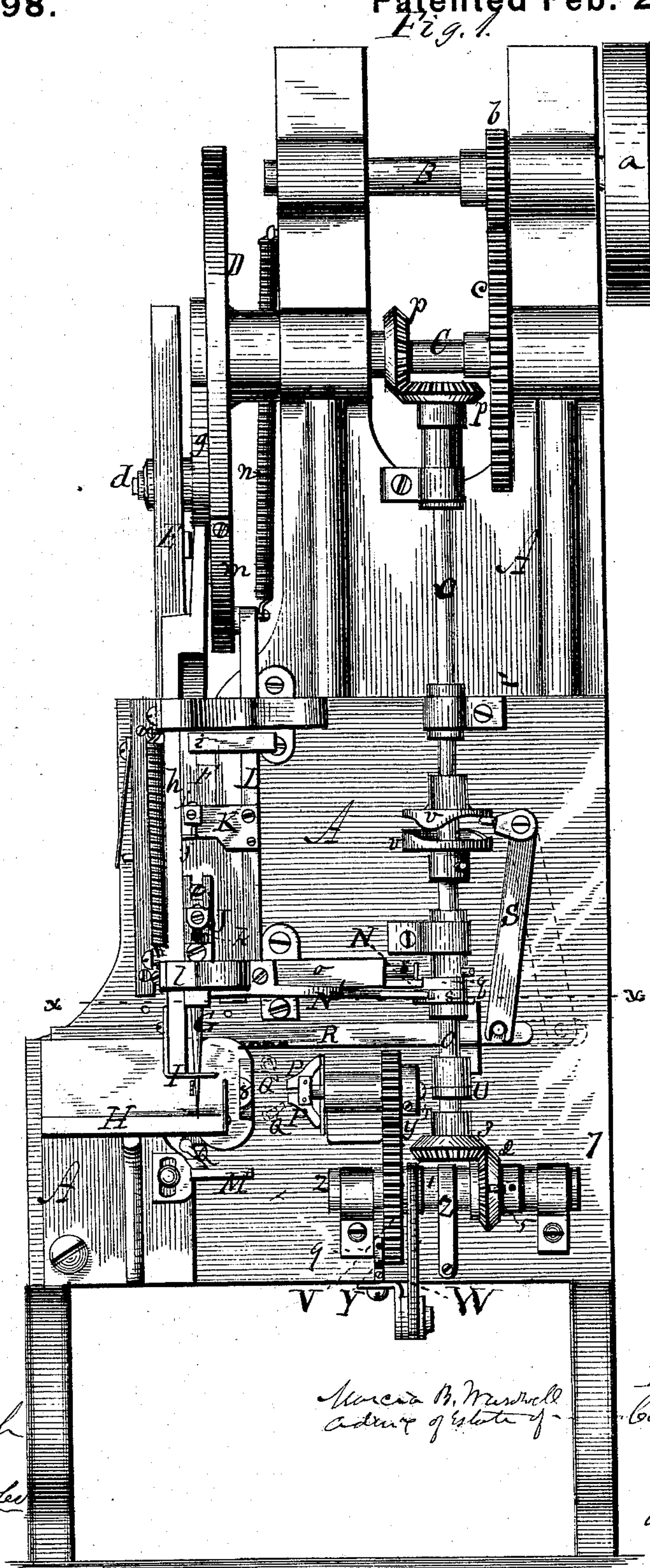


C. P. S. WARDWELL, dec'd., 3 Sheets—Sheet 1.

M. B. WARDWELL, Administratrix, J. L. ODELL, administrator de bonis non,
Successor to M. B. WARDWELL.

Machine for Wiring Paper into Bunches.
No. 238,198. Patented Feb. 22, 1881.



Witnesses;
Fred. G. Dosterich
J. Walter Lowder

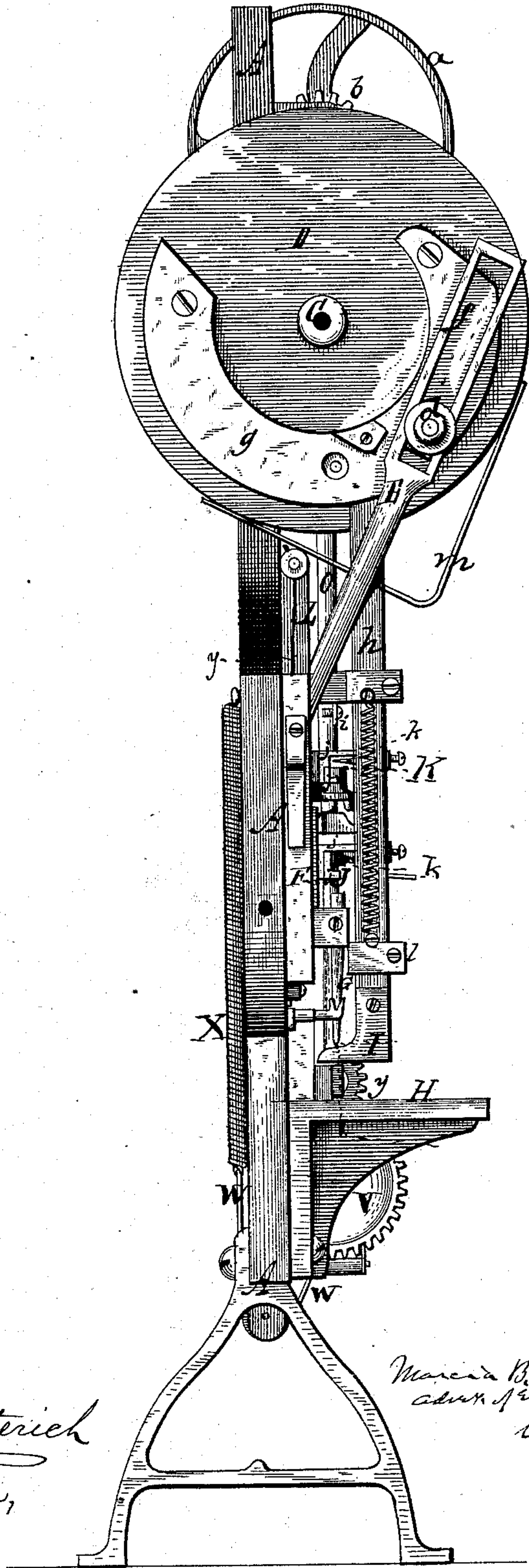
Marcia M. Wardwell
Admin^r of estate of—

Inventor;
C. P. S. Wardwell
By *heavily*
J. M. M.

