(No Model.)

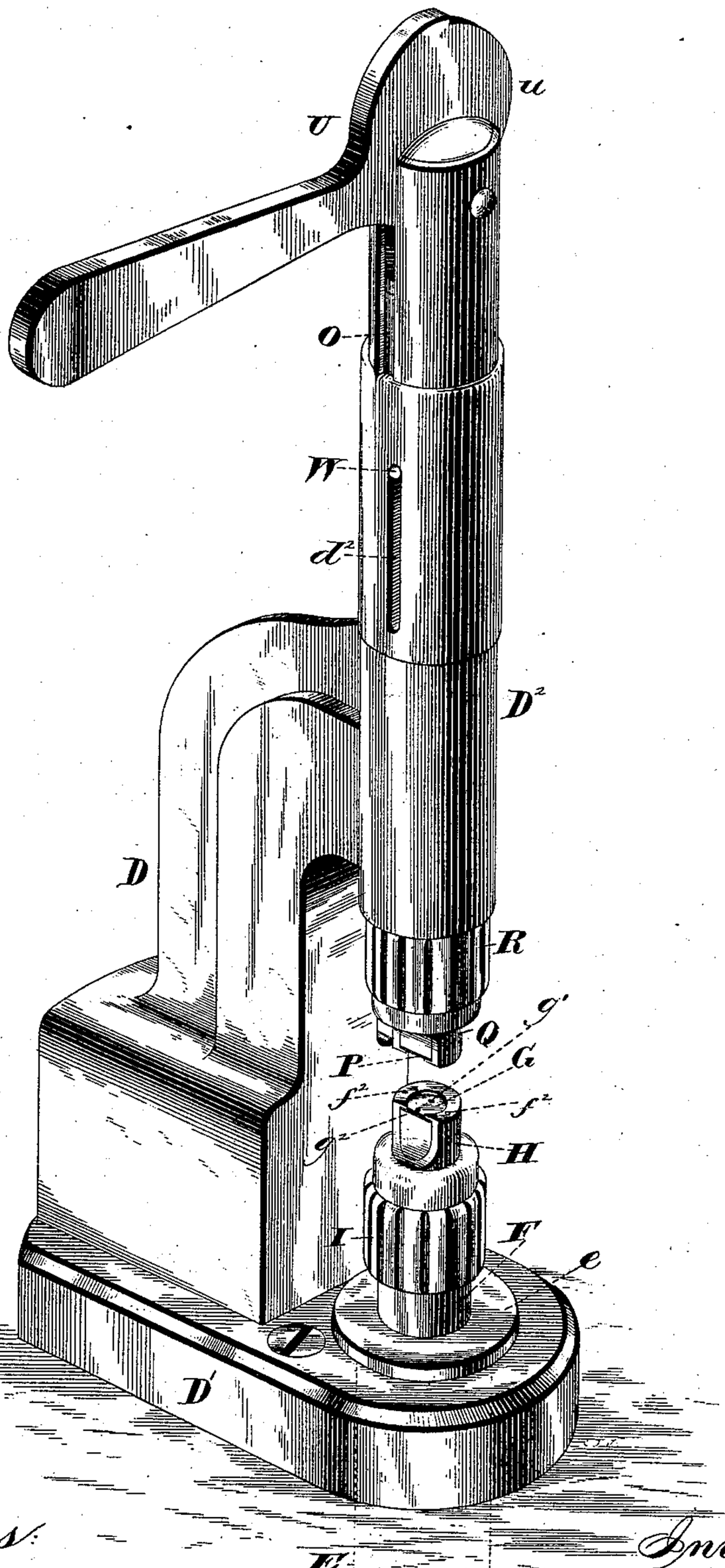
7 Sheets—Sheet 1.

G. E. HUNTER.

MACHINE FOR DRIVING AND CUTTING STEADY PINS FOR WATCH ESCAPEMENTS.

No. 345,634. Patented July 13, 1886.

Fig. 1.



Witnesses:
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Henry C. Hazard.

Inventor:
Geo. E. Hunter by
Pindle & Russell his attys

(No Model.) 7 Sheets—Sheet 2.

G. E. HUNTER.

MACHINE FOR DRIVING AND CUTTING STEADY PINS FOR WATCH ESCAPEMENTS.

No. 345,634. Patented July 13, 1886.

Fig. 2.

