

(No Model.)

H. D. HIBBARD.

STAMP SHOE AND DIE AND METHOD OF MAKING SAME.

No. 575,548.

Patented Jan. 19, 1897.

Fig: 1.

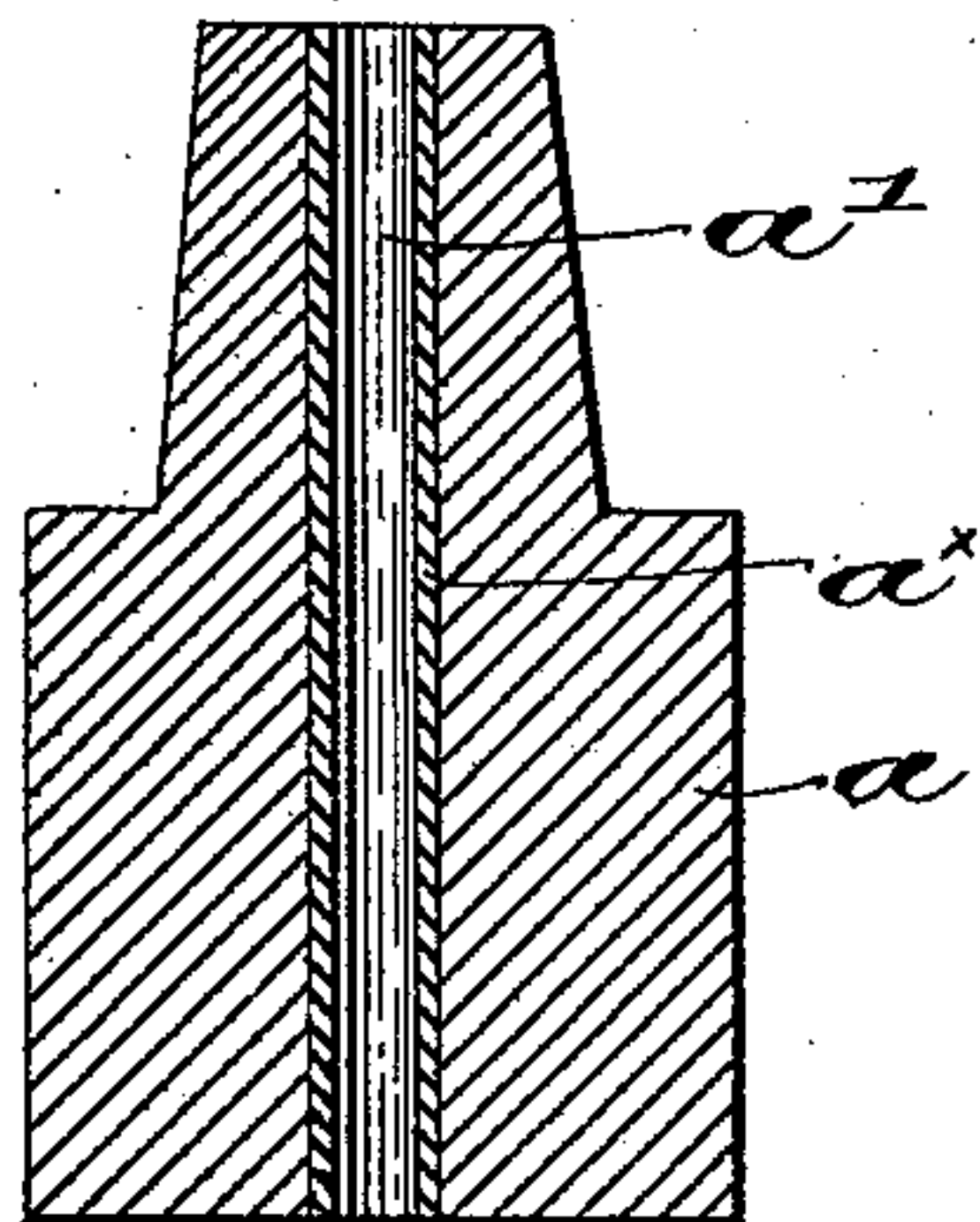


Fig: 2.