C. P. S. WARDWELL, dec'd.,

M. B. WARDWELL, Administratrix, J. L. ODELL, administrator de bonis non,
Successor to M. B. WARDWELL.

Machine for Wiring Paper into Bunches.
No. 238,198. *Fig. 2.* Patented Feb. 22, 1881.



Witnesses;
Fred. G. Dieterich
J. Walter Fowler,

Marcia B. Wardwell Inventor;
Admin. of estate
C. P. S. Wardwell,
My atty.,
J. S. Brown

C. P. S. WARDWELL, dec'd.,

M. B. WARDWELL, Administratrix, J. L. ODELL, administrator de bonis non,

Successor to M. B. WARDWELL.

Machine for Wiring Paper into Bunches.

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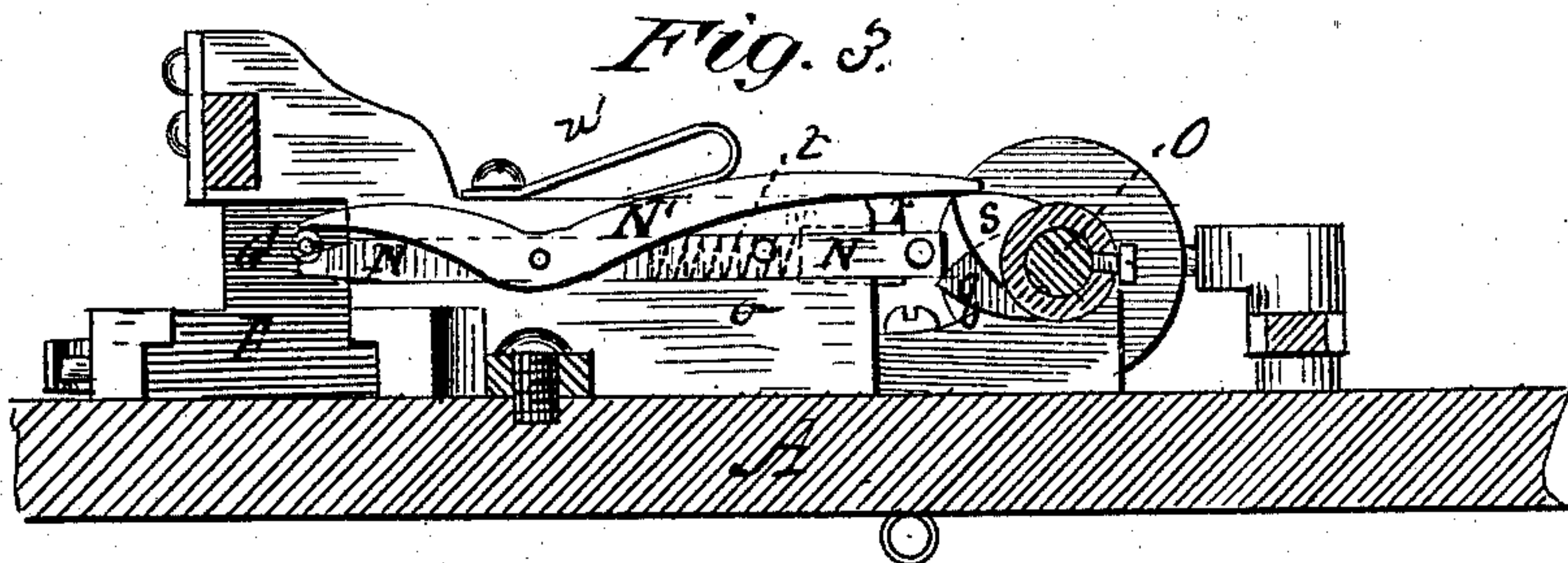


Fig. 4.

