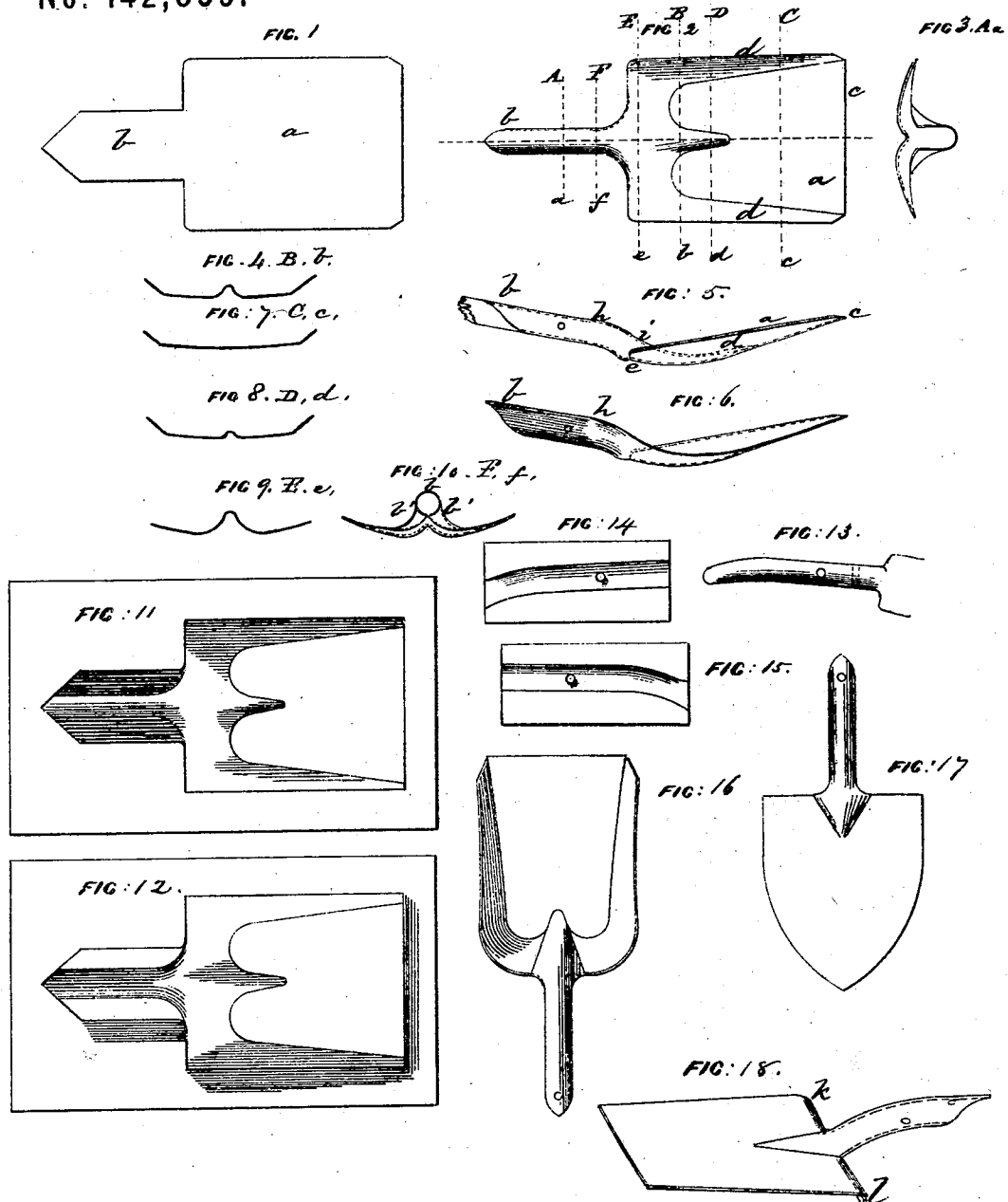


H. L. LOWMAN.
Manufacture of Shovels, &c.
 No. 142,859. Patented September 16, 1873.



WITNESSES:
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IMPROVEMENT IN THE MANUFACTURE OF SHOVELS, &c.

Specification forming part of Letters Patent No. **142,859**, dated September 16, 1873; application filed July 24, 1873.