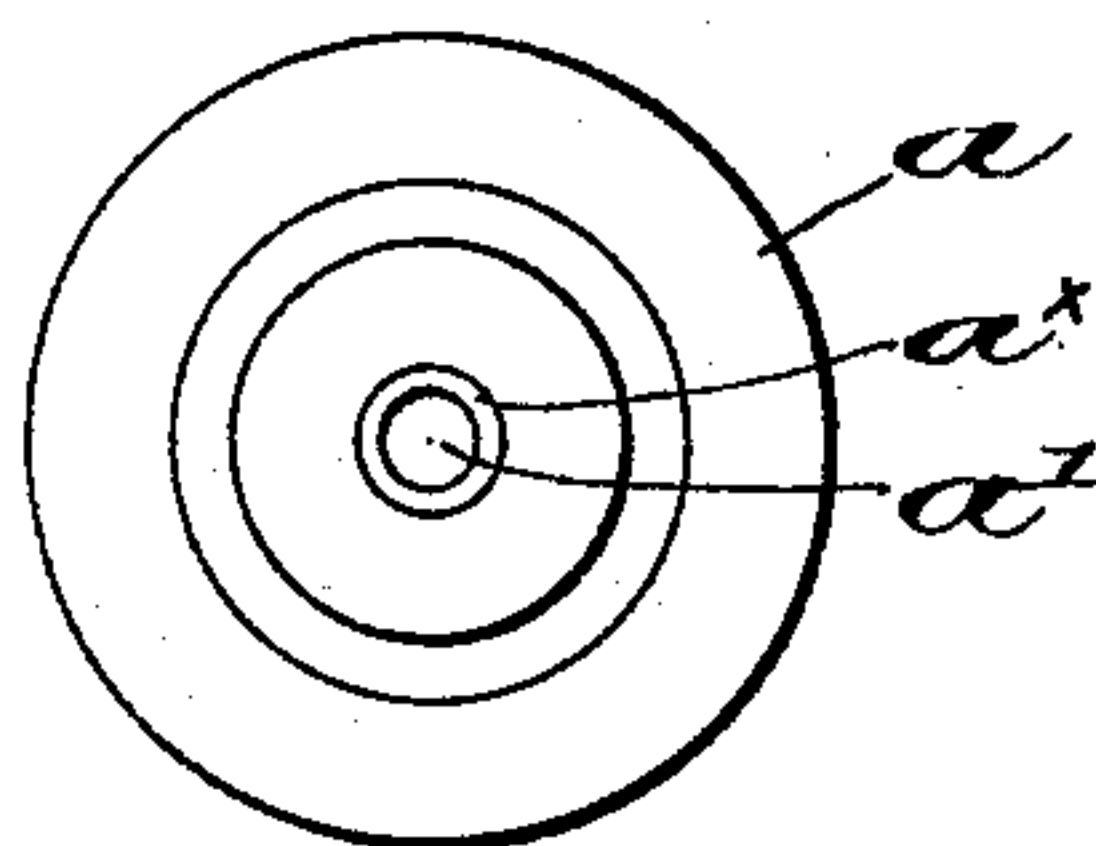


Fig: 3.

