

(No Model.)

6 Sheets—Sheet 1.

H. M. CROWELL.
WATCH LID OR BACK MACHINE.

No. 522,317.

Patented July 3, 1894.

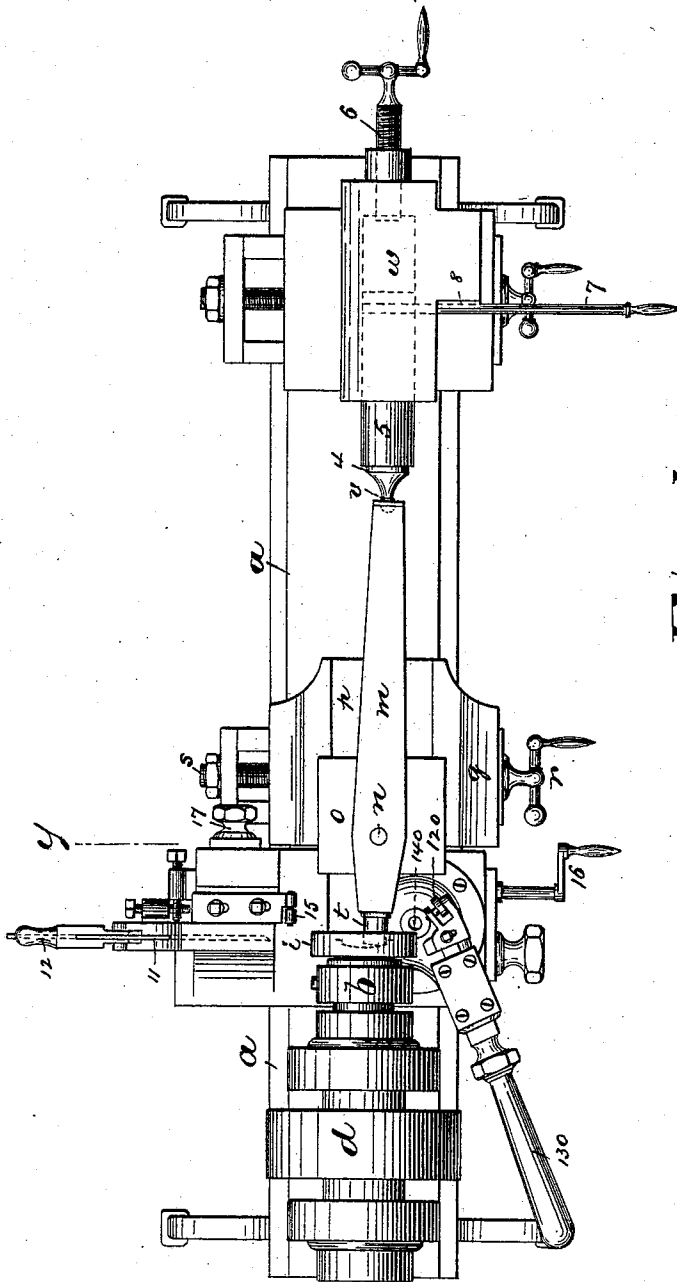


Fig. 1.

Witnesses

Robert Loeberger
E. L. Brundage

Inventor

Henry M. Crowell,
By Drake & Co. Attys.