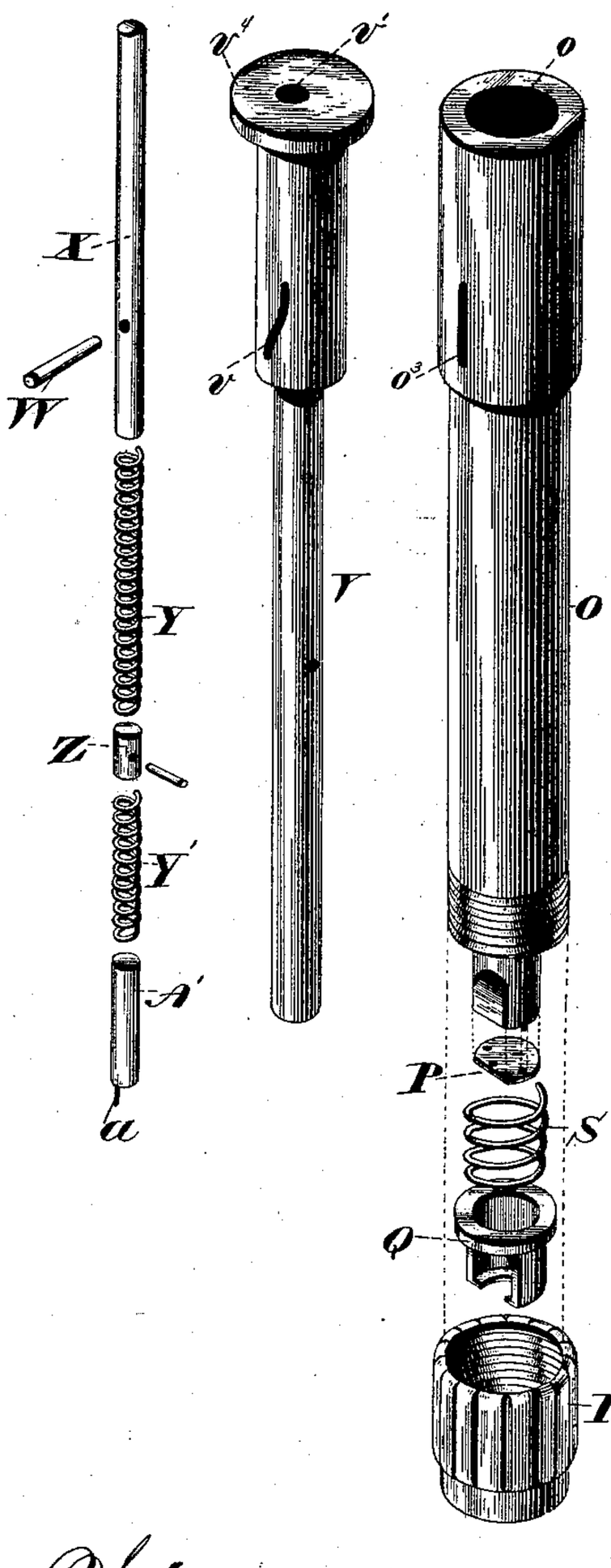
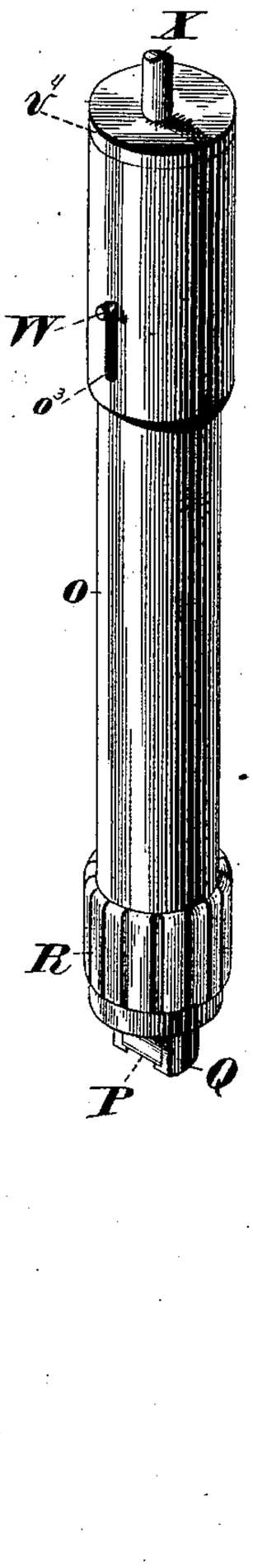


Fig. 3.



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(No Model.) 7 Sheets—Sheet 3.

G. E. HUNTER.

MACHINE FOR DRIVING AND CUTTING STEADY PINS FOR WATCH ESCAPEMENTS.

No. 345,634. Patented July 13, 1886.

Fig. 4.