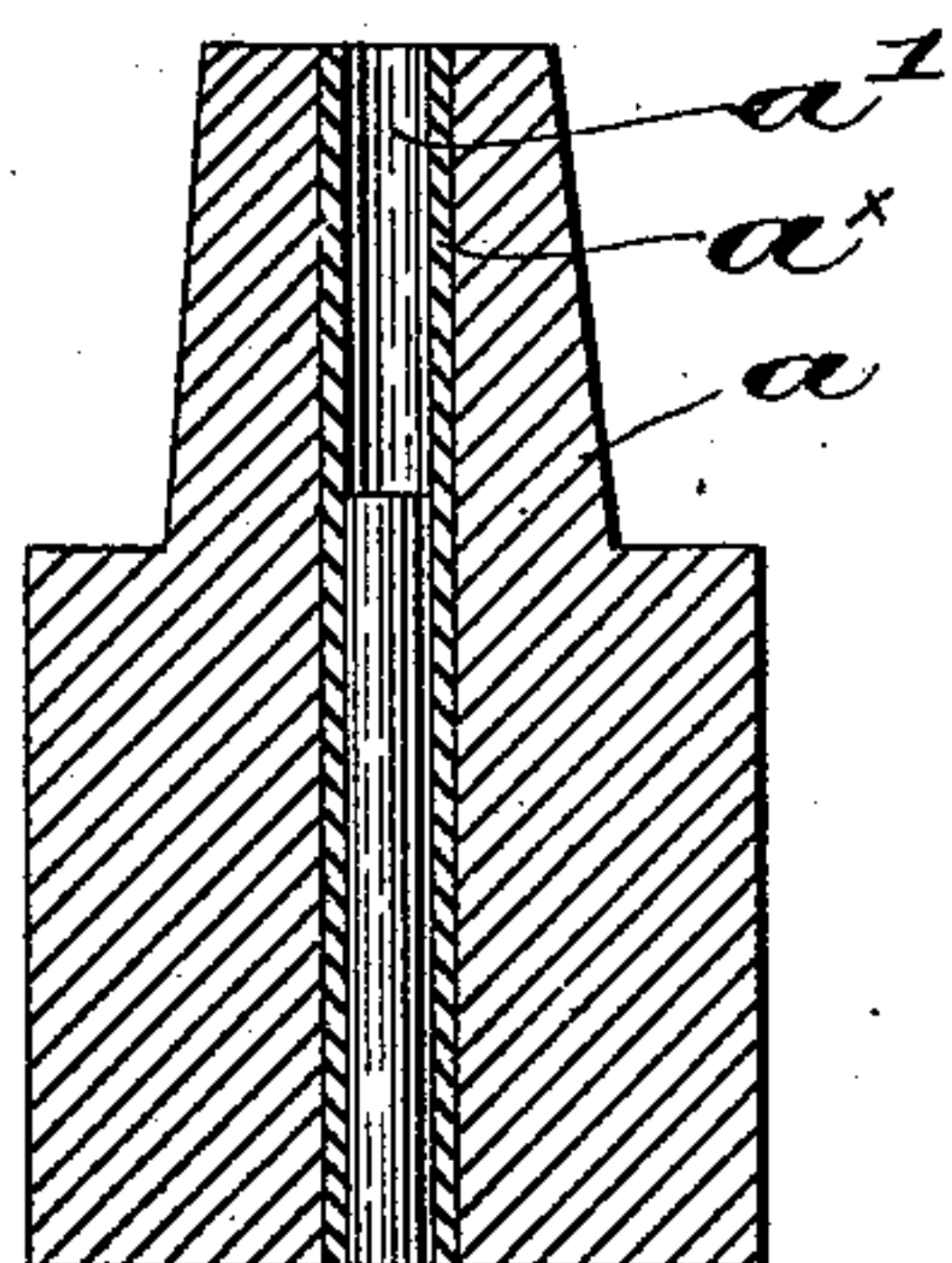


Fig: 4.

