

(No Model.)

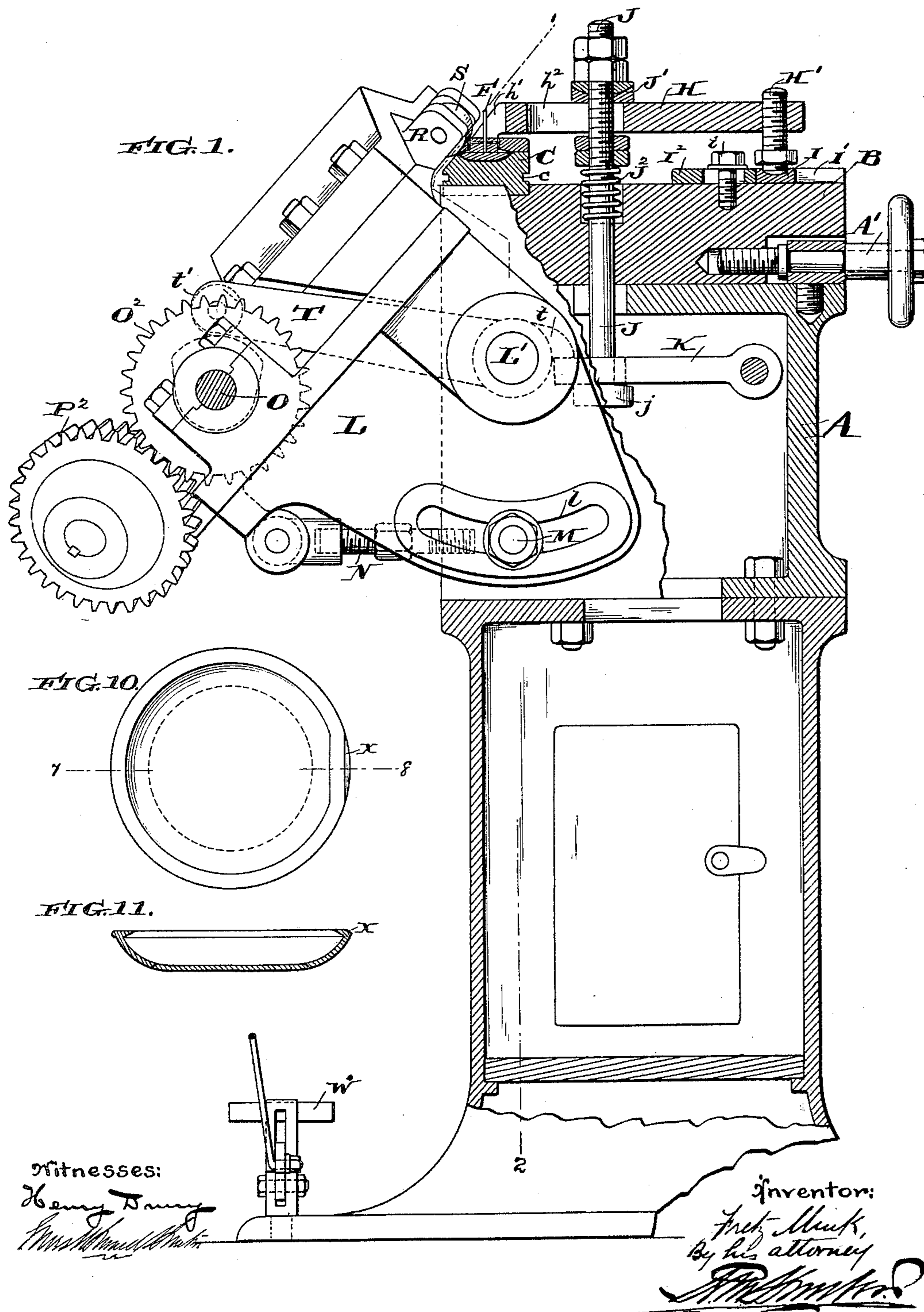
4 Sheets—Sheet 1.

F. MINK.

APPARATUS FOR FORMING HINGE FLATS UPON WATCH CASES.

No. 462,803.

Patented Nov. 10, 1891.



(No Model.)