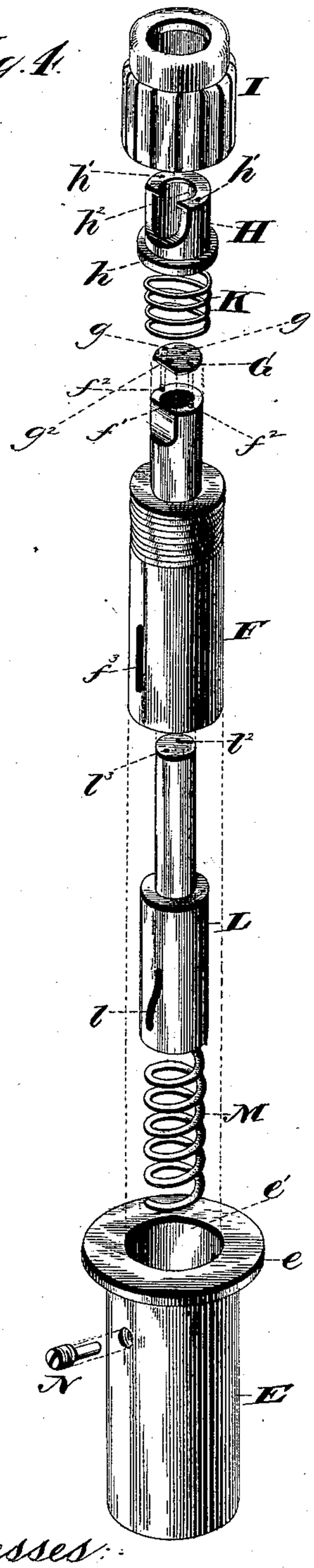
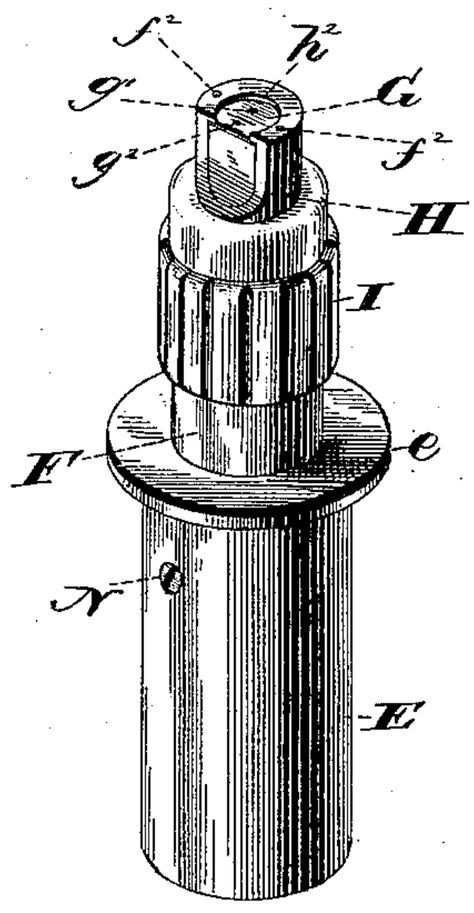


Fig. 5.



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(No Model.)

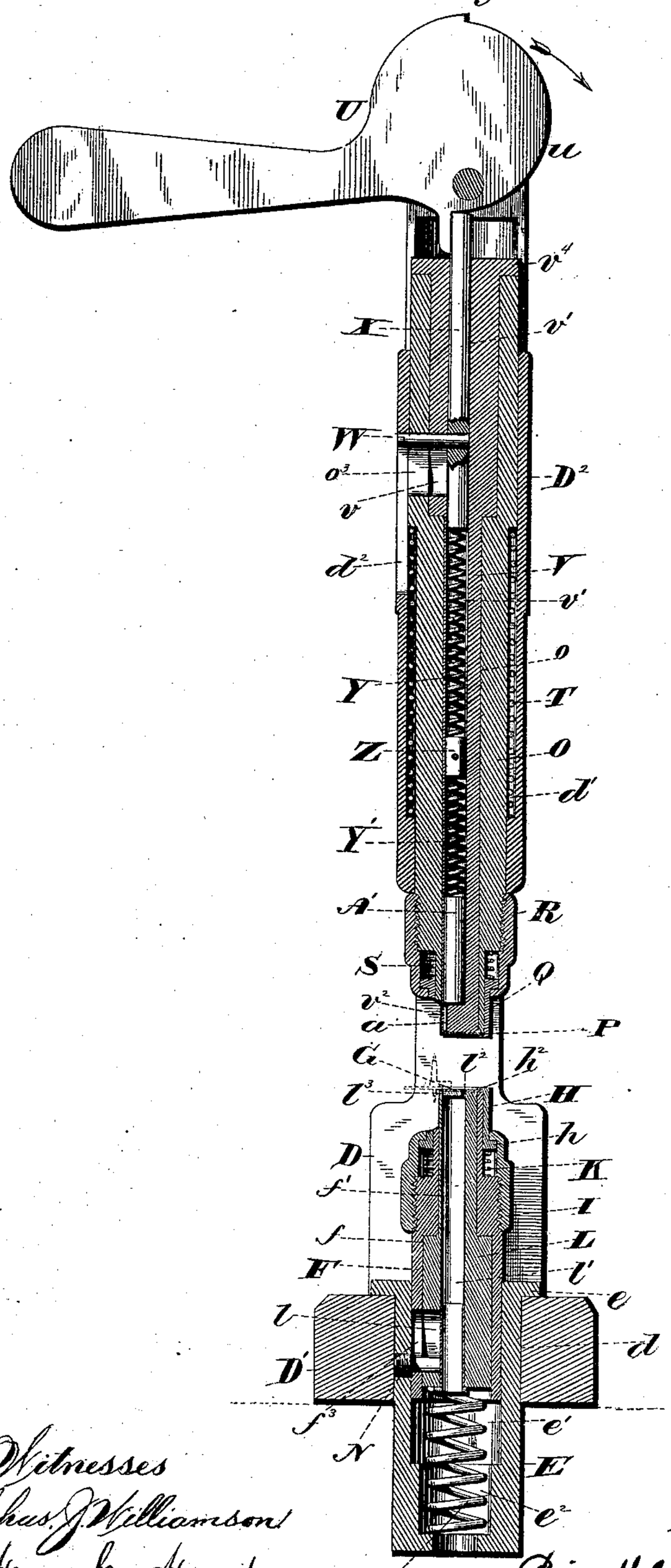
7 Sheets—Sheet 4.

