(No Model.)

T. BOWATER & L. D. YORK.

MANUFACTURE OF HOES.

No. 281,441. Patented July 17, 1883.

Fig I

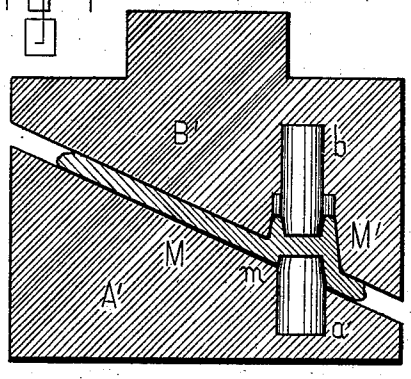


Fig IV

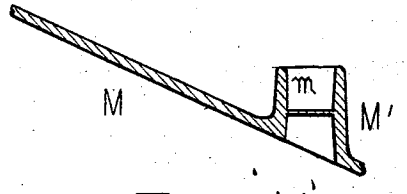


Fig V

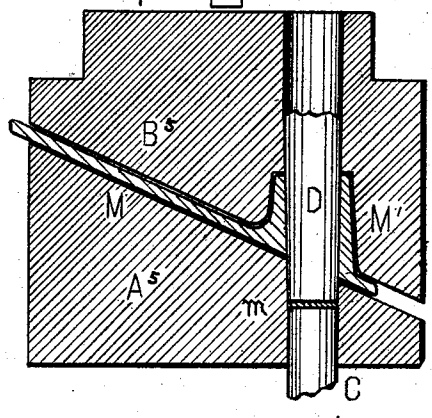


Fig II

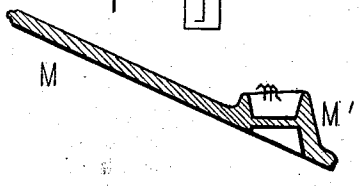


Fig III

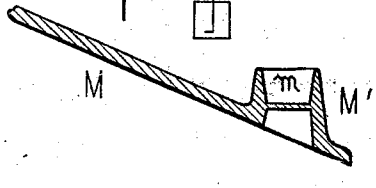
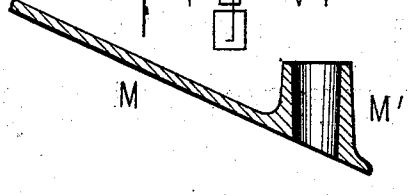


Fig VI



Witnesses

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Charles C. Stetson.

Inventors:

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UNITED STATES PATENT OFFICE.

THOMAS BOWATER AND LEVI D. YORK, OF PORTSMOUTH, OHIO.

MANUFACTURE OF HOES.

SPECIFICATION forming part of Letters Patent No. 281,441, dated July 17, 1883.

Application filed May 11, 1882. (No model.)

To all whom it may concern:

Be it known that we, THOMAS BOWATER and LEVI D. YORK, of Portsmouth, in the county of Scioto and State of Ohio, have invented certain new and useful Improvements in the Manufacture of Planters' Hoes, of which the following is a specification.

It has long been common to form or aid to form these hoes by dies, which, taking the metal in a form somewhat thicker than is ultimately required for the blade of the hoe, shape it for the eye by two or more operations, producing a hole in the eye which extends nearly through, but not quite, and then removing the small quantity of metal which extends across the eye by a punch, which punches it out and thrusts it away. We do this, and instead of producing its final operation at the extreme front of the eye, thus leaving the roughness and burr due to the shearing at that important and conspicuous point, we effect it at a plane half-way or approximately half-way between the front and rear of the hole. The roughness produced by its removal is concealed within the eye, and the exterior of the entire hoe has continuity, smoothness, and perfection, and may be produced with the economy, rapidity, and uniformity due to die-work. We initiate the hole in the eye by two punches, one entering from one side or face of the hoe, and consequently producing one end of the hole in the eye, and the other entering from the other face, and consequently producing the other end of the hole in the eye. We form the plugs of separate pieces of metal of suitable hard character and temper, and insert them in the dies so that any length of plug may be used, and the lengths may be varied in order to draw the central piece of metal which is left in the eye of the hoe down to a very small thickness. After this diaphragm is made as thin as may be, it is punched out by suitably-shaped sharp, clear-cutting punches, which are movable in a pair of dies very similar to those before used in shaping the hoe, and the central piece or diaphragm is taken out of the eye clean and without bending or warping the hoe.