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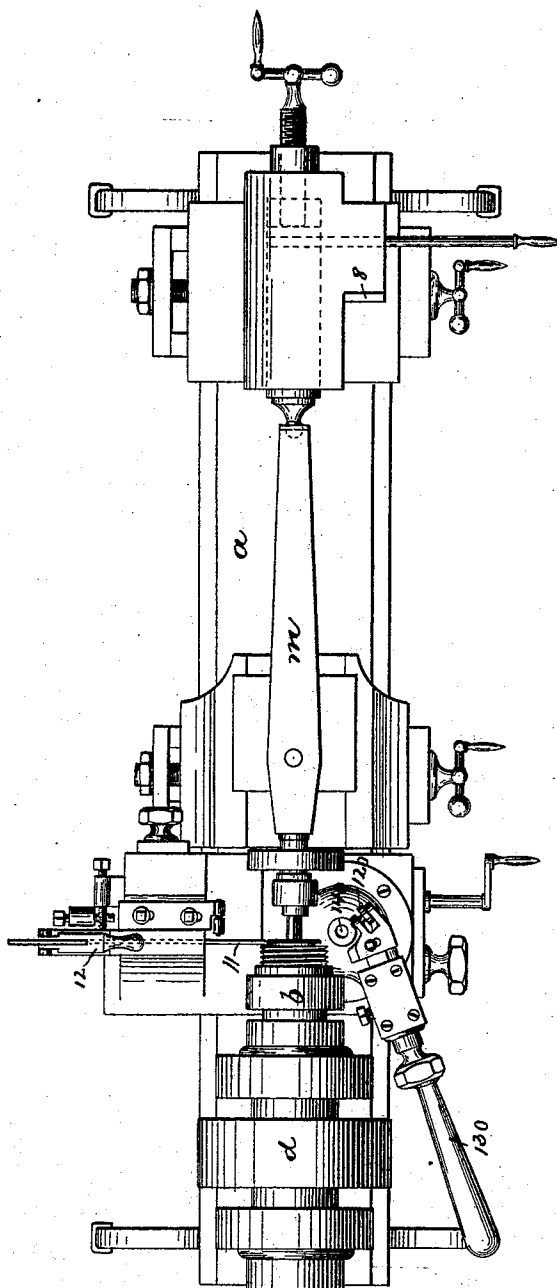


Fig. 2.

Witnesses

Inventor

Robert Lollberger
Edw. Knudsen

Henry M. Crowell,

By Drake & Co. Atty's.

