

I. H. HATCH.
Box-Nailing Machine.

No. 212,096.

Patented Feb. 11, 1879.

Fig. 1.

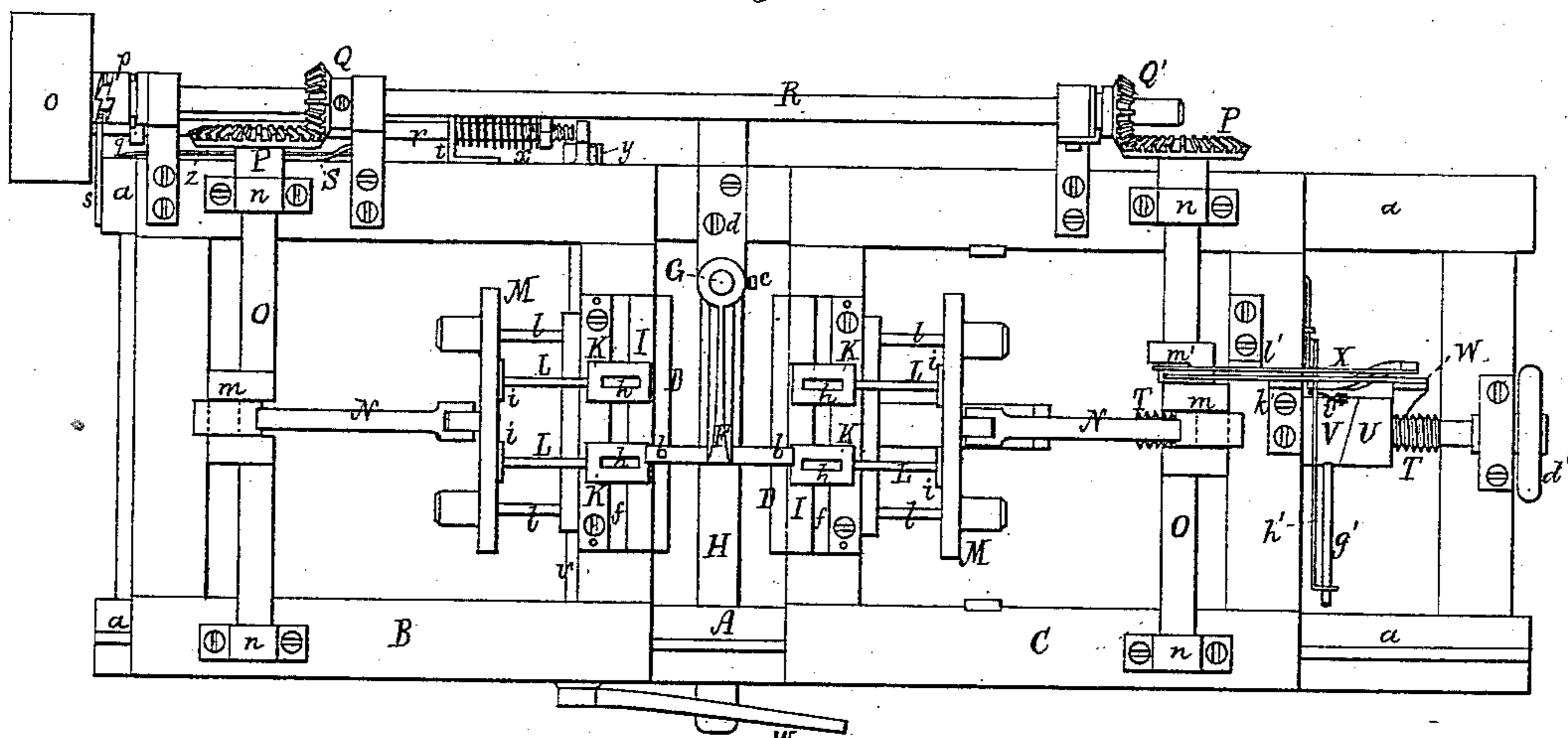
