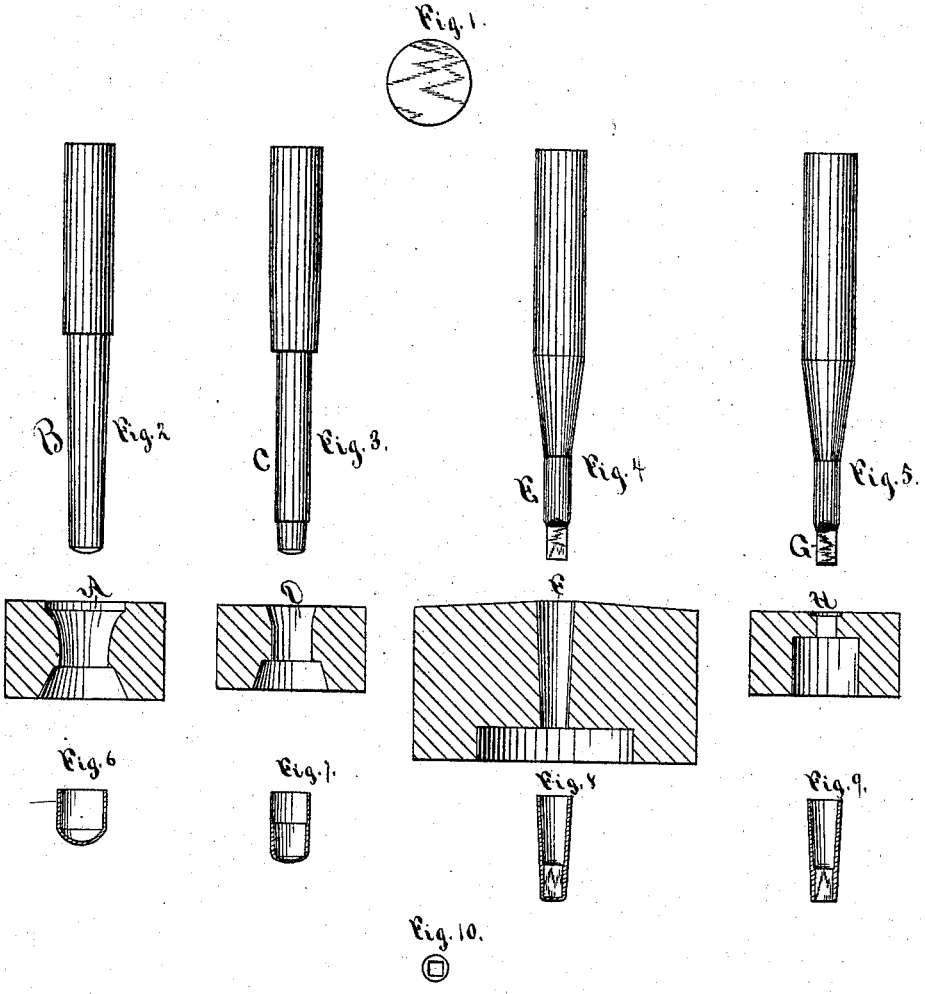
D. & F. L. ELLIS.

Manufacture of Watch-Keys.

No. 211,323. Patented Jan. 14, 1879.



Witnesses.

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DARWIN ELLIS, OF WATERBURY, AND FREDERICK L. ELLIS, OF MILLDALE, CONNECTICUT.

IMPROVEMENT IN THE MANUFACTURE OF WATCH-KEYS.

Specification forming part of Letters Patent No. **211,323**, dated January 14, 1879; application filed November 6, 1878.

To all whom it may concern:

Be it known that we, DARWIN ELLIS, of Waterbury, in the county of New Haven, and FREDERICK L. ELLIS, of Milldale, in the county of Hartford, and State of Connecticut, have invented certain new and useful Improvements in the Manufacture of Watch-Keys, of which the following is a specification:

Prior to our invention clock and watch keys had been made of wire, and also of sheet metal, by bending and swaging, in both of which cases there were one or more longitudinal seams in the barrel.