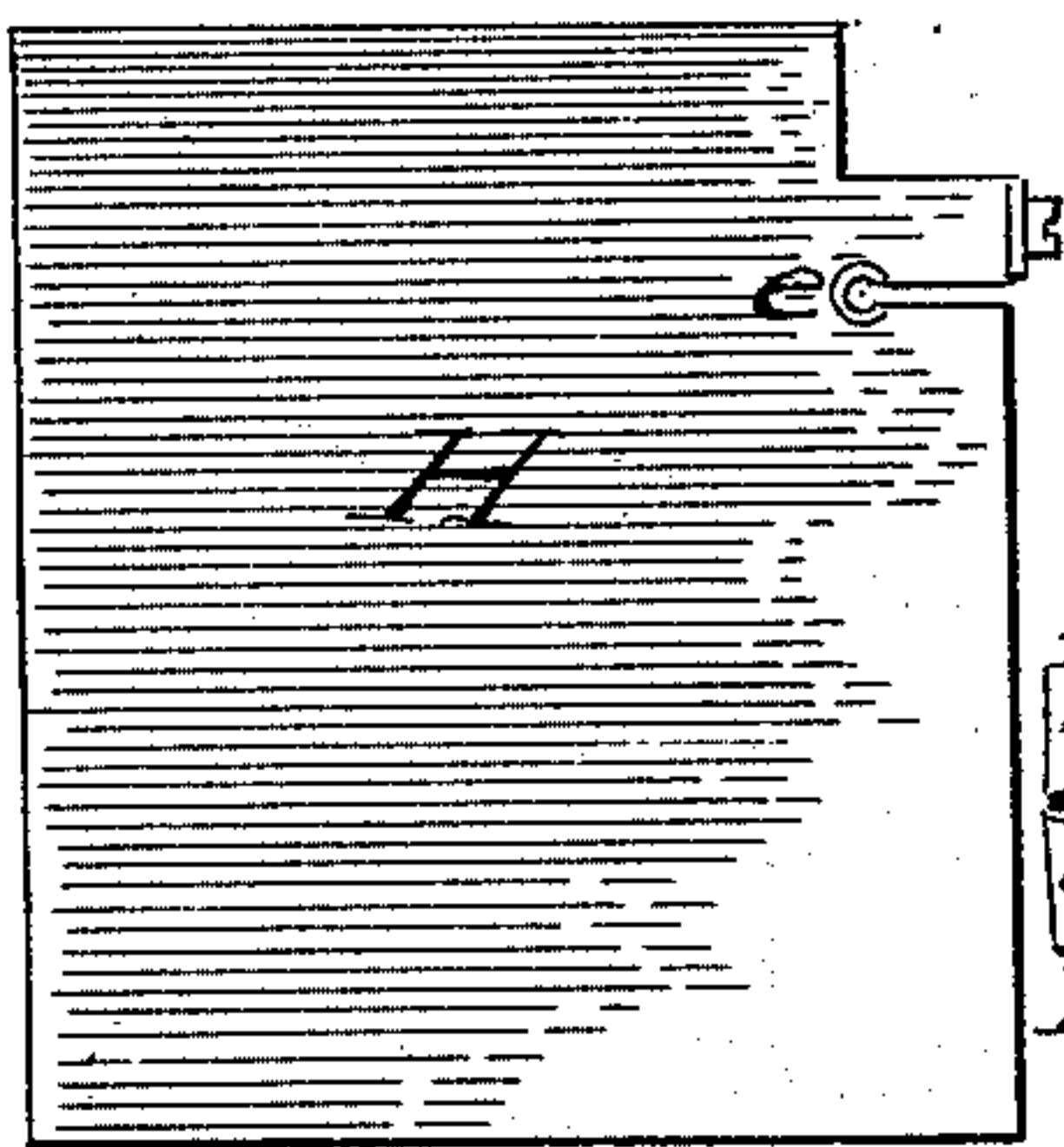


Fig. 8.

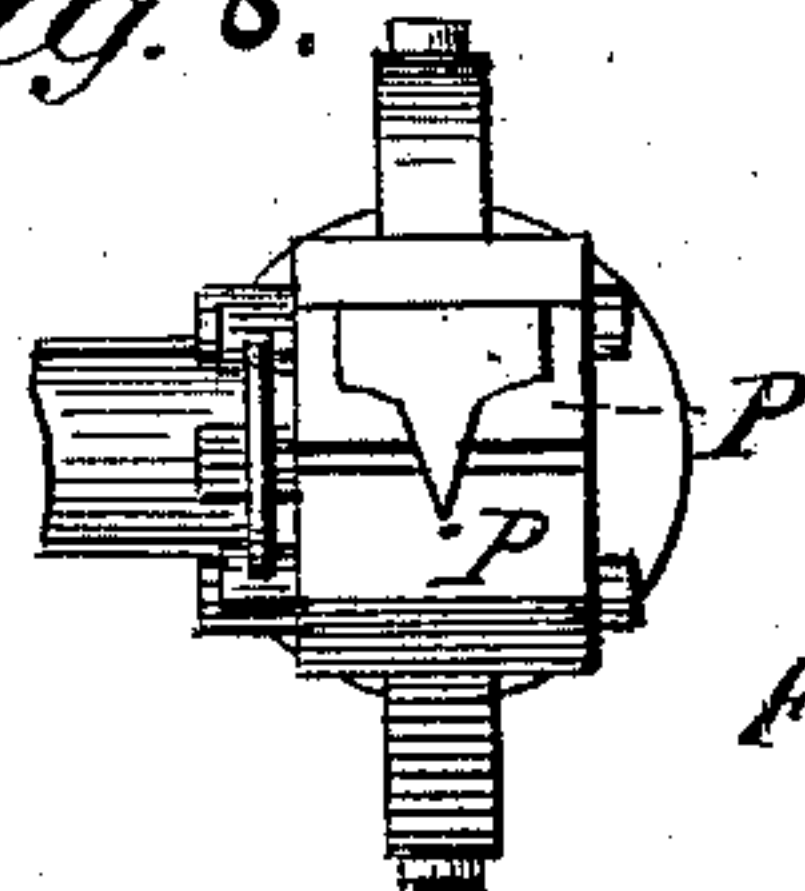


Fig. 7.

