2 Sheets—Sheet 1.

T. MUELLER.

Device for Manufacturing Centers of Watch-Cases.

No. 219,594. **Patented Sept. 16, 1879.**

FIG: 1.

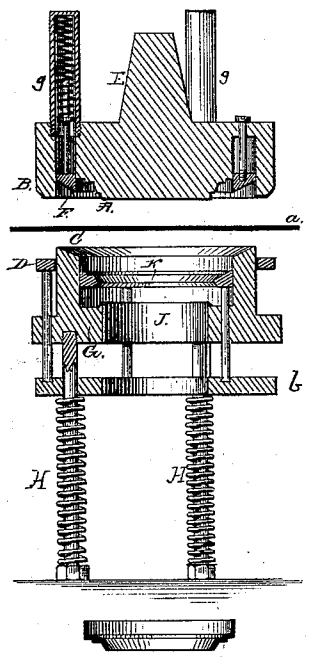
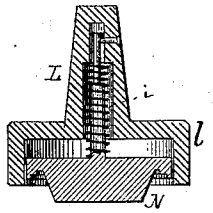


FIG. 1.a

FIG: 2.



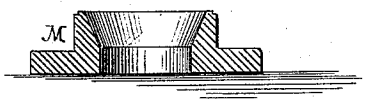


FIG: 2.a

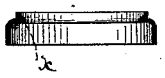
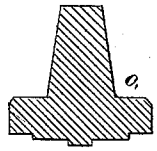


FIG: 3.



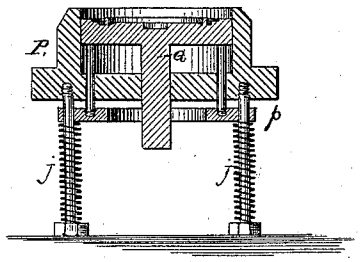
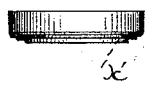


FIG: 3.a



WITNESSES

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FIG:4.

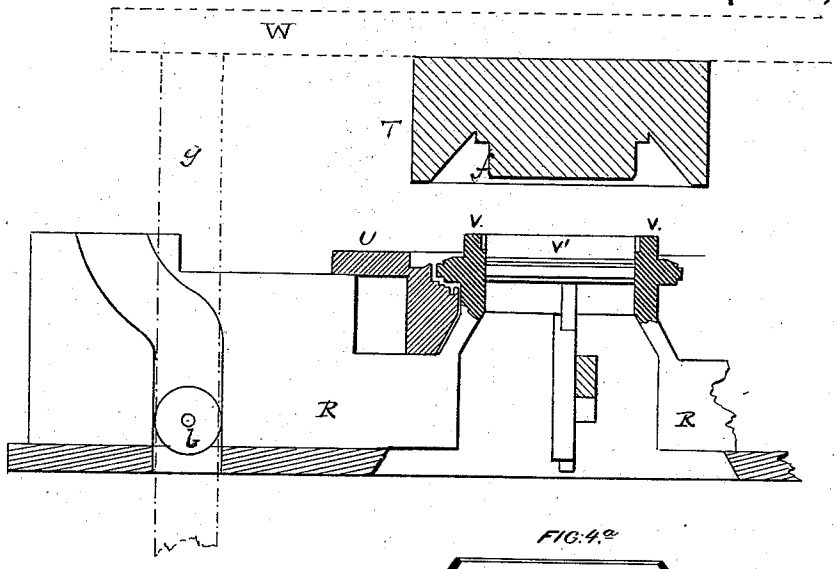


FIG:4.a

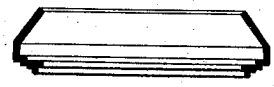


FIG:5.

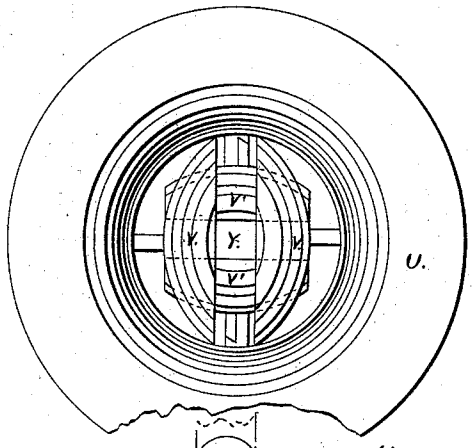


FIG:7.