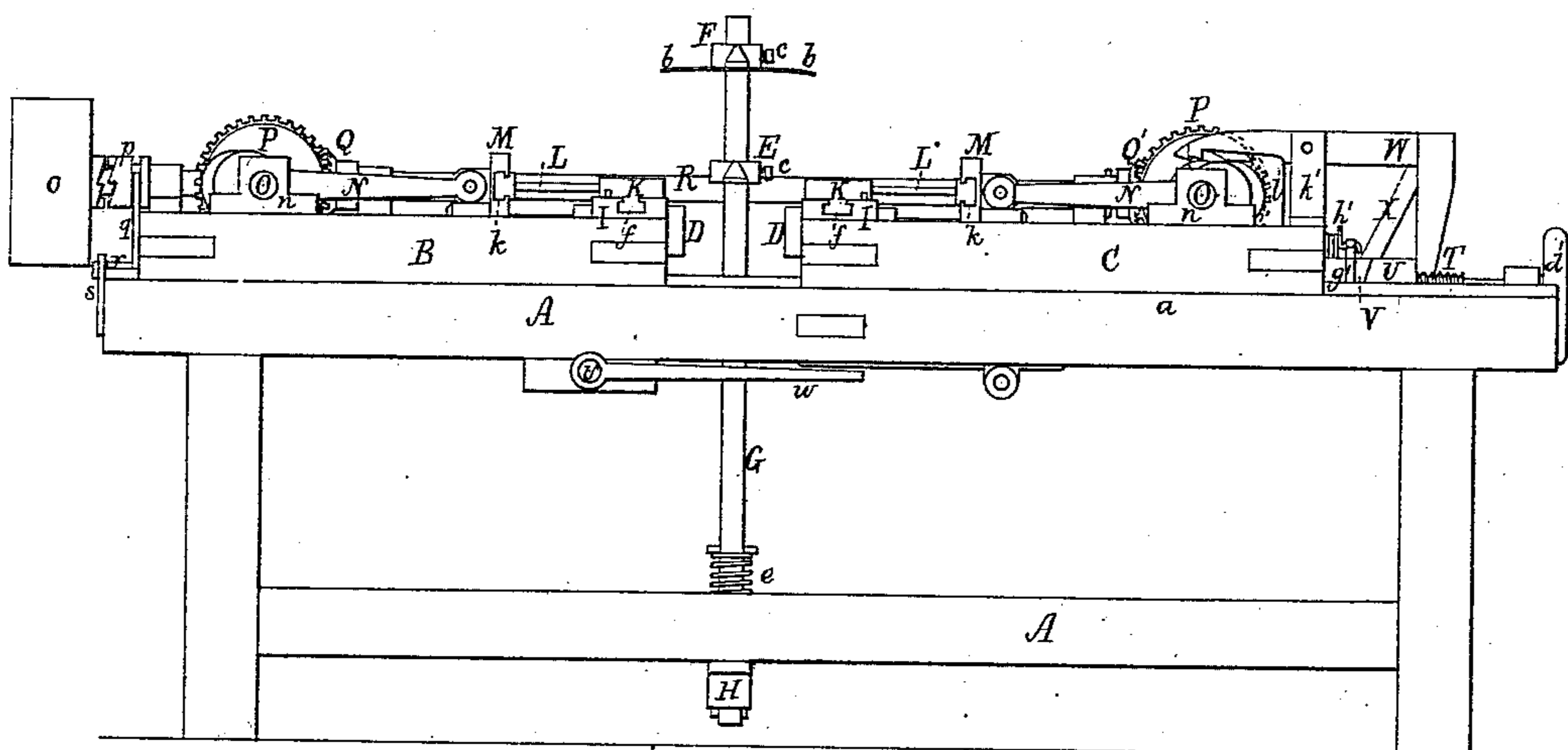


Fig. 2.



Witnesses.

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Fig. 4.