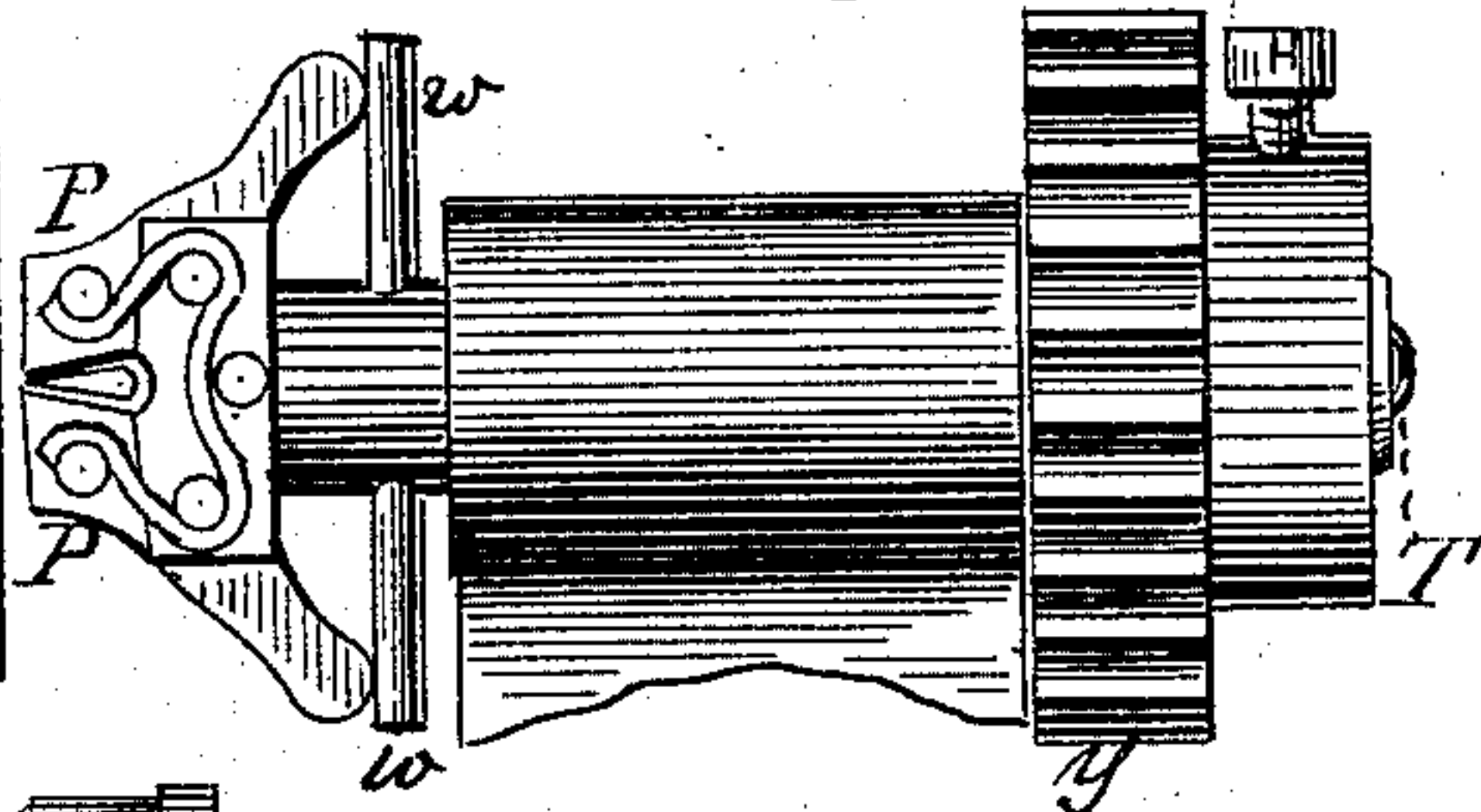


Fig. 10.

G

Fig. 6.