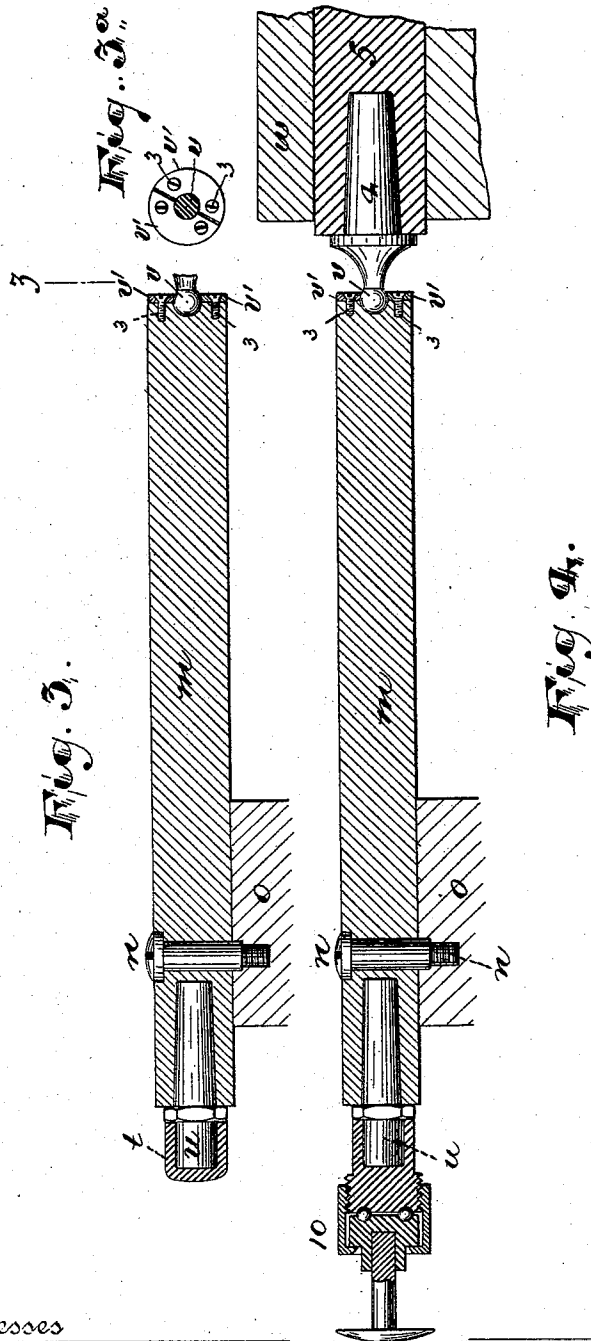
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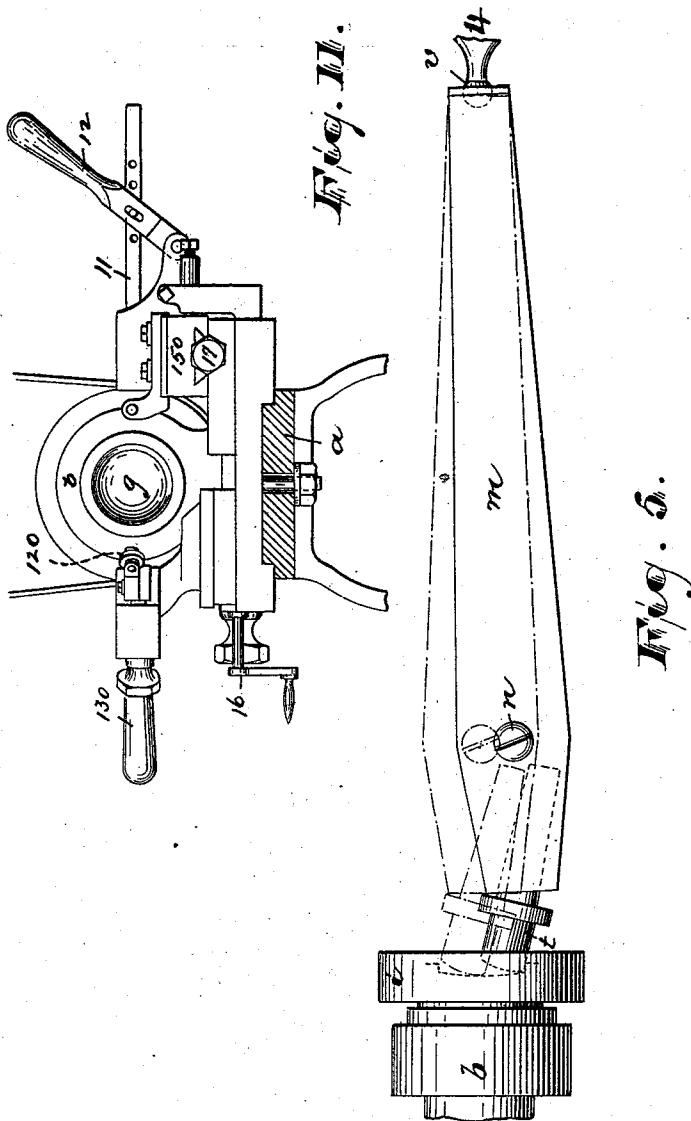
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Witnesses =

Inventor =

Robert Tollberger
Edmund Brundage

Henry M. Crowell,
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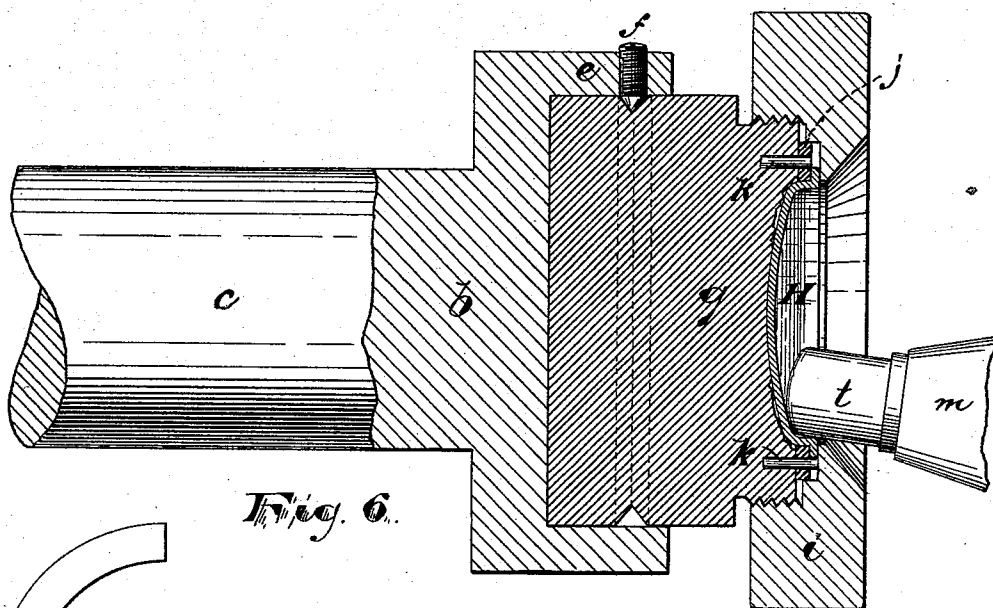


