Aug. 23, 1932. E. TURNQUIST 1,873,164

MANUFACTURE OF SHEET METAL WARE

Filed Jan. 6, 1930 2 Sheets-Sheet 1

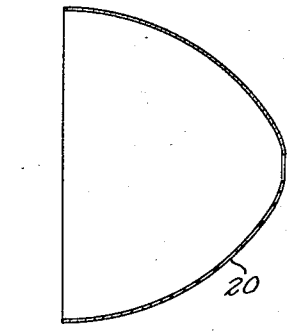


Fig. 1.

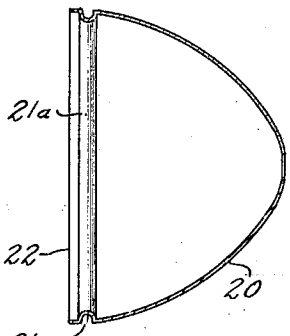


Fig. 2.

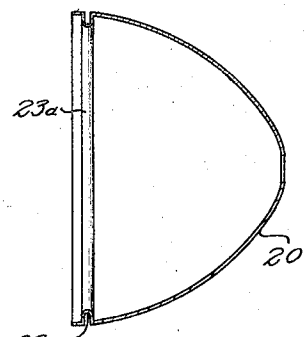


Fig. 3.

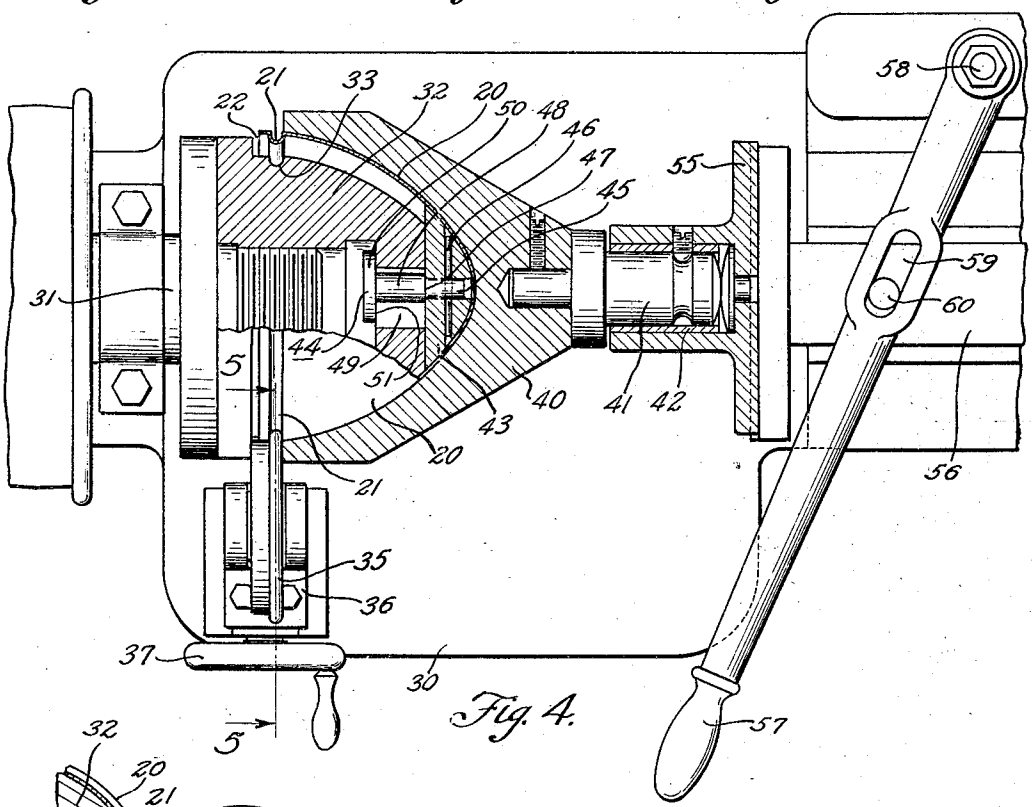


Fig. 4.

