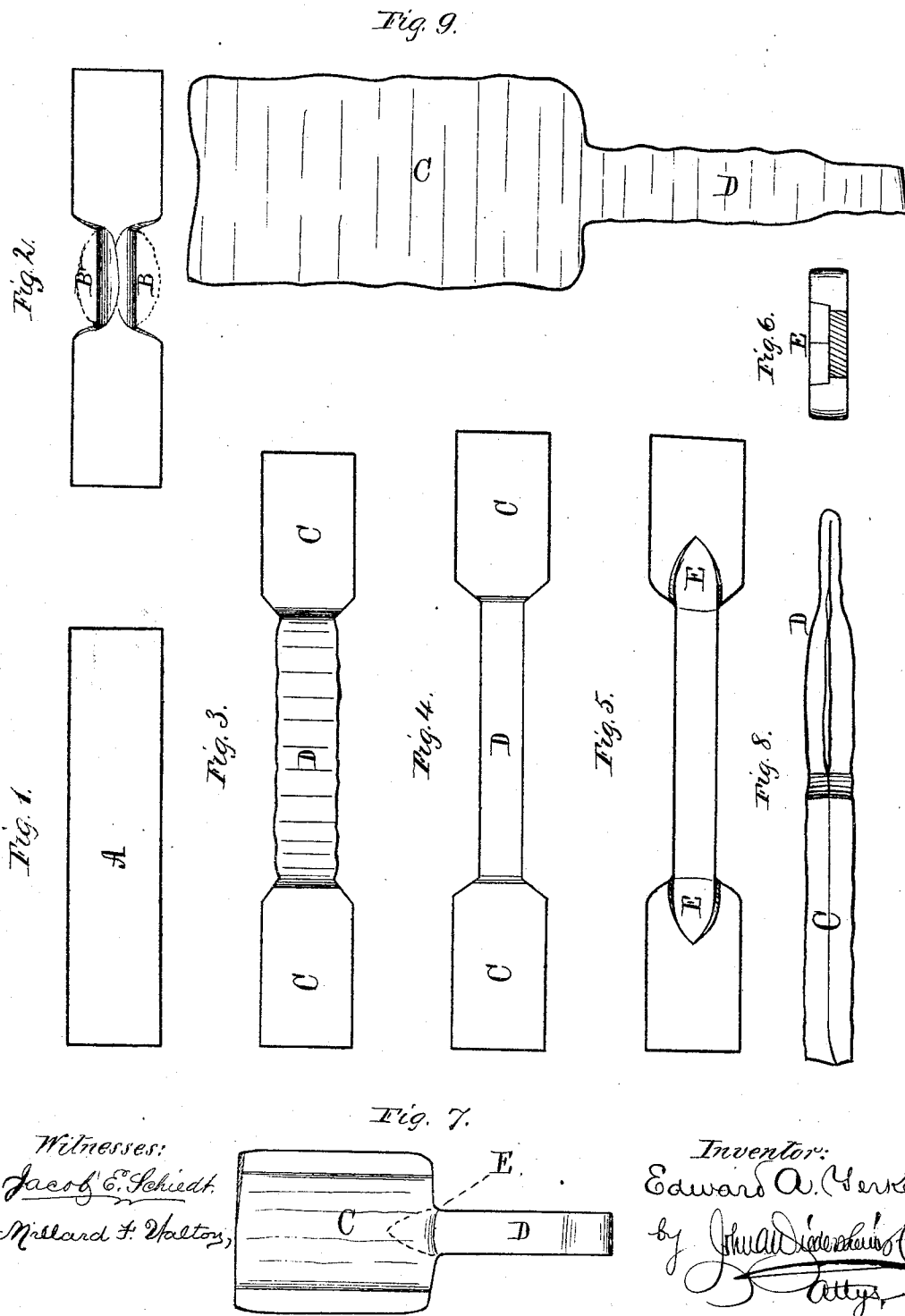


**E. A. YERKES.**  
**Manufacture of Shovels.**

No. 140,334.

Patented June 24, 1873.