Fig. 6.

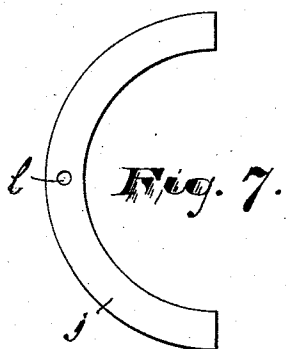


Fig. 7.

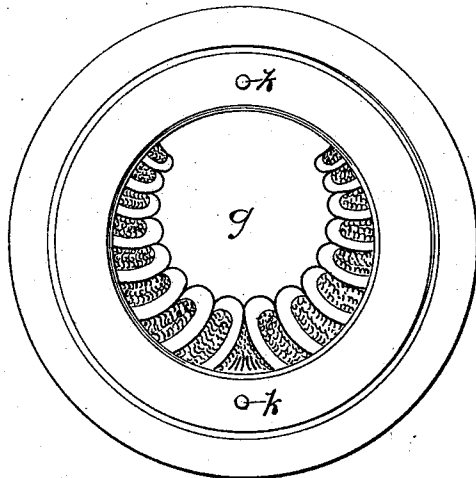


Fig. 8.

Witnesses

Robert Solberger
E. L. Brundage

Inventor,

Henry M. Crowell,

By Drake & Co. Attys.

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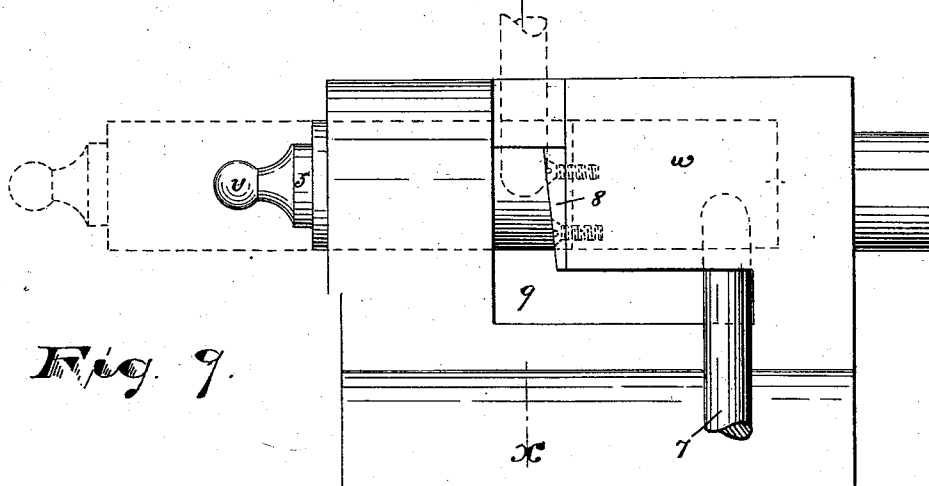


Fig. 9.

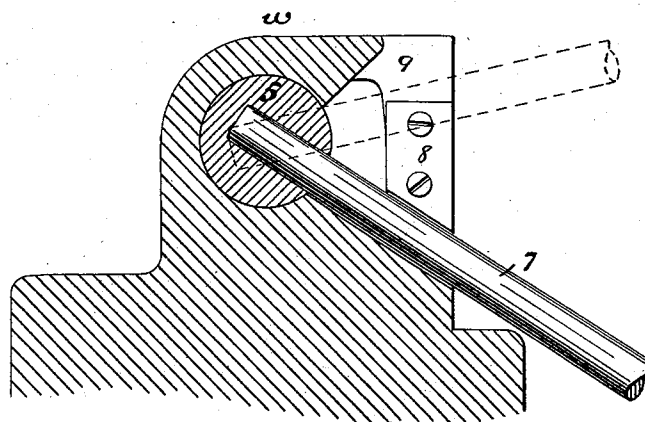


Fig. 10.

