(No Model.)

# S. D. HARTOG, Jr.

## MANUFACTURE OF PUNCHES AND DIES.

No. 598,867. Patented Feb. 8, 1898.

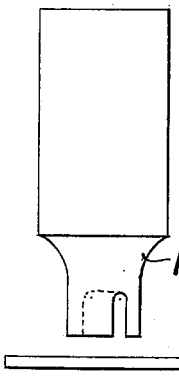



FIG. 1.

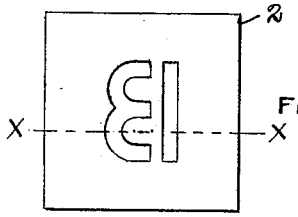



FIG. 2.

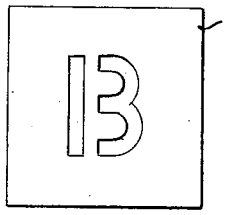
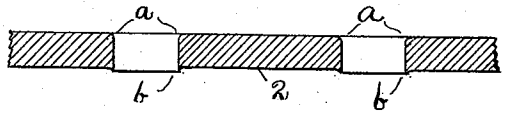



FIG. 3.

FIG. 4.



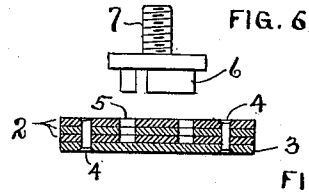




FIG. 6.

FIG. 5.

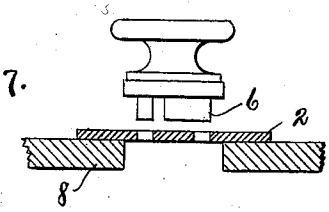



FIG. 7.

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# UNITED STATES PATENT OFFICE.

STEPHEN D. HARTOG, JR., OF ST. LOUIS, MISSOURI, ASSIGNOR TO THE EUREKA STENCIL MACHINE COMPANY, OF SAME PLACE.

## MANUFACTURE OF PUNCHES AND DIES.

SPECIFICATION forming part of Letters Patent No. 598,867, dated February 8, 1898.

Application filed July 12, 1897. Serial No. 644,180. (No model.)

*To all whom it may concern:*

Be it known that I, STEPHEN D. HARTOG, Jr., a citizen of the United States, residing at St. Louis, in the State of Missouri, have invented certain new and useful Improvements in the Manufacture of Punches and Dies, of which the following is a specification.

My invention relates to the manufacture of punches and dies to be used on sheet material—as, for example, the production of paper-stencils—and has for its object certain improvements whereby any number of duplicates of both punches and dies may be made by means of a single master-punch.

My invention is illustrated in the accompanying drawings, in which—

Figure 1 is an elevation of a master-punch and a plate through which it is to be driven. Fig. 2 is a top view of said plate after being punched. Fig. 3 is the same plate turned over, showing the bottom. Fig. 4 is an enlarged section on the line X X of Fig. 2, showing the effect of the punching operation on the metal. Fig. 5 is a section of a matrix or mold made up of a number of such plates riveted together. Fig. 6 is an elevation of a punch cast in such a matrix; and Fig. 7 is an elevation, partly in section, of a punch and die as they are to be used.

In the said drawings, 1 represents a master-punch cut from a solid block of steel in the ordinary manner except that the character is the reverse of the punch to be actually used. The plate 2, in which the character is punched, is shown in plan in Fig. 2. This character in this position is the reverse of what is wanted, but when the plate is turned over, as shown in Fig. 3, it is in proper shape. This plate when finished becomes the die to be used with the punch hereinafter described. The reason for making the master-punch the reverse way and then turning the punched plate over to get the proper form of the die will become apparent by inspection of Fig. 4, wherein it will be seen that the punched opening has a rounded edge *a* at the top and a ragged but sharp edge *b* at the bottom. It will be obvious that it will take much less labor to remove the "bur" or ragged edge *b*, and thus get a sharp edge for the die than it would be to remove metal enough from the top of the plate to get rid of the round corners *a*. To get a punch that will fit a die made in this way, I take a number of such punched plates and after finishing them to get a sharp edge on both sides I secure them to another plate 3 by the rivets 4. This forms a matrix or mold 5, in which is cast a punch 6, provided with a screw 7 for holding it. A plan of the matrix shown in Fig. 5 would look like Fig. 3, because it is made up of such plates superimposed upon each other and riveted to another but unpunched plate to form a bottom. As the punch 6 is cast in plates made by the master-punch 1, it follows that this punch will also fit any other plate made by the same master-punch. With one master-punch and one matrix made of plates stamped out by the master-punch it will be evident that any number of die-plates 2 and any number of punches 6 may be made any pair of which will exactly fit and work properly together.

Punches and dies made by this process are intended to be mounted in a machine the construction of which is not properly the subject-matter of the present application. The relative location, however, of the punch and its corresponding die is shown in Fig. 7, in which 8 represents a portion of the frame of the machine on which is supported the die-plate 2.

What I claim is—

1. The herein-described method of producing a mold which consists (*a*) in cutting a master-punch the reverse of the character required, (*b*) in punching a series of plates therewith, and (*c*) in securing said series of plates in a reversed and superimposed position to an unpunched plate.

2. The herein-described method of producing a reversed punch which consists (*a*) in punching a plate with a master-punch, (*b*) in securing to an unpunched plate a number of such punched plates in a reversed and superimposed position, and (*c*) in making a casting in the mold thus formed.

3. The herein-described method of producing both punches and dies from a single master-punch which consists (*a*) in punching a plate by said master-punch and reversing the same for a die, (*b*) in securing to an unpunched plate a series of such punched and reversed plates superimposed on each other to form a mold, and (*c*) in making a casting in said mold to obtain the required punch.

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