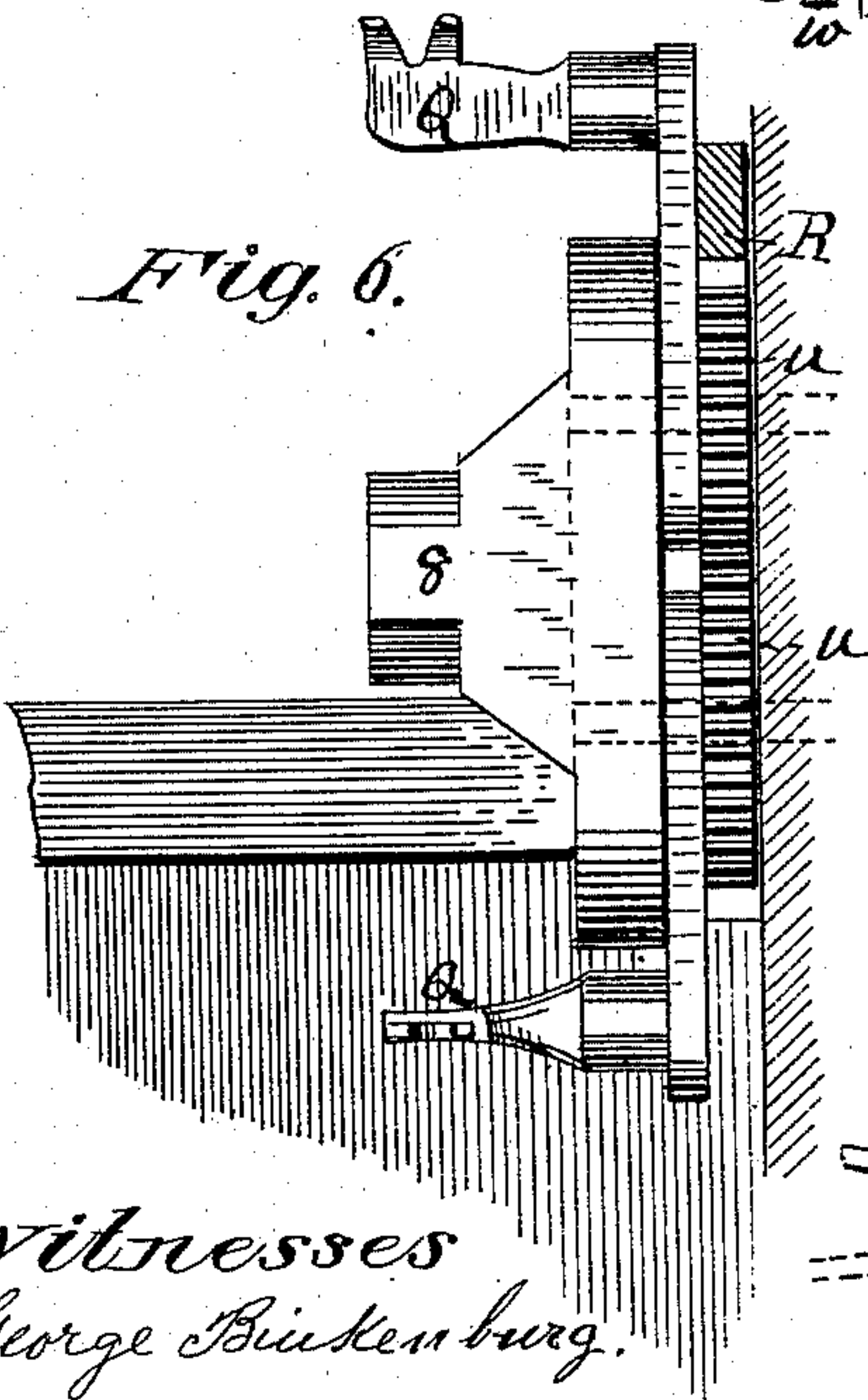


Fig. 9.

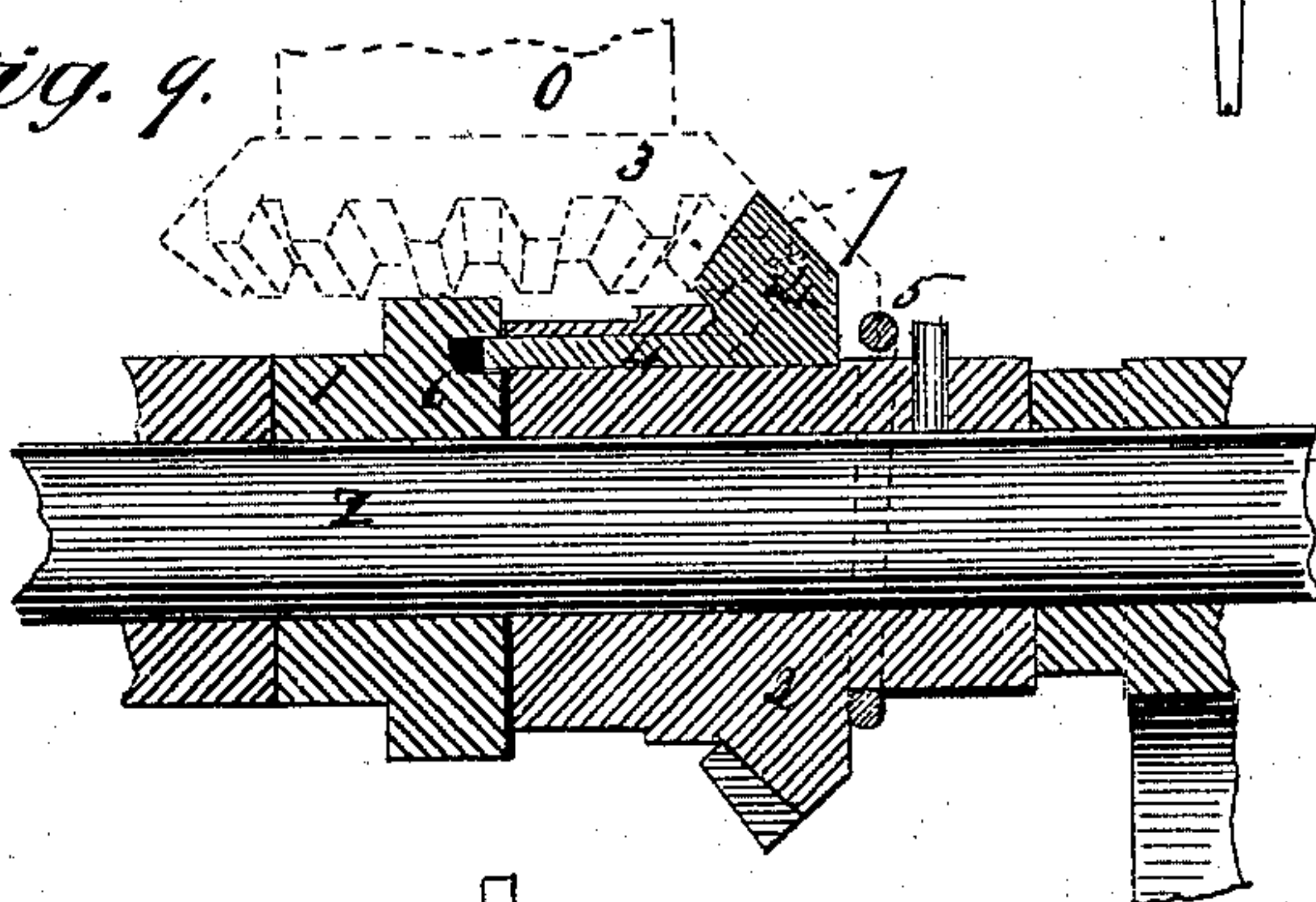
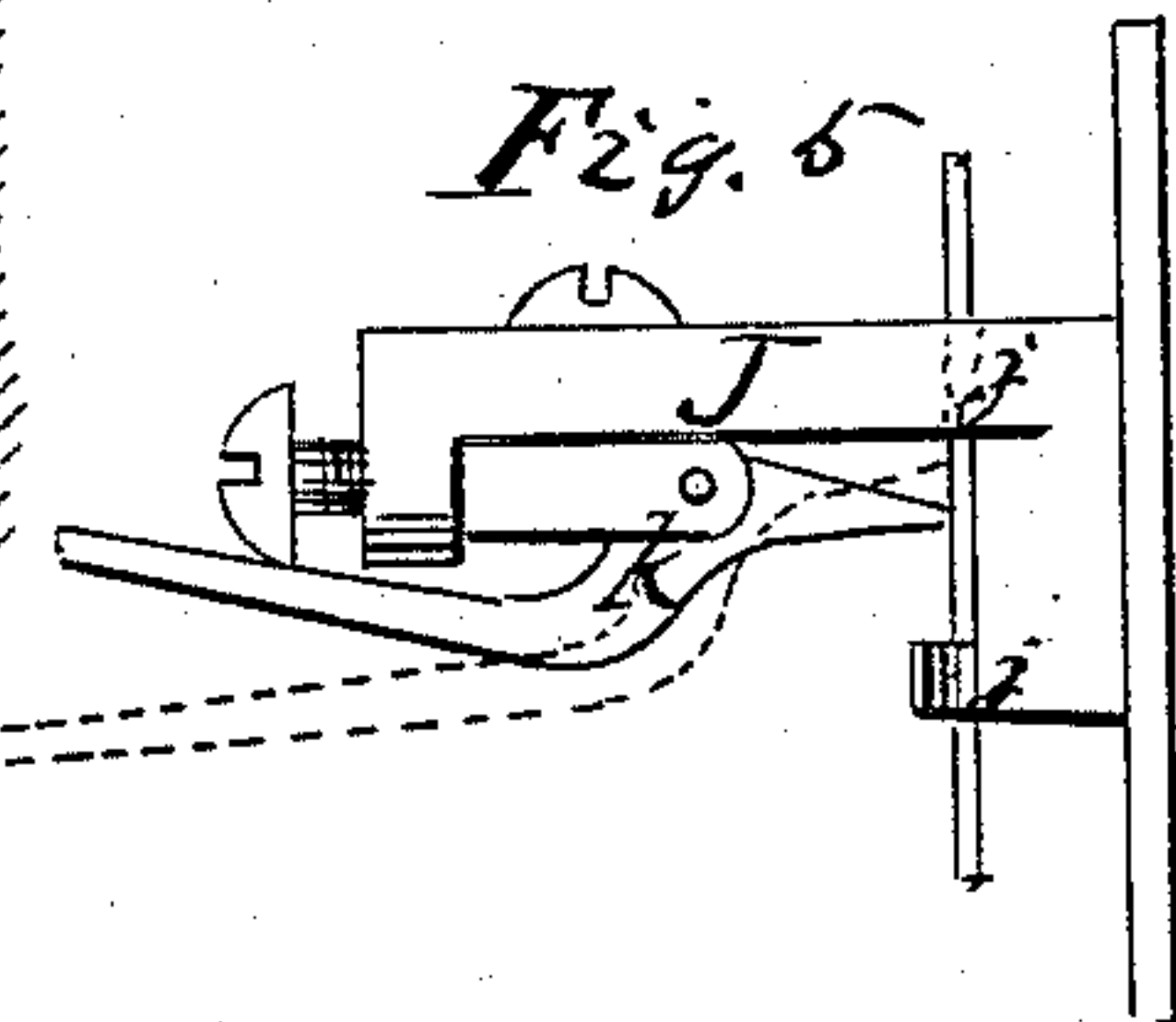