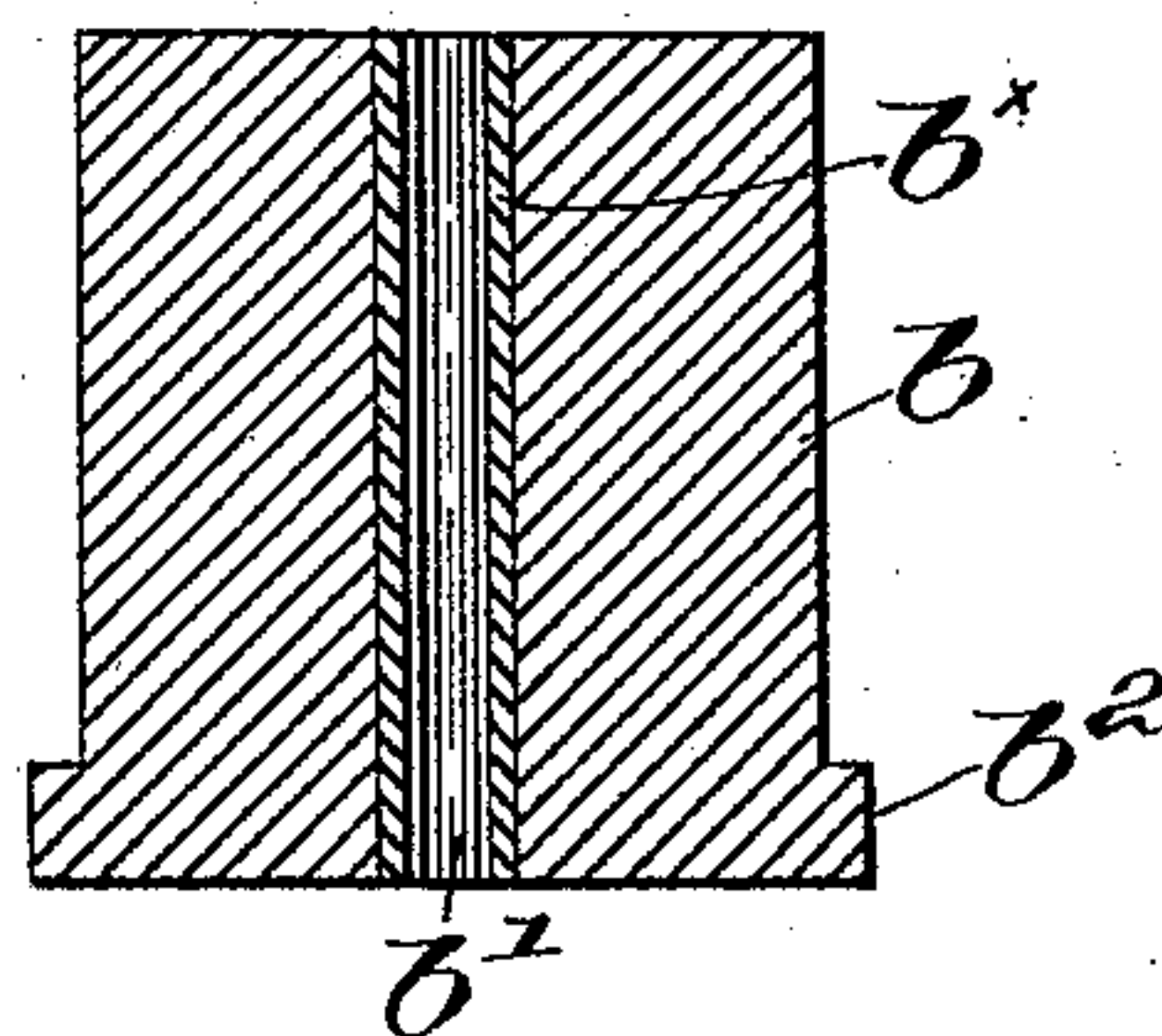
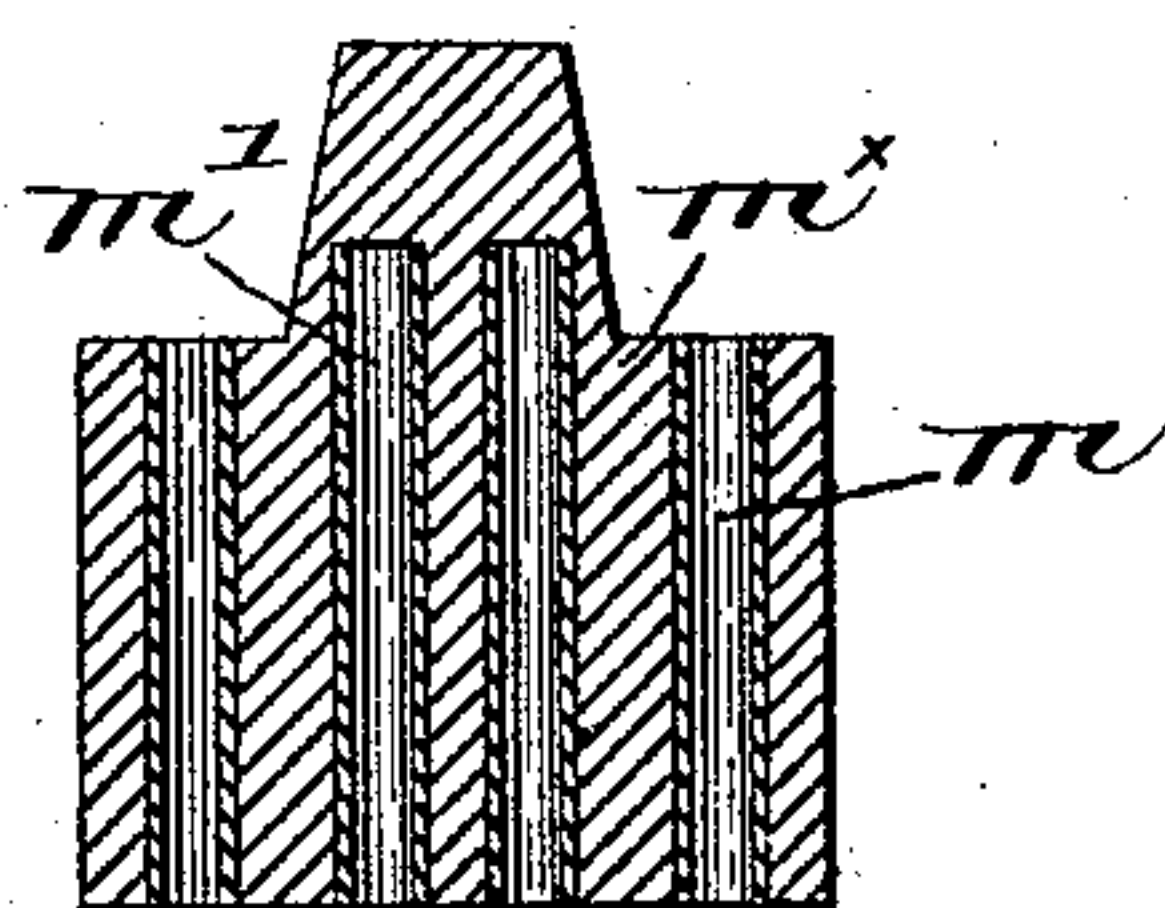


