No. 771,032. PATENTED SEPT. 27, 1904.

H. W. AVERY.

PROCESS OF MAKING SHOVELS.

APPLICATION FILED JUNE 25, 1903.

NO MODEL.

Fig. 1.

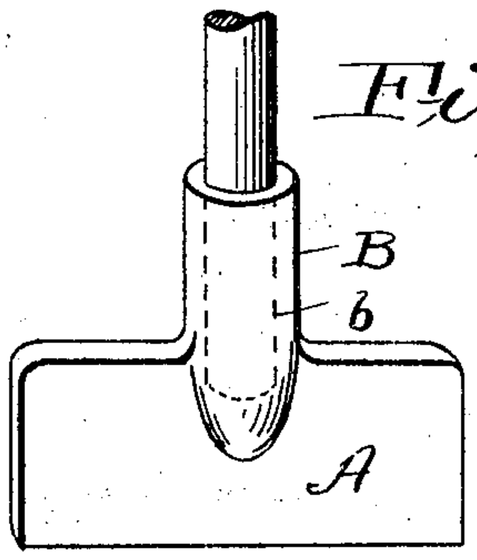


Fig. 2.

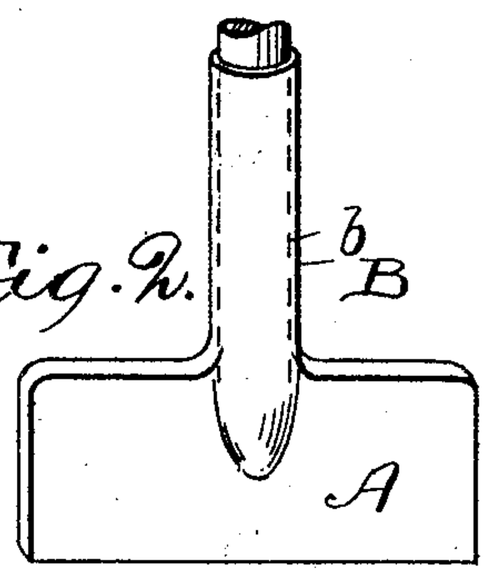


Fig. 3.

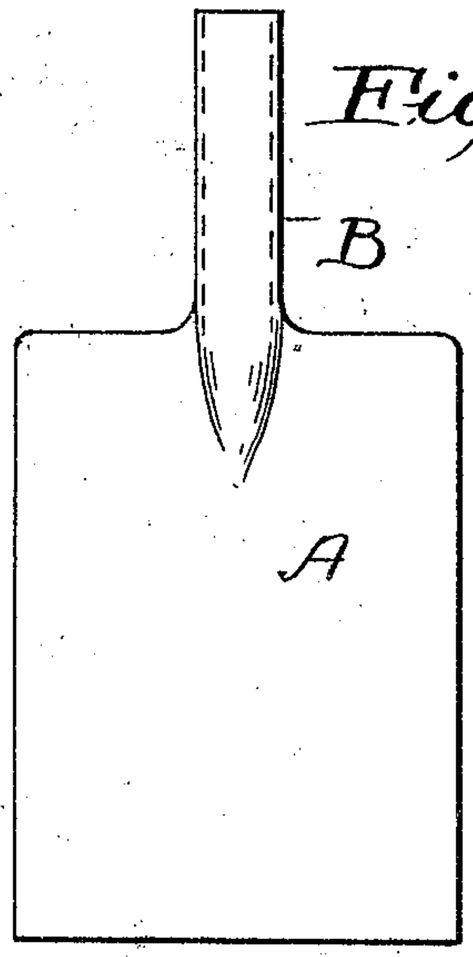


Fig. 5.