To all whom it may concern:

Be it known that I, HARVEY LESTER LOWMAN, of Birmingham, in the State of Connecticut, have invented an Improved Process of Manufacturing Shovels, Spades, Grocers' Scoops, and other like articles, reference being had to the accompanying drawings making part of this specification, in which—

Figure 1 represents the blank for a shovel cut out of a sheet of metal of the required thickness; Fig. 2, a face view of the blank after it has undergone the first swaging operation; and Figs. 3 and 4, cross-sections of the same taken at the lines A *a* and B *b* of Fig. 2. Fig. 5 is an edge view of the completed shovel; Fig. 6, a longitudinal section; and Figs. 7, 8, 9, and 10 cross-sections, taken severally at the lines C *c*, D *d*, E *e*, and F *f*, Fig. 2; Figs. 11 and 12, the dies for the first swaging operation; Fig. 13, the mandrel on which the shank is finished; and Figs. 14 and 15, the dies for finishing the shank. Figs. 16 and 17 are other forms of shovels; Fig. 18, a spade.

The same letters indicate like parts in the several figures.

My said invention relates to the process of manufacturing shovels, spades, grocers' scoops, and other analogous articles, blade and shank, of one piece of sheet metal; and consists in cutting the blank for the blade and shank of one piece of sheet metal, and by two successive swaging operations bending the sheet metal into the form required for the blade, and a hollow shank to receive the wooden handle.

The blank is cut with shears or cutters from sheet metal of the required thickness for the intended shovel, spade, or scoop, as the thickness is not materially reduced by the after operations of swaging. The form of the blank will depend upon the form of the blade of the shovel or other article desired to be produced. If for a shovel, such as represented by Fig. 5 of the accompanying drawings, the blank should be cut of the form represented by Fig. 1, the part *a* being for the blade, and the part *b* for the shank to receive the wooden handle. The blank thus cut out is then subjected to the first swaging operation between two dies or swages, Fig. 11, having its face of the form of the front face of the blade and shank of the

shovel when completed, and Fig. 12 having its face of a form the reverse of the face of Fig. 11 less the thickness of the blank after having been so swaged. The form of the blank, after the first swaging operation, is represented by Figs. 2, 3, and 4, and the form of the blade *a* is completed, as also the upper or front portion of the shank *b*, by this first swaging operation. The shank or socket is afterward completed by a second swaging operation. The part, *b*, that is the half-formed shank or socket is put upon a mandrel, Fig. 13, and while it is so held it is subjected to the swaging or bending operation of two dies, Figs. 14 and 15, by which the two edges *b'* *b'* of the part *b* of the blank are bent around the mandrel until the two edges meet, or nearly so, which completes the form of the shank or socket. When so completed the blade of the shovel will be of the form represented by Figs. 2 and 5, with the front edge *c* straight, and the sides *d d* and back edge *e* slightly curved to give the required concavity to the front or working face, while the shank *b* is tubular for a part of its length to form a socket, into which the handle is to be driven, and, if desired, secured by one or more rivets. The shank or socket is circular in its cross-section, as seen at Fig. 10, and straight, or nearly so, in the direction of its length from its extreme end to the point *h* within a short distance of the back edge *e* of the blade. In the direction of the length it extends in a convex ridge from *h* to *i*, and from *i* in a concave ridge, vanishing into the face of the blade; and, laterally, the edges which meet or nearly meet to form the tubular part of the shank by gradual curves run into the back edge of the blade, the sheet metal being bent each way from the central line, spreading laterally in curved planes, as represented in the cross-sections, Figs. 7, 8, and 9. The general form produced by the bending of the sheet metal at the junction of the blade with the socket part of the shank is such as to present arches longitudinally and transversely, giving a greater amount of strength for the weight of metal than can be obtained by any other mode of construction known.

Figs. 16 and 17 represent other shovels, which differ only in the form of the blade.

Fig. 18 represents a spade made in the same manner, except that the back edge *k* of the blade is formed by turning the back edge *l* at right angles, to form the required flat surface for the bearings of the foot. This result is produced by cutting the blank a little longer than the blade of the intended spade, and forming one of the dies for the first swaging operation a little longer than the other and with a flange.

I prefer to heat the metal for the swaging operations; and, although I prefer to use sheet metal of one equal thickness, nevertheless it will be obvious that the sheet metal for the blanks may be rolled of unequal thickness, making it thickest in the parts which in the article, when made, will be exposed to the greatest strain.

It will be obvious from the foregoing that the form of the shovels, scoops, spades, or other like instruments may be varied so long as they are made with the blade and shank of

one piece of sheet metal, substantially as described.

What I claim as my invention is—

The combined process, substantially such as described, for making shovels, spades, scoops, or other analogous articles in one piece from sheet metal, by cutting the sheet for the body of the shovel and with a projection from the rear edge thereof, which is to form the hollow shank, and at one swaging operation between dies giving the form required for the shovels and the half form to the projecting part which is to form the projecting hollow socket, and then by the second swaging operation completing the hollow tubular projecting socket for the reception of the handle, substantially as and for the purpose specified.

H. L. LOWMAN.

Witnesses:

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