E. L. KEELER.

Machine for Forming the Eyes of Hoes.

No. 205,394. Patented June 25, 1878.

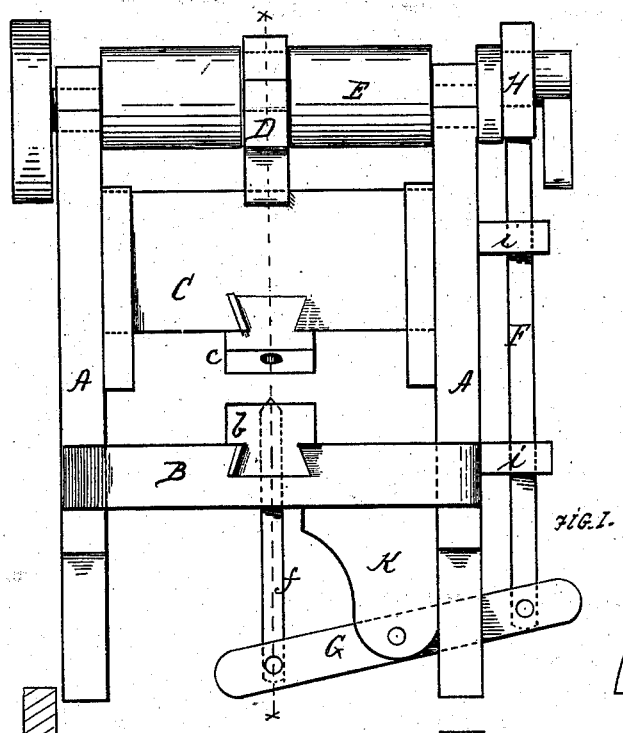

FIG. 1.

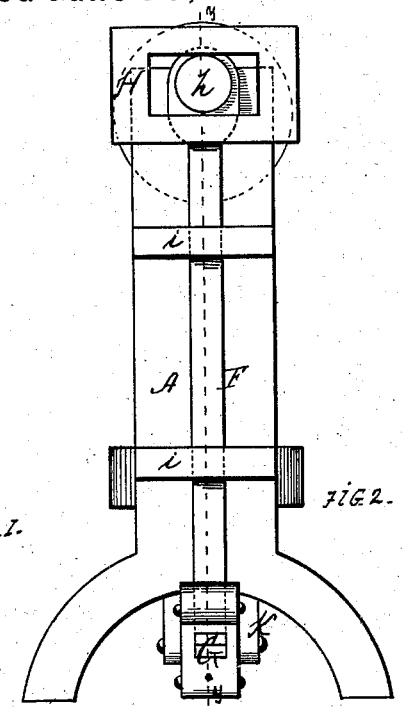

FIG. 2.

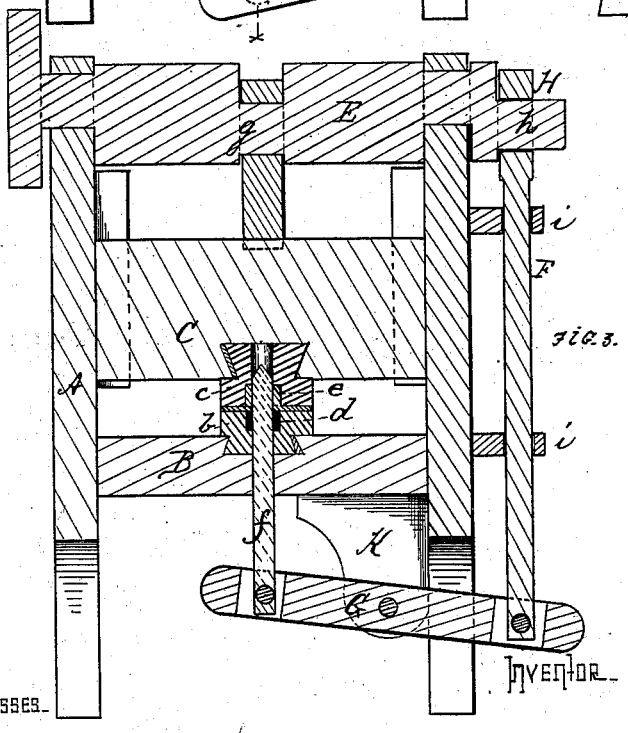

FIG. 3.

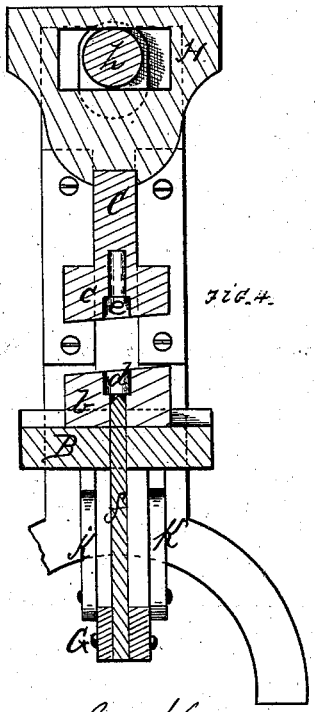

FIG. 4.

Witnesses.

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UNITED STATES PATENT OFFICE.

