

(No Model.)

M. G. CRANE.
METHOD OF MAKING PLIERS.

No. 393,361.

Patented Nov. 27, 1888.

Fig. 1.

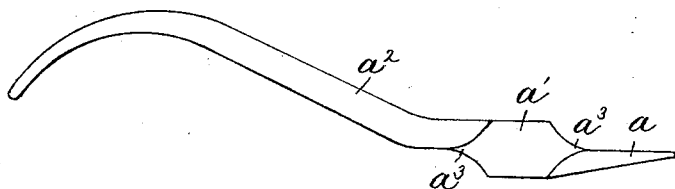


Fig. 2.

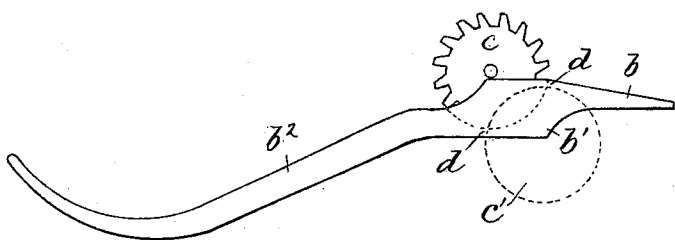
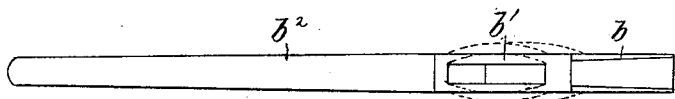


Fig. 3.



Witnesses.
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UNITED STATES PATENT OFFICE.

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METHOD OF MAKING PLIERS.

SPECIFICATION forming part of Letters Patent No. 393,361, dated November 27, 1888.

Application filed April 13, 1886. Renewed May 1, 1888. Serial No. 272,436. (No model.)

To all whom it may concern:

Be it known that I, MOSES G. CRANE, of Newton, county of Middlesex, State of Massachusetts, have invented an Improvement in the Method of Making Pliers, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

My invention relates to the art of making pliers or similar articles consisting of two members pivoted together, in which each member comprises a jaw and handle, and the joint portion containing the pivot between the jaw and handle of one member, which will be called the "outer member," has an opening or mortise, in which the joint portion of the other member works. Heretofore articles of this kind have been made wholly by hand-forging, the outer member being shaped or forged with an opening to receive the inner member. This operation requires considerable skill and expenditure of time, thus making the pliers very expensive when of good material and workmanship.

The main novel feature of the present invention consists in forging the outer member in dies with its joint portion solid, and then making the opening for the inner member by cutting out the material from the outer member by suitable cutters. Both members when made in this way may be forged quickly and cheaply in dies, constituting what are known as "drop-forgings," and the forging of the outer member will then have the opening for the inner member cut in it, after which it will be heated and the sides of the said opening separated sufficiently to permit the jaw or handle of the inner member to pass through, and then the sides of the opening in the outer member will be restored to their proper normal position, and the two members pivoted together substantially the same as when made by hand. By making the members of the pliers of drop-forgings and operating on the said forgings by cutters comparatively little labor is required for finishing the pliers, which may be made far more perfect and highly finished than the hand-made pliers at much less expense.

Figure 1 is a side elevation of the inner member of a pair of pliers in the process of manu-

facture in accordance with this invention; Fig. 2, a side elevation of the outer member, showing the cutter as having entered the proper depth from one side of the joint portion of the pliers; and Fig. 3, an edge view of the outer member of the pliers having the opening cut for the inner member, and shown in dotted lines with the sides of the said opening separated to receive the inner member of the pliers.

In the manufacture of pliers in accordance with this invention the inner member (shown in Fig. 1 as composed of a jaw, *a*, joint portion *a'*, and handle *a''*) may be forged in the usual manner, being preferably, however, for the sake of cheapness and uniformity, forged in dies, and being shown in this instance as reinforced at the junction of the joint portion with the jaw and handle, in accordance with an invention on which I have filed another application for Letters Patent. The outer member, (shown in Fig. 2,) composed of a jaw, *b*, joint portion *b'*, and handle portion *b''*, is forged to the same external shape, as usual, but instead of forming the opening or mortise in the joint portion *b'* to receive the joint portion *a'* of the other member in the process of forging, as usually practiced, the said joint portion *b'* of the outer member is forged solid, thus enabling the said member to be forged in dies, and the opening for the inner member is made in the outer member by cutting away or removing a portion of metal in the outer member by a suitable cutter (shown as a rotating burr-cutter, *c*,) operated in any usual manner. In making the opening in the outer member the cutter *c* is first caused to enter the metal on one side as far as its arbor will permit, as shown in full-line position, Fig. 2, and then the position of the member with relation to the cutter is reversed and the cutter entered as far as possible on the other side, its position with relation to the member of the pliers being then as indicated by the dotted line *c'*, and it will be seen that the two operations of the cutter will remove nearly all the material required, in order to receive the joint portion *a'* of the inner member, there being, however, small internal projections, *d*, in the outer member, which will have to be removed either by file or some other suitable tool. It will be seen that the cutters enter the face of the jaw for

some distance from its junction with the joint portion, thus making the recess or opening to receive the re-enforcing portion a^3 of the inner member, when the pliers made by the present process are of the kind shown and described in my other application. After the opening has been cut in the outer member the remaining steps of putting the members together are substantially the same as heretofore practiced when the pliers are made by hand, the joint portion of the outer member being heated and the sides of the opening separated, as shown in dotted lines, Fig. 3, so that the jaw a or handle portion a^3 of the inner member may be passed through the opening, after which the sides of the latter will be pressed or hammered back to the position shown in full lines, Fig. 3, with the joint portion a' of the inner member between them, and the joint portion of both members will then be bored and riveted together in the usual manner.

I claim—

1. That improvement in the art or method of making pliers in which the joint portion of an inner member works within an opening in the joint portion of the outer member, which consists in forging the outer member with the joint portion solid, and then forming an opening therein by cutting out or removing a por-

tion of the metal of the said forging, substantially as described.

2. That improvement in the art or method of making pliers in which the joint portion of an inner member works within an opening in the joint portion of the outer member, which consists in forging the outer member with the joint portion solid, and then forming an opening therein by cutting out or removing a portion of the metal of the said forging by exposing both sides of the member to the action of a circular cutter, substantially as described.

3. That improvement in the art or method of making pliers in which the joint portion of an inner member works within an opening in the joint portion of the outer member, which consists in drop-forging both members solid, then cutting an opening in the outer member, separating the sides of the said opening, inserting the inner member, closing the outer member therein and pivoting the two members together, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

MOSES G. CRANE.

Witnesses:

JOS. P. LIVERMORE,
H. P. BATES.