E. A. KUEN.

METHOD OF MAKING REFLECTORS.

APPLICATION FILED APR. 7, 1916.

1,294,486.

Patented Feb. 18, 1919.

2 SHEETS—SHEET 1.

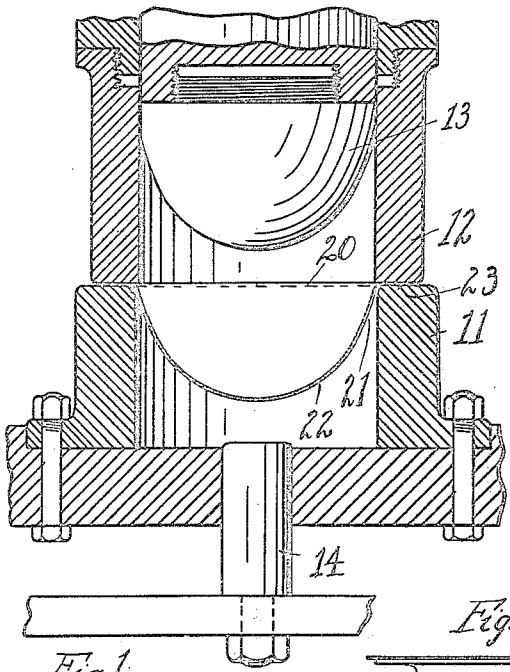

Fig. 1.

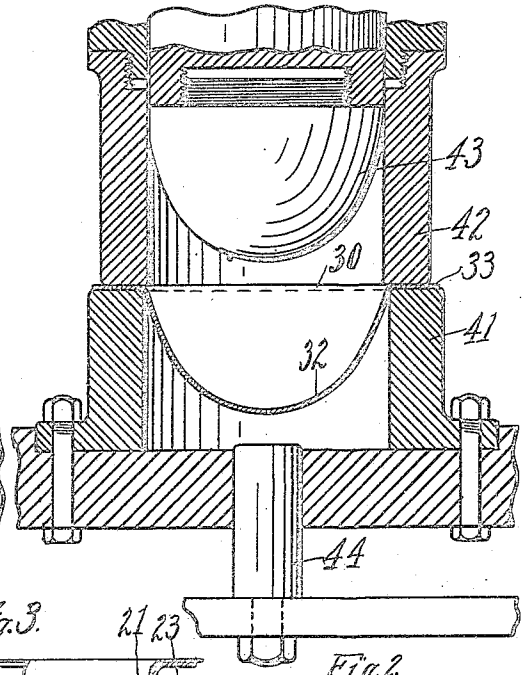

Fig. 2.

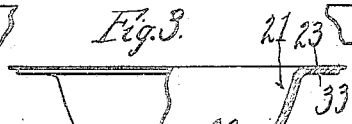

Fig. 3.

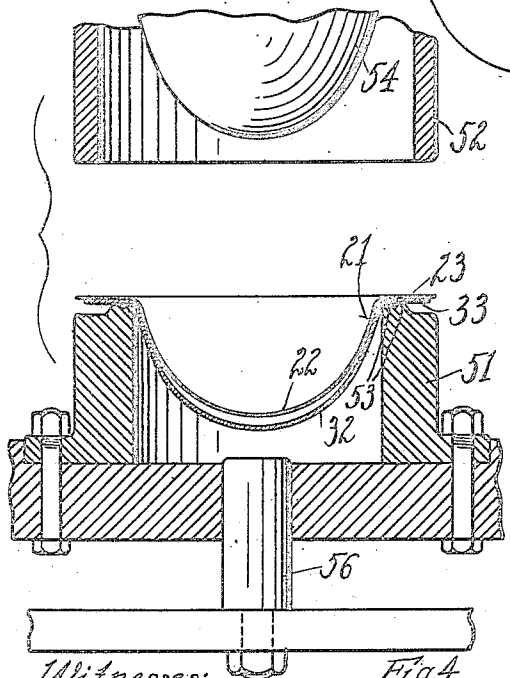

Fig. 4.