Fig. 5.



Witnesses
George Binkenburg.
Fred. G. Dietrich

Marcia B. Wardwell,
Admin. of estate of
Inventor,
C. P. S. Wardwell.

My atty.
J. P. Moore

UNITED STATES PATENT OFFICE.

JOSEPH L. ODELL, OF GILFORD, NEW HAMPSHIRE, ADMINISTRATOR DE BONIS NON, SUCCESSOR TO MARCIA B. WARDWELL, ADMINISTRATRIX OF CHARLES P. S. WARDWELL, DECEASED.

MACHINE FOR WIRING PAPER INTO BUNCHES.

SPECIFICATION forming part of Letters Patent No. 238,198, dated February 22, 1881.

Application filed September 2, 1879.

To all whom it may concern:

Be it known that CHARLES P. S. WARDWELL, deceased, did invent a new and Improved Machine for Wiring Paper; and I, MARCIA B. WARDWELL, of Lake Village, in the county of Belknap and State of New Hampshire, administratrix of the estate of the said CHARLES P. S. WARDWELL, do hereby declare that the following is a full and exact description of the said machine, reference being had to the accompanying drawings, making part of this specification—

Figure 1 being a front view of the machine; Fig. 2, a side view of the same; Fig. 3, a horizontal section in a plane indicated by the line *x x*, Fig. 1; Figs. 4, 5, 6, 7, 8, and 9, views of parts in detail; Fig. 10, a view of the paper-perforating needle enlarged.

Like letters designate corresponding parts in all of the figures.

The object of this invention is to insert a loop of wire, or its equivalent, through a thick bunch—as a ream, more or less—of paper, and to twist or otherwise secure the ends of the inserted wire together by an automatic operation, and to effect this with successive bunches rapidly and at slight expense.

The entire organization of the machine is believed to be new, and the specific features of novelty therein will be designated in order.

Any suitable stand or frame, A, as represented or otherwise, is employed. The prime driving shaft B, located near the top, receives its power from the provided source by a belt running on the pulley *a* thereof. Suitable gear-wheels, *b c*, communicate a slower motion, as desired, from this shaft to another shaft, C, by which the several operative parts of the machine receive their movements.

Upon the shaft C is a crank and cam disk or wheel, D, for producing the paper-perforating and wire-inserting movements.