Witnesses

Inventor

Robert Seeger
E. L. Krundage

Henry M. Crowell,
By *Drake & Co.* Attys.

UNITED STATES PATENT OFFICE.

HENRY M. CROWELL, OF MAPLEWOOD, NEW JERSEY, ASSIGNOR TO THE
ESSEX WATCH CASE COMPANY, OF NEW JERSEY.

WATCH LID OR BACK MACHINE.

SPECIFICATION forming part of Letters Patent No. 522,317, dated July 3, 1894.

Application filed November 9, 1893. Serial No. 490,452. (No model.)

To all whom it may concern:

Be it known that I, HENRY M. CROWELL, a citizen of the United States, residing at Maplewood, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Watch Lid or Back Machines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters and figures of reference marked thereon, which form a part of this specification.

The objects of this invention are to produce, in the manufacture of watch cases, a more perfectly impressed engraving upon the outer face of the lids or backs and, at the same time, a more perfect burnish upon the interior surface, more free from marks or defects due to the impressions made on the outer side of the case, than are found in the cases made by the processes now commonly employed; to facilitate the operation and reduce the cost of manufacture by dispensing with certain processes or operations heretofore necessary; to reduce the quantity, and the consequent cost, of the tools employed in effecting the desired results; to enable the tools employed to perform a greater variety of work; to enable the die-engraved lids to be placed on the market in a hardened condition so as to be spring-like in service, instead of soft and inelastic, because of an annealing process employed in former operations subsequent to impressing the engraving, and to secure other advantages and results some of which will be referred to in connection with the descriptions of the working parts.

The invention consists in the improved watch-case machine and in the arrangements and combinations of parts, and in the operations and process hereinafter set forth and finally embraced in the clauses of the claim.

Referring to the accompanying drawings in which like letters and figures indicate corresponding parts in each of the several views, Figure 1 is a plan of the machine showing the parts of the same in their engraving relations, the tail stock center and force-lever fulcrum

being eccentric to the axial center of the rotary die and its chuck. Fig. 2 shows the several parts arranged for "rolling the lid down" or turning the edges to form the "snap." Fig. 3 is a central longitudinal action of an impression lever, and Fig. 3^a is a section of the same on line *z*. Fig. 4 is a section showing the impression lever arranged with a lid-holding center for use in holding the lid to the die in the snap making operation. Fig. 5 illustrates a modification in which the force lever is arranged in connection with a tail-stock lever permanently concentric with the check-center. Fig. 6 illustrates, on an enlarged scale, the construction and arrangement of the engraving-die with its head stock and chuck. Fig. 7 is a section of a take-up ring in plan. Fig. 8 is a face view of an engraving die. Figs. 9 and 10 are respectively a front elevation and section on line *x*, of the tail stock and co-operating appliances and Fig. 11 is a section on line *y*, Fig. 1.

In said drawings, *a* indicates a suitable bed or frame at one end of which is arranged a suitable headstock having a rotary chuck, *b*, in connection with a spindle, *c*, and pulleys, *d*, or other means for rotating the chucks. Said chuck is preferably cup-shaped, as at *e*, Fig. 6, and within the cup-shaped portion is secured by means of the set screw *f*, a die, *g*, the face of which is concaved to conform to the desired form of the watch case lid and is engraved, as indicated in Fig. 8, to give the desired ornamental finish to said lid under the operations hereinafter described.

H indicates the lid in said die which, in the engraving operations, is held at its edges between a threaded clamping ring, *i*, and a sectional take-up ring, *j*, held from turning on the die by pins or lugs, *k*, which enter holes, *l*, in said sections, as indicated in Fig. 6.

The take-up ring, *j*, provides for the marginal metal of the case that is afterward to be turned inward to form the annular flange or snap.