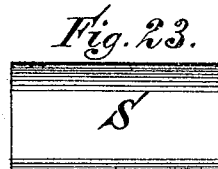
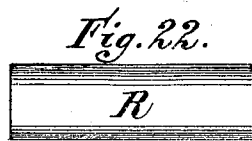
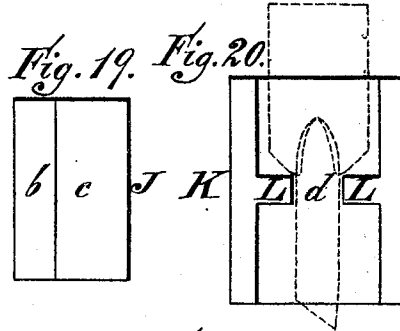
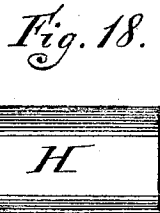
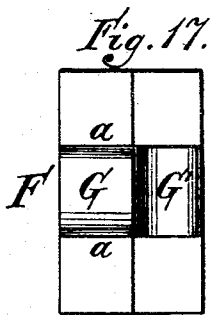
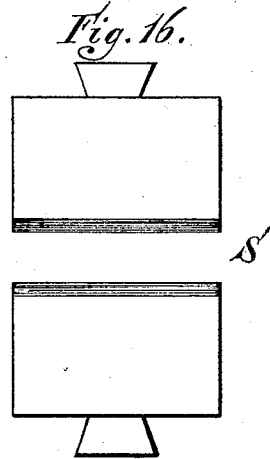
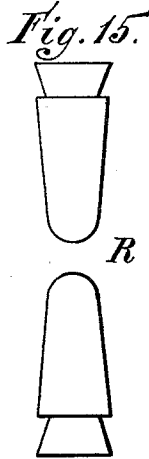
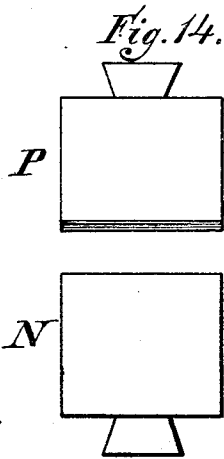
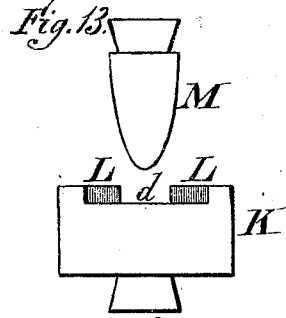
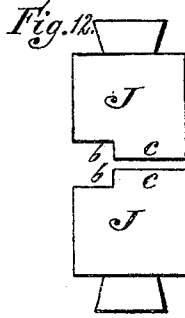
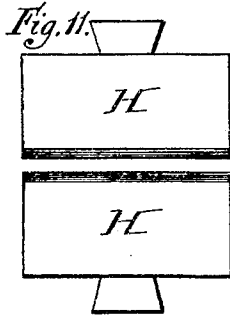
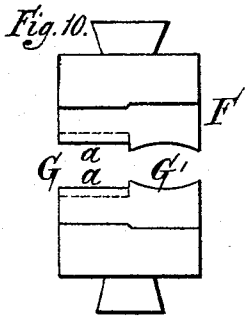
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# UNITED STATES PATENT OFFICE.

EDWARD A. YERKES, OF PHILADELPHIA, PENNSYLVANIA.

## IMPROVEMENT IN THE MANUFACTURE OF SHOVELS.

Specification forming part of Letters Patent No. **140,334**, dated June 24, 1873; application filed March 29, 1873.

*To all whom it may concern:*

Be it known that I, EDWARD A. YERKES, of the city and county of Philadelphia and State of Pennsylvania, have invented a new and useful Improvement in the Manufacture of Shovels; and I do hereby declare the following to be a clear and exact description of the nature thereof, sufficient to enable others skilled in the art to which my invention appertains to fully understand, make, and use the same, reference being had to the accompanying drawings making part of this specification, in which—

Figures 1 to 9, Sheet 1, represent the successive stages of the work. Figs. 10 to 16, inclusive, Sheet 2, represent front views of the several dies employed. Fig. 17 is a face view of one of the dies, Fig. 10. Fig. 18 is a face view of one of the dies, Fig. 11. Fig. 19 is a face view of one of the dies, Fig. 12. Fig. 20 is a face view of the lower die, Fig. 13. Fig. 21 is a face view of the upper die, Fig. 13. Figs. 22 and 23 are face views respectively of the dies, Figs. 15 and 16.

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

This invention consists in the manufacture of shovels by successive operations of squeezing or pressing the metal from the blank to the form necessary for the stamping and finishing processes. It also consists in dies for squeezing the blank for the first operations of forming the neck portion of the shovel. It also consists in dies for forming depressions in the blank at a certain stage for the socket portion of the shovel. It also consists in dies for the successive operations of working the metal.