A crank-pin, *d*, on the face of the disk D, operates a connecting-rod, E, which is pivoted at its lower end to a vertically-sliding carriage or head-block, F, to the lower end of which is secured a hollow or tubular needle, G, that perforates the bunches of paper by its downward motion, and opens a passage for the wire

threaded and carried therein. The paper at the time rests on a table or support, H, which has a hole, *e*, Fig. 4, through it for the needle to pass down into or through, the said hole opening to one edge of the table by a side slot, whereby the wire, when passed through the table, is carried out without withdrawing, for securing the ends of the piece forming the loop together, while the paper remains on the table. As the needle is required to remain stationary for a time in its lowest position, the upper end of the connecting-rod E has a long slot bearing, *f*, to work on the crank-pin *d*. The length of this slot is equal only to about half the diameter of the sweep of the crank-pin, to allow the requisite extent of vertical movement of the needle-carrier F to be produced thereby.

A cam, *g*, on the face of the disk D forces down a vertically-sliding bar, *h*, which carries a presser-plate, I, to hold the bunches of paper compactly on the table, and allow the needle to be withdrawn therefrom in its upward movement. The presser-plate is also perforated and notched or slotted at one edge, to allow the passage through of the needle and the lateral discharge of the wire therefrom when securing its ends together. The wire, having first been straightened and wound upon a reel of large diameter, first passes from the reel down through a friction-clamp, *i*, then through two dogs, J and K, in succession, then into and through the needle G. The dogs J and K by their peculiar construction and operation feed the wire down in proper lengths at successive movements in the following manner: The lower dog, J, is attached to the needle-carrier F, and has, of course, corresponding and simultaneous movements therewith. It is constructed with two guide eyes or holes, *j j*, and between them a pivoted catch, *k*, as shown most clearly in Fig. 5, which clamps the wire between its end, made sharp or chisel-edged, and the back plate of the dog. It is so hung and pivoted that when the dog descends it swings upward till its sharp end clamps against and holds the wire, the outer end thereof being counterweighted, so as to tend to hold against the wire; but when the dog ascends it frees the catch from its hold

on the wire and slides thereon. As the needle-carrier descends, this dog draws the wire, already reaching through the entire length of the needle, down with it till the needle approaches its lowest position, when the outer end of the dog-catch strikes a fixed part, *l*, of the frame, and, being raised thereby, loosens the holding end of the catch and sets the wire free. Just then the upper dog, *K*, which is constructed and operates in the same way as the dog *J*, begins to descend and moves the wire down still farther, so that it will project sufficiently below the needle and the bunch of paper for connecting with the other part above the paper and form a loop of the requisite size. This dog *K* is mounted on a separate sliding bar, *L*, which is forced down by a cam, *m*, on the periphery of the disk *D*, and its return upward movement is effected by a counter-spring, *n*, or its equivalent. Its catch is released from the wire at the close of its downward movement by striking the top of the dog *J*, which at that time just begins to ascend with the needle. A trough or support, *M*, below the table receives the lower end of the wire, and sustains the part cut off from the wire stock to form the successive loops until the twisting or end-uniting mechanism is brought into action.

The severing of the wire to form the loop, which is the next operation, and is effected as soon as the needle ascends far enough to permit it to be done below the same, is performed by a mechanism substantially as follows: The cutting-off device, as shown in Fig. 3, consists of shear-blades *N N'*, which have a longitudinally-sliding movement in a part, *o*, of the frame, so as to retire out of the way of the needle as the same descends, but to advance at the proper time, and then cut off the wire. To this end one blade, *N*, slides in its way endwise and has no other movement. The other blade, *N'*, is pivoted to and carried by the sliding blade *N*, and has a lateral movement to shear off the wire. To produce these movements of the shear-blades, a vertical shaft, *O*, is mounted on the frame in a proper position, and receives its motion from the shaft *C* by suitable bevel-wheels *p p*, of equal size, so that the shaft makes one revolution at each entire movement of the needle and other operative parts. On this shaft is a cam, *q*, which moves the sliding blade *N* forward, the return movement being effected by a spring (shown by dotted lines in Fig. 3) acting on a push-bolt, *r*. Another cam, *s*, on the shaft *O* swings the shear-blade *N'*, to cut off the wire at the proper moment. Its reverse opening movement is also effected by a counter-spring, *u'*.

The next operation is to bring the ends of the severed wire around together, and to insert the same between the twisting-jaws *P P*. This is effected by two forks or hook-fingers, *Q Q*, which turn on two shafts, Figs. 1 and 6, bearing, respectively, cog-wheels *u u*, geared together, and one also geared into a rack, *R*,

whereby the fingers are vibrated in the proper arc of a circle, one limit of which is indicated by the position of the fingers in full lines back of the wire in Fig. 1, and the other by the position of the fingers in dotted lines in the same figure. The reciprocating motion of the rack *R* to produce this vibratory movement of the fingers is produced by a crank-lever, *S*, one arm of which engages with the rack-bar, and the other arm is actuated by counter-cams *v v* on the shaft *O*. The fingers bring forward the ends of the wire and insert them between the twisting-jaws *P P*, which at the time are in a vertical position, as indicated in Fig. 7, and at right angles to the position shown in Fig. 1, which is the position of the same after the twisting of the wires, and when the loop-wire is to be withdrawn therefrom and the wired paper bunches from the machine.