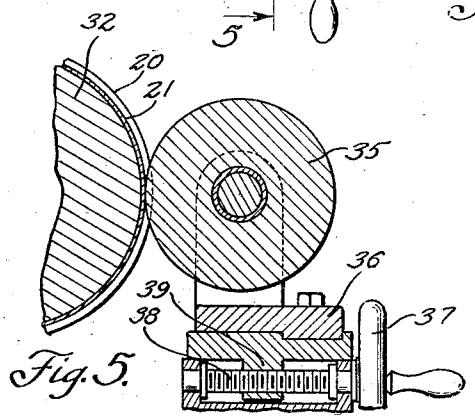


Fig. 5.

Inventor
Edward Turnquist

By Spencer Hardman & Fehr
his Attorneys

Aug. 23, 1932. E. TURNQUIST 1,873,164

MANUFACTURE OF SHEET METAL WARE

Filed Jan. 6, 1930 2 Sheets-Sheet 2

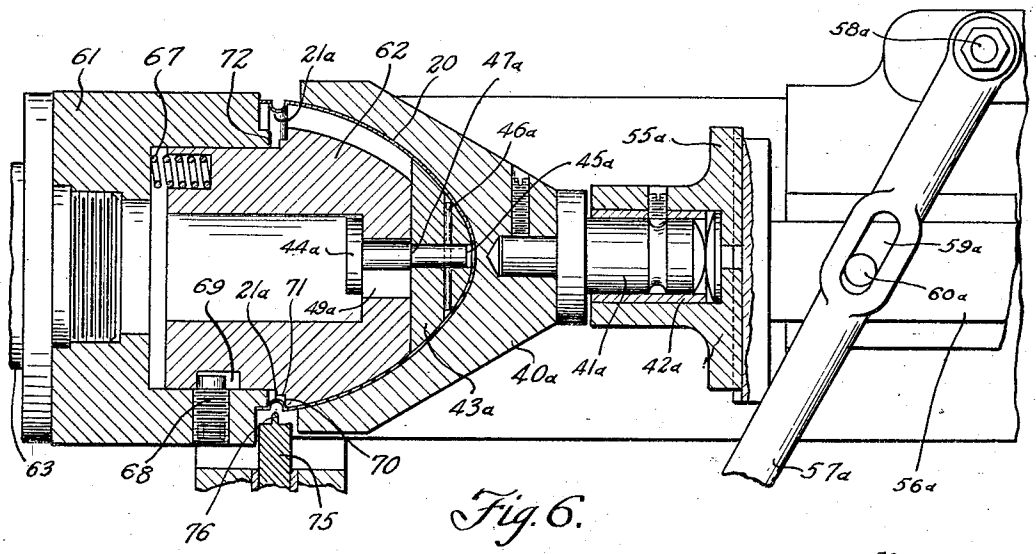


Fig. 6.