Referring to the drawings, A, Fig. 1, represents a bar or piece of metal constituting a blank for the manufacture of shovels. F, Figs. 10 and 17, represents dies whose working-faces are formed with concavities G G', which extend at right angles to each other, or respectively longitudinally and transversely. The blank A is laid sidewise transversely on the longitudinal concavity G of the lower die F, and power having been applied to the upper die, the latter descends, and by a few reciprocations the edges *a a* of the two concavities are squeezed into the blank A, and the shape of the concavities is imparted to the

center of the blank, as seen in dotted lines, Fig. 2. The blank is now shifted to the transverse concavity G' of the lower die F, and on the descent of the upper die the center of the blank will be worked down and out, and assume the form shown at B, Fig. 2. H H, Figs. 11 and 18, represent fuller dies whose working faces are rounded, as is well known. The blank B is now passed transversely between the dies H, so that the portion B of the blank will be in line to be operated upon by the rounded faces of the dies H. A few reciprocations of the upper dies H over the length of the portion B will squeeze said portion B so that it assumes the form shown in Fig. 3, which may be said to be a blank having wide ends C for the blade of the shovel, and the neck D for the strap thereof. J J, Figs. 12 and 19, represent dies whose working-faces are formed with shoulders *b b* and flat-faces *c*. The blank C D, Fig. 3, is removed from dies H, and the neck is introduced sidewise between the shoulders *b b* of the dies J J, and the upper die reciprocating, the sides of the neck are squeezed so as to be straightened and smoothed. Then the neck is turned flat between the faces *c* of the dies J, and the faces of the neck are likewise smoothed. The blank thus prepared (see Fig. 4) is now laid on the lower die K of those shown in Fig. 13, whose working-face is illustrated at Fig. 20. This face is depressed, and at the center thereof there project toward each other two guides, L, which have a space, *d*, between them, at least equal to the width of the neck D of the blank. The working-face of the upper die M is elliptical in form, (see Fig. 21,) and moves in a right line with the space between the guides L of the lower die. The neck D of the blank is placed in the space *d*, and one end C of the blank brought against the guides L, (see Fig. 20,) the blank being shown in dotted lines. The die M now descends and squeezes into the portion of the end C of the blank at a point adjacent to the neck D, and one-half of the face of the die M forms a depression, E, at said point, the other-half of the face of the die coming over the neck, which, being worked out or thinned, is not reached by said other half. On the ascent of the die M the blank is moved or shifted so as to bring the end C of the blank against the guides L,

and on the descent of the die M a depression will likewise be squeezed in said end C, similar to that previously formed in the other end C. Each end C of the blank has now a depression, E, the two depressions pointing in opposite directions, as illustrated in Figs. 5 and 6, said depressions being designed for the formation of the socket of the shovel. The middle portion of the neck D is then thinned or worked out by means of a flat-face die, N, and a fuller die, P, (see Fig. 14,) so that the blank may be bent at said thinned middle portion, thus bringing together the two ends C and halves of the neck D, the depressions E being coincident and producing a cavity or socket for the handle of the shovel, as stated, which cavity or socket is to be filled with scale earth or other suitable substance to prevent closing thereof during the subsequent manipulations. The blank has now assumed the form seen in Fig. 7, and is then subjected to squeezing by the fuller dies R R and S S, Figs. 15 and 22, and 16 and 23, whereby said blank, Fig. 7, is widened and lengthened, as illustrated in Figs. 8 and 9. In this condition the blank is ready for the opening of the neck D, the insertion of a proper tool in the socket E E, and the subsequent stamping and finishing process, but which are well known and have no special novelty. The depressions E are uniform in both heads, C, and thus there is no irregularity in their location when brought together, so that the socket is always properly placed. The

socket may be made to suit the style of any handle by using a correspondingly-shaped die for the depression in the heads.

It will be seen that by the manipulations stated there is no cutting off or waste of material. The absence of rolling and hammering saves considerable laborious work and preserves the fiber of the metal. The shovel will be found to be of superior manufacture, and produced at an appreciable saving over the method heretofore practiced.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The improvement in the manufacture of shovels involved in the successive squeezing operations stated, and the results of which are illustrated in Figs. 1 to 9, inclusive, for the purpose described.

2. The dies F F, with the concavities G G', substantially as and for the purpose set forth.

3. The die K, with the guide L, and die M, constructed and operating substantially as and for the purpose set forth.

4. The series of squeezing dies, as set forth, and illustrated in Figs. 10 to 23, inclusive, for the purpose described.

The above signed by me this 4th day of February, 1873.

EDWARD A. YERKES.

Witnesses:

PETER CASTOR,

JONATH YERKES.