Fig: 5.



Witnesses.
Edward H. Allen.

Thomas Drummond.

Inventor:
Henry D. Hibbard.

by Crosby & Gregory.
attys.

UNITED STATES PATENT OFFICE.

HENRY D. HIBBARD, OF HIGH BRIDGE, NEW JERSEY, ASSIGNOR TO THE
TAYLOR IRON AND STEEL COMPANY, OF SAME PLACE.

STAMP SHOE AND DIE AND METHOD OF MAKING SAME.

SPECIFICATION forming part of Letters Patent No. 575,548, dated January 19, 1897.

Application filed June 19, 1895. Serial No. 553,266. (No model.)

To all whom it may concern:

Be it known that I, HENRY D. HIBBARD, of High Bridge, county of Hunterdon, State of New Jersey, have invented an Improvement in Stamp Shoes and Dies and Method of Making the Same, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

In the manufacture of stamp shoes or dies for use in rock or other crushing mills it has heretofore been the practice to make them solid in order to obtain the requisite weight and resistance. It is desirable in many cases to subsequently treat the shoe and die by heating and then to cool at a predetermined rate, as, for instance, by quenching in water or other suitable fluid. The method and rapidity of heating and cooling the metal will vary with its composition and form no part of this invention. I herein refer to all such methods as "heat treatment" and to metal which has been thus heated and cooled as "heat-treated." Such a solid mass of metal will, it is evident, conduct the heat relatively slowly, so that the interior of the shoe or die will be heated or cooled much more slowly than the exterior, and if rapid cooling be desirable the interior will in consequence be less benefited than the exterior. This is especially true of manganese steel, which to be serviceable should be cooled very rapidly throughout the mass from at least a red heat or higher temperature, the said manganese steel naturally tending to cool irregularly on account of its extraordinarily poor heat conductivity. Whatever be the treatment, the result will be more uniform in a mass having one or more openings therein than in a solid mass.