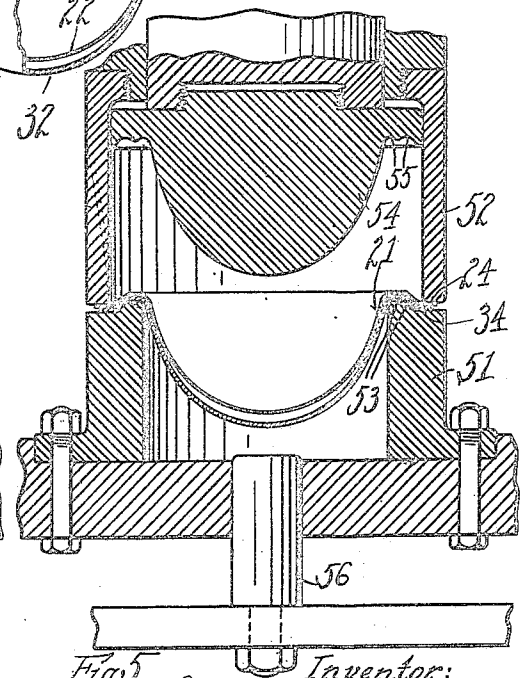

Fig. 5.

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2 SHEETS—SHEET 2.

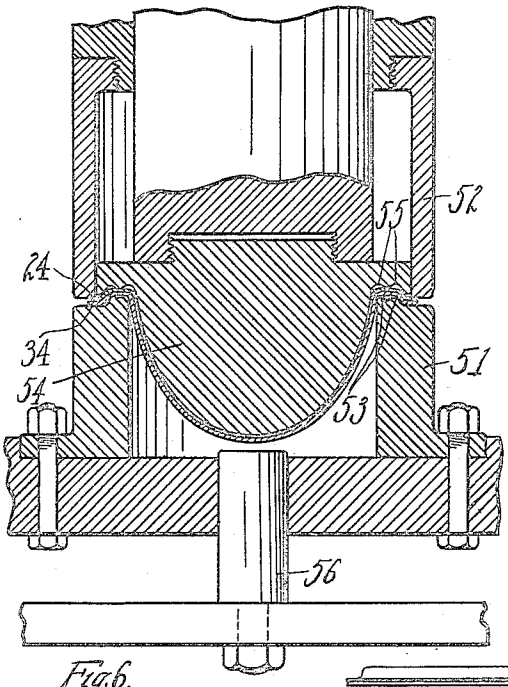

Fig.6.

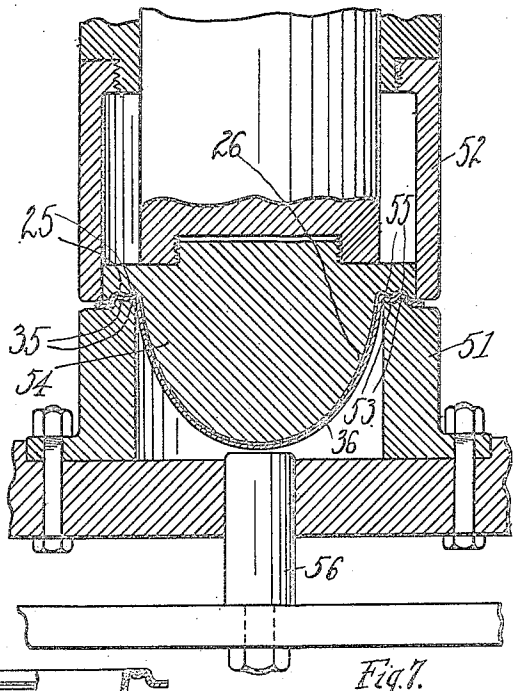

Fig.7.

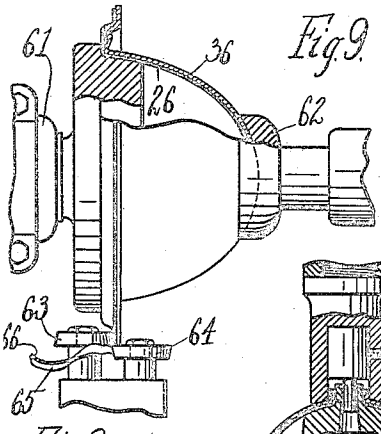

Fig.8.