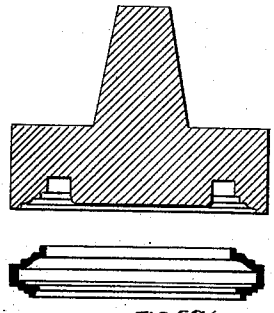
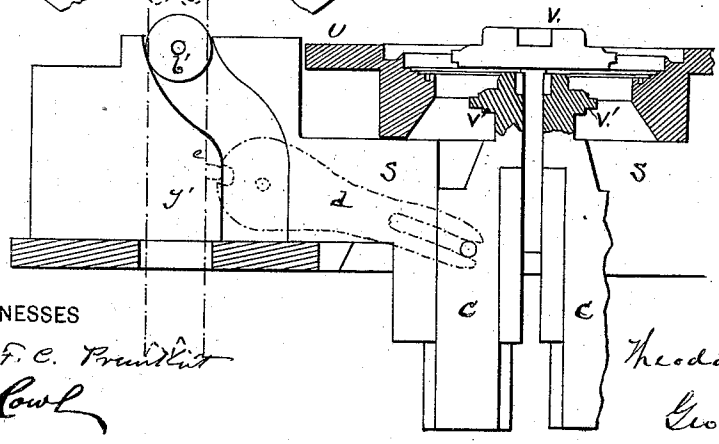


FIG:5.a

FIG:6



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UNITED STATES PATENT OFFICE.

THEODORE MUELLER, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO THOMAS B. HAGSTOZ AND CHARLES N. THORPE, OF SAME PLACE.

IMPROVEMENT IN DEVICES FOR MANUFACTURING CENTERS OF WATCH-CASES.

Specification forming part of Letters Patent No. **219,594**, dated September 16, 1879; application filed November 20, 1878.

To all whom it may concern:

Be it known that I, THEODORE MUELLER, of the city and county of Philadelphia, and State of Pennsylvania, have invented new and useful Devices for Manufacturing the Centers of Watch-Cases; and I do hereby declare the following to be a sufficiently full, clear, and exact description thereof to enable others skilled in the art to make and use the said invention, reference being had to the accompanying drawings, and the letters of reference marked thereon, forming a component part of this specification.

The nature of my invention consists in the forming of a watch-case center from a flat plate of metal by cutting, drawing, and compressing, so as to preserve the greatest strength of the material with the least abrasion of the external surface by means of dies and cutters, hereinafter more particularly described.

My method is peculiarly adapted to the manufacture of plated cases, for the watch-case center, when it leaves the dies, needs no turning out, which turning out would, in almost every case, expose the baser metal.

Figure 1 shows the dies and cutters employed in the first operation, in section; Fig. 1^a, the blank or shell resulting from the action of the dies in Fig. 1, in section; Fig. 2, the dies used in the second operation, also in section; Fig. 2^a, the blank or shell resulting from the second operation, in section; Fig. 3, the third set of dies, also in section; Fig. 3^a, the blank or shell resulting from their operation, also in section. Fig. 4 shows the dies employed in the fourth operation, and Fig. 4^a the blank resulting. Fig. 5 is a plan of the collapsible segmental core used in the fourth and fifth steps in the process. Figs. 4, 5, and 6 show the arrangement of the collapsible core. Fig. 7 is the die used in the last operation, and Fig. 5^a is a section of the resulting product, a finished watch-center ready for the attachment of the pendant and hinges.

The sections here shown are all made on a plane coincident with their vertical axes. A plan view of the same dies, blanks, and finished center would be circular in form.

In Fig. 1, *a* represents a flat plate of metal, from which the center 5^a is to be formed. In the die E, B is a cutting-collar, fitting accurately at its lower internal edge upon the upper external edge of the stationary collar *c* of the die G, and when the collar B descends upon the plate A it cuts therefrom a circular disk of metal, which rests upon the collar *c*. Within the die E is the ring F, held in place by suitable screws passing through the die E, and provided with two or more springs, *g g*, tending to press it downward, as shown in the figure. A further downward movement of the die E forces the circular disk into the lower die, G. The ring F, pressing the disk upon the sloping face of collar *c*, prevents it from buckling or wrinkling as it is gradually compressed into the cylindrical portion of the die G until it is fully formed therein, when the punch A cuts out its central portion, which is discharged through the central opening, J. Encircling the die G is the ring D, and within is the ring K, both held upward by the springs H H. Under the downward pressure of the die E and the blanks these rings yield; but when the die E is withdrawn the rings return to their normal position, and the ring D delivers the external waste of the plate *a*, and the ring K delivers the blank from within, and Fig. 1^a is the resulting product.

Fig. 2 shows the dies used in the second operation.

The blank 1^a, being placed over the die M, is subjected to pressure from the die L, and is discharged from the die by the plunger N.

It will be observed that the conical form of the plunger N expands the conical portion of the blank 1^a in the reverse direction—that is, its edge, instead of being of its least diameter, is, by this die, given a greater diameter than the shoulder X, the edge of the blank 1^a being folded back, as it were, upon itself to form the shoulder. In the third operation, in which the blank 2^a is subjected to the action of the dies shown in Fig. 3, this shoulder is finished, as at X′, and forms the support upon which the movement rests. It is believed that this setting or shoulder has heretofore always been soldered in; but by my process, as here described, it is formed so perfectly as to need

no turning out or after-finish, and at much less cost and labor than by any process of which I have knowledge.