G. E. HUNTER.

MACHINE FOR DRIVING AND CUTTING STEADY PINS FOR WATCH ESCAPEMENTS.

No. 345,634. Patented July 13, 1886.

Fig. 6.



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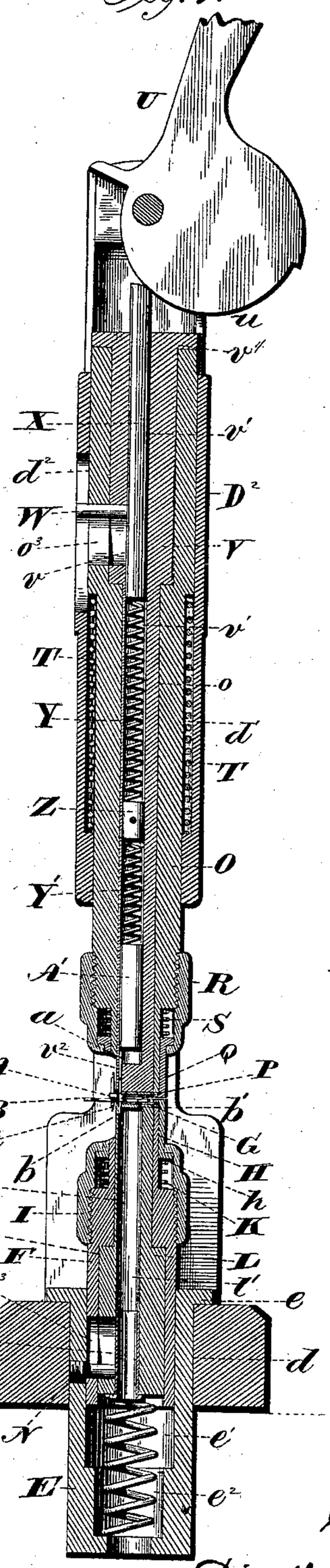
7 Sheets—Sheet 5.

G. E. HUNTER.

MACHINE FOR DRIVING AND CUTTING STEADY PINS FOR WATCH ESCAPEMENTS.

No. 345,634. Patented July 13, 1886.

Fig. 1.



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(No Model.)

7 Sheets—Sheet 6.

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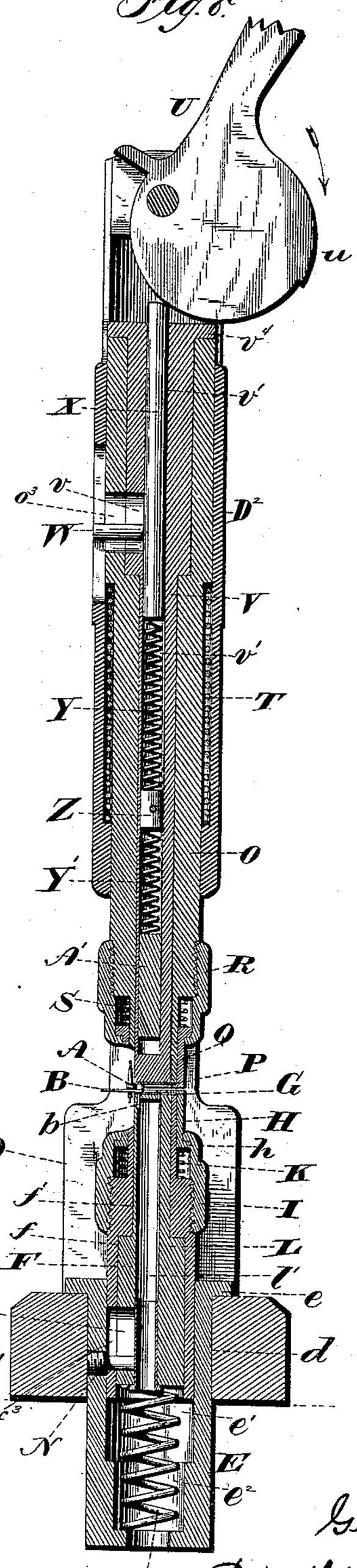
MACHINE FOR DRIVING AND CUTTING STEADY PINS FOR WATCH ESCAPEMENTS.