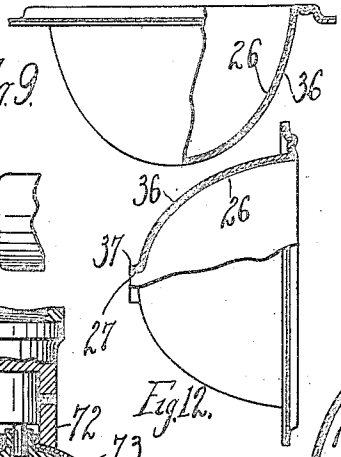

Fig.9.

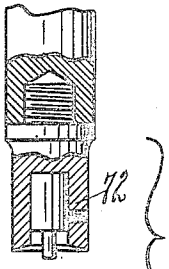

Fig.10.

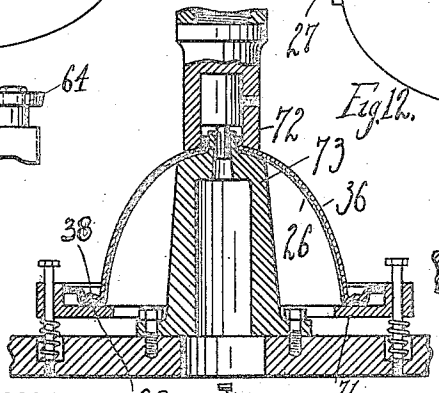

Fig.11.

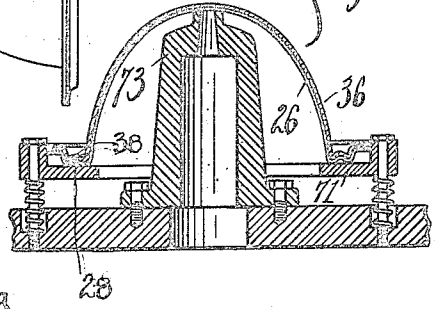

Fig.12.

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UNITED STATES PATENT OFFICE.

EUGENE A. KUEN, OF CINCINNATI, OHIO, ASSIGNOR, BY MESNE ASSIGNMENTS, TO THE CORCORAN-VICTOR COMPANY, OF CINCINNATI, OHIO, A CORPORATION OF OHIO.

METHOD OF MAKING REFLECTORS.

1,294,486. Specification of Letters Patent. Patented Feb. 18, 1919.

Application filed April 7, 1916. Serial No. 89,653.

To all whom it may concern:

Be it known that I, EUGENE A. KUEN, a citizen of the United States, residing at Cincinnati, in the county of Hamilton and State of Ohio, have invented certain new and useful Improvements in Methods of Making Reflectors, of which the following is a specification.

This invention relates to improvements in the art of making reflectors, such as the parabolic reflectors used in automobile lamps, headlights, and the like.

It is usual to make reflectors of this character out of metal which is capable of receiving a surface of high polish, and it has been customary to shape the same out of an integral sheet of brass. It has been found in practice that the sheet of brass out of which the reflector is formed must be of substantial thickness to successfully stand the handling of the same during the polishing and other operations, in order to retain its form and prevent indentations, the value of the reflector depending on its shape so as to properly project the rays of light, for instance from an incandescent electric light-bulb in the focal axis of the reflector, and susceptible of receiving a high polish in order to reflect the rays of the light with intensity.

The price of the metal out of which reflectors have heretofore been made has risen materially, and I have conceived the idea of making reflectors out of a plurality of sheets of material, employing an inner sheet capable of receiving a high polish and an outer sheet for imparting strength to the reflector.

Instancing the materials, I form the reflector out of an inner sheet of brass and an outer sheet of sheet steel. I give each sheet independently a preparatory approximate shape and impart the finishing shape, for instance, the proper parabolic form, to the sheets while in assembled relation, and impart the subsequent steps to the reflector while the sheets remain so assembled.

In the drawings:

Figure 1 is a vertical axial section of a preparatory forming of an inner layer, instanced as accomplished by a draw-press, parts whereof are shown in vertical axial section.

Fig. 2 is a similar view of a preparatory forming of an outer layer.

