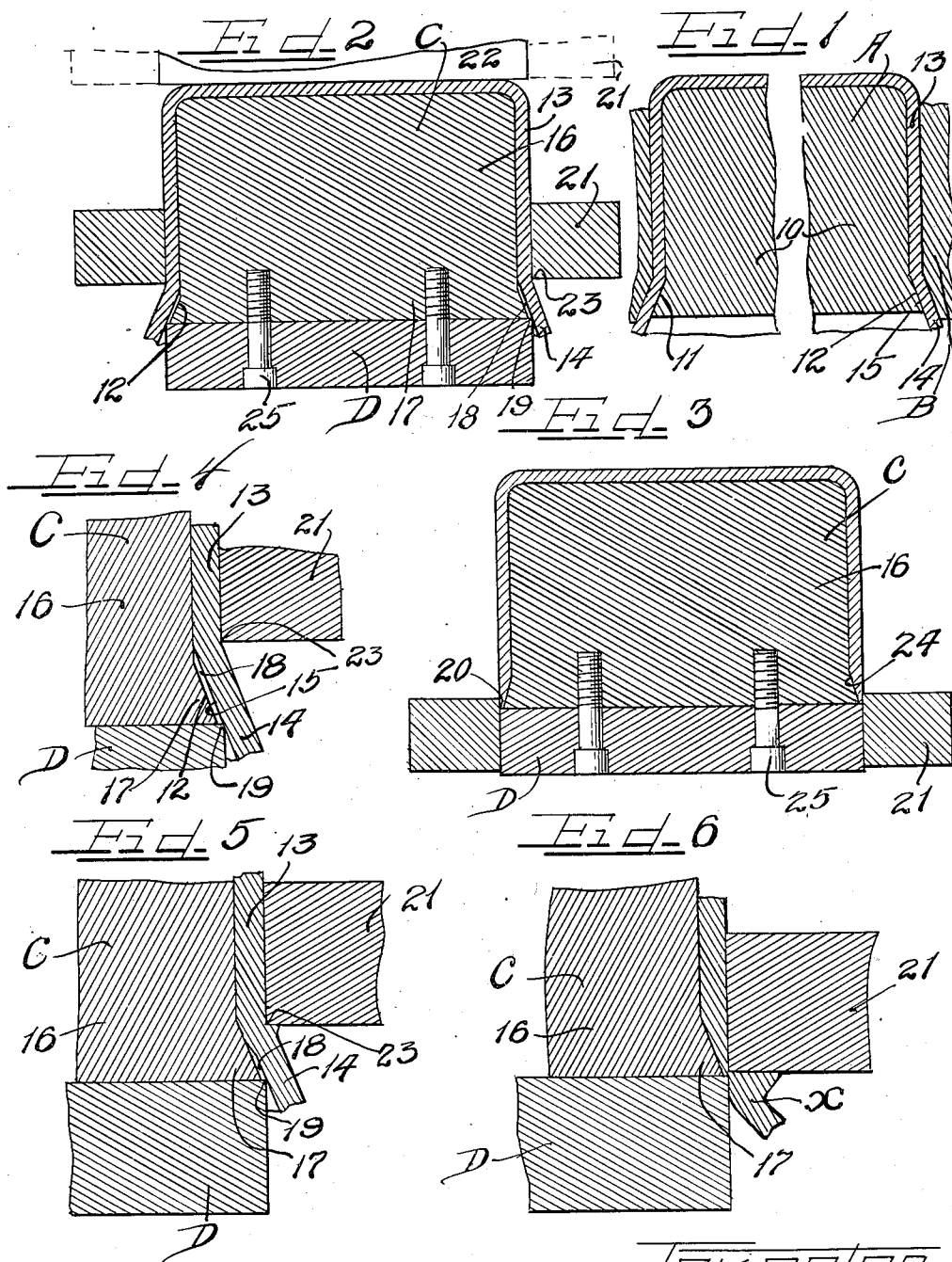


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METHOD FOR PRODUCING DRAWN CUPS WITH
FACED AND BEVELED EDGES
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METHOD FOR PRODUCING DRAWN CUPS WITH FACED AND BEVELED EDGES

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1 Claim. (Cl. 29—148.2)

My invention relates to an improved method for producing a drawn sheet metal cup with its end faced in a diametral plane and with the inner edge beveled. My invention is particularly adaptable and useful for producing a cup forming part of the fin or tailpiece assembly of bombs. Such cups are cylindrical and must have the end thereof accurately faced to be in a diametral plane, and the inner edge must be accurately beveled. Heretofore in the manufacture of such cups, at least three operations were necessary. In the first operation the cup is drawn from a sheet metal blank, then in a second operation the end of the embryo cup is cut off for the desired depth of the cup and the end is machine faced, and then in the third operation the inner edge is beveled off to leave a face of the required width. Such prior procedure thus requires considerable time and machine work, and the important object of my invention is to provide a method for more economically producing a cup of this type, preferably by only two operations.

In accordance with my improved method, the first operation comprises drawing an embryo cup from a sheet metal blank around a cylindrical die block having a frusto-conical end so that the end portion of the cup metal will be flared outwardly to the angle of the desired bevel. The second operation comprises the mounting of this embryo cup on another die block with a frusto-conical end and with a cylindrical shearing block secured thereto below the frusto-conical end with its outer cylindrical surface in alignment with the outer cylindrical surface of the cup body, and then passing a shearing ring along the outside of the cup body for cooperating with the shearing block to cut off the flared end and at the same time force the cup end intimately against the frusto-conical part to accurately form the bevel.