The third operation, then, using the dies shown in Fig. 3, develops the blank 2^a into 3^a, which finishes that side of the center. Should the blank stick in die P, it is delivered by the plunger Q.

Fig. 4 is a vertical view, partly in section, of the dies by which the fourth operation is performed, and blank 3^a is transformed into 4^a. By this operation a portion of the cylindrical part of 3^a is contracted into a conical form, ready for the finishing step.

In Figs. 4, 5, and 6, V V and V′ V′ show the collapsible segmental core, which must be introduced within the cylindrical portion of blank 4^a to prevent it from collapsing under the pressure necessary to contract its upper part into the conical form in 4^a and the finished form of 5^a. This core is in four parts. The segments V V are attached to slides R R, moving horizontally within the frame supporting the die U, and the segments V′ V′ are attached to the slides S S at right angles to R R. The segments V V simply move horizontally, withdrawing far enough to permit the blank 3^a to be placed within the die U. The other segments, V′ V′, have a double movement—first, they are withdrawn from the blank, and they are dropped down, as shown in Figs. 5 and 6, below the line of the segments V V to permit the withdrawal of V V. This is more fully shown in Fig. 6, where *c c* are vertical slides bearing the segments V′ V′. These slides are operated by levers, one of which, *d*, is shown, the other being similar. This lever is pivoted to the frame. An open slotted jaw engages a pin on *c*, and the motion of the lever is controlled by a pin, *e*, on the rod T′, which strikes in a jaw.

It is possible to use but two parts of this segmental core. In that case the center would need to be subjected to two operations of the die, the blank being turned one-fourth of a revolution after the first compression. The upper die might be partially cut away, so as not to bear unduly on the unsupported part of the center. The four-parted segment, however, as here described, will be found to produce the best results.

The arrangement of the dies and segmental core is shown in Figs. 4 and 5, while Fig. 6 is a plan of the segments as withdrawn.

In Fig. 4 the die T, by means of which a part of the cylindrical portion of 3^a is contracted, as shown in 4^a, is attached to the plate W, which rests on four vertical movable rods passing through the frame-work carrying the die U. One of these rods, T′, is shown in dotted lines. The others are similar. Each of these rods has a roller, *b b′*, turning freely upon a central pivot and running within a cam-groove in the slides R R and S S.

When the plate W is raised high enough to introduce the blank 3^a into the die U the segments of the core are retracted, as shown in Figs. 5 and 6, permitting the free introduction of the blank. As the die T descends the rollers *b* move the slides R R, carrying the segments V V into the positions shown in Fig. 4, when they closely fit the inside of the blank. A little further downward movement of the die T, and the pins *e* on *j′* strike the jaws of the lever *d*, which raises the slide *c* and segments V′ to the plane of the segments V V. A little further downward movement of T, and the rollers *b′* move the slides S S and carry the segments V′ V′ into the blank and complete the circle. On further downward movement the conical inner face of the die T strikes the blank, and contracts it in the form shown in Fig. 4^a. At the same time the cylindrical part *f* enters within the upper cylindrical part of the segments and holds or supports them with additional firmness within the blank. The blank 4^a results from this operation.

Substituting the die in Fig. 7 for T, Fig. 4, and placing 4^a in the die U and subjecting it to a similar operation, the resulting product is Fig. 5^a, which is a section of a finished watch-center, fully and perfectly formed, needing no turning, and ready to receive the pendant and hinges.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The herein-described improvement in the art of forming in watch-case centers the setting for the movement, consisting, first, in reversing the slope of the conical part of blank 1^a, so that its diameter from the outer edge shall increase instead of decrease; second, forming a portion of this sloping conical part flat and the rest cylindrical, the flat part having a less diameter than the cylinder, substantially as shown and described.

2. The combination of the die G, the external ring, D, for delivering the waste, the internal ring, K, delivering the blank, the plate *b*, carrying the pins supporting the rings D and K, and the springs H H, substantially as described.

3. The combination of the die L, consisting of the case *l*, the spring *i*, and the conical plunger N, said plunger having outside its conical surface a series of flat and annular steps, substantially as described.

4. The combination of the die P, consisting of the plunger Q, the plate *p*, carrying the supporting-pins, and the springs J J, substantially as described.

5. In a collapsible segmental core for the manufacture of watch-case centers, the combination of the two core-segments fixed to horizontal movable slides with suitable means for placing and retracting them from the center.

6. In a collapsible segmental core for the

manufacture of watch-case centers, the combination of the core-segments, two of which are fixed to vertical movable slides carried by horizontal movable slides, and the other two on horizontal slides, with suitable means for placing and retracting them from the centers, substantially as described.

7. The combination of the horizontal slide S, carrying the vertical slide C, provided with the core-segment V′, the rod T′, roller b', pin e', and lever d, substantially as described.

TH. MUELLER.

Witnesses:
HENRY PLEASANTS, Jr.,
B. H. LOWRY.