The accompanying drawings form a part of this specification, and represent what we consider the best means of carrying out the invention.

Figure I shows the lump of hot metal in the act of being treated in the first pair of dies. The figure is a central vertical section. Figs. II, III, and IV show the metal in three successive stages of treatment, the dies (not represented) for each treatment being modified to give the more advanced condition of the blank. Fig. V is a central vertical section through the blank and dies in the act of removing the web. Fig. VI is a section through the completed hoe.

Similar letters of reference indicate corresponding parts in all the figures.

We have represented the operation as effected by treating the material in several successive pairs of dies, bringing it, not at one blow or impression, but at several successive blows or impressions, into the required form.

M is the blade of the hoe, and M′ the eye or hub which receives the handle.

A′ and B′ are respectively the lower and upper dies of the first pair. There are correspondingly-matched dies of the second pair, and so on for as many pairs of dies as shall be found expedient to gradually bring the metal into shape for any given size or style of hoe and any required length of eye. The several plugs *a* and *b*, which produce the hole in the eye, are fitted within these main dies A and B, and act on the hot metal simultaneously therewith. The plug *a* enters the eye from the lower side, and the plug *b* enters it from the upper side. By giving these plugs just a proper amount of taper the metal is displaced by the plug and forced radially outward all around, re-enforcing the wall of metal which constitutes the eye proper when finished.

When the hoe is completely shaped, except a thin web of metal, *m*, extending across the eye between the ends of the plugs *a* and *b*, the nearly-completed hoe is subjected to a pair of dies correspondingly marked A^5 and B^5, which carry movable punches D C set therein, so as to enter the eye from each end in the same manner as the plugs *a* and *b*. These punches are so operated by mechanism (not shown) that they move from opposite sides nearly into contact with each other, and firmly take hold on the web of metal *m*, and also displace it upward or downward, preferably downward, so as to shear it off from its connection with the interior of the eye and completely sepa-

rate it therefrom. On the opening of the dies the metal *m* thus displaced drops away, and the hoe is complete. The roughness induced by the breaking away of the metal in this manner is entirely within the eye. It is only important that the eye have sufficient metal, and that the clear space in the interior is sufficient for the handle, and that a smooth and reliable bearing for the handle is furnished both at the front and back ends of the eye. A slight enlargement and roughness of the cavity at the mid-depth of the eye is of no consequence.

Modifications may be made without departing from the principle or sacrificing the advantages of the invention. The plugs *a* are separate pieces of steel firmly fixed in the proper positions in the main dies A, and the same with regard to the parts B and *b*. The angle at which the blade M is set relatively to the eye M′ may be varied. When the hoe is made of soft iron, cast-steel may be welded along the edge, either before or after the treatment herein described.

We do not confine the invention to any specific number of pairs of dies. We have shown conditions of the hoe requiring five pairs. More than five pairs may be used. A less number may be used. A single pair will succeed, care being taken to introduce the blank at a sufficiently high temperature and sheared to about the proper shape. The faces of the dies A B should be large enough to receive the whole area of the hoe, and provided with a thin frazing to determine the outline, and partially or entirely trim the edges by separating the superfluous metal. The hoes may be subsequently treated by hand or by additional dies to produce absolutely perfect edges. All the surfaces may be polished. Without polishing, both ends of the eye will have the form both outside and inside due to complete finishing in the dies. Several blows may be struck by each pair of dies, if preferred.

We do not claim dies in which the punches are integral therewith.

We claim as our invention—

In the manufacture of hoes or similarly-shaped implements, the herein-described dies for forming the body of the hoe, each provided with a separately-formed plug for stamping out the eye, set in the dies so as to each enter a certain distance into and shape the interior of the eye, substantially as herein set forth.

In testimony whereof we have hereunto set our hands at Portsmouth, Ohio, this 8th day of May, 1882, in the presence of two subscribing witnesses.

THOMAS BOWATER.
LEVI D. YORK.

Witnesses:
CHAS. E. JEWELL,
PH. ZNELLNER.