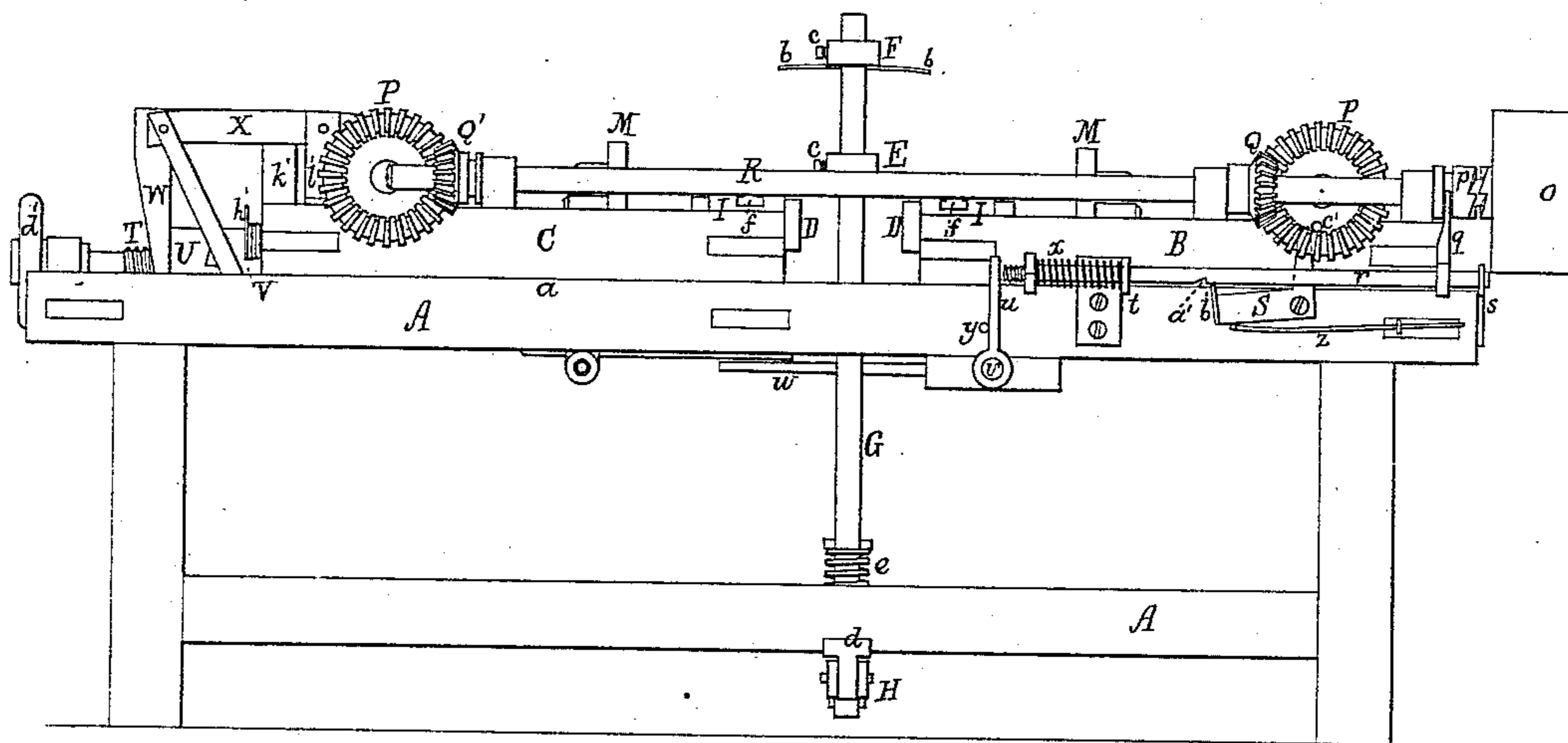


Fig. 3.