EDWARD L. KEELER, OF BEAVER FALLS, PENNSYLVANIA, ASSIGNOR TO JOSEPH GRAFF, OF SAME PLACE.

IMPROVEMENT IN MACHINES FOR FORMING THE EYES OF HOES.

Specification forming part of Letters Patent No. **205,394**, dated June 25, 1878; application filed May 24, 1878.

To all whom it may concern:

Be it known that I, EDWARD L. KEELER, of Beaver Falls, in the county of Beaver and State of Pennsylvania, have invented a new and useful Improvement in Machines for Forming the Eyes of Hoes and like articles; and I do hereby declare the following to be a full, clear, and exact description thereof, reference being had to the accompanying drawing, forming part of this specification, in which—

Figure 1 is an elevation of devices embodying my invention. Fig. 2 is an end view, showing the crank, yoke, and pitman or rod for actuating the punch. Fig. 3 is a vertical longitudinal section through the bed-dies and punch. Fig. 4 is a vertical transverse section.

Like letters refer to like parts wherever they occur.

My invention relates to the construction and operation of devices adapted to open out and form the eyes of hoes and like articles.

In the manufacture of hoes and like articles, where a raised or drawn eye is desired, the method usually practiced is to first form a cup-shaped cavity by means of suitably-shaped dies, and then to open out the cavity, and finally shape the eye with a tapering punch or mandrel, and in a die having a corresponding cavity. In the main such method can be successfully practiced; but often the chilling and shrinking of the blank upon the former or mandrel involves loss of time, much labor, and even reheating, before the mandrel or tapering punch can be removed.

The object of the present invention is to substitute for the devices now used means which can be worked so rapidly as to avoid the liability of the blank chilling on the former, and which will, at the same time, correct and preserve the form of the hoe or like article.

I will now proceed to describe my invention, so that others skilled in the art to which it appertains may apply the same.

In the drawing, A A indicate suitable uprights, supporting a bed or table, B, and serving as guides or ways for a movable cross-head, C.

Secured in dovetailed grooves, or otherwise keyed to the bed B and cross-head C, are dies *b c*. Said dies have central openings *d e* for the passage of a tapering or pointed punch, *f*, the upper die having its central opening *e* of form and shape corresponding to what is required in the finished eye of the hoe, and the two dies having their faces sloped at such an angle as the blade of the hoe or like article is to have when finished.

The movable cross-head C, to which the die *c* is secured, is provided with a yoke, D, within which works a crank, *g*, formed on or secured to a shaft, E, journaled in the uprights A A. On the shaft E is a second crank, *h*, working in a yoke, H, on the end of a rod or pitman, F, which moves in guides *i*, secured to uprights A A, and actuates a lever, G, pivoted in brackets K pendent from bed B. To the opposite end of punch-lever G is pivoted the tapered punch *f*, arranged to center in the opening *d* of bed-die *b*.

The above-described devices constitute the means employed by me for opening out and forming the eyes of hoes, &c., and are used as follows: The hoe or like blank having been first cupped by means of a dome-shaped or other suitable former and die, a hole is next punched at the bottom of the cup, and after the blank is properly heated it is laid on bed-die *b*, over the central punch-opening *d*. Power being applied to shaft E, the crank G forces down the cross-head C, carrying the movable die *c*, which descends upon the blank, the cup-cavity of which enters the central hole *e* of die *c*. At the same time, or, if preferred, a little later, the crank *h* forces down pitman or rod F, actuating lever G and forcing punch *f* up through bed-die *b* and the cup-cavity of the blank, spreading the metal thereof, and forming and perfecting the eye at the same time that the sloping dies *b c* correct and preserve the angle of the blade, and square up the shoulder or edge of the eye. The continued revolution of the shaft lifts the die *c* and retracts the punch, the blank being hugged or drawn down on the bed-die *b*, which serves as a stripper to draw the blank from the mandrel punch or former *f*.

The form of the central openings *d e* of the dies, and also the form of the punch *f*, will, of course, vary, being determined by the shape of eye desired; and the slope of the dies will

be regulated by the relative angle of the blade to the axis of the eye required.

The advantages of my invention are, the rapidity and accuracy with which the eye of a blank can be opened and formed without liability of straining or rupturing the metal, or of the blank adhering to the punch or former, and also the ability to square up the shoulder or edge of the eye and incline the blade.

I am aware that a drop-die, bed-die, and separate mandrel operating through the dies have heretofore been devised for forming the eyes of hoes, and do not herein claim such subject-matter; but

Having thus described the nature and advantages of my invention, what I claim, and desire to secure by Letters Patent, is—

1. The combination, in a machine for forming the eyes of hoes and like articles, of two perforated dies and a punch operated through the dies, together with power mechanism, substantially as described, for reciprocating the punch and one of the dies, substantially as and for the purpose specified.

2. The combination, in a machine for forming the eyes of hoes, &c., of two sloping-faced perforated dies and a punch operating through the dies, together with mechanism, substantially as described, for reciprocating the punch and one of the dies, substantially as and for the purpose specified.

In testimony whereof I, the said EDWARD L. KEELER, have hereunto set my hand.

EDWARD L. KEELER.

Witnesses:
R. H. WHITTLESEY,
F. W. RITTER, Jr.