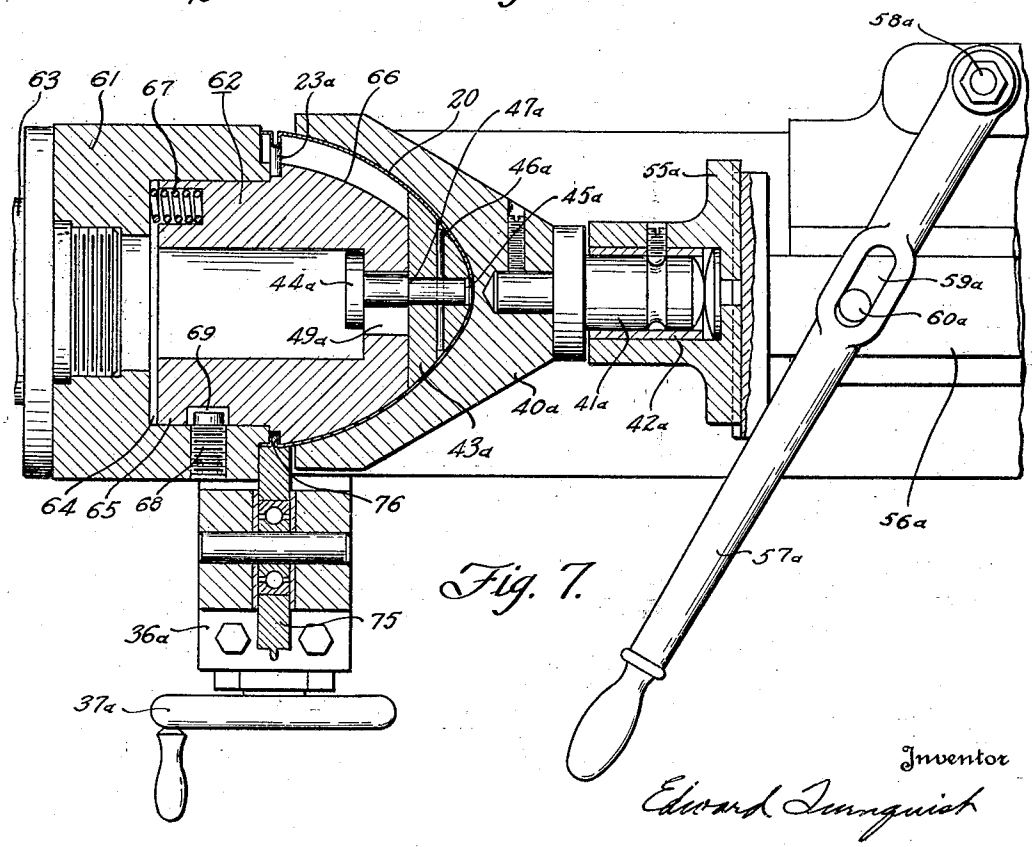


Fig. 7.

Inventor
Edward Turnquist

By Spencer Hardman & Fehr
his Attorneys

Patented Aug. 23, 1932 1,873,164

UNITED STATES PATENT OFFICE

EDWARD TURNQUIST, OF ANDERSON, INDIANA, ASSIGNOR TO GUIDE LAMP CORPORATION, OF ANDERSON, INDIANA, A CORPORATION OF DELAWARE

MANUFACTURE OF SHEET METAL WARE

Application filed January 6, 1930. Serial No. 418,854.

This invention relates to the manufacture of sheet metal ware by spinning operations and more particularly the manufacture of lamp housings for automobiles.

One of the objects of the present invention is to provide a novel method and apparatus for forming a relatively narrow and deep annular groove adjacent the periphery of a parabaloidal lamp housing in order that it may interlock with an inwardly turned flange of the lamp door rim or lens bezel ring.

Further objects and advantages of the present invention will be apparent from the following description, reference being had to the accompanying drawings wherein a preferred embodiment of one form of the present invention is clearly shown.

In the drawings:

Figs. 1, 2 and 3 are cross sectional views of a lamp housing showing the various stages in the manufacture thereof according to the method embodying the present invention.

Fig. 4 is a plan view partly in longitudinal cross section showing the apparatus for performing the step shown in Fig. 2.

Fig. 5 is a fragmentary sectional view taken on the line 5—5 of Fig. 4.

Figs. 6 and 7 are fragmentary plan views, partly in longitudinal cross section, of apparatus for performing the step in the method shown in Fig. 3. These figures show the apparatus in two positions of operation.