Fig. 3 is an edge elevation, partly in axial section, showing the preparatory formings of the layers in assembled relation, the bottoms of the preparatory bowl-shaped layers being in separated relation.

Fig. 4 is a vertical axial section, showing the preparatory formings of the layers in assembled relation, in connection with draw-press parts shown in vertical axial section.

Fig. 5 is a central vertical axial section of the preparatory formings of the layers with their edges partly formed and with the bottoms of the preparatory bowl-shaped layers in separated relation.

Fig. 6 is a vertical axial section of the reflector layers with their proximate faces in contact throughout their areas, shown accomplished by means of draw-press parts shown in axial vertical section.

Fig. 7 is a similar view of the same with the flanges of the reflector layers combinedly shaped.

Fig. 8 is an edge elevation, partly in section, illustrating the simultaneous trimming of the peripheral edge of the combined layers.

Fig. 9 is an edge elevation, partly in axial section, showing the layers of the parabolic reflector in connected relations with the edge of the flange thereof trimmed for providing an annular edge thereto.

Fig. 10 is a vertical axial section of the combined reflector layers, preparatory to having the piercing and flanging step performed thereon, and exemplifying a piercing and flanging means in central axial section.

Fig. 11 is a central axial section of the same, illustrating a piercing and flanging step; and,

Fig. 12 is an edge elevation of the layers of the parabolic reflector in united and finished relation.

Suitable devices may be employed in carrying out my invention for imparting the various shapes to the sheet-metal, as by spinning, drawing or otherwise manipulating the same, either manually or by machinery.

I have exemplified the forming operations as accomplished by means of pressing devices.

In employing my method, I use an inner layer of softer or more pliable sheet-metal and an outer layer of stiffer sheet-metal.

The inner layer may, for instance, be exemplified as soft sheet-brass and the outer layer as a cold-rolled sheet-steel, which may be a soft cold-rolled steel-sheet.

20 represents an exemplified sheet of softer metal, (see dotted line in Fig. 1), for instance of brass, which may be cut into the form of a round disk, and 30 represents a sheet of stiffer metal, (see dotted line in Fig. 2), for instance, sheet-steel, shaped into the form of a round disk.

The sheet 20 is manipulated for being formed into a preparatory bowl-shaped inner member 21, which may be accomplished by placing the sheet in a so-called draw-press of usual construction, the sheet being received between a lower die 11 and an upper die 12, (see Fig. 1), being clamping or pressing dies, for holding the periphery of the sheet, for instance by the usual spring-pressure acting on the dies, whereby, while the margin of the sheet is prevented from seaming or kinking, it will be permitted to yield in its plane during the forming operation. While the sheet is so held it is acted on by a drawing punch 13, the die 11 also acting as a forming die, for imparting the preparatory bowl-shape 22 to the inner member and drawing the bowl-shaped portion to extend from the plane of the sheet for providing the bowl-shaped inner member with an annular flange 23 extending laterally. A usual knock-out 14 may be employed for removing the preparatory bowl-shaped inner member from the press.

The sheet 30 is manipulated in manner similar to the manipulation of sheet 20, the margin thereof being clamped between clamping pressure dies 41, 42, (see Fig. 2). While pressure is exerted on the margin of the sheet 30, the drawing punch 43 is caused to act to impart the preparatory bowl-shape 32 to the outer member, drawing the bowl-shape to extend from the plane of the sheet for providing the bowl-shaped outer member with an annular flange 33 extending laterally. A usual knock-out 44 may be employed for removing the preparatory bowl-shaped outer member from the press.

The preparatory bowl-shaped inner member is thereupon placed within the preparatory bowl-shaped outer member, the former being of sufficiently smaller diameter than the latter at the inner edges of their flanges to be received in the outer member, the bowl of the former being sufficiently shallower than the bowl of the latter to space the bottom of the bowl of the former slightly from the bottom of the bowl of the latter when the parts are assembled, such assembled relation being shown in Fig. 3.