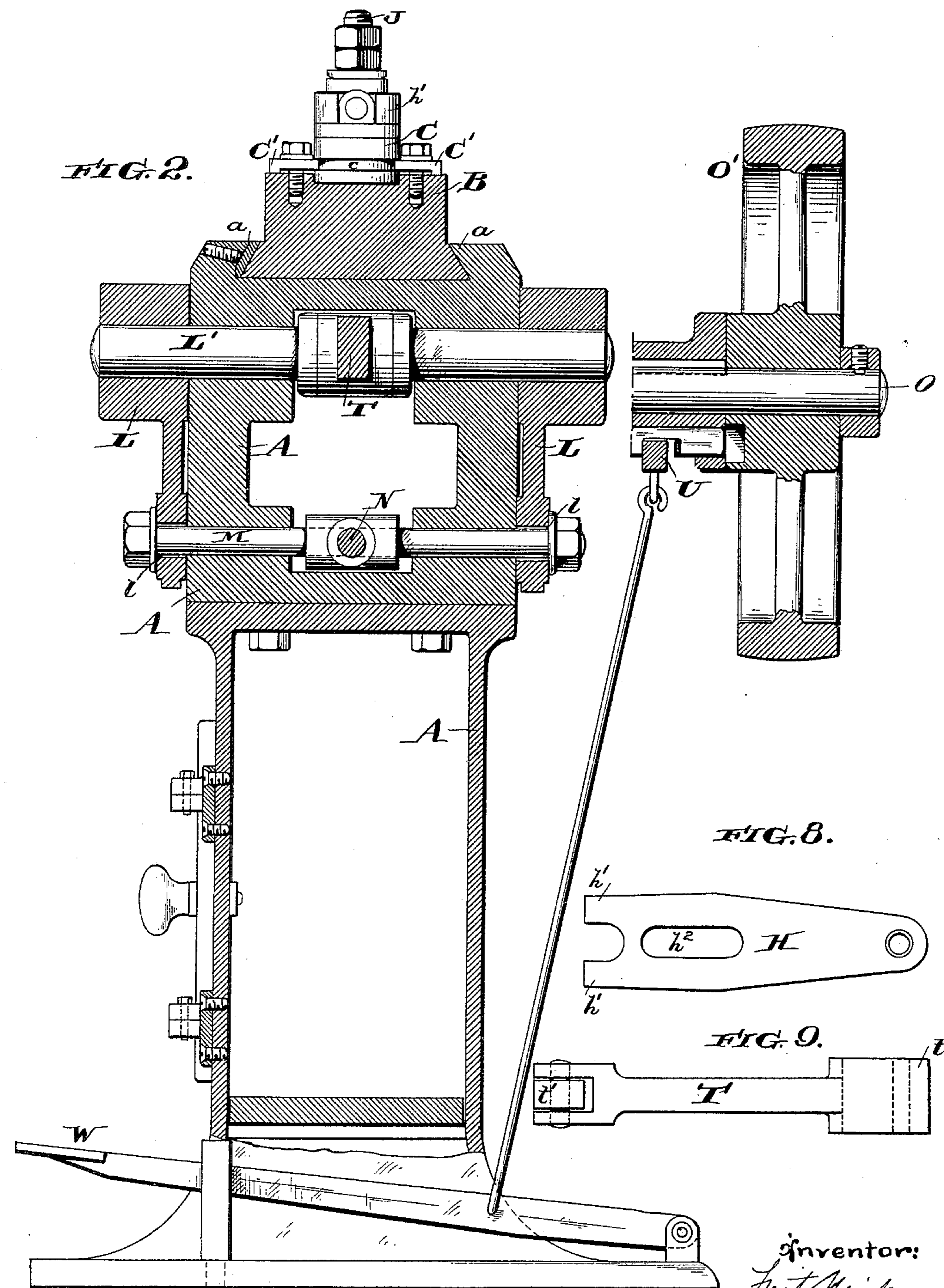
4 Sheets—Sheet 2.