The construction and operation of the twisting apparatus are substantially as follows: The twisting-jaws *P P* are mounted on a horizontal shaft nearly in line with the center of the vertical shaft *O*, and are pivoted thereto, as shown. A sliding pin or bolt, *T*, located in the center of the jaw-shaft, bears a cross pin or bar, *w*, which presses against the heels of the pivoted jaws *P P*. When the jaws are in a horizontal position, ready to receive the ends of the wire, the pin *T* is held back by a spring, so as to leave the jaws *P P* just far enough open to admit the ends of the wire. As soon as these wire ends are inserted, a cam, *U*, on the shaft *O* strikes the projecting end of the pin *T*, and, pushing it forward, closes the jaws against the wire and holds the same till the twisting is performed. A little projection on the middle of the face of one jaw enters a notch or depression in, or projects over, the other jaw, as shown in Fig. 8, thus closing the space between the jaws and preventing the ends of the wire from crossing each other as they are brought into place, and holding them in the exact position required. The revolving of the jaws for twisting the ends of the wire together after they are inserted and the jaws are clamped against them is effected instantaneously by independent power, while the shaft *O* and cam *U* remain in nearly one position and hold the jaws clamped together. To effect this a pinion, *y*, is secured on the jaw-shaft, and into this gears a cog-wheel, *V*, of larger diameter, so as to give as many turns of the wire-twisting shaft as desired by giving only a part of one revolution to the cog-wheel shaft *z*. On this shaft is a drum or pulley, *1*, around which winds a strap, cord, or chain, *W*, the other end of which is connected with a spring or weight, *X*, for turning the cog-wheel with the necessary force to twist the wires. On this shaft, also, is a bevel-gear wheel, *2*, which gears into another bevel-gear wheel, *3*, on the vertical shaft *O*, and consequently turns the drum-shaft constantly as the machine continues to operate; but the drum is attached to a collar or sleeve, which turns freely on the said shaft when not

coupled to the gear-wheel 2 or its shaft direct. This coupling is effected by means of a sliding pin, 4, Fig. 9, kept pushed against the said collar by a spring, 5, and is thereby caused to catch against a shoulder or in a hole, 6, in the end thereof. The drum is thus ordinarily kept coupled to its shaft, so that as the shaft O revolves, the cog-wheel V and drum 1 revolve and wind the drum strap or cord W on the drum, thereby drawing upon the spring or weight. By the time that the fingers bring the ends of the wire to the jaws P P the shaft O has turned the said jaws around and brought them into a vertical position, ready to receive the ends of the wire, which are then inserted by the fingers, and the cam U clamps them therein. Just then one of the cogs of the bevel-gear wheel 3 strikes a projection, 7, on the sliding pin 4, which lies between two cogs on the bevel-gear wheel 2, into which the said bevel-wheel 3 gears, and slides the pin back sufficiently to uncouple it from the drum, whereupon the spring or weight X acts to turn the drum through the strap or cord W wound thereon, and consequently revolves the jaws P P and instantly twists the ends of the wire together. A projection block or bar, 8, is fixed inside of the wire ends, just back of where the twist is made, to prevent the twist from being made too far from the ends. A projection, 9, on the cog-wheel V strikes an elastic stop, Y, when the strap or cord W has sufficiently turned it, and holds it there a moment, leaving the jaws P P, as shown in Fig. 1, in a horizontal position long enough to allow the ready removal of the wire loop therefrom and the wired bunch or package of paper from the machine. By this time the cam U has passed along and allowed the jaws to open and set the wire free to be withdrawn. A friction-brake, Z, bears lightly against the periphery of the drum 1, to keep the same in its proper position at all times.

The needle G is not only tubular from end to end, but has a notch at one side from the tubular aperture at the point, so that the wire may turn to one side without injuring the point. This notch does not interfere with penetrating the paper.

What I claim as the invention of the late CHAS. P. S. WARDWELL is—

1. In a machine for wiring paper, the combination of a tubular perforating-needle, G, through which the wire passes, and wire-feeding dogs J K, situated above the needle and having separate and differently-timed movements, substantially as and for the purpose herein specified.

2. In a machine for wiring paper, the twisting-jaws P P, arranged to receive the ends of the wire when in a position at right angles to the block or anvil 8, and to deliver the same when in a position parallel with the said block

or anvil, substantially as and for the purpose herein specified.

3. The combination of a tubular perforating-needle, through which the wire is fed, wire-carrying arms Q Q, and a pair of revolving jaws, P P, for twisting the ends of the wire together, substantially as herein specified.

4. The wire-feeding dogs J K, having separate independent movements, and arranged to be operated at different times; substantially as and for the purpose herein specified.

5. The shear-jaws N N', having first a longitudinal advancing movement, then a shearing movement, and then a longitudinal receding movement, by means substantially as described, and for the purpose herein specified.

6. The twisting-jaws P P, in combination with the pinion y, cog-wheel V, drum or pulley 1, strap, cord, or chain W, and spring or weight X, constituting an independently-acting device, substantially as and for the purpose herein specified.

7. In combination with the twisting-jaws P P, the continuously-revolving shaft O, the drum 1, arranged to be alternately coupled to and uncoupled from the said shaft, the chain, cord, or belt W, and spring or weight X, substantially as and for the purpose herein specified.

8. In combination with the twisting-jaws P P of a paper-wiring machine, the loose drum 1 on the continuously-revolving shaft O, and intermediate gear, V y, the sliding pin 4, and cog-wheel 3, substantially as and for the purpose herein specified.

9. The combination of the support M, arms Q Q, twisting-jaws P P, and projecting block or anvil 8, substantially as and for the purpose herein specified.

10. The projection 9 on the cog-wheel V, in combination with the elastic stop Y, substantially as and for the purpose herein specified.

11. A machine for wiring paper in quantity and uniting the ends of the wire after it is passed through the paper, having the following elements: a hollow perforating-needle, G, in which the wire is fed through the paper, a wire-severing device, N N', revolving twisting-jaws P P, to unite the ends of the wire passed through the paper and severed from the continuous wire, and arms Q Q, or equivalent means for bringing the ends of the severed wire to the twisting-jaws, substantially as herein specified.

The foregoing specification signed by me.

MARCIA B. WARDWELL,
Administratrix of the estate of Chas. P. S. Wardwell, deceased.

Witnesses:

JOHN ALDRICH,
KATE HASERICK.