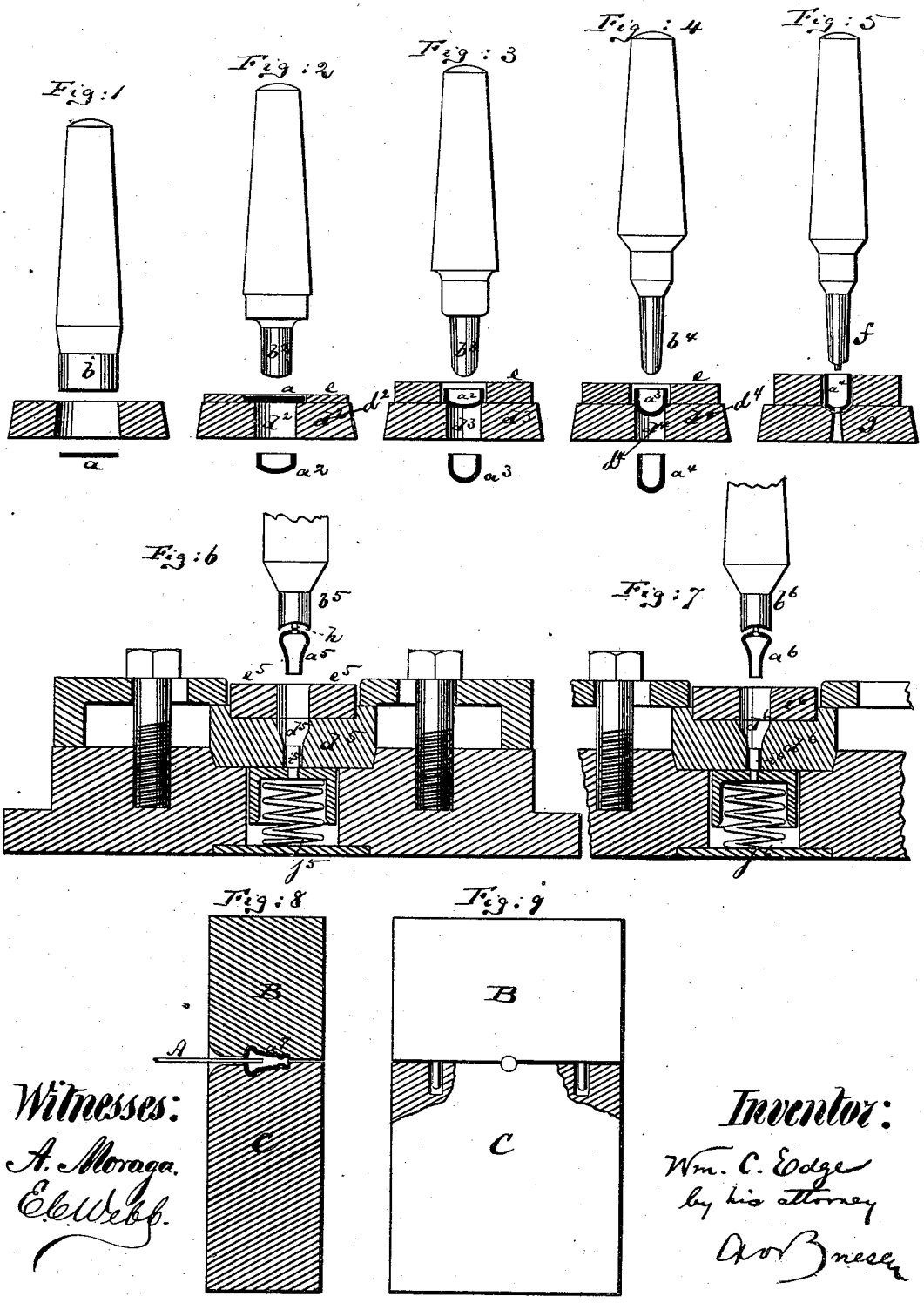
W. C. EDGE.

Dies for Making the Heads of Chain-Swivels.

No. 164,366. Patented June 15, 1875.



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UNITED STATES PATENT OFFICE.

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IMPROVEMENT IN DIES FOR MAKING THE HEADS OF CHAIN-SWIVELS.

Specification forming part of Letters Patent No. **164,366**, dated June 15, 1875; application filed April 16, 1875.

To all whom it may concern:

Be it known that I, WILLIAM CHARLES EDGE, of Newark, in the county of Essex and State of New Jersey, have invented a new and Improved Machine for, and Process of, Making the Heads of Chain-Swivels, of which the following is a specification:

This invention has for its object to manufacture the heads of watch-chain swivels from sheet metal, and to dispense with the casting, boring, and turning of solid swivels.

By my invention a perfect swivel-head can be formed from a small piece of sheet metal, not exceeding one-half inch in diameter, said sheet being either entirely of gold or other precious metal, or merely plated therewith on one face, in which latter case the plating will, under my process, be caused to embrace the entire finished swivel.

My invention consists, principally, in subjecting the sheet metal to a series of punches and dies, whereby it is first caused to acquire a cup form, then a more and more elongated cup form, and finally the pear shape or other shape generally imparted to the heads of watch-chain swivels. This hollow sheet-metal pear is, lastly, subjected to the action of a pair of hollow molds, within which it is turned to receive the complete outline finish required. During the upsetting process, and before receiving the pear form, a square hole is punched through the end of the blank to allow the blank to be held on the end of a square rod and turned within the reciprocating molds while receiving the final outline finish. My invention also consists in the new mechanism for imparting the pear form to the blank, said mechanism being composed of a fixed die, reciprocating punch, guide-ring, and spring-ejector, all as hereinafter more fully described.