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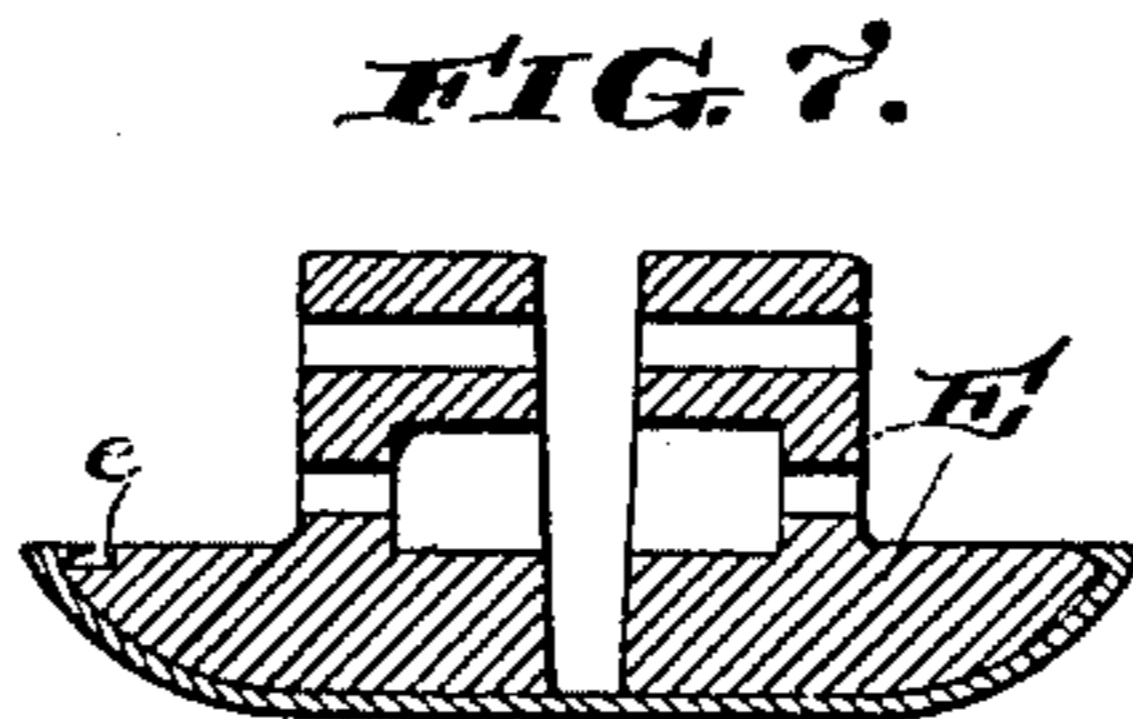