No. 345,634. Patented July 13, 1886.

Fig. 8.



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(No Model.)

7 Sheets—Sheet 7.

G. E. HUNTER.

MACHINE FOR DRIVING AND CUTTING STEADY PINS FOR WATCH ESCAPEMENTS.

No. 345,634. Patented July 13, 1886.

Fig. 9.

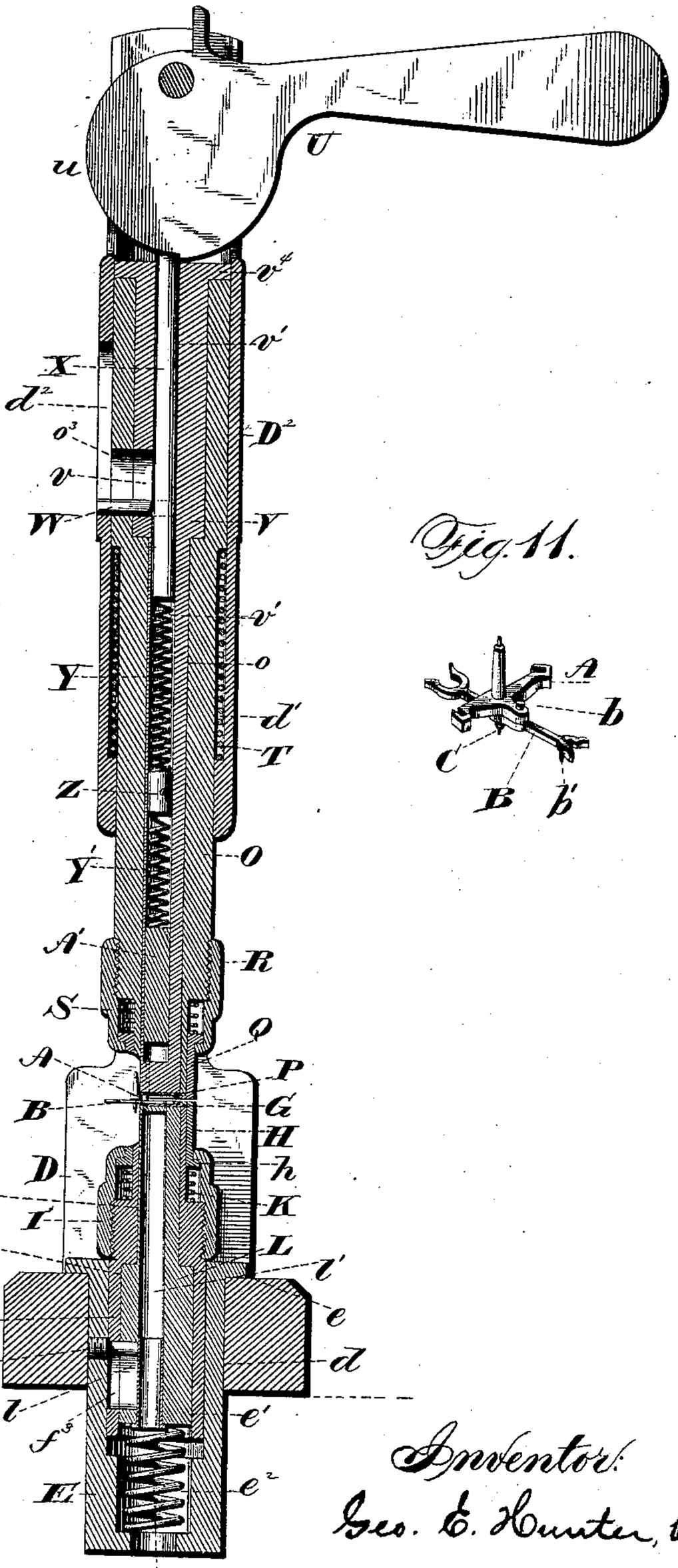

Fig. 10.

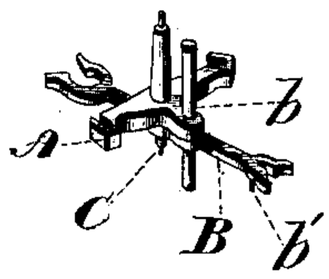

Fig. 11.

Witnesses:
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Henry C. Hazard.

Inventor:
Geo. E. Hunter, by
Pindle & Russell, his Attys.

UNITED STATES PATENT OFFICE.