To force the metal of the lid against the engraved face of the die and impress the design into said case, I provide a force lever, *m*, fulcrumed, as at *n*, on a slide, *o*, which works in a longitudinal way, *p*, in a transversely

movable or adjustable carriage, *q*, controlled in its transverse movements by the hand crank, *r*, and screw *s*.

At the end of the lever, *m*, next adjacent to the die, the said lever is provided with either a rotary impression wheel, *t*, Fig. 3, or a stationary impression surface or burnisher, the latter in most cases being preferred, inasmuch as the non-rotary surface serves as a means of securing a more bright and perfectly finished surface on the interior side of the case, and does not operate to force the small particles of dust, &c., that settle on the case, into the metal and thus produce indentations or defects, as the rollers are apt to do, but, on the other hand, the burnisher forces the dust ahead of the tool and not into the metal of the lid.

The non-rotary burnisher may be secured by simply fixing the wheel, *t*, upon the axle, *u*, in any suitable manner, or it may be provided in any other way which would occur to the mind of a skilled mechanic.

On the opposite end of the lever, *m*, from the impression or forcing surfaces thereof, the lever is engaged by the ball bearing, *v*, or center of the tail stock *w*. The socket for the ball bearing in the end of the lever being preferably supplemented by the stay plates *v'*, *v'*, Figs. 3 and 3^a, secured by the screws, 3, in any suitable manner. Said stay plates may be dispensed with. The head, 4, carrying the ball bearing, *v*, is preferably separable from the spindle, 5, of the tail stock and thus is easily replaced should the ball break under the great pressure exerted thereon.

The spindle, 5, turns in its bearings in the preferred construction shown and also has a longitudinal movement in the tail stock produced either by the end screw, 6, or the lever, 7, the former being employed in the snap-forming operation and the latter in engraving the case.

To give longitudinal movement to the spindle, 5, by means of the lever, 7, I employ, in connection therewith, a wedge or incline 8, Figs. 1, 9, and 10, which is formed or fastened on the tail-stock contiguous to the vertical plane of movement of the lever and so that when the said lever is raised, it engages the inclined surface of the wedge. The lever is secured in a hole in the spindle, 5, and, when it engages the wedge, it is given a lateral movement so that the spindle is forced longitudinally, which movement is transmitted to the force lever, *m*, and the burnishing or impression tool, *t*, or surface is pressed hard against the revolving lid. The high pressure due to the great leverage is sufficient to force the metal of the case into the engraved lines and indentations of the die, producing the reverse of the design of the die, in the case, with great perfection, and, at the same time, producing a smooth and finished surface on the opposite or interior side of the lid.

The pressure of the force against the interior of the case, being governed by the hand

of the operator, who may, by means of the improved construction, both guide the hand-lever, 7, and constantly inspect the work in hand, should a first passage of the tool over the lid fail to burnish out a defect in the interior of the lid, such defect may be quickly detected and a second passage of the tool be quickly and easily accomplished. The burnisher, furthermore, not being wholly under the control of mechanical means, but largely under the control of the hand, blemishes or defects due to the irregularities in the engraved die are easily worked out by increasing or diminishing the hand pressure.

The slot, 9, in which the hand-lever, 7, works, may be angular as indicated in Fig. 9, the vertical part admitting or allowing the movements above referred to and the horizontal part providing for the horizontal movement of the lever caused when the spindle is moved back from engagement with the force lever.

After the design has been impressed on the exterior of the lid and the interior has been burnished by the roller or burnishing surface on the force lever, (the said force lever, being, in the operations before described, fulcrumed at a point eccentric to the axis of the chuck, *b*, so that the roll or burnisher presents but a small surface to the lid whereby the pressure exerted by the lever 7, is more effective in impressing the design,) I operate the hand screw *r*, *s*, and throw the fulcrum, *n*, into the said axial line. I also bring the tail stock center into the same line by operating its adjusting means, all as indicated in Fig. 2.