The assembled preparatory bowl-shaped members are thereupon manipulated to combinedly partially form the flanges by bending the outer peripheries of said flanges so as to be located within the planes of the bowl-formations 22, 32, which are perpendicular to the axes of said bowl-formations, as indicated at 24, 34. This is instanced as accomplished in a draw-press, (see Figs. 4 and 5). Thus the assembled preparatory bowl-shaped members are placed between a lower forming die 51 and an upper die 52, the outer margin of the former and the latter acting as clamping pressure dies, similarly to the action of the dies 11, 12 and 41, 42, and combinedly shaping said outer edges of the superposed flanges 23, 33, over the annular beads 53 of the die 51.

The preparatory bowl-formations while located one within the other are thereupon combinedly formed into the parabolic shape of the reflector and the flange formation completed, while the layers are in assembled relation, accomplished in the present exemplification by a drawing punch 54 having annular marginal grooves 55 which coact with the annular beads 53 of the die 51. The preparatory bowl-shaped members have their approximate parabolic shape combinedly imparted to them while in assembled relation, as indicated in Fig. 6. The final drawing action takes place at the time of the formation of the annular beads 25, 35, for forming the annular superposed grooves 28, 38, in the combined flanges of the inner and outer members. A suitable knockout 56 may be employed for removing the combined parabolic reflector layers from the press.

The manipulations of the inner and outer sheets as hereinbefore described will cause the outer edges of the flanges of the superposed layers to be uneven or out of line with one another, on account of the different extent to which different parts of said margins have been drawn upon in the formation of the layers due to different resistances of the metals and to different resistances to the forming action in different parts of the respective layers.

In order that the superposed marginal layers shall have coincident outer peripheral edges, I combinedly trim said superposed edges, exemplified as accomplished in a trimming lathe. The superposed parabolic layers are clamped between the rotating heads 61, 62, a pair of rotating cutting disks 63, 64, trimming the margins into circular form by trimming off the irregular outer peripheral edges 65, 66, (see Fig. 8), for imparting a form exemplified in Fig. 9 to the superposed parabolic layers which have become formed into connected relation, the forming of the parts uniting the layers.

I prefer to form the rear of the superposed parabolic layers with a pluri-layer tube surrounding the axial line of the reflector, by cutting out a small superposed

disk 70 in the axial line of the reflector and combinedly forming the superposed layer portions adjacent to the hole left by the removal of said superposed disk in the form of a tube 27, 37, having said superposed layer portions concentrically one within the other, whereby further the superposed layers are additionally secured together.

I prefer to accomplish this manipulation by placing the combined superposed parabolic layers on a spring-pressed rest 71 so that the apex of the reflector will be between a cutting and forming die 72 and a coacting cutting and forming die 73, as illustrated in Fig. 10, the coaction of the die causing the cutting out of the superposed disk 70 and the formation of the pluri-layered tube 27, 37, as indicated in Fig. 11, the finished pluri-layered parabolic reflector exemplified being shown in Fig. 12.

My improved method results in a great saving in cost and by it a superior parabolic reflector of great strength and comparatively light weight is produced, the inner or reflector surface of which is capable of receiving a high polish, the softer inner layer during polishing being backed and supported by the stiffer outer layer. My improved method further enables a high-grade inner layer capable of receiving an extremely high polish to be combined with an outer layer of different metal and less-grade, in order to produce a high-grade reflector at comparatively small cost.

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

The method of making a parabolic reflector which consists in forming a preparatory bowl-shaped inner layer with a peripheral flange and a bowl-shaped portion of less depth, and a preparatory bowl-shaped outer layer with a peripheral flange and a bowl-shaped portion of greater depth, placing said bowl-shaped inner layer in said bowl-shaped outer layer with said peripheral flanges of said respective layers in superposed relation and the middle parts of said bowl-shaped portions in separated relation, combinedly bending the outer peripheries of said flanges toward the bowl-shaped ends of said layers, and then, while said layers are assembled one in the other, combinedly forming said preparatory bowl-shaped layers into the parabolic form of the reflector with said middle parts in contact with one another and combinedly stretching said flanges to form superposed annular grooves therein while the material at the inside and outside of said annular grooves is resistingly acted on.

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

EUGENE A. KUEN.

Witnesses:
THERESA M. SILBER,
DAWSON E. BRADLEY.