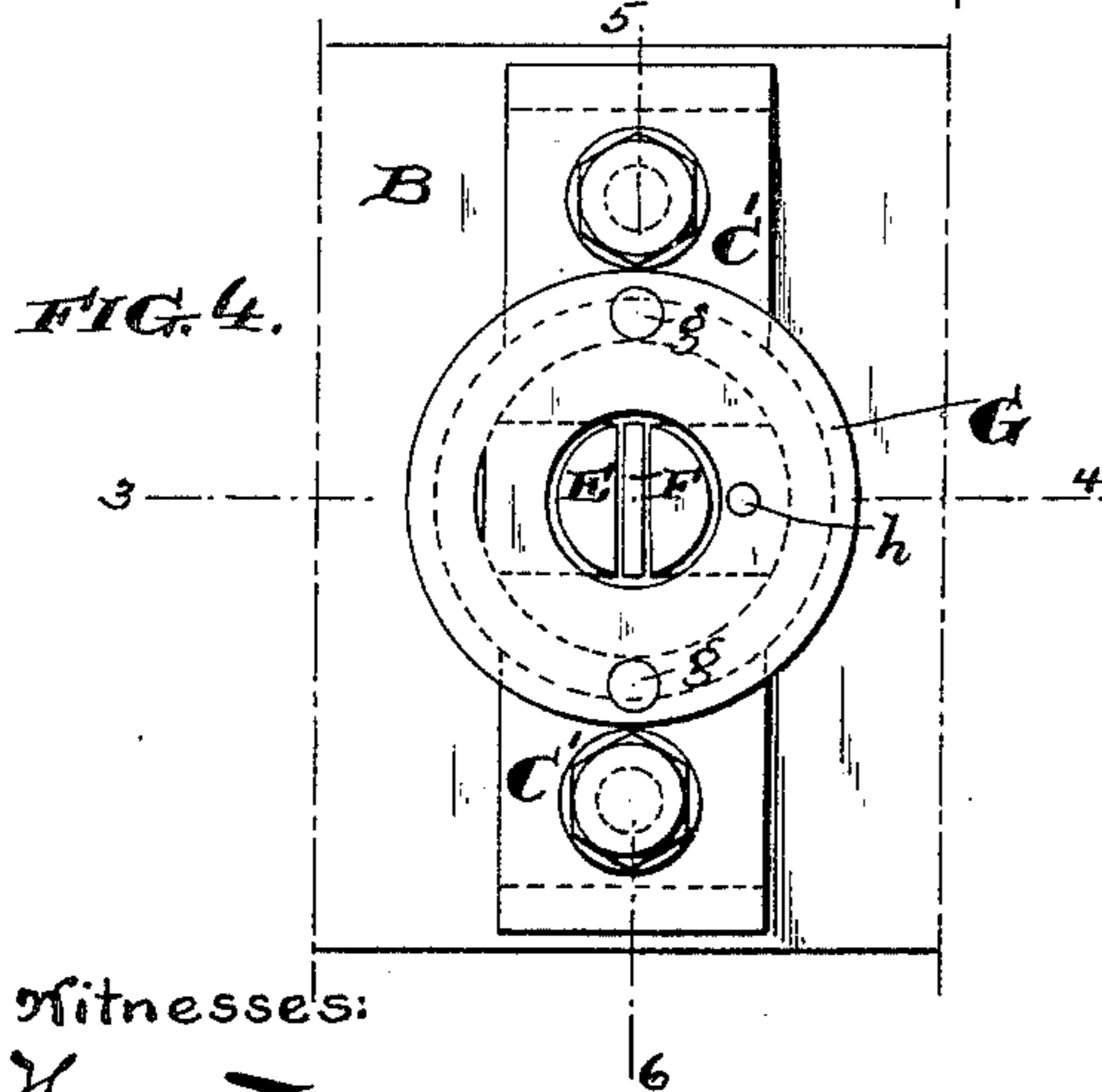
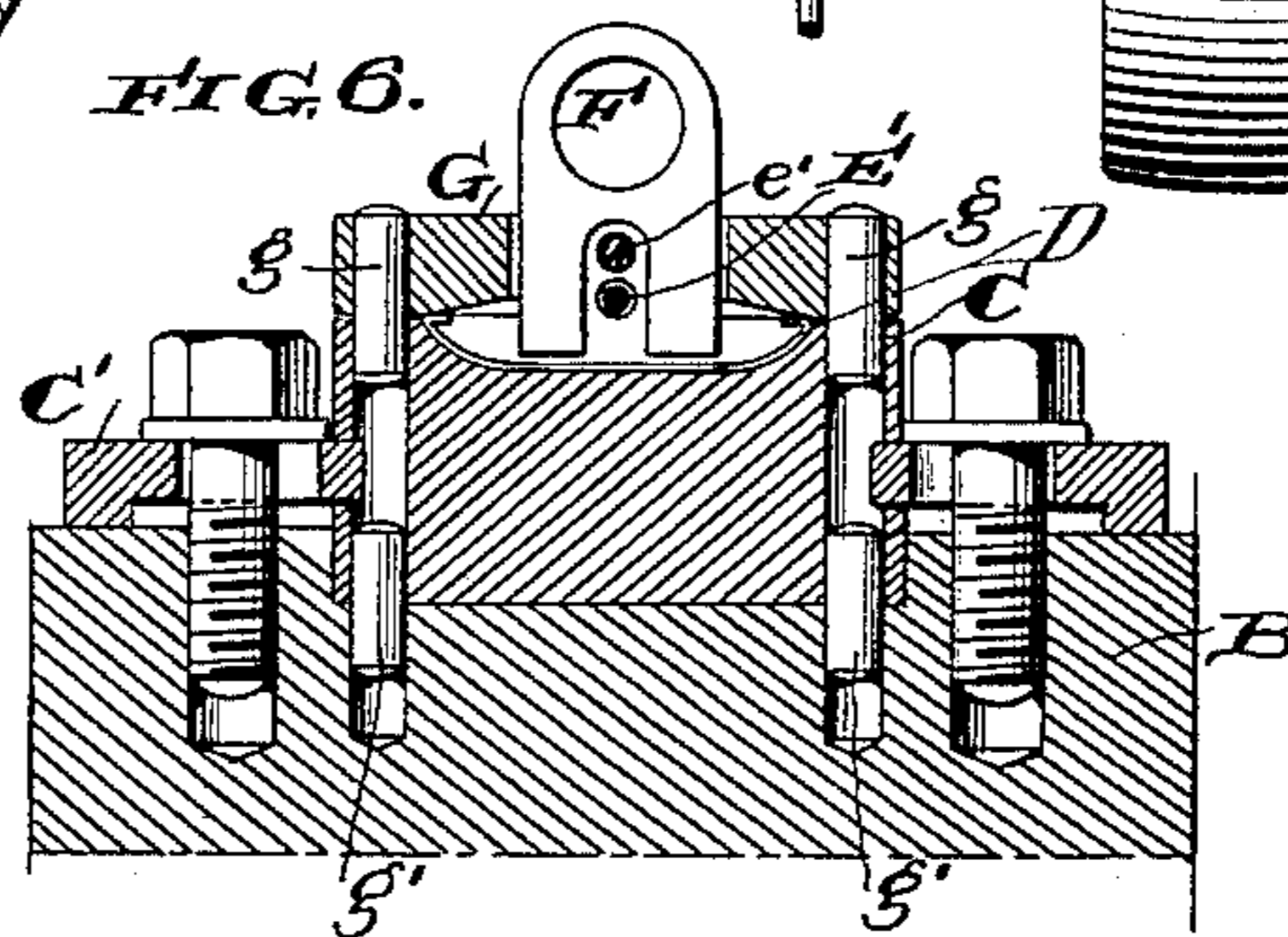
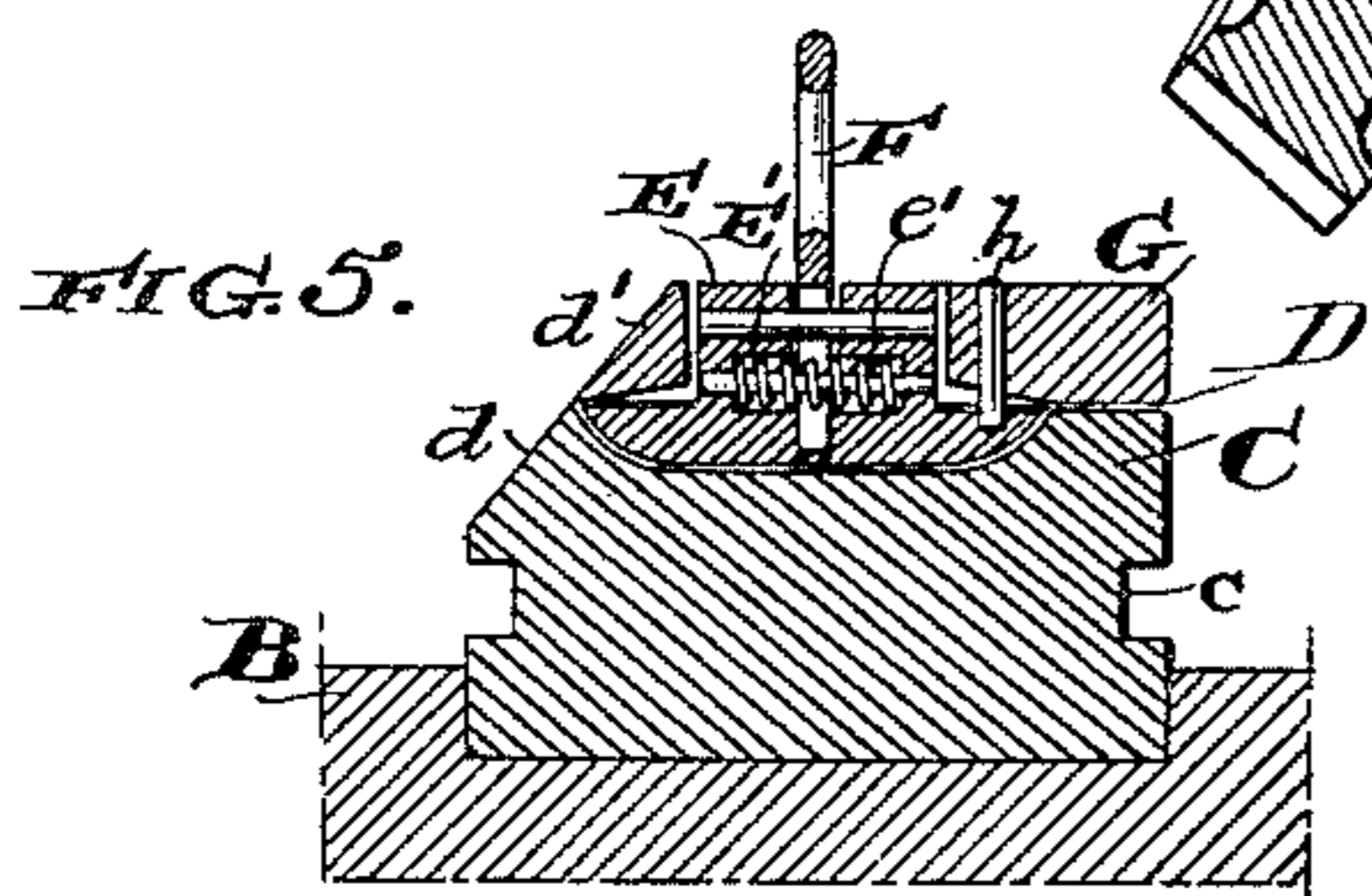