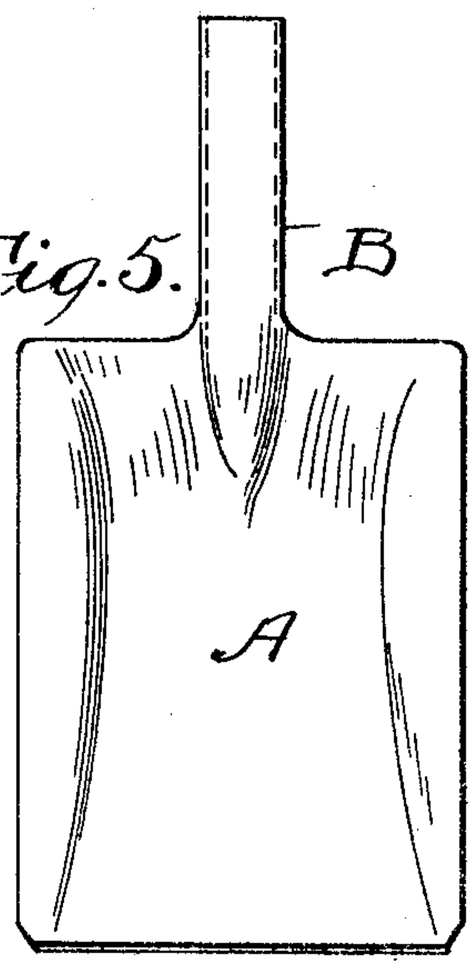


Fig. 4.

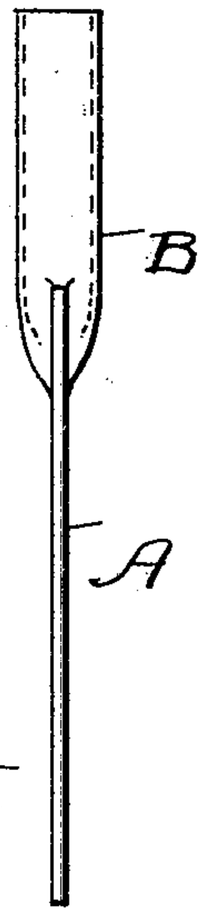
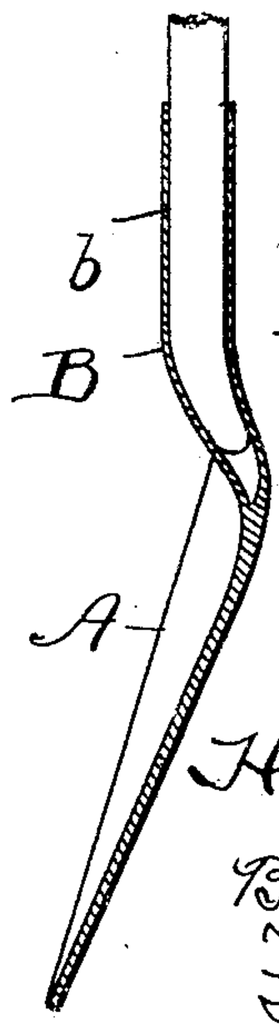


Fig. 6.



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No. 771,032. Patented September 27, 1904.

UNITED STATES PATENT OFFICE.

HENRY W. AVERY, OF CLEVELAND, OHIO, ASSIGNOR OF ONE-HALF TO THE AVERY STAMPING COMPANY, OF CLEVELAND, OHIO, A CORPORATION OF OHIO.

PROCESS OF MAKING SHOVELS.

SPECIFICATION forming part of Letters Patent No. 771,032, dated September 27, 1904.

Application filed June 25, 1903. Serial No. 163,003. (No model.)

To all whom it may concern:

Be it known that I, HENRY W. AVERY, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented a certain new and useful Improvement in Processes of Making Shovels, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings.

The primary object of the invention is to produce a shovel which shall have the maximum of strength and durability for the material employed and which shall have all of the desirable characteristics of the so-called "smooth-back" shovels and some desirable characteristics peculiar to itself; and the invention consists in the process hereinafter described, and definitely pointed out in the claim, whereby there is produced a smooth-backed shovel without joint or seam and having projecting from its upper edge an integral seamless tubular handle-socket whose recess extends well into the blade.

The shovel itself as produced by my process is shown, described, and claimed in my divisional application, Serial No. 173,755, filed September 19, 1903.

In the drawings, Figure 1 is a perspective view of the blank employed in making the shovel herein described. Fig. 2 is a plan view of the blank after the tubular tang has been drawn out. Fig. 3 is a plan view, and Fig. 4 a side view, of the blank after the body portion of the blank has been reduced to the desired thickness for the blade; and Fig. 5 is a plan view, and Fig. 6 a central longitudinal sectional view, of the finished shovel.

