Dec. 18, 1928. 1,695,476

L. G. WINKLER

PROCESS OF COUNTERSINKING HOLES IN METAL

Filed Dec. 19, 1927

FIG. 1

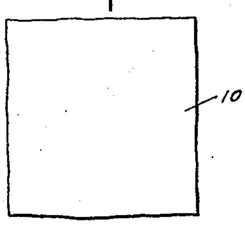


FIG. 3

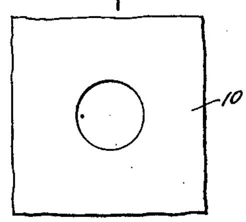


FIG. 5

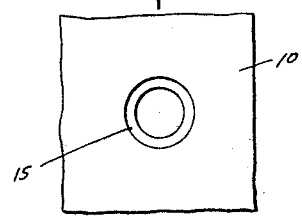


FIG. 2

FIG. 4

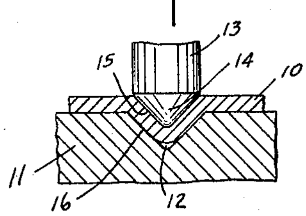


FIG. 6

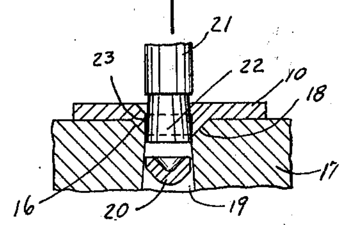


FIG. 7

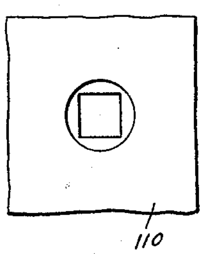


FIG. 9

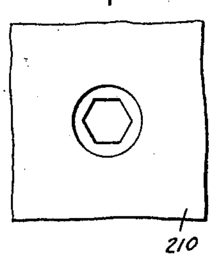


FIG. 13

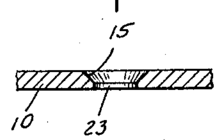


FIG. 8

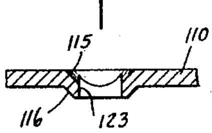


FIG. 10

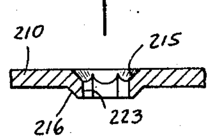


FIG. 11

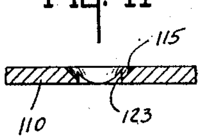
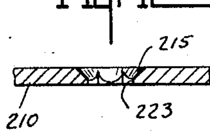


FIG. 12



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UNITED STATES PATENT OFFICE.

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PROCESS OF COUNTERSINKING HOLES IN METAL.

Application filed December 19, 1927. Serial No. 241,023.

This invention relates to a process of countersinking holes in metal plates.

The chief object of this invention is to form countersunk holes in an improved manner.

The chief feature of the invention consists in forming the countersunk portion of the hole prior to the formation of the hole itself, and thereafter forming the hole within the countersunk portion and to the desired outline.

The full nature of the invention will be understood from the accompanying drawings and the following description and claim:

In the drawings Fig. 1 represents a plan view of a sheet of metal. Fig. 2 is a central sectional view thereof. Fig. 3 is a top plan view of the metal after the countersinking has occurred. Fig. 4 is a central section through the countersunk plate shown in Fig. 3 and of the dies for securing the same. Fig. 5 is a top plan view of the plate with a countersunk hole formed therein. Fig. 6 is a central sectional view of the countersunk plate with the hole formed therein and the dies for forming the same. Fig. 7 is a view similar to Fig. 5 and shows a square hole instead of a circular hole. Fig. 8 is a view similar to Fig. 6 with the dies omitted. Fig. 9 is a view similar to Figs. 5 and 7 and is of a plate having a countersunk hexagonal hole. Fig. 10 is a view similar to Figs. 6 and 8 with the dies omitted. Fig. 11 is a view similar to Fig. 8 and of a plate wherein the countersunk portion does not project from the opposite face but shows the walls of the hole flush with the face of the plate. Fig. 12 is a view similar to Fig. 10 and shows the flush arrangement of the plate with the countersunk hole. Fig. 13 is a view similar to Fig. 6 of the plate with the walls of the countersunk hole flush with the opposite face of the plate.

In the drawings, 10 indicates a metal plate which is placed between a male and female die, the female die 11 having a conical hole or recess 12 therein and the male die 13 having a conical head 14 at the end thereof. The head 14 is aligned with respect to the conical recess 12 and when the plate is interposed between said dies and the dies are brought together, the metal therebetween is caused to form a conical recess 15 in one face and a conical projection 16 upon the opposite face of the plate. For all of the several modifications shown herein the foregoing constitute the first and common step.

The metal plate 10 is thereupon positioned in a perforate die having the female portion 17 with a conical seat 18 adapted to receive the conical projection 16 and thereby center the plate in the die with respect to the conical recess 15. The die 17 has a flared opening 19 extending therethrough through which the severed portion 20 of the metal plate is projected. The male head 21 has a cutting portion 22 of the desired peripheral outline and the opening 23 is formed complementarily thereto to receive the same.

As shown clearly in Figs. 5 and 6, the wall 23 of the opening is herein shown circular and concentric, or coaxial with the countersunk portion 15.

In Figs. 7 and 8 the blank 110 includes the countersunk portion 115, the conical projecting portion 116 and the wall 123 of the opening which herein is shown square.

Figs. 9 and 10 illustrate plate 210 having the countersunk portion 215 coaxial with the projecting portion 216 and having a wall 223 hexagonal in outline.

In Fig. 11 the blank 110 is shown provided with the countersunk portion 115 and the wall 123 square similar to that shown in Figs. 7 and 8, but herein the projection 116 is omitted and this is obtained by grinding the projection 116 from the face so that there is no projection upon the face opposite the countersunk face or by providing a die, see Fig. 6, which will not have the recess 18 therein, but which will be square shouldered, or suitably formed so that the projecting portion 16 will be removed by the die head 22 in the meeting engagement of the two die portions. The removal of this projection may thus occur simultaneously with the formation of the hole in the countersunk portion.

Fig. 12 is similar to Fig. 10, but shows the plate having a flush face opposite the countersunk portion.

Fig. 13 is similar to Figs. 11 and 12, of the flush face type but of the plate shown in Figs. 5 and 6.

While the invention has been specifically described and illustrated as including a conical countersunk portion, it is, of course, to be understood that the countersinking neces-

sarily may have a pyramidal or any other desired outline, and where the terminology "conical" is employed in the claim the aforesaid disclosure is to be considered as equivalent in interpreting the scope of said claim.

The invention claimed is:

The process of countersinking holes in metal plates, consisting of deforming the plate to form a conical recess in one face and a projection upon the opposite face, and thereafter removing the central portion of the recessed portion of the plate and all of the projected portion upon the opposite face.

In witness whereof, I have hereunto affixed my signature.

LOUIS G. WINKLER.