My improved method will be more fully understood by reference to the drawing, in which:

Figure 1 is a diametral section, with part broken away, to illustrate the first operation of drawing the cup and providing the flared end thereon;

Figure 2 is a diametral section illustrating the second operation, the shearing ring being about to engage with the outside of the flared cup end;

Figure 3 is a section like Figure 2 showing the shearing operation substantially completed;

Figure 4 is an enlarged view of one corner of the assembly for the second operation showing

the shearing ring about to start its cutting and forming operation;

Figure 5 is a section similar to Figure 4 showing the shearing ring starting its cut and the forcing of the flange or flared end portion metal against the beveled end of the die block; and

Figure 6 is a section like Figures 4 and 5 showing the surplus metal about to be sheared off for completion of the cup.

Referring to Figure 1, the die block A for the first operation comprises the cylindrical body 10 and the frusto-conical end 11, the angle of whose outer surface 12 accords with the angle of the desired bevel on the cup. The outer or forming die member B engages a blank of sheet metal and forces it around the die block A to form the cylindrical body 13 of the cup, the lower end of the forming die member B then cooperating with the frusto-conical end 11 of the block A to flare out the end portion 14 of the cup metal with its inner face intimately against the outer side of the frusto-conical end to define the desired angle of bevel. The forming die member B is then removed and the embryo cup is ready for the second operation.

For the second operation, the embryo cup is mounted on the die block C which has the cylindrical body 16 and the frusto-conical end 17. Secured to the die block C concentric therewith is the shearing block D the diameter of whose outer surface is substantially the same as the outer diameter of the cup body 13.

Referring to Figure 1, after drawing of the cup on the die block A, the beveled outer surface of the frusto-conical end 11 is in intimate engagement with the inner side of the flared end portion 14 and with the corner between the die block body and the frusto-conical end coincident with the inner corner of the cup between its body part and the flared end portion. Referring to Figure 2, the overall height of the die block C is the same as the overall height of the die block A, but the distance between the top of the die block C and the corner between the die block body and its frusto-conical end 17 is slightly increased so that the corner between the die block body and the frusto-conical end is slightly outside of the inside corner of the cup between its body and the flared portion 14. The bevel angle of the frusto-conical portion 17 remains the same as on the die block A, and the increased distance of the die block C is such that the beveled outer side of the frusto-conical end 17 will be displaced from the flared portion 14 of the cup by a space 18, and the outer edge of the frusto-conical end

17 will be radially inwardly of the upper edge of the shearing block D to leave the annular forming seat 19 on the shearing block D, the radial width of this seat being the desired width of the end face 20 for the finished cup.

Cooperable with the shearing block D is a shearing ring 21 whose inner diameter is substantially the same as the outer diameter of the cup body 13. After mounting of the embryo cup on the die block C, this shearing ring is moved downwardly, by any suitable mechanism, along the cup body, and a holding pad 22 is also brought down by any suitable means, against the cup bottom to hold it securely and snugly on the die block C. Figures 2 and 3 show the shearing ring about to engage its shearing edge 23 with the upper end of the flared portion 14 of the cup, and Figure 5 shows the movement of the shearing ring in engagement with the flared portion. The pressure of the shearing ring against the outer slanting side of the flared portion 14 will involve a vertical component toward the shearing block D and a horizontal or radial component toward the die block C, the resultant pressure against the flared portion 14 causing the metal of this portion to be progressively forced in toward the die block C and its frusto-conical end, as indicated by Figure 5, and to cause the metal to completely fill the space 18, the final movement of the shearing ring 21, as indicated on Figure 6, cutting off the surplus metal or trim X by the cooperation of the cutting edge 23 of the shearing ring 21 with the upper or cutting edge of the shearing block D, and after this trimming operation the cup will be finished, as indicated on Figure 3, the cup being then cylindrical throughout and having the accurately formed and finished bevel 24 and the accurately finished end face 20.

The shearing block D is preferably detachably

secured to the die block C, as by screws 25 to facilitate die construction and to enable replacement of the shearing block D which will have a tendency to wear at the cutting edge after a period of use.

I thus provide a very efficient method for economically and accurately forming cups with very accurate and exact bevel and end face finish. I do not desire to be limited to the exact procedure shown and described as changes and modifications may be made without departing from the scope of the invention.

I claim as follows:

The method of producing a drawn cylindrical cup with its edge portion internally beveled and terminating in a base surface in a plane at right angles with the cup axis, which comprises first die drawing a sheet metal blank to form an embryo cup with a cylindrical body and a flared edge portion with frusto-conical inner and outer surfaces, then mounting this embryo cup on a die block structure having a frusto-conical surface parallel with but radially displaced from the inner frusto-conical surface on said flared edge portion and with said die block structure having an annular flat surface at the base of the frusto-conical surface thereon terminating in a cutting edge, and then forcing a forming ring along the outside of the body of the embryo cup with an annular cutting edge on the ring engaging with the outer side of said flared portion for subjecting said flared portion to radial inward pressure to force the metal thereof against said frusto-conical surface and the flat surface on said die-block structure and with the cutting edge on said ring finally cooperating with the cutting edge at the end of the flat surface on said die-block structure to shear off surplus metal from said flared portion and to produce the finished cup.

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