The blank shown in Fig. 1, from which the shovel is to be made, consists of a body part A and an integral tang B, which projects centrally from one edge of the body. This blank may be cast or forged or cut from a bar; but however formed there must be a recess *b* extending from the outer end of the tang down through it and a short distance into the body portion of the blank. In the transformation of this blank into the shovel the tubular tang is elongated and the thickness of its wall correspondingly reduced, and the body portion A is reduced in thickness; but it does not much matter which of these two operations is first performed. Preferably, however, the tang is first drawn out. Preparatory to drawing out the tang one drives into the recess thereof a mandrel which completely fills it and is preferably of substantially the same cross-sectional size and shape as said wooden handle which is to be applied to the shovel. Then this tubular tang, with the mandrel in it, is drawn out, thereby elongating it and reducing the thickness of the wall. This result may be produced either by rolls or in a press containing a suitable drawing-die or by any other well-known method or mechanism. The body part A of the blank is then plated or rolled down to the desired thickness, and this, as also the operation of drawing out the tubular tang, may be done when the blank is either hot or cold. The blade is then trimmed as may be necessary, and the tubular tang is also cut to the desired length. After these operations are performed it is necessary that the blade be shaped and the tubular handle-socket also be shaped and bent so that it will occupy the proper angular relation to the blade. It is thought that these two results may best be obtained independently, although it is possible to produce them in one operation by using suitable dies. In order, however, to bend and shape the tubular handle-socket piece and the upper part of the blade into which the handle recess or socket extends, it is necessary to fill this recess with a flexible mandrel which remains therein while said parts are being bent to shape between suitable dies. Any flexible mandrel may be employed; but it is thought that there is a distinct advantage in using as such mandrel the wood handle, which after the shaping operation referred to is allowed to remain in the recess, which it fits perfectly. When so used, the wood should be well steamed before it is driven into the socket, so that it may be easily bent.

It has not been thought necessary to show

any mechanism for severally performing the steps of the process, because such mechanism is well understood by those familiar with this art.

The described shovel, which will be produced by the process described, is without joint or seam and has a tubular handle-socket which extends well into the blade, whereby the wooden handle inserted therein adds its strength to the metal structure at the place where the latter might otherwise bend in use—viz., at the juncture of the blade and socket-piece. The lower end of the wooden handle is, moreover, protected from wear and does not impede the movement of the shovel into the material being shoveled as it does with the hollow-back shovels. The handle-socket is, moreover, seamless, and therefore in itself is stronger than either the straps found on most smooth-back shovels or the almost tubular sockets such as are sometimes formed on hollow-back shovels by bending a flat tang. The exterior surface of the shovel-handle near the blade—viz., that part which is formed of wood having the metal on the outside—is smooth, as it is not in shovels having metal straps between which the wood handle is secured.

A shovel produced by my process is especially well adapted for heavy work—as, for example, the shoveling of ore—for two reasons—first, because the handle extending continuously down into the blade leaves no weak point where great weight upon the shovel could break it, and, second, because in lifting heavy loads the workman must place his hand as close as possible to the blade to reduce the leverage which the load obtains, and my socket being continuously tubular and having no open or rough space along its length allows him to do this. Any longitudinal opening in the socket not only weakens the shovel, but tends to abrade the hand of the operator. There is still another advantage in the continuously tubular socket in that it protects the extreme end of the shovel-handle from moisture, which would tend to rot it, the end fiber of wood being much more susceptible to rotting than the side surface thereof. In a word, the described shovel has all of the desirable characteristics of the so-called "plain-back" shovels and none of the objectionable characteristics of the so-called "hollow" backs, and it has, moreover, several desirable characteristics not found in either. Considering the difficulty and expense of properly securing the handle between the straps of the ordinary plain-back shovel, it is believed that the shovel herein described can be constructed more cheaply than the smooth-back shovels heretofore made and almost as cheaply as the ordinary hollow backs.

Having described my invention, I claim—

The mode of making shovels, consisting in forming a shovel-blank having a straight tubular tang, with the socket thereof extending well down into the blade or body portion, inserting a wooden handle into said socket, and then bending said tang, handle, and the adjacent portion of the blade, as shown and described.

In testimony whereof I hereunto affix my signature in the presence of two witnesses.

HENRY W. AVERY.

Witnesses:

E. B. GILCHRIST,

E. L. THURSTON.