GEORGE E. HUNTER, OF ELGIN, ASSIGNOR TO THE ELGIN NATIONAL WATCH COMPANY, OF CHICAGO, ILLINOIS.

MACHINE FOR DRIVING AND CUTTING STEADY-PINS FOR WATCH-ESCAPEMENTS.

SPECIFICATION forming part of Letters Patent No. 345,634, dated July 13, 1886.

Application filed April 1, 1886. Serial No. 197,452. (No model.)

To all whom it may concern:

Be it known that I, GEORGE E. HUNTER, of Elgin, in the county of Kane, and in the State of Illinois, have invented certain new and useful Improvements in Machines for Driving and Cutting Steady-Pins for Watch-Escapements; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, in which—

Figure 1 is a perspective view of my machine as arranged for use. Fig. 2 is a like view of the upper spindle and its parts separated from each other. Fig. 3 is a perspective view of the same combined, but separated from the frame of the machine. Fig. 4 is a like view of the table and its parts separated from each other. Fig. 5 is a perspective view of the same united. Fig. 6 is a vertical central section of the machine, and shows the normal positions of parts. Fig. 7 is a like view of the same with the upper spindle depressed until the upper cutter is about to act. Fig. 8 is a similar view of said machine when the upper cutter has performed its office and the lower spindle is about to be depressed. Fig. 9 is a vertical central section of said machine after the lower spindle has been forced to its lowest position and its cutter has acted. Fig. 10 is a perspective view of a lever and its pallets ready for the operation of the machine, and Fig. 11 is a like view of the same after having been operated upon.

Letters of like name and kind refer to like parts in each of the figures.

The object of my invention is to enable the steady-pin of an escape-lever and pallets to be driven to place and cut to the required length for heading down; and to this end my said invention consists in a machine constructed and combined to operate in the manner and for the purpose substantially as hereinafter specified.

In the manufacture of watch-movements, the pallets A and lever B are preferably constructed separately and placed upon the same arbor C, and in order that the former may maintain their relative positions, a pin, known as a "steady-pin," *b*, is passed through the same, and its ends riveted down or headed. My invention is designed for use in driving such pin firmly to place, and then cutting off from each end all stock except such as is necessary for forming the rivet-head, and is constructed as follows, viz: For the support of the operative mechanism I use a frame, D, which has the general form shown in Fig. 1, its lower end being provided with a broad base, D′, and its upper part composed of a vertically-arranged cylindrical housing, D^2, that overhangs one end of said frame-base. Within the base D′, in a line with the axis of the housing D^2, is provided a round vertical opening, *d*, that receives and contains a thimble, E, which at its upper end has a radial flange, *e*, that extends over and rests upon the upper face of said base, and limits the downward movement of said thimble. From its upper end downward about two-thirds its length said thimble has a straight cylindrical opening, *e*′, while below the latter is a second smaller opening, e^2, that extends nearly to the lower end of said thimble, which end is partly or entirely closed. Fitted into the opening *e*′ is a round sleeve, F, that from its lower end upward, about two-thirds its length, has such diameter as to enable it to be moved therein longitudinally without looseness, while its upper portion has about one-half such diameter, and, as seen in Fig. 4, is a plain cylinder. Interiorly the lower half of said sleeve is provided with a round straight axial opening, *f*, having about two-thirds the diameter of its exterior, and its upper half is provided with a similar opening, *f*′, that has about one-half the diameter of said lower opening. Each of said openings *f* and *f*′ extends to the contiguous end of said sleeve. The upper open end of the sleeve F is inclosed by means of a plate, G, that fits upon the same, and is held in relative circumferential position by means of two dowel-pins, f^2, which project from the former into corresponding openings, *g*, in the latter. Said plate is held down upon said sleeve by means of a thimble, H, that fits over the upper end of said sleeve and embraces the edge of said plate, and a nut, I, which fits upon the threaded upper portion of the large portion of said sleeve and engages with a peripheral flange, *h*, upon the lower end of said thimble, the arrangement being such that when said nut is screwed downward said thim-

ble is drawn down upon said plate and the latter pressed firmly upon the end of said sleeve and upon its said dowel-pins.

In order that the plate G may be easily placed in or removed from position, and for other purpose hereinafter named, one side of the upper portion of the sleeve F and a coinciding part of the thimble H are cut away, as shown in Figs. 4 and 5, and said thimble then secured in relative circumferential position by means of the dowel-pins f^2, which project through said plate into suitable openings, h', that are provided in the overlapping flange h^2 of said thimble. A spiral spring, K, placed beneath the lower end of said thimble, operates to raise the latter as soon as the nut I is raised, so as to disengage its said flange h^2 from said plate and leave the latter free to be raised from off its dowel-pins, and then withdrawn.

