July 10, 1945. R. HARTE 2,380,361

MANUFACTURE OF SHOVELS OR THE LIKE

Filed Feb. 18, 1943

Fig. 1.

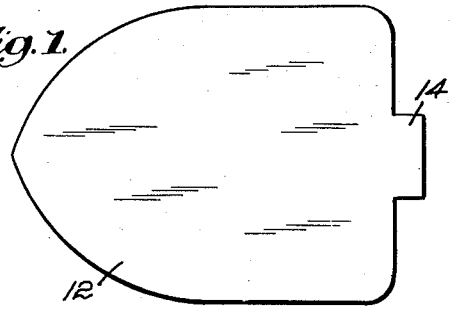


Fig. 2.

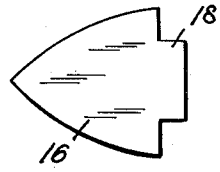


Fig. 3.

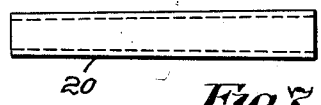


Fig. 4.



Fig. 5.

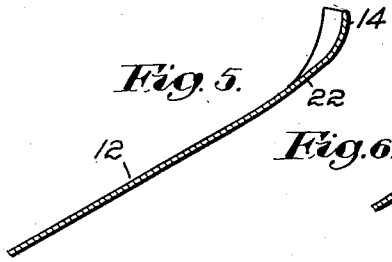


Fig. 6.



Fig. 7.

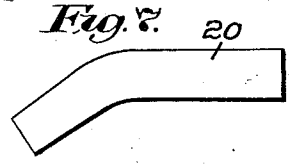


Fig. 8.

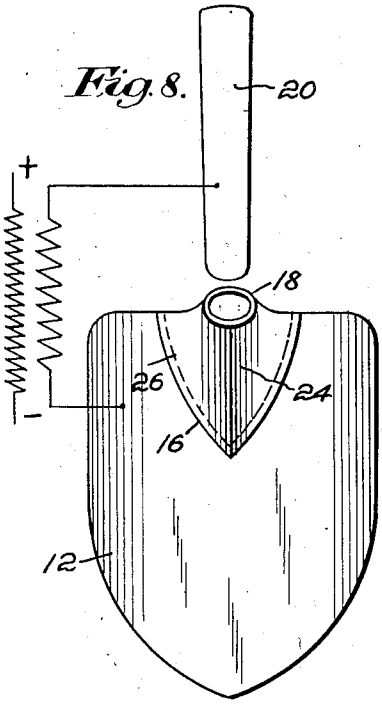
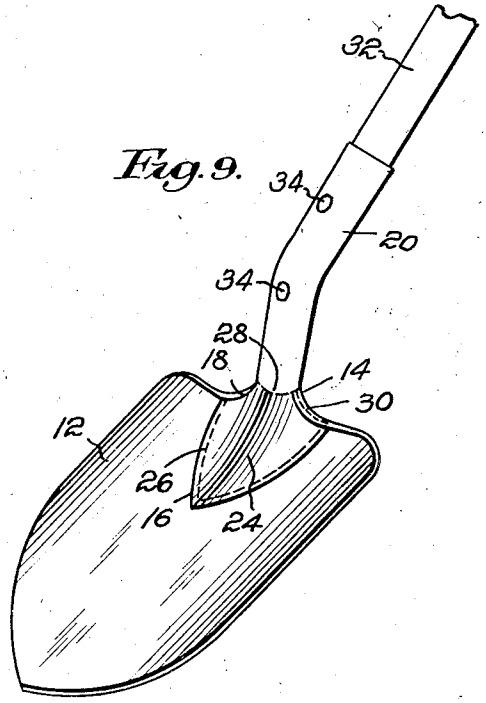


Fig. 9.



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MANUFACTURE OF SHOVELS OR THE LIKE

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6 Claims. (Cl. 76—113)

This invention relates to shovels and like tools having a wide working portion or blade and a handle as exemplified, for example, by the round-point digging shovel shown in the drawing and which for convenience I shall refer to herein as shovels, using that word in a generalized sense. The object of the invention is to provide an improved method for the economical manufacture of a strong and durable tool. The shovel produced by the method in its general construction resembles in some ways so-called plain-back and back-strap shovels and in particular the form of shovel disclosed in the patent to Ready 1,989,063 although of specifically different construction and made by a different and preferable process.