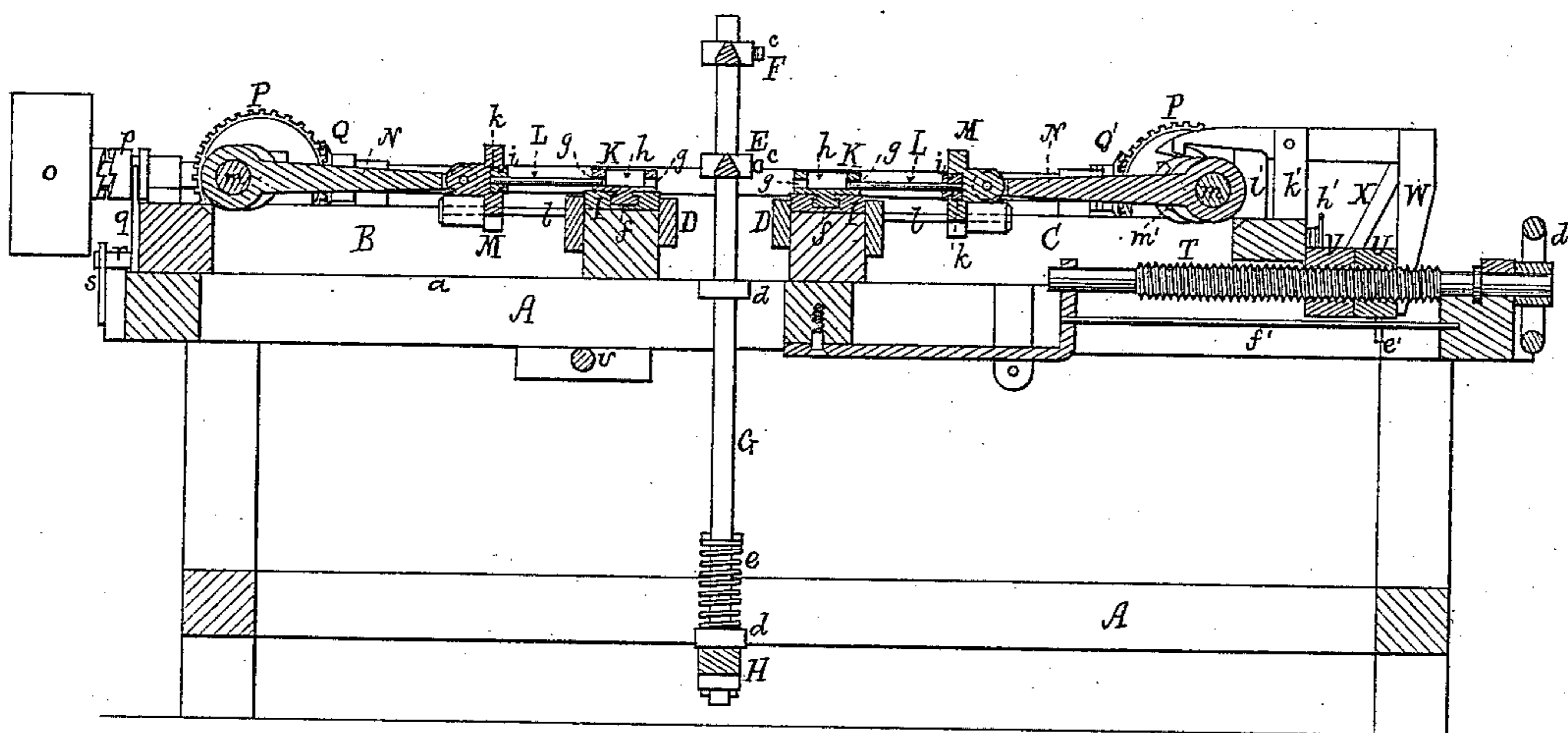


Fig. 8.



Fig. 9.

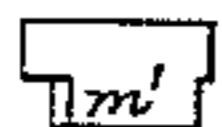


Fig. 5.