Fitted within the axial openings f and f' of the sleeve F is a spindle, L, which corresponds therewith in size and shape, and at its lower end rests upon and is supported by means of a spiral spring, M, that is contained within the space between said end and the lower end of the thimble E. A screw, N, passing horizontally inward through the side of said thimble into a vertical slot, f^3, in said sleeve F, and into a similar but obliquely-arranged slot, l, in said spindle L, limits the upward motion of said sleeve and spindle, while allowing them to be depressed within the limits of said slots. As thus arranged, the depression of said sleeve and spindle does not change the position of the former circumferentially; but in consequence of the oblique line of the slot l, said spindle will be caused to partially rotate in one direction within said sleeve when thus moved downward, and to turn back again to its normal position when moved to the upper limit of its motion with said sleeve by the action of said spring M.

The spindle L is provided with a round opening, l', which extends from its lower end almost to its upper end, and is placed at one side of its axis, as shown in Fig. 6. Within its closed upper end is provided a small round opening, l^2, that is located at the axial center of said spindle, and coincides with a like opening, g', in the plate G, while at a point at or near the outer side of said longitudinal opening l' another round opening, l^3, is provided in said spindle end, which, when the parts occupy their normal positions, coincides with a like opening, g^2, in said plate G. When, by the depression of said sleeve and spindle, the latter is caused to have a partial relative rotation, as before described, said opening l^2 will be moved out of coincidence with said opening g', so as to produce a shearing cut upon a pin which had been previously passed through the same.

The housing D^2 is provided with a round axial opening, d', that, from a point near its lower end to the upper end of said housing, has a slightly greater diameter than at said lower end. Within said axial opening is placed a sleeve, O, which from its lower end upward about two-thirds of its length corresponds in size to the diameter of the lower smaller portion of said opening, while the upper portion of said sleeve has such dimensions as to cause it to loosely fill the larger part of said opening.

Except in length, the sleeve O is the counterpart of the sleeve F, and is provided at its lower end with a covering-plate, P, thimble Q, nut R, and spring S, which are like the similar parts of the latter, as before described. A spiral spring, T, placed around said sleeve, within the housing D^2, operates to hold the former with a yielding pressure at the upper limit of its motion, while a cam-lever, U, which is pivoted within the upper end of said housing, enables said sleeve to be moved downward, when desired.

Within the axial opening o of the sleeve O is fitted a spindle, V, which is constructed like the spindle L, and like it has a diagonally-arranged slot, v, (for the reception of a stud, W, that passes through the same, through a slot, o^3, in said sleeve, and through a vertical slot, d^2, in the housing D^2,) an eccentrically-arranged longitudinal opening, v', and an eccentrically-arranged opening, v^2, in its covered end, while at its upper end said spindle V is provided with a radial flange, v^4, that extends over and bears upon the contiguous end of said sleeve O. The stud W is secured within and extends radially outward from a rod, X, which is placed within the axial opening v' of the spindle V, and is adapted to move longitudinally within the same a distance equal to the length of the slot v. The lower end of said rod rests upon a spiral spring, Y, which operates to hold the rod with a yielding pressure at the upper limit of its motion, while its upper end projects above said spindle and bears against the periphery of the cam u of the cam-lever U. The spring Y has its lower end in engagement with a block, Z, which is secured within the opening v' of the spindle V, and below such block is a second spring, Y', that bears against a plunger, A', which is fitted loosely within said opening v', and is by the action of said spring held with a yielding pressure at the lower end of said opening. From the lower end of said plunger an arm, a, projects downward into the opening v^2 for reasons hereinafter stated.

The slot d^2 in the housing D^2, through or into which projects the stud W, is vertical and straight, and has more than twice the length of either of the slots o^3 or v, and enables the sleeve O and its spindle to be moved longitudinally a distance equal to its length.

In the use of this machine the pallets A and lever B, united upon the arbor C, and having the steady-pin b inserted, as shown, and the guard-pin b' in place, are placed upon the plate G, with the lower projecting portion of said steady-pin within the openings g^2 and l^3, the guard-pin b' within the openings g' and l^2, and the arbor C adjacent to the cut away side of the sleeve F, as seen in Fig. 6, after which

the cam-lever U is turned in the direction indicated by the arrows. As the cam-lever moves downward, the cam impinges first upon the upper end of rod X and moves the same, with all of its attachments, downward until the rod *a* of the plunger A′ engages with the upper end of the steady-pin *b* and forces the same firmly into its opening. When the steady-pin has been forced into place, the spring Y′ above the plunger A′ yields and the upper portion of said pin is permitted to pass into the openings *p′* and v^2, so that the plate P may impinge upon the upper side of the pallets A, as shown in Fig. 7. The strength of the spring Y being greater than the strength of the spring T, has enabled the motion described to be effected without movement of the rod X within the spindle V, but after the plate P has impinged upon the pallets A there is the added resistance of the spring K to overcome, and as a result said spring Y yields and permits said rod to pass downward to the position seen in Fig. 8, by which means the stud W, traveling lengthwise of the diagonally-arranged slot *v* of said spindle V, gives to the latter a partial revolution and cuts off the end of the steady-pin *b*, which is contained within the openings *p′* and v^3. A further motion of said lever causes the lower sleeve and spindle to be moved downward until the latter has been partially rotated within the former and the surplus portion of the lower projecting end of the steady-pin has been cut off by the shearing action before described, the relative positions of parts being shown in Fig. 9. Upon moving the cam-lever in the opposite direction, the operative parts of the machine will be returned to their normal positions, as seen in Figs. 1 and 6, when the steady-pin will be found to have been firmly driven to place and all of the surplus stock removed from each of its ends, only enough stock being left to form the desired head.