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4 Sheets—Sheet 3.

APPARATUS FOR FORMING HINGE FLATS UPON WATCH CASES.
No. 462,803. Patented Nov. 10, 1891.



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New York

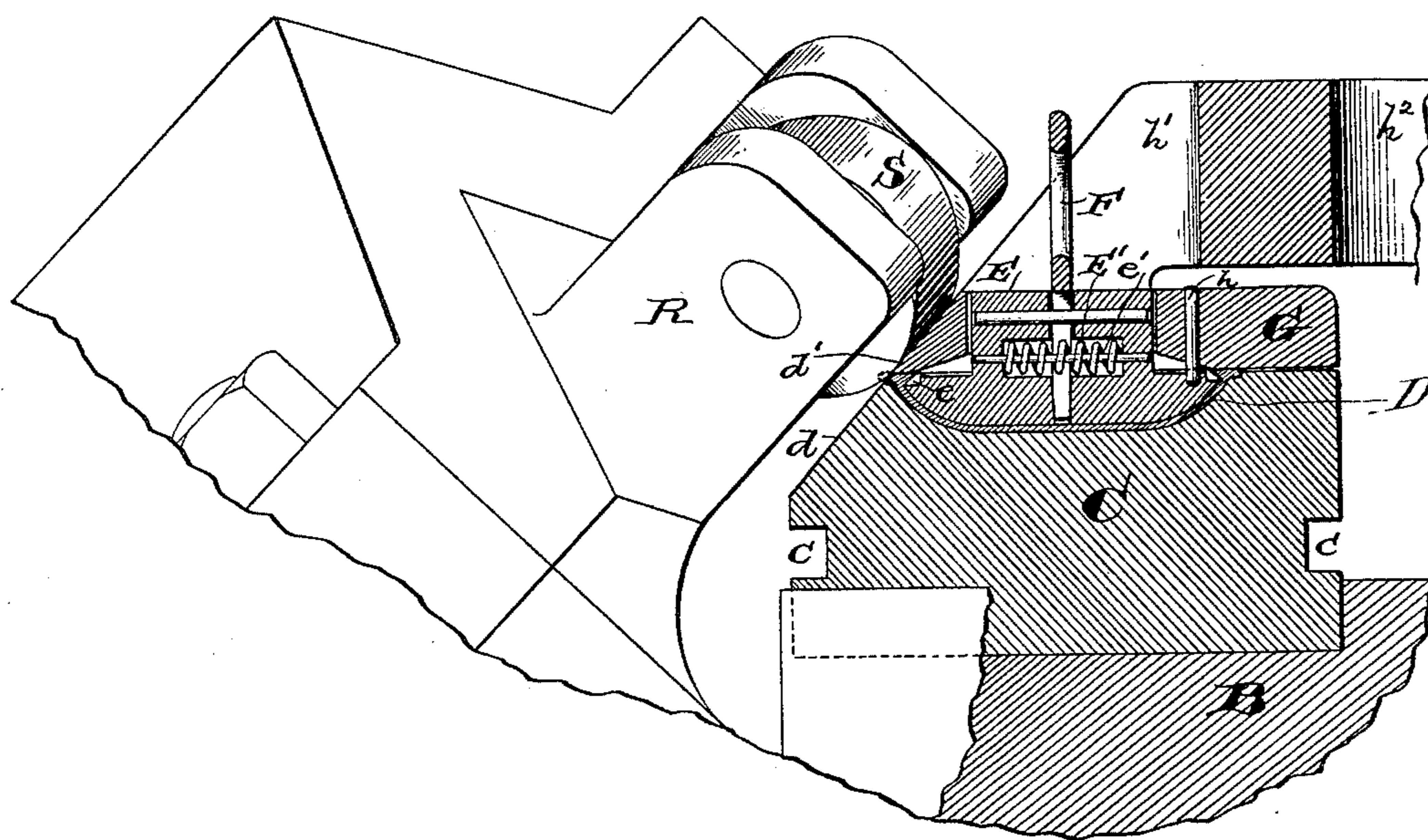
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4 Sheets—Sheet 4.

