and in part will be more fully set forth in the following particular description of one form of mechanism embodying my invention, and the invention also consists in certain new and novel features of construction and combination of parts hereinafter set forth and claimed.

Referring to the accompanying drawings:—

Fig. 1 is a transverse sectional view through a large reflector with the several layers exaggerated in thickness to show details and taken on the line 1—1 of Fig. 2 looking in the direction indicated by the arrows. This figure shows the completely

formed reflector assembled with an encircling armouring band for protecting the edges of the same; and

Fig. 2 is a reduced view in rear elevation of the device shown in Figure 1.

In the following description and in the claims, parts will be identified by specific names for convenience of expression but they are intended to be as generic in their application to similar parts as the art will permit.

In the accompanying drawings, a reflector has been selected to illustrate one form of the resulting product obtained from practicing the method disclosed. It is to be understood that a very thin film 11 of silver has been deposited upon a highly polished glass mould as more fully described in my copending application on apparatus for spraying solutions, Serial No. 387,974, filed June 10, 1920. After the silver deposit was set the mould with the silver film thereon was positioned in an electrolytic vat and a thin copper film deposited on the rear face of the reflecting material as is usual in such processes. After the film had attained some thickness, as indicated at 12, so as to provide a frame spacing layer, the reenforcing element, such as the ring 13, was positioned on the copper film 12 and the electrolytic depositing process continued to form a backing sheet 14 of the desired thickness. The copper backing embeds the reenforcing ring within its depth so that the element is entirely surrounded with the integral sheet 14 and in this way secured to the reflecting film to form a single united structure.

In situations such as illustrated wherein there is shown a reflector of the curvilinear type, the ring 13 is utilized to outline the periphery of the reflector. This reenforcing ring is made of any suitable form of material which will give the desired rigidity to the structure and may be a built-up structure featuring the best practices inherent in other internal reinforcement arts. In situations where the element of light weight is a material factor, the ring is made of aluminum but in general practice wooden structures have been found to be preferable for numerous reasons such as resiliency and cheapness of manufacture.

In those situations where it is desired that the ring form of reinforcement be used in articles of large diameter it is possible to form the reinforcement in the form of a wheel with internal bracing spokes 15 and this structure is particularly applicable in the large sized reflectors which are provided with a central opening 16. In this case the spokes are joined to a hub ring 17 which encircles the aperture opening 16. In such devices it is preferable that the hub member and the part of the spokes connected thereto be in spaced relation to the metallic part of the reflector so as to permit the necessary degree of expansion and contraction usual with the reflectors of high power lamps.

It is obvious that the securing of the reenforcing element within the body of the backing layer eliminates any necessity for providing securing elements which would otherwise have to pass through the metallic part of the reflector to the reflecting surface thus giving rise to an objectionable appearance to the front of the device. The reflector disclosed is firmly braced at its periphery and is finished off in a manner to give a pleasing finish to the edge and at the same time to minimize the possibility of cracks starting at the edge of the reflecting surface. The back side of the reflector looks as if it is formed entirely of copper with a thickened edge thus presenting a pleasing and complete appearance to the reflector as a whole. In installing the reinforcement in place there is eliminated any necessity of manual labor in fastening the reenforcing element to the reflector for the electroplating process acts to secure the frame accurately, positively, and permanently, and without, in any way, weakening either the reenforcing frame or the thin films of metal which go to make up the reflector proper.

Referring to a refinement of structural detail, it is noted that the outer edge of the ring 13 forms a sharp angled projection 13′ at its inner side to insure the forming of the copper into the angle on the outerside of the ring as it forms on the inner side as shown in the thickened portion 14′. The reflector as thus described is complete and may be transported and positioned in the reflecting apparatus with which it is intended to operate without additional attachments. These reflectors are frequently rolled about from place to place in the manner of rolling a large wheel and it is deemed advisable under some conditions of use to provide the formed reflector with an armouring band 18 resembling the rim of a wheel. In the illustrated showing of the invention the periphery of the reflector has been formed particularly to be received in an annular groove formed in the inner periphery of the band 18. The reflector is mounted in the band in a manner similar to the mounting of a picture in a frame. The band illustrated is formed of wood with a metallic coating 18′ but this is of course immaterial and that form of band will be used which is best suited to give the strength or pleasing appearance desired.

The illustrated showing is further complicated to disclose means for positively securing the band to the reflector. For this purpose countersunk bolts 19 are passed

through the band and through the reinforcing element 13 and these bolts are shown to have nuts 20 engaging their inner ends.

It will be understood that the drawing illustrates a collective showing of the several features described and that usually there is no need for the armouring rim band nor for the peculiar configuration of the periphery of the electrolytically formed parts of the reflector.