Having thus described my invention, what I claim is—

1. As an improvement in the manufacture of watch-movements, a machine in which are combined mechanism, substantially as shown, for automatically driving a steady-pin to place, and for cutting off the surplus stock from each of its ends, substantially as and for the purpose specified.

2. As an improvement in the manufacture of watch-movements, a machine in which are combined the following elements, to wit: mechanism for supporting an escape-lever and its pallets in position to receive a steady-pin, mechanism for driving the steady-pin to place, and mechanism for cutting off the surplus stock from each end of said steady-pin, substantially as and for the purpose shown.

3. As an improvement in the manufacture of watch-movements, a machine in which are combined with means for supporting an escape-lever and its pallets in position to receive a steady-pin, means for driving the steady-pin to place, means for cutting off the surplus stock from the upper end of said steady-pin, and means for cutting off the surplus stock from the lower end of said steady-pin, said mechanism being arranged to operate in the order named, substantially as and for the purpose set forth.

4. As an improvement in the manufacture of watch-movements, a machine in which are combined with means for supporting an escape-lever and its pallets in position to receive a steady-pin, means for driving the steady-pin to place, means for cutting off the surplus stock from the upper end of said steady-pin, and means for cutting off the surplus stock from the lower end of said steady-pin, said mechanism being adapted to be automatically actuated in the order named by the movement of a cam-lever, substantially as and for the purpose shown and described.

5. As an improvement in the manufacture of watch-movements, a machine in which are two plates, one of which is superimposed upon the other, and each is provided with an opening that is adapted to receive the projecting end of a steady-pin, and coincides with the opening in the other plate, in combination with means, substantially as shown, whereby a sufficient pressure of said plates against the escape-lever and pallets, or from said escape-lever and pallets upon said plates, will cause one of the latter to move with relation to the other so as to throw their said openings out of coincidence, substantially as and for the purpose shown.

6. As a means for supporting the escape-lever and pallets, the arbor and the steady-pin, and for cutting off the lower end of the latter, the hollow vertically-movable sleeve provided at its upper end with a covering-plate that has an axial opening for the guard-pin, and an eccentrically-located opening for the steady-pin, and the hollow spindle fitted into said sleeve and provided within its upper closed end with openings for the reception of said guard and steady pins, which openings normally coincide, in combination with means, substantially as described, whereby said parts are held with a yielding pressure at the upper limit of their motion, and when depressed said spindle is partly rotated within said sleeve, so as to move their steady-pin openings out of coincidence with each other, substantially as and for the purpose set forth.

7. As a means for driving a steady-pin to place and cutting off the surplus stock from the other end, a vertically-movable spring-supported hollow sleeve, which at its lower end is provided with an inclosing-plate that has an eccentrically-located opening for the reception of the end of the steady-pin, a hollow spindle fitted within said sleeve and provided within its inclosed end with a steady-pin opening that normally coincides with the like opening of said sleeve-plate, a plunger placed within said spindle and provided with an arm which is held with a yielding pressure within

said steady-pin openings, in combination with each other, with means for supporting the escape-lever, pallets, and steady-pin in position for operation, and with means, substantially as shown, whereby said sleeve and spindle are first moved downward until said plunger has forced said steady-pin to place, and has been pressed upward within said spindle, and the latter is then partially rotated, so as to move the steady-pin openings out of coincidence and cut off the projecting end of said steady-pin, substantially as and for the purpose specified.

8. As a means for confining the inclosing-plate upon the end of the sleeve, a thimble which is adapted to fit over the end of said sleeve, and to engage the outer face of said plate at its edge, and a nut that engages with a peripheral flange upon said thimble, and with a threaded portion of the periphery of said sleeve, substantially as and for the purpose shown.

9. In combination with the thimble and nut employed for confining the inclosing-plate upon the end of the sleeve, a spiral spring placed beneath and adapted to exert an outward pressure upon said thimble, substantially as and for the purpose set forth.

In testimony that I claim the foregoing I have hereunto set my hand this 13th day of March, A. D. 1886.

GEO. E. HUNTER.

Witnesses:
W. P. HEMMENS,
W. H. CLOUDMAN.