The roller or burnisher, *t*, is removed from the lever, *m*, and I substitute for the same, a revolving lid-holding center, 10, having ball bearings to reduce friction. Said center, 10, Fig. 4, fits more or less closely the interior of the case and holds the same up to the die. The clamp, *i*, is then unscrewed and the split ring, *j*, is taken off leaving the edge of the case exposed and projecting beyond the face of the die. The surplus metal is then cut away leaving, however, a proper amount to form the inwardly projecting flange or snap. The cutting operation is accomplished by means of a suitable cutting knife or tool, 11, which is thrown against the lid by means of a hand lever 12. The projecting metal still remaining is then forced inward by a suitable tool to form the "snap," the tool being preferably the roller 120, on the swinging hand lever 130 centered at 140. I next form the "bead" at the base of the snap by means of the snap-roll, 15, which is movable with its carriage 150 at right angles to the axis of the chuck by the hand screw, 16, and longitudinally with reference to said axis by means of the hand screw, 17, in any suitable manner common in watch case lathes. Thus the snap is formed without removal of the lid from the engraving die and the ornamentation on the outer surface is not marred in the snap-forming operations as heretofore. The lid may

now be removed from the die and the hinge joints and the thumb piece may be soldered in place, the lid being annealed in such operations.

5 Heretofore, the method of manufacturing die-engraved lids has been such as that the lid, thus annealed, has been placed on the market in a soft, inelastic condition. In my improved method the lid is again placed in
10 the die, after the annealing and soldering operations and again subjected to the burnishing tool so that the metal is hardened and rendered elastic and consequently better able to resist without indentation or defacement,
15 the rough usage of ordinary service.

Instead of a back center laterally adjustable so as to be thrown out of axial center of the engraving-die, it may be permanently in said center and in that case the burnishing
20 tool or surface may be on an axle arranged in the lever, *m*, at an angle to the longitudinal center as indicated in Fig. 5. I am aware that other modifications and variations from the specific structures shown may be em-
25 ployed, and consequently I do not wish to be understood as limiting myself to the positive terms employed in the description, excepting as the state of the art requires.

Having thus described the invention, what
30 I claim as new is—

1. In a machine for engraving watch case lids, the combination with the engraved die and means for rotating the same, of the force lever *m*, pivoted upon a laterally movable
35 slide *o*, a tail stock having a spindle, 5, the center of which engages the said lever and a hand lever for forcing the spindle forward, and means for moving the force-lever laterally, substantially as and for the purposes set
40 forth.

2. In combination with the rotary engraving die and means for holding the watch case against the engraved face thereof, of a cutter,

11, for trimming the edge of the lid, and a snap-forming roll arranged adjacent to said
45 engraved die for forming the snap while the case is in the engraving die, substantially as set forth.

3. In combination with the rotary watch-case-lid-engraving die and means for clamp-
50 ing the lid thereto, of a longitudinally movable lever, tail stock and means for forcing the lever longitudinally, of a snap forming roll arranged adjacent to said die and adapted to turn the snap flange inward while the lid
55 is in said die, substantially as set forth.

4. In combination, the bed *a*, chuck, *b*, spindle *c*, and pulleys, *d*, for turning said spindle and chuck, a concavous and engraved die,
60 clamping ring, *i*, and sectional take-up ring, *j*, held from turning on the die by pins or lugs *k*, a force lever *m*, fulcrumed at *n*, on a slide *o*, which in turn works in a longitudinal way, *p*, in a transversely movable and adjustable
65 carriage, *q*, said carriage, hand screw, *s*, for operating said carriage, wheel, *t*, arranged on said lever contiguous to said die, axle *u*, for said wheel, tail stock, *w*, spindle, 5, having the head, 4, with a ball bearing *v*, means for
70 adjusting the tail stock laterally, and means for forcing the tail stock longitudinally, substantially as set forth.

5. In combination with the rotary lid-engraving die and means for clamping the lid thereto, of a pivoted force-lever held at one
75 end by a tail-stock-spindle, a hand lever, 7, for turning said spindle, a tail-stock, and a wedge, 8, arranged to be engaged by the said hand lever, substantially as set forth.

In testimony that I claim the foregoing I
80 have hereunto set my hand this 26th day of October, 1893.

HENRY M. CROWELL.

Witnesses:

CHARLES H. PELL,
OLIVER DRAKE.