Having thus described my invention, I claim:

1. In the art of forming a reinforced reflector, the process which consists in forming a film of a reflecting substance on a mould, partially forming a layer of strengthening material as a backing to the reflecting substance and to form a frame spacing film of the backing material, positioning a preformed reenforcing element on the film forming said partially formed backing and completing the formation of said backing thereby to embed the element in the backing material and thus secure the element to the reflector.

2. In the art of reenforcing electrolytically formed reflectors, the process which includes the steps of depositing electrolytically a layer of the substance to be reinforced, positioning a reenforcing element in juxtaposition to the formed layer and continuing the electrolytical deposition thereby to form a layer of the substance about parts of said element to secure the same within the integral layer of the substance formed by the electrolytic deposits.

3. In the art of reenforcing electrolytically backed reflectors, the process which consists in forming a layer of the reflecting substance on a mould, positioning a reenforcing element in juxtaposition to the exposed face of said formed layer and electrolytically forming a backing to said formed layer while permitting the backing to extend across the reinforcing element to secure the same in place.

4. In the art of forming metallic reflectors, the process which consists in depositing a layer of silver on a mould electrolytically depositing a layer of copper on the back of the silver layer, positioning a reenforcing element on said copper layer and covering the back of the copper layer and the frame with an additional backing of copper electrolytically deposited.

5. A reflector including a film of reflecting metal on the front side thereof and provided with a backing of a stiffening material, a preformed rigid reenforcing frame formed of a material differing from the stiffening material and embedded in said stiffening material.

6. A metallic reflector including a thin sheet of metal, constituting the reflecting surface, said sheet being of insufficient mass to maintain its configuration, a reenforcing frame secured to the thin sheet of metal to maintain the reflector in its prescribed shape.

7. A curvilinear reflector including a thin film of reflecting metal, free of securing apertures, a backing of stiffening material formed on the back of the reflecting metal film and a reenforcing frame for maintaining the reflector in position, said frame being secured to the reflecting sheet by the stiffening material and secured coeval with the formation of the backing.

8. A curvilinear reflector including a thin film of reflecting metal, a backing of stiffening material formed on the back of the reflecting metal film, and a self-sustaining reenforcing frame for maintaining the reflector in position, said frame being secured to the reflecting sheet by the stiffening material and embedded in the stiffening material and concealed thereby.

9. A reflector comprising three elements forming a unitary structure and including solely a film of reflecting metal, a sheet of metal forming a backing for the reflecting metallic film and an element for reenforcing the sheet and film, said element being intimately associated with the backing and free of fastening means.

10. A reflector having a thin layer of reflecting material defining the front side, a layer of strengthening metal defining the back side and a self-sustaining reenforcing frame secured to the reflecting layer and concealed by the back strengthening layer.

11. A reflector, including a thin layer of reflecting metal defining its front face, a frame at the rear side of the reflecting surface and outlining the periphery of the reflector and an electrolytically deposited layer of metal securing the frame to the reflecting layer.

12. A curvilinear reflector, including a thin layer of reflecting metal defining its front face, a circular frame at the rear side of the reflecting surface and outlining the periphery of the reflector and an electrolytically deposited layer of metal securing the ring to the reflecting layer and said ring provided with means for strengthening the same against distortion.

13. A reflector including a thin front layer of a reflecting material and a thin backing layer in engagement therewith said backing layer being of one-piece, said layers being of insufficient rigidity to maintain the configuration of the reflector, and a self-sustaining reenforcing frame therefor, having parts thereof outlining the reflector, embedded in and surrounded by the outer portion of the backing layer.

14. A reflector including a thin front layer of a reflecting material and a thin backing layer in engagement therewith,

said layers being of insufficient rigidity to maintain the configuration of the reflector, a reenforcing frame therefor having parts thereof outlining the reflector and embedded in the outer portion of the backing layer and said frame including other parts free of the backing layer thereby permitting relative movement between the backing layer and said free parts.

15. In a device of the class described, the combination with a reflector having a copper coated periphery formed electrolytically, of an armouring band similarly coated and encircling said periphery to form a rim for the reflector and with the contacting surfaces between the reflector and rim of the same metal.

16. In a device of the class described, the combination with a reflector having a thin central portion and a periphery formed electrolytically and having a greater thickness than the central portion of the reflector, of an armouring band encircling said periphery to form a rim for the reflector, said band provided with a recess for receiving the periphery of the reflector and said periphery and band coacting to maintain the configuration of the reflector.

17. In a device of the class described, the combination with a reflector having a periphery formed electrolytically, of an armouring band encircling said periphery to form a rim for the reflector and means for securing the band to the reflector said means being in spaced relation to its reflecting surface.

18. A reflector having a thin layer of reflecting material defining the front side, a layer of strengthening material defining the back side, means for maintaining the shape of the reflector secured to the reflecting layer by the back strengthening layer and positioned rearwardly of the reflecting material and a reenforcing band encircling said means as well as the reflecting material.