Our invention relates to a seamless key barrel or pipe formed of sheet metal; and consists in the method of, and dies for, making the same, as hereinafter described.

In the accompanying drawing, Figure 1 is a plan view of a blank which is the result of the first step in the manufacture of watch-key barrels in accordance with our invention. Figs. 2, 3, 4, and 5 are side elevations of the several punches and sectional views of the several dies for use in operating upon said blank. Figs. 6, 7, 8, and 9, respectively, are sectional views of the succession of forms produced by said dies; and Fig. 10 is an end view of a watch-key pipe or barrel which is the product of our invention.

All of the figures in the drawing are exaggerated in order to avoid crowded lines. The several dies and punches are designed for use in any ordinary press, which it is deemed unnecessary to show.

A plain disk of sheet metal, Fig. 1, preferably of steel, is first blanked out by any ordinary means, and is then subjected to the cupping-die A and punch B, Fig. 2, and forced through said die, thereby throwing the disk-blank into a cupped blank, as shown in Fig. 6, substantially in the same manner as ferrules and other articles are cupped. The cupped blank, Fig. 6, which is the result of the last-described operation, is then operated upon by the punch C and die D, Fig. 3, and forced through said die to further elongate the blank, and also to reduce the thickness of metal at the upper end thereof, the body of the punch C being made larger than its tip, in order to thin the upper end of said blank and leave the metal at its lower end of full thickness, as shown in the second cupped blank, Fig. 7, which is, in turn, operated upon by the punch E and die F. This punch is square in cross-section for a short distance from its end upward, as shown, and the die is tapering. The operation of this die and punch further elongates the cupped blank; and as the punch is forced endwise into the die with the blank surrounding the punch, said blank is swaged laterally at its lower end, the inside being thrown into a square form corresponding with the square end of the punch, and the outside into a round and tapering form corresponding with that of the die, as shown by the cupped and squared blank, Fig. 8.

The square portion of the punch G, Fig. 5, is a little longer than that of the punch E, upon which the blank, Fig. 8, was squared. This blank is slipped upon the end of the punch G, and said punch then forced down into the mouth of the square die H, Fig. 5, said die and punch cutting out a square slug from the solid end of the blank, Fig. 8, and leaving a square hole through the lower end thereof, which converts said blank into a key pipe or barrel, as shown in Figs. 9 and 10. The object of making the square portion of the last punch longer than its predecessor, or at least longer than the square hole in the blank, Fig. 8, is, that it may pass through the hole in said blank to punch out its end without changing its form above the end.

After punching out the end of the cupped and squared blank to form it into a key-pipe, the ends may be smoothed or polished off in any desired manner, and the key pipe or barrel thus produced can be attached to any suitable handle in any proper manner. If it is to be attached to a wire handle, the end of the wire may be snugly driven into the upper end of the barrel or pipe, which will be all the fastening required. If desired, a greater number of cupping or drawing dies may be employed, and instead of punching out the end of the cupped and squared blank, its end might be polished or sawed off, so as to expose the square interior, and substantially the same pipe or barrel would be produced. The invention is also applicable to clock-keys, and the product

of our invention is a very substantial, solid, durable, neat, and inexpensive article.

We claim as our invention—

1. The method of making seamless key-barrels from sheet metal which consists of cutting out a flat metal blank, then striking it up into cup-shaped form, then further reducing the metal by elongating said cup-shaped blank, then squaring the interior thereof near its solid end, and then removing the solid end, all substantially as described, and for the purpose specified.

2. The series of dies and punches, Figs. 2, 3, 4, and 5, for the progressive formation of key-barrels from a sheet-metal disk, substantially as described.

3. The die F, made round and tapering, in combination with the punch E, made square in cross-section for a short distance at its end, and suitable operating mechanism, the die and punch being so arranged that the largest diameter of the die is on the same side as the punch, the whole combined to operate as and for the purpose described.

4. As a new article of manufacture, the seamless key-barrel formed of sheet metal, substantially as described, and for the purpose specified.

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