My invention will be well understood by reference to the following description taken in connection with the accompanying drawing, wherein:

Figs. 1 through 4 illustrate blanks from which the parts which go to make up the completed shovel are made, and

Fig. 1 is a plan of the blade blank,

Fig. 2 is a plan of the frog blank,

Fig. 3 is a plan of the blank from which the handle-receiving socket is made, and

Fig. 4 is an end view of Fig. 3;

Figs. 5, 6 and 7 illustrate the forms which these blanks assume in the completed shovel although in these figures they are shown separate one from another, and

Fig. 5 is a central longitudinal section through the blade proper,

Fig. 6 is a central longitudinal section through the frog-forming element constructed from the blank of Fig. 2, and

Fig. 7 is a side elevation of the socket portion;

Fig. 8 is a plan view diagrammatically illustrating a step in the process; and

Fig. 9 is a perspective view of the completed shovel.

In Fig. 1 I show a blade blank in the form of a flat piece of sheet steel of suitable gauge having a main portion 12 of proper shape to form the finished blade. As contrasted with the blade blanks utilized in the conventional plain-back shovel which have projecting from their rear edge a long strap-forming portion, the rear edge of the blank substantially conforms to the rear edge of the blade in the completed shovel, that is, the line of the shoulders or steps thereof. For reasons which will appear, I prefer to provide centrally of this rear edge a relatively short projection 14, that is, one which is shorter longitudinally of the shovel than it is transversely of the same. Thus by way of example and not by way of limitation in a shovel of ordinary size the projection may be about ¾ of an inch long and 2½ inches wide.

In Fig. 2 I have shown a blank for a frog-forming element consisting of a generally triangular head 16 substantially smaller than the blade 12 and which may have at the rear edge thereof a short projection 18 substantially duplicating the projection 14.

The handle-receiving socket proper may be formed from a section of tube 20, as seen in Figs. 3 and 4, having an unbroken cylindrical wall, either a length of cylindrical tube or an extrusion slightly tapered at one end.

Figs. 5, 6 and 7 show the parts constructed from the blanks of Figs. 1, 2 and 3 in the form which they assume in the completed shovel and in accordance with one manner of practising the invention they may all be brought into this form before being secured together as a unitary whole.

Referring to Fig. 5, either in connection with the shaping of the body of the blade 12 to its desired contour, herein somewhat dished, or separately, the rear central portion thereof is slightly depressed at 22 to form in the finished shovel the lower half of a frog-forming recess and centrally the back of the blank, herein represented by the projection 14, is shaped to the contour of the arc of a closed curve (substantially a circle) with its concavity facing forwardly. Herein this portion is turned up somewhat at an angle to the "plane" of the blade proper.

Referring to Fig. 6, the frog-forming element 16 is formed with a central protrusion 24 to form the upper half of the frog and it is centrally bent to the arc of a closed curve with the concavity facing rearwardly, the arc preferably being supplementary to the arc of the blade substantially to complete the curve. In other words, in the example of the invention shown wherein the short projections 14 and 18 are utilized they present terminally a short tubular section when the blade 12 and the frog head 16 are assembled.

Referring to Fig. 7, the tube 20 which forms the socket proper is cranked as shown in that figure to provide the proper lift to the shovel, that is, the proper relation between the blade and the handle which is inserted in the outer end of the socket. The lower end portion may be slightly tapered during this bending if not already so formed. The lower end of the tube forms a closed curve adapted to mate with the arcs

formed as described on the rear edges of the blade 12 and the frog-forming element 16.

The frog-forming piece 16 is superposed on one face of the blade piece, herein the front face, and welded marginally thereto as indicated by the dash lines 26 in Fig. 8. This in the example shown corresponds to the usual method of attaching the frog and front strap to the blade of a plain-back shovel. The connection at 26 may preferably be effected between the flat blanks, as shown in Figs. 1 and 2, after which the rear edges of the parts may be shaped to the contours of Figs. 5 and 6, although one or both of the parts may be preshaped before the two are joined. In the former case the operation is similar to that practised in the case of a plain-back shovel having long strap-forming extensions. The frog is first "opened out", that is to say, the central portion of the superposed flat parts are pressed outwardly by the insertion of a suitable instrument from the rear edge of the blade to provide the depression 22 and protrusion 24 and the rear margins of the part are then properly shaped so that the central portions, in the example shown the projections 14 and 18, present rearwardly the arcs above described. This shaping is, of course, done while the metal is hot and it is easy to press the opposed edges of the two parts into intimate contact. The end of the cranked tube 20, as shown in Fig. 7, is then, in the manner diagrammed in Fig. 8, presented endwise to the arcs formed at the rear edges of the parts 12 and 16, specifically on the projections 14 and 18 as shown in Figs. 5 and 6, and welded thereto. Electric butt welding is well adapted to this step and is indicated diagrammatically in Fig. 8 by the showing of a transformer. As indicated by that figure, the two parts may be pressed against one another endwise during the application of a welding current to cause the ends to interfuse in a butt weld.

