

H. HAMMOND.
MANUFACTURE OF AXES.

No. 321,494.

Patented July 7, 1885.

Fig. 1

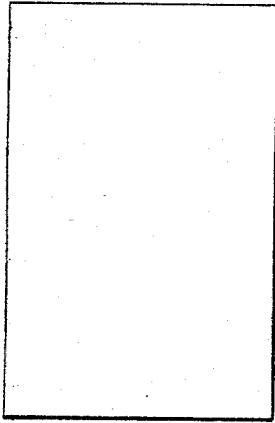


Fig. 2



Fig. 3

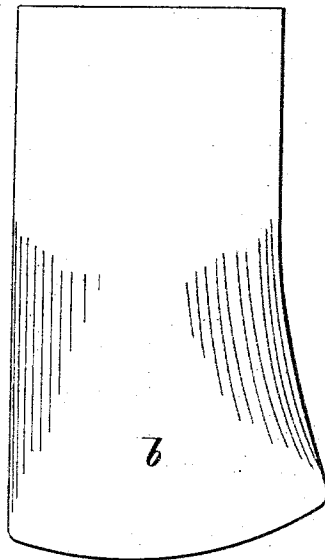


Fig. 4



Fig. 5.

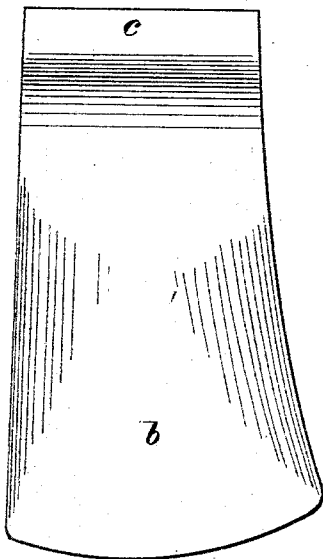


Fig. 6.



Fig. 7.

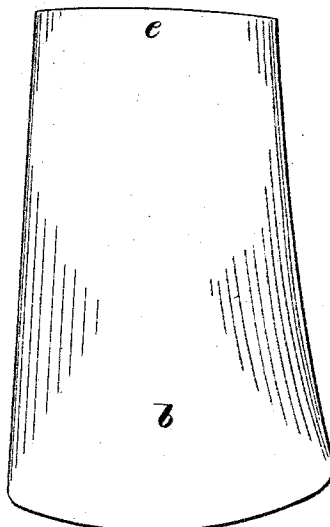
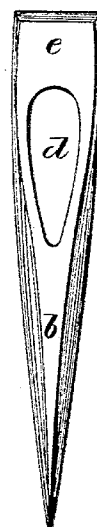


Fig. 8.



Witnesses.
Frank H. Pierpont
Albert H. Walker

Inventor
Henry Hammond

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Fig 9

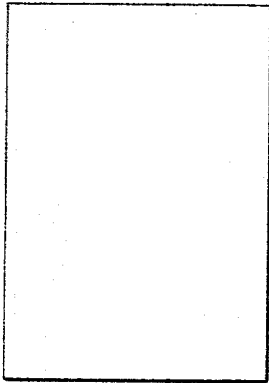


Fig. 10



Fig. 11

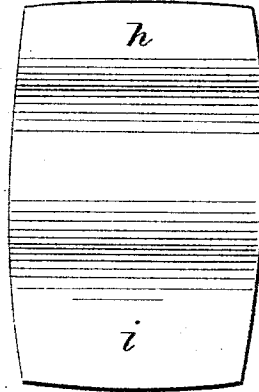


Fig. 12



Fig. 13

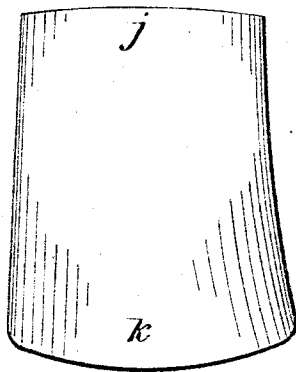
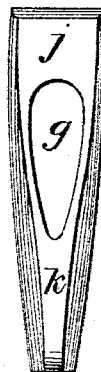


Fig. 14



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UNITED STATES PATENT OFFICE.