According to the present invention the first step in the method consists of spinning into a parabaloidal sheet metal blank 20 shown in Fig. 1, a relatively wide and shallow annular groove 21 adjacent the peripheral edge 22 thereof. In order to form the groove 21 into the relatively narrow and relatively deep groove 23 shown in Fig. 3, the blank 20 is rotated while relative axial movement is effected between the portions of the housing blank located on opposite sides of the groove 21. This relative movement may be produced by holding the peripheral edge portion 22 stationary as regards axial movement while causing that portion at the right of the groove 21 to move axially toward the portion 22.

The apparatus shown in Figs. 4 and 5 for performing the step of the method in Fig. 2 comprises a base 30 which supports a power driven shaft 31 to which is attached a spinning head 32 having a groove 33 for shaping the groove 21 of the lamp housing blank. A forming wheel 35 cooperates with the groove 33 to form the groove 21 in the blank 20. The wheel 35 is mounted on a frame 36, which is slidable along the base 30 in a direction at right angles to the axis of the shaft 31. This motion of the frame 36 is effected by turning a handle 37 which turns a screw 38 cooperating with a nut 39 to which the frame 36 is attached.

While being operated on, the blank 20 is received by a work holder 40 attached to a shaft 41 mounted in a bearing 42 which is parallel with the shaft 31 but which is out of alignment with the shaft 31 by an amount corresponding to the difference in diameter of the groove 21 to be formed in the blank and the forming groove 33 of the spinner head 32, the latter being made smaller than the blank 20 in order that the blank 20 may be removed from the head 32 after the groove 21 has been formed. The head 32 carries a block 43 which is the shape of a segment of a parabaloid, the surface of which coincides with the inner surface of the central portion of the blank 20. This pressure block 43 is secured to the inner head 32 by means providing for an orbital movement of the block 43 relative to the head 32 while the head 32 rotates. This connection is provided by a pin 44 having a shank 45 attached by a pin 46 to the block 43, having a shoulder 47 which bears against the block 43, having a head portion 48 extending through a hole 49 of larger diameter in the head 43 and having a head 50 larger in diameter than the hole 49 in order that the pin 44 may be retained in position. The distance between the shoulder 47 and the head 50 is slightly greater than the distance between the surface 51 and the right hand end surface of the block 32 so that relative lateral movement between the head 32 and the block 43 may take place freely as the spinner head 32 rotates.

The bearing 42 is supported by a support 55 which may be secured adjustably in any

desired manner to a sliding frame 56 guided for movement in a direction parallel to the shaft 31. This frame 56 is moved by lever 57 pivoted at 58 upon the frame 30 and having a slot 59 for receiving a pin 60 attached to the frame 56.

By moving the lever 57 counter-clockwise as viewed in Fig. 4, the work holder 40 is retracted from the spinner head 32 in order that a blank 20 may be placed thereon. Then the lever 57 is moved clockwise in order to clamp the blank 20 between the pressure block 43 and the work holder 40, as shown in Fig. 4. While the blank is maintained in this position, the shaft 31 is rotated and the forming wheel 35 is caused to move into the groove 33 of the head 32 in order to spin the groove 21 into the blank 20.