The resulting product is shown in Fig. 9 wherein the welds are indicated in conventional manner by dash lines, the butt weld just referred to at 28. When, as I prefer, the parts 12 and 16 are shaped hot after being welded together at 26, the lateral portions of the rear edge of the frog-forming member 16 and the opposed rear edge of the blade and also opposed edges of the projections 14 and 18 may be pressed together closely along the dotted line 30 and no electric welding along the junction is required.

The provision of the projections 14 and 18 on the blade-forming portion 12 and the frog-forming portion 16 is desirable as it facilitates smoothing off the butt weld 28 in finishing the shovel.

Referring to Fig. 9, a wooden handle or stale 32 is forced into the end of the socket 20 and may be secured by fore and aft rivets 34. Because of the strength of the socket and of the bent portion of the same where it unites with the blade due to the unbroken tubular construction, a straight handle may be used which may be steamed and forced more or less around the curve of the socket 20, this being made possible because of the strength against expansive disrupting forces of the tubular construction.

The shovel, as shown in Fig. 9, is exceedingly strong and comparable in strength to so-called solid-shank shovels but lighter and better balanced.

It will be seen that the method is simple and inexpensive. As indicated in part in the foregoing specification, the order of steps is not critical and their recital in a certain order in the claims is therefore not intended as a limitation.

I have described the frog-forming element 16 as applied to the front face of the blank 12 to form a frog similar to that in a so-called plain-back shovel. If it were applied to the rear face of the blade, the arc-shaped margins of the parts would be bent to face in the opposite direction and the resultant shovel would bear the same relation to that specifically illustrated as a back-strap shovel does to a plain-back shovel.

I am aware that it has been proposed to make handle-receiving sockets for shovels from sections of tube connected in various ways to a blade and this I do not claim. The invention may be embodied in other specific forms without departing from the spirit or essential attributes thereof, and I therefore desire the present embodiment to be considered in all respects as illustrative and not restrictive, as is in fact clear in several matters from the description itself. Reference is to be had to the appended claims to indicate those principles of the invention exemplified by the particular embodiment described and which I desire to secure by Letters Patent.

I claim:

1. The method of making a shovel which comprises forming a blade with a rear edge substantially conforming to the line of the rear edge in the completed shovel, securing marginally to a face of the blade adjacent said edge a frog-forming plate having a rear edge substantially aligned with the opposed portion of the rear edge of the blade, shaping the opposed parts to arcs of a closed curve and welding thereto as a handle-receiving socket the end of a length of tubing having a circumferential unbroken wall which terminally presents corresponding arcs.

2. The method of making a shovel which comprises forming a blade with a rear edge substantially conforming to the line of the rear edge in the completed shovel, securing marginally to a face of the blade adjacent said edge a frog-forming plate having a rear edge substantially aligned with the opposed portion of the rear edge of the blade, shaping the opposed parts to arcs of a closed curve and welding thereto as a handle-receiving socket the end of a length of tubing having a circumferential unbroken wall which is longitudinally cranked to provide a desired lift to the handle and the inner end of which terminally presents corresponding arcs.

3. The method of making a shovel which comprises forming a blade having a short projection centrally of its rear edge, securing marginally to the face of the blade a frog-forming plate having at its rear edge a short projection substantially aligned with the first named projection, shaping the opposed projections to arcs of a closed curve and welding thereto as a handle-receiving socket the end of a length of tubing having a circumferentially unbroken wall which terminally presents corresponding arcs.

4. A shovel or like tool comprising a blade having secured to a face thereof adjacent its rear edge a frog-forming plate having a rear edge substantially aligned with the opposed portion of the rear edge of the blade, the opposed parts being in the form of arcs of a closed curve and a handle socket comprising a length of tubing having a circumferential unbroken wall terminally presenting corresponding arcs and joined thereat to the arcs of the blade and plate by a fused joint.

5. A shovel or like tool comprising a blade having secured to a face thereof adjacent its rear edge a frog-forming plate having a rear edge sub-

stantially aligned with the opposed portion of the rear edge of the blade, the opposed parts being in the form of arcs of a closed curve and a handle socket comprising a length of tubing having a circumferential unbroken wall and which is longitudinally cranked to provide a desired lift to the handle, the inner end of the tubing terminally presenting corresponding arcs and joined thereat to the arcs of the blade and plate by a fused joint.

6. A shovel or like tool comprising a blade having a short projection centrally of its rear edge, a frog-forming plate secured marginally to the face of the blade having at its rear edge a short projection substantially aligned with the first projection, the opposed projections having the form of arcs of closed curves and a handle-receiving socket comprising a length of tubing having a circumferentially unbroken wall terminally presenting corresponding arcs and joined thereat to the arcs of the blade and plate by a fused joint.

RICHARD HARTE.