19. A curvilinear reflector comprising three elements forming a unitary structure and including solely a film of reflecting metal, a sheet of metal forming a backing for the reflecting metallic film, an element for reenforcing the sheet and film, said element being intimately associated with the backing and free of fastening means, said backing extending homogeneously about the element and a band encircling the periphery of said reflector.

20. A curvilinear reflector comprising three elements forming a unitary structure and including solely a film of reflecting metal, a sheet of metal forming a backing for the reflecting metallic film, an element for reinforcing the sheet and film, said element being intimately associated with the backing and free of fastening means, a band encircling the periphery of said reflector and bolts passing through the band and reinforcing element.

21. A metallic mirror composed of an opaque film of chemically deposited silver, the same having a reflecting surface which is the counterpart of an optically ground and polished mold a backing for said silver film and a stiffening ring forming part of said backing.

22. A mirror, having an exposed reflecting surface of deposited silver reinforced by an electrolytic backing of copper superimposed upon the silver and a stiffening ring electrically soldered to the copper at the edge of the reflecting surface.

23. A mirror, having an exposed reflecting surface of chemically deposited silver reinforced by an electrolytic backing of copper, a stiffening ring electrolytically soldered to the silver and copper at the edge of the reflecting surface and a backing of copper anchored to the edge ring.

24. A mirror, having an exposed reflecting surface of chemically deposited silver reinforced by an electrolytic backing of copper, a stiffening ring electrolytically soldered to the silver and copper at the edge of the reflecting surface and a backing of copper anchored to the electrolytic deposit of copper and to the edge ring.

25. A mirror, having an exposed reflecting surface of chemically deposited silver reinforced by an electrolytic backing of copper superimposed upon the silver, a stiffening ring electrolytically soldered to the silver and copper at the edge of the reflecting surface, said ring having a rabbeted outer edge, and a backing of copper interlocked with said rabbeted edge.

26. A mirror, having an exposed reflecting surface of chemically deposited silver reinforced by an electrolytic backing of copper superimposed upon the silver, a stiffening ring electrolytically soldered to the silver and copper at the edge of the reflecting surface, a backing of copper anchored to the edge ring, and a metal reinforcement for the ring.

27. The process of producing a mirror of the desired shape which consists in chemically depositing silver on a form of highly polished glass, reenforcing the chemically deposited silver by an electrolytic backing of copper superimposed upon the silver, stiffening the silver deposits by applying a backing material to the copper, and removing the mirror from the form.

28. The process of making a mirror of the desired shape, which consists in chemically depositing silver on a form of highly polished glass, reenforcing the chemically deposited silver by an electrolytic deposit of copper, superimposing upon the copper an additional electrolytic deposit of copper and

by the latter soldering a stiffening edge ring in place, and removing the mirror thus formed from the form.

29. The process of producing a mirror of the desired shape which consists in chemically depositing silver on a form of highly polished glass, reenforcing the chemically deposited silver by an electrolytic backing of copper superimposed upon the silver, stiffening the copper deposit by a backing reinforced by a shell, and removing the mirror from the form.

30. The process of producing a mirror of the desired shape which consists in chemically depositing silver on a form of highly polished glass, reenforcing the chemically deposited silver by an electrolytic backing of copper superimposed upon the silver, stiffening the copper backed silver layer so formed by a backing and removing the mirror from the form.

31. A mirror, having an exposed reflecting surface of chemically deposited silver reinforced by an electrolytic backing of copper superimposed upon the silver, a stiffening ring electrolytically soldered to the copper at the edge of the reflecting surface, a central opening in the reflecting surface and a stiffening central ring around the central opening and secured to the silver and copper.

32. A mirror, having an exposed reflecting surface of chemically deposited silver reinforced by an electrolytic backing of copper superimposed upon the silver, a stiffening ring electrolytically soldered to the copper at the edge of the reflecting surface, a central opening in the reflecting surface, a stiffening central ring around the central opening to the silver and copper, and a backing over the copper anchored to the edge ring.

33. A mirror, having an exposed reflecting surface of chemically deposited silver reinforced by an electrolytic backing of copper superimposed upon the silver, a stiffening ring electrolytically soldered to the copper at the edge of the reflecting surface, a backing of copper anchored to the edge ring, and a metal shell reinforcement secured to the ring.

34. A mirror, having an exposed reflecting surface of chemically deposited silver reinforced by an electrolytic backing of copper superimposed upon the silver, a stiffening ring electrolytically soldered to the copper at the edge of the reflecting surface, and a metal shell formed with perforations and fastening means in said perforations for securing the shell to the stiffening ring.

Signed at New York city, in the county of New York and State of New York, this 17th day of May, A. D. 1920.

BLASIUS BART.