APPARATUS FOR FORMING HINGE FLATS UPON WATCH CASES.

Patented Nov. 10, 1891.

FIG. 12.



Inventor:

Fritz Mink
By his atty

Wm. Brewster

UNITED STATES PATENT OFFICE.

FRITZ MINK, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO THE KEYSTONE WATCH CASE COMPANY, OF SAME PLACE.

APPARATUS FOR FORMING HINGE-FLATS UPON WATCH-CASES.

SPECIFICATION forming part of Letters Patent No. 462,803, dated November 10, 1891.

Application filed December 17, 1890. Serial No. 374,972. (No model.)

To all whom it may concern:

Be it known that I, FRITZ MINK, of the city and county of Philadelphia, and State of Pennsylvania, have invented an Improvement in Apparatus for Forming the Hinge-Flats upon Watch-Cases, of which the following is a specification.

My invention has reference to apparatus for forming the hinge-flats upon watch-cases; and it consists of certain improvements which are fully set forth in the following specification and shown in the accompanying drawings, which form a part thereof.

The object of my invention is to form the hinge-flats upon the backs, bezels, and centers of watch-cases with economy and rapidity, and without a cutting away or abrasion of the surface metal of the watch-case. By this means the hinge-flats are formed upon filled watch-cases without exposing the interior filling of base metal, the metal being pressed into the required form without any abrasion or cutting away of the surface.

In carrying out my invention I employ a clamping-die, within which the part of the watch-case to be operated upon is securely held, exposing to the action of a die or roller so much of the rim of the metal as is to be formed into the hinge-flat. The pressure of this die or roller upon the exposed portion of the metal flattens it into the desired shape. By means of suitable mechanism this pressure die or roller is operated to move in contact with the exposed metal. Clamping devices are employed for clamping the part of the watch-case firmly in the dies, and these clamping devices are adapted to automatically unclamp after each operation of the pressure die or roller to release the part operated upon, permitting it to be removed and replaced by a second part.

My invention also relates to certain novelties of construction and combinations of parts, all of which are more fully described herein-after and claimed.

While I have shown my invention in the drawings applied to a watch-case back, it will be understood that it may be applied equally well to a watch-case bezel or center or to any piece of jewelry or other article upon which a hinge-flat is to be formed, the change

of the article requiring merely a change in the form of the clamping or supporting die.

In the drawings, Figure 1 is a side elevation of my improved apparatus with a portion of the frame and clamp in the section and with the main driving-wheel removed. Fig. 2 is a longitudinal sectional view of the same on the line 1 2 of Fig. 1. Fig. 3 is a front elevation of the upper portion of the machine. Fig. 4 is a plan view of the chuck and supporting-dies in which the part operated upon is supported and clamped during the operation of the machine. Fig. 5 is a cross-sectional view of the same on the line 3 4 of Fig. 4. Fig. 6 is a longitudinal and sectional view of the same on the line 5 6 of Fig. 4. Fig. 7 is a sectional view, on an enlarged scale, of the inner die and the back or bezel. Fig. 8 is a plan view of the detached clamping-bar by which the supporting-dies are clamped upon the part to be operated upon. Fig. 9 is a plan view of the detached trip and its roller by which the clamping-bar is automatically operated. Fig. 10 is a plan view of a watch-case back or cover, showing the hinge-flat as formed thereon by my improved apparatus. Fig. 11 is a sectional view of the same on the line 7 8 of Fig. 9; and Fig. 12 is a view similar to the upper left-hand portion of Fig. 1, on an enlarged scale, showing the operation of the apparatus in forming the hinge-flat.

A is the main frame of the machine, in the upper portion of which is located a sliding frame B, adapted to move in guides *a* of the frame A.

C is a clamping die or chuck, which is carried by the sliding frame B, and is held there-to preferably by means of clamping-plates *C'*, fitting in grooves *c* of the chuck C (see Figs. 4 and 6) or in any other convenient manner. This chuck C is provided with a die-surface D, corresponding to the watch-case back or bezel or other article to be operated upon, and has a beveled face *d* to expose upon one side so much of the metal as is to be operated upon.

E is a split die fitting within the inner surface of the watch-case back, so as to clamp it securely within the chuck. This die is formed upon one of its edges with a depres-

sion or die-face *e* to permit the metal of the watch-case back or bezel to be pressed in at that point to form the hinge-flat. (See Fig. 7.)

The two parts of the split die E are connected by means of pins *E'*, while permitting movement of the parts one toward the other, and a spring *e'* interposed between the two portions normally to hold them apart. By compressing the spring, the die E may be inserted within the bezel or back or removed therefrom.

F is a locking-key, which is inserted between the two parts of the die to lock them apart during each operation of the machine.

G is a ring fitting about the projecting portions of the split die E and upon the chuck C, and held thereto by means of pins *g*. Similar pins *g'* may also be employed between the chuck C and the sliding frame B. These pins serve to center the parts one upon the other, or to bring the chuck in the proper position with reference to the operating-parts of the machine and the ring G into proper position with reference to the chuck C. One face of the ring G is provided with a beveled face *d'*, corresponding to the beveled face *d* of the chuck C, so that when the watch-case back is clamped in the chuck the portion of the metal to be operated upon for the formation of the hinge-flat will be exposed between these adjacent beveled faces *d* and *d'*, as is shown in Figs. 4 and 5. A pin *h* may also be employed between the split die E and the ring G to properly center the former, so as to bring its depressed edge *e* immediately within the exposed surface between these surfaces *d* and *d'*.