In the accompanying drawing, Figs. 1, 2, 3, 4, 5, 6, 7, and 8 represent side views, partly in section, of the tools which are successively employed by me in forming the swivel-head from a flat plate of sheet metal. Fig. 9 is a face view, partly in section, of the finishing-molds.

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

The letter a in Fig. 1 represents a section of a sheet-metal disk, which is, by a punch, b, cut from a suitable plate or sheet. This circular blank a is next laid over the cavity of a die, d^2, as in Fig. 2, and subjected to the action of a descending plunger, b^2, which upsets the blank, and drives it through the die, from which it will drop in form of a short cup, a^2. The cup a^2 is next placed bottom downward on a die, d^3, Fig. 3, whose cavity is somewhat smaller than that in d^2, and subjected to the action of a descending plunger, b^3, which is smaller than b^2, and which, in driving the blank through the die, elongates it, producing a cup, a^3, somewhat longer and smaller in diameter than a^2. The cup a^3, not yet having the requisite length, thinness, and reduction of diameter, is next put bottom downward over the cavity of a die, d^4, and subjected to the action of a still smaller punch, b^4, by which it will be driven through the die d^4, and formed into the still more elongated cup a^4. (Shown in Fig. 4.) It may be presumed that the cup has now the requisite extent; but I wish it to be understood that either a larger or a smaller number of punches and dies may be used to upset the blanks and gradually elongate the cup formed therefrom. Over each of the dies d^2, d^3, and d^4 is placed a guide-ring, e, as shown in Figs. 2, 3, and 4, which ring serves to prevent the spreading of the blank above the respective surfaces of the dies. The next operation is to pierce a square hole through the end of the blank, which is done by a suitable punch, f, and die g, as indicated in Fig. 5.

The blank a^4 is now placed with its edges downward in the tapering cavity of a die, d^5, and gradually forced into said cavity by a plunger, b^5, which has its lower end made concave, as shown in Fig. 6, so it will fit the rounded end of the blank. To insure central guidance the plunger b^5 has by preference a projecting pin, h, which enters the aforementioned square hole in the end of the blank. A guide-ring, e^5, is placed on the die d^5 to embrace the blank before it has been forced down, and prevent the same from being spread. Within the cavity of the die d^5 is placed a pin, i^5, resting on a suitable spring, j^5. When the blank is

by the plunger forced into the die d^5 the lower part of the blank is gradually contracted by entering the contracted part of the cavity of the die, and assumes a shape approaching the form of a pear. In descending the blank forces the pin i^5 downward and compresses the spring j^5, the effect of which will be that, upon the elevation of the plunger, the spring, in expanding, will raise the pin i^5, and thereby throw the blank out of the die. Fig. 6 shows the blank a^5 in the position of being just raised out of the die after having been shaped therein. The blank a^5 is next placed with its edges downward in the tapering cavity of another die, d^6, shown in Fig. 7, which die, with all its appurtenances, is substantially like that represented in Fig. 6, excepting that the cavity of the die d^6 is more tapered, so the blank will have its open end still more contracted, as appears from the shape of the blank a^6, in Fig. 7, that being the shape imparted to the blank in the die d^6.

Apparatus of the same style as that shown in Figs. 6 and 7 may be still further duplicated in accordance with the form to be imparted to the blank, and in some cases the device shown in Fig. 6 alone may suffice, without having even that shown in Fig. 7. As to the device shown in Fig. 5, I wish to remark that the same or its equivalent may be employed at any other stage of the operation. The square hole may even be punched through the flat blank a, or through the end of the pear-shaped blank a^6. The blank a^6 is now put on the squared end of a rod, A, shown in Fig. 8, said rod being inserted through the square hole in the end of the blank, and by means of said rod, which constitutes a handle for the blank, the latter is held between two metal molds, B and C. The shape of the complete swivel-head is formed as a cavity in the contiguous surfaces of the molds B C, one-half in each mold, as indicated in Fig. 8. The upper mold B receives reciprocating motion by suitable mechanism, and whenever it is raised off the mold C the attendant turns the blank slightly in the mold C. So a new surface of the blank will be exposed to the action of the reciprocating mold on each descent. Thus, by turning the blank beneath the reciprocating mold, the same finally receives the required shape, being in exact conformity with the form of the recesses in the molds B and C. The swivel-head a^7 as it comes from the molds B C is in condition for application to the other parts of a chain-swivel. The reciprocating mold B and stationary mold C may also be employed for shaping cast swivel-heads, where a continuous row of such heads is cast in one piece, those projecting from the molds serving in such a case as handles for those subjected to the action of the molds.

I claim as my invention—

1. The series of dies herein described for making the heads of chain-swivels.

2. The combination of the dies b^2 d^2 b^3 d^3 d^5 b^5, and molds B C, for the purpose set forth.

3. The combination of the die d^5, guide-ring e^5, plunger b^5, pin i^5 and spring j^5, arranged for the purpose of contracting the open end of the cup-shaped swivel-head blank, substantially as set forth.

4. The reciprocating mold B, combined with the stationary mold C, the opposite faces of the two molds having cavities for the reception of a swivel-head blank, a^6, which is to be formed into a swivel-head, a^7, by the operation of the molds, substantially as specified.

Signed this 8th day of April, 1875.

WILLIAM C. EDGE.

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