The apparatus shown in Figs. 6 and 7 for performing the step of the method shown in Fig. 3 resembles the apparatus shown in Fig. 4. The work holder and means for moving it axially, are substantially the same as in the apparatus shown in Fig. 4 and will not be described in detail. The same is true of the movable frame which moves a spinning wheel transversely of the axis of the work, and of the pressure block which clamps the work against the work holder. Therefore the parts of these devices which are similar to those shown in Fig. 4 will be designated by the same reference numerals as in Fig. 4, except that the affix "*a*" is added. The two apparatuses differ particularly with respect to the spinner head and the spinning wheel. The spinner head comprises two telescopically engaging parts 61 and 62, the former being attached to a drive shaft 63 and having a cylindrical recess 64 coaxial with the drive shaft 63 and receiving the cylindrical shank 65 of the part 62 which is provided with the parabaloidal surface 66 for engaging the work. It will be noted that the part 62 is urged by one or more springs 67 toward the right with respect to the part 61, this movement being limited by a stop screw 68 received by a slot 69 located longitudinally in the side of the cylindrical shank 65 of the part 62. The part 62 is shaped to provide an annular plane ledge or shoulder 70, the width of which is substantially equal to the depth of the groove 23 to be provided, as shown in Fig. 3; and is shaped to provide a cylindrical ledge 71, the width of which is substantially equal to the width of the bead 23*a* which is formed internally with respect to the blank 20 when forming the groove 23. Normally the distance between the plane annular ledge 70 and the right hand end surface 72 of the part 61 is wide enough to receive the bead 21*a* which forms the groove 21 as shown in Fig. 2. The head 40*a* being retracted from the spinner head 62, the operator will place the part provided by the groove 21 upon the head 62, the bead 21*a* being received between the surfaces 70 and 72 of part 62 and 61 respectively. Then the work holder 40*a* will be moved against the work in order to clamp it between the holder 40*a* and the pressure block 43*a* as shown in Fig. 6. While the head 62 is rotating, the lever 57*a* is moved still further toward the left in order to cause the annular space between the surfaces 70 and 72 to decrease. While this movement is taking place, a spinning wheel 75 which is rotatably supported by frame 36*a*, is moved transversely of the axis of the head 62 in order to cause a relatively narrow annular flange 76 of the wheel 75 to enter the groove 21 of the work. The thickness and width of this flange 76 corresponds substantially with the depth and width of the groove 23 to be formed. During the squeezing together or collapsing of the side walls of the bead 23*a* produced by forcing the spinner head member 62 from the position shown in Fig. 6 to that shown in Fig. 7, the flange 76 of the spinner wheel tends to force the bead 23*a* down against the end surface 72 of the spinner head member 61 and against the cylindrical shoulder 71 of the spinner head member 62. The flange 76 of the wheel 75 tends also to smooth out any irregularities in the groove 23 so that it may the more readily receive the internal annular flange of a bezel ring or similar device used for securing a lens to the front of the lamp housing.

While the form of embodiment of the present invention as herein disclosed, constitutes a preferred form, it is to be understood that other forms might be adopted, all coming within the scope of the claims which follow.

What is claimed is as follows:

1. Apparatus for forming a relatively wide, shallow, annular bead of a metal shell into a bead defining a relatively narrow deep groove, comprising in combination, companion spinning members, one of which is a wheel having a flange shaped to provide the desired bead, and the other member provides a groove variable in width for receiving said flanged wheel, said other member including two parts, one movable axially relative to the other in order to vary the width of the groove, yet being held in a fixed position to the other part while the metal shells are being interchanged.

2. Apparatus for forming a relatively wide, shallow annular bead of a metal shell into a bead defining a relatively narrow deep groove, comprising in combination, a wheel movable toward the bottom of the groove and having a flange shaped to provide the desired bead from the outside of the shell, a shell receiving member, a core which provides a support for the inside of the desired bead and which yieldingly clamps the said shell onto said shell receiving member, and means for moving said wheel in the said

direction in order to form the desired bead.

3. Apparatus according to claim 2 in which the core comprises two parts, one of which defines one sidewall of the groove on the inside of the bead, and the other the opposite sidewall of the groove, said other parts being movable axially relative to the former thereby gradually forming the bead into the desired shape.

4. Apparatus according to claim 2 in which the core comprises two parts, one of which is axially stationary, the other yieldingly movable axially away from the former for clamping the shell onto a shell receiving member thereby yieldingly clamping the shell against displacement.

5. Apparatus according to claim 2 in which the core comprises two parts, one of which defines one sidewall of the groove, and the other the opposite sidewall and the bottom of the groove, said other part being yieldingly movable axially away from the former for uniformly clamping the shells onto said shell receiving member, and movable toward the first said part for gradually forming the bead into the desired shape.

In testimony whereof I hereto affix my signature.

EDWARD TURNQUIST.