HENRY HAMMOND, OF NEW HAVEN, CONNECTICUT.

MANUFACTURE OF AXES.

SPECIFICATION forming part of Letters Patent No. 321,494, dated July 7, 1885.

Application filed September 27, 1884. (No model.)

To all whom it may concern:

Be it known that I, HENRY HAMMOND, of New Haven, Connecticut, have invented an Improvement in the Manufacture of Axes, of which the following description and claim constitute the specification, and which is illustrated by the accompanying two sheets of drawings.

This invention is a new process of making the eye and head of an ax; and it consists, essentially, in forcing the sides of an ax-blank apart at the eye portion to such an extent as to perform the double work of making the eye and expanding the cheeks into the ultimate contour and thickness desired, and in upsetting the head of the blank till it reaches the thickness and shape desired for the head of the ax.

Sheet 1 of the drawings illustrates the process when executed after the forming of the blade, and Sheet 2 represents the same when executed before the blade is completed.

Figures 1 and 2 are side and edge views, respectively, of a block of steel of suitable size and proportions for producing a steel ax. Figs. 3 and 4 represent that block after its lower portion has been forged into the form of the blade of an ax. Figs 5 and 6 illustrate the article shown in Figs. 3 and 4 after that article has been furnished with the hole *a*, by being split open from edge to edge with one or more chisels or punches having inclined sides. Figs. 7 and 8 show the article illustrated in Figs. 5 and 6 after the hole *a* has been enlarged into the eye *d* and the head *c* has been upset into the shape of the head *e*. Figs. 9 and 10 are side and edge views, respectively, of a block or blank of iron of suitable size and proportions for producing an ax-poll. Figs. 11 and 12 represent that block or blank after both of its ends have been narrowed as a convenient preliminary to subsequent operations, and after it has been furnished with the hole *f* in the same manner that the hole *a* is produced in the article shown in Figs. 5 and 6. Figs. 13 and 14 illustrate the blank shown in Figs. 11 and 12, after the hole *f* has

been enlarged into the eye *g*, and the head *h* has been upset into the shape of the head *j*, and the lower part *i* has been thinned and widened out at its edges into the form *k* preparatory to making a finished ax by the application of a bit in either of the well-known methods.

The new process is as follows: The blank is first heated and then the eye is made with one or more chisels or punches having inclined sides, which, as they penetrate the metal, force the sides of the blank apart and thus expand the blank at the eye portion to the ultimate thickness desired for the ax at that place, and the head is made by upsetting the upper end of the blank, so as to make it approach and, if desired, to exceed in thickness the eye portion of the ax.

I recommend that the eye be formed without expelling any metal from the blank; but the penetrating instrument may have a blunt edge, which will expel a small amount of the metal, while it also makes room for itself by forcing the metal sidewise into convex protuberances, substantially like those shown in Figs. 6 and 12. So, also, I recommend that the holes *a* and *f* be first formed, and afterward enlarged into the eyes *d* and *g*, respectively; but those eyes may be made at once without any preliminary holes. I recommend, also, that the indicated forging and forming be done with dies and chisels operated by machinery; but it may be done with hand tools.

I claim as my invention—

The process of making the eye and head of an ax, which consists in first heating an ax-blank and then in forcing the sides thereof apart at the eye portion till that portion is expanded to the ultimate thickness and form desired, and in upsetting the upper end of the blank till it reaches the thickness and shape desired for the head of the ax, all substantially as described.

HENRY HAMMOND.

Witnesses:

ALBERT H. WALKER,
FRANK H. PIERPONT.