This invention has for its object the production of shoes or dies of a uniform character throughout, whereby the life and strength of the shoe or die are greatly increased and its operation improved, and the method of making such shoes or dies also forms a part of my invention.

The particular features in which my invention consists will be hereinafter described, and particularly pointed out in the claims.

Figure 1 represents in vertical section a stamp-shoe embodying my invention, the

heat-equalizing opening being open. Fig. 2 is a top plan view thereof. Fig. 3 is a view similar to Fig. 1, the central opening being closed by a metal bar. Fig. 4 is a vertical sectional view of a die corresponding in its construction to the stamp-shoe shown in Figs. 1 and 2. Fig. 5 is a vertical sectional view of a modified form of shoe to be described.

Inasmuch as the shoes and corresponding dies are very similar in their construction and mode of manufacture I have herein treated them jointly.

Referring to Fig. 1, the shoe *a* is provided with an opening *a'*, extending completely therethrough, which may be formed by a suitable core, around which the shoe is cast, so that in the subsequent heat treatment, which consists in heating the casting and thereafter cooling it more or less rapidly, the heat and cooling medium can act simultaneously from the interior as well as the exterior of the mass, producing a very uniform effect throughout the extent of the mass. If desired, a metallic pipe, as *a^x*, may be used as the core, the shoe being cast around it, and this opening may afterward be closed by the insertion of a metal bar, as shown in Fig. 3, or it may be left open to be filled in use by pieces of the material to be crushed, the cross-section of the opening being small relatively to the area of the bottom of the shoe. The die *b* (shown in Fig. 4) is made in the same manner, with an opening *b'* therein, which may be formed by a pipe *b^x*, if desired, the die having a suitable extended base *b²*.

In Fig. 5 I have shown a shoe having a plurality of openings. The iron pipes *m m'* are set in the mold and the molten metal is poured around the pipes, which act as cores for the casting *m^x*. The pipes may run completely through the casting, as at *m*, or only partially through it, as at *m'*. These holes may be closed after the heat treatment in any suitable manner, as by the metal bars or debris before alluded to, and shown in Fig. 3.

While I have herein shown the shoes and dies as circular in cross-section, my invention is not restricted thereto, as they may be made of any desirable shape, so long as they are adapted to be heat-treated in a uniform manner throughout their substance.

I claim—

1. A water-toughened cast-manganese-steel stamp shoe or die, provided with a vertical heat-equalizing hole, extended partially
5 therethrough from its face, whereby the uniformity of heating and cooling of the mass is increased, substantially as described.

2. A water-toughened cast-manganese-steel stamp shoe or die, provided with a vertical heat-equalizing hole, whereby the uniformity of heating and cooling of the mass is increased, said hole being permanently
10 stopped thereafter, substantially as described.

3. A water-toughened cast-manganese-steel stamp shoe or die, provided with a vertical heat-equalizing hole, whereby the uniformity of heating and cooling of the mass is increased, said hole being permanently

stopped with metal thereafter, substantially
20 as described.

4. The herein-described method of making uniformly-heat-treated manganese-steel stamp shoes or dies, which consists in casting the shoe or die about a metallic pipe and
25 forming thereby a heat-equalizing hole, said pipe extended partially through said shoe or die, and then water-toughening the said casting containing this hole, the said hole equalizing the heating and cooling throughout the
30 mass, substantially as described.

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

HENRY D. HIBBARD.

Witnesses:

WM. G. NEILSON,

VOLNEY W. MASON, Jr.