H is a clamping-bar having its end formed with feet *h' h'*, which are adapted to be clamped down upon the ring G, thus securely clamping the watch-case back or bezel within the chuck and dies. This clamping-bar is movable toward and away from the chuck and dies to permit the ready removal of a part that has been operated upon and the substitution of another part. It is not material to my invention, when broadly considered, how this clamping-bar is made movable. I prefer, however, to connect the outer end of the bar H with an adjusting-screw *H'*, which bears upon a slide I upon the surface of the sliding frame B. This slide I is guided upon the frame B by suitable guides *I'*. (See Fig. 1.) To limit the inward movement of the slides I, a stop is employed, which may be constructed in the form of a slotted slide *I²*, arranged in the path of the slide I and adjustable by means of an adjusting-screw *i*.

The sliding frame B is adjustable upon the frame A by means of an adjusting-screw *A'*, or in any other convenient and well-known manner.

The clamping-bar H is clamped down upon the dies and chuck, holding the part to be operated upon preferably by means of a downwardly-extending rod J, which passes through a slot *h²* in the bar H and through the sliding

frame B, being provided upon its lower end with a head *j*. The upper end of the rod J is provided with a washer *J'*, which bears upon the bar H, so that by depressing the rod J the bar H will be clamped down upon the dies.

J² is a spring which normally tends to raise the rod J, and thus remove its pressure from the bar H and unclamp it.

K is a pivoted arm, the free end of which rests upon the head *j* of the rod J, upon which a pressure is extended to depress the rod J and clamp the bar H automatically, as is hereinafter more fully explained.

L is a pivoted frame carried by the journal *L'* in the main frame A. In practice I prefer to form the frame L with two side arms, one journaled on each side of the main frame A, as shown in Fig. 2, for the purpose of obtaining better support for the weight and strain of the frame L. These arms of the frame L are formed with slots *l*, through which extends a transverse bolt M, the slots permitting the frame L to be adjusted in its movement upon the journal *L'*. By means of an adjusting-screw N between the frame L and this transverse bolt M the former may be adjusted. This adjusting-screw is preferably constructed as shown in Fig. 1, being a right and left threaded screw with its ends received respectively in the correspondingly-threaded collars upon the frame L and bolt M.

Journaled in the frame L is a shaft O, carrying the main driving-wheel O', and also a beveled gear O².

P is a second shaft journaled in the frame L and having a beveled gear P², which engages with the beveled gear O², whereby motion is imparted to the shaft P from the main driving-wheel O'. The shaft P is provided with a crank P', to the crank-pin of which is connected a connecting-rod Q. Carried by the connecting-rod Q is a plunger R, which is reciprocated by the connecting-rod Q in the guides *r* of the frame L. Carried by the plunger R is the forming die or piece S, which is moved in contact with the metal exposed between the beveled surfaces *d* and *d'* of the supporting chuck and dies, and causes the metal to flow into the desired flattened shape to form the hinge-flat. In practice I prefer to employ for this forming die or piece S a roller of highly-polished hard steel journaled in the end of the plunger. The plunger R and its guides *r r* are preferably arranged at an angle to the exposed surface of the metal to be operated upon in the manner shown in the drawings, so that the pressure of the roller S will be exerted upon the metal gradually and uniformly. The passing of the forming die or roller S over the metal in an angular direction causes the metal in its cold state to flow more readily under the pressure of the die, and thus avoids any abrasion or cutting of the surface metal. In making hinge-flats upon filled metal watch-cases or other articles of filled metal, this is

of great importance, as it avoids the exposure of the inner base filling and presents a joint or hinge-flat with a continuous covering of precious metal. A single movement of the forming die or roller over the metal is sufficient. To automatically operate the clamping-bar H with each movement of the plunger, so that the article or part operated upon may be removed, I employ a trip T, pivoted upon the journal L', and having upon one end a locking-projection *t*, which rests upon the end of the lever K. The other end of the trip T carries a roller *t'*, which rests upon the shaft O, and this shaft O carries a cam R', which is adapted to raise the trip T when it comes in contact therewith. The raising of the free end of the trip T by the cam R' forces the projection *t* down upon the lever K, thus in turn depressing the rod J and clamping down the bar H. As the cam R' passes from under the end of the trip T the latter drops by its own weight, and the projection *t* is raised from the lever K, thus releasing the rod J and unclamping the bar H. To reduce the friction between the end of the trip T and the cam R', the former may be provided with a small roller *t'*.

The main driving-wheel O' may be connected or disconnected with the shaft O by means of a clutch V, operated from a foot-lever W, or in any other convenient and well-known manner.

The minor details of construction which have been here shown, while preferable, are not material to the principles of the invention, and may be varied without departing from the spirit of the invention.

The operation of the machine in the formation of a hinge-flat is as follows: The bar H is unclamped and withdrawn to permit the clamp C and the dies to be reached with ease. The watch-case back, or whatever the article is that is to be operated upon, is placed in the recess of the chuck C, with the split die E locked upon its inner surface. The ring G is then put in place, the pins *g* and *g'* properly centering the parts or arranging them in proper position in relation one to the other, as has been heretofore described. The article to be operated upon is thus held in the chuck and dies with a small portion of the metal exposed between the beveled faces *d* and *d'* in the path of the forming die or roller S. The clamping-bar H is moved forward to bring its feet *h'* *h'* in position over the chuck or dies. As the shaft O rotates the plunger is moved forward and the trip T is operated in the manner heretofore described to depress the rod J and force down the feet *h'* *h'* of the clamping-bar H upon the dies within which the article is held. By this means the article is clamped fixedly in the chuck and dies and the plunger moves forward over the beveled faces *d* and *d'*, reciprocating the forming die or roller in an angular direction in contact with the exposed metal. During this operation the clamping-bar H is held

down by the rod J, but when the plunger continues to descend after the forming operation has been completed, the cam R' of the shaft O is moved from under the trip T and permits the free end of the trip to fall sufficiently to raise the projection on the other end, and thus release the rod J, which is immediately raised by the spring J² and unclamps the bar H. The bar H is then moved back to permit the article that has been operated upon to be removed from the dies, and the operation is performed as before. The frame B is adjusted upon the guides *a a* to remove the chuck C to or from the plunger R, to suit the different sizes of the watch-case backs, &c., operated upon.

In Figs. 10 and 11 of the drawings is shown a watch-case back having the hinge-flat as formed thereon by this apparatus. The hinge-flat is indicated at X, while in dotted line the same is shown as applied to a watch-case bezel. It is apparent also that the machine is equally adapted to any other article upon which it is desired to form a flattened portion or hinge-flat by slightly changing the shape of the supporting-chuck and dies to correspond with the shape of the particular article to be operated upon.

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

1. In a machine for forming hinge-flats, the combination, with supporting-dies to support the article with the portion of its surface to be formed exposed, of a reciprocating forming-die, and means to move said forming-die in contact with and across said exposed surface.

2. In a machine for forming hinge-flats, the combination of a supporting-die for the article to be formed, a clamp to clamp the article in said supporting-die, and a reciprocating forming-die movable across the edge of the article to be formed while held by said supporting-die and clamp.

3. In a machine for forming hinge-flats, the combination of a support for the article to be formed, a clamp to clamp the article therein, a clamping-rod to operate said clamp, and a reciprocating forming-die movable across the edge of the article while held by said support and clamp.

4. In a machine for forming hinge-flats, the combination of a support for the article to be formed, a clamp to clamp the article therein, a clamping-rod to operate said clamp, a reciprocating plunger movable across the said support, a forming-die carried by said plunger and adapted to be moved in contact with the article in said support, a trip to operate said clamping-rod, and means to release said trip after each operation of the plunger.

5. In a machine for forming hinge-flats, the combination of a support for the article, a clamping-bar to clamp the article therein, a clamping-rod to operate said clamping-bar, a trip to depress said clamping-bar, a plunger movable across the face of said support, a

forming-die carried by said plunger, and a cam to operate said trip and depress the clamping-bar during each operation of the plunger and forming-die.

5 6. In a machine for forming hinge-flats, the combination of a support for the article, a clamping-bar to clamp the article therein, a clamping-rod to operate said clamping-bar, a spring to normally raise said rod and re-
10 lease the clamping-bar, a trip to depress said bar, a reciprocating forming-die movable across the edge of the article held in said support and clamp, and a cam to intermittently raise said trip and release the clamping-rod.

15 7. In a machine for forming hinge-flats, the combination of a fixed frame, a support for the article to be operated upon carried thereby, a frame pivotally connected with said fixed frame and a reciprocating forming-die mov-
20 able across and in contact with the metal of the article in said support and carried by said pivoted frame.

8. In a machine for forming hinge-flats, the combination, with a support for the article to
25 be operated upon, of a reciprocating forming-die arranged at an angle to said support, and means to reciprocate said forming-die transversely and at an angle and in contact with the edge of the article in said support.

30 9. In a machine for forming hinge-flats, the combination, with a support for the article to be formed, of a reciprocating plunger, a forming-die consisting of a roller carried by said

plunger, and means to reciprocate said plunger to move said forming-roller transversely 35 across the edge of the article in said support.

10. In a machine for forming hinge-flats, the combination of a supporting die or chuck C for the article to be operated upon, a split die for holding the article in said chuck, a clamp-
40 ing-ring G, fitting over said chuck and split die, said ring G and chuck C having an opening between their adjacent edges to expose the portion of the metal to be formed into the hinge-flat, and a reciprocating forming-die 45 adapted to be moved transversely across said exposed metal.

11. In a machine for forming hinge-flats, the supporting-chuck C, having the beveled face *d*, the split die E, adapted to fit within the ar-
50 ticle when held in the supporting-chuck C, the ring G, having beveled face *d'*, corresponding to the beveled face *d* of the chuck C, whereby the article is clamped between said chuck C and die E, with the portion of 55 the metal to be formed into the hinge-flat exposed between said beveled faces *d* and *d'*, and a reciprocating forming-die adapted to be moved across said beveled faces in contact with the exposed metal. 60

In testimony of which invention I have hereunto set my hand.

FRITZ MINK.

Witnesses:

H. L. ROBERTS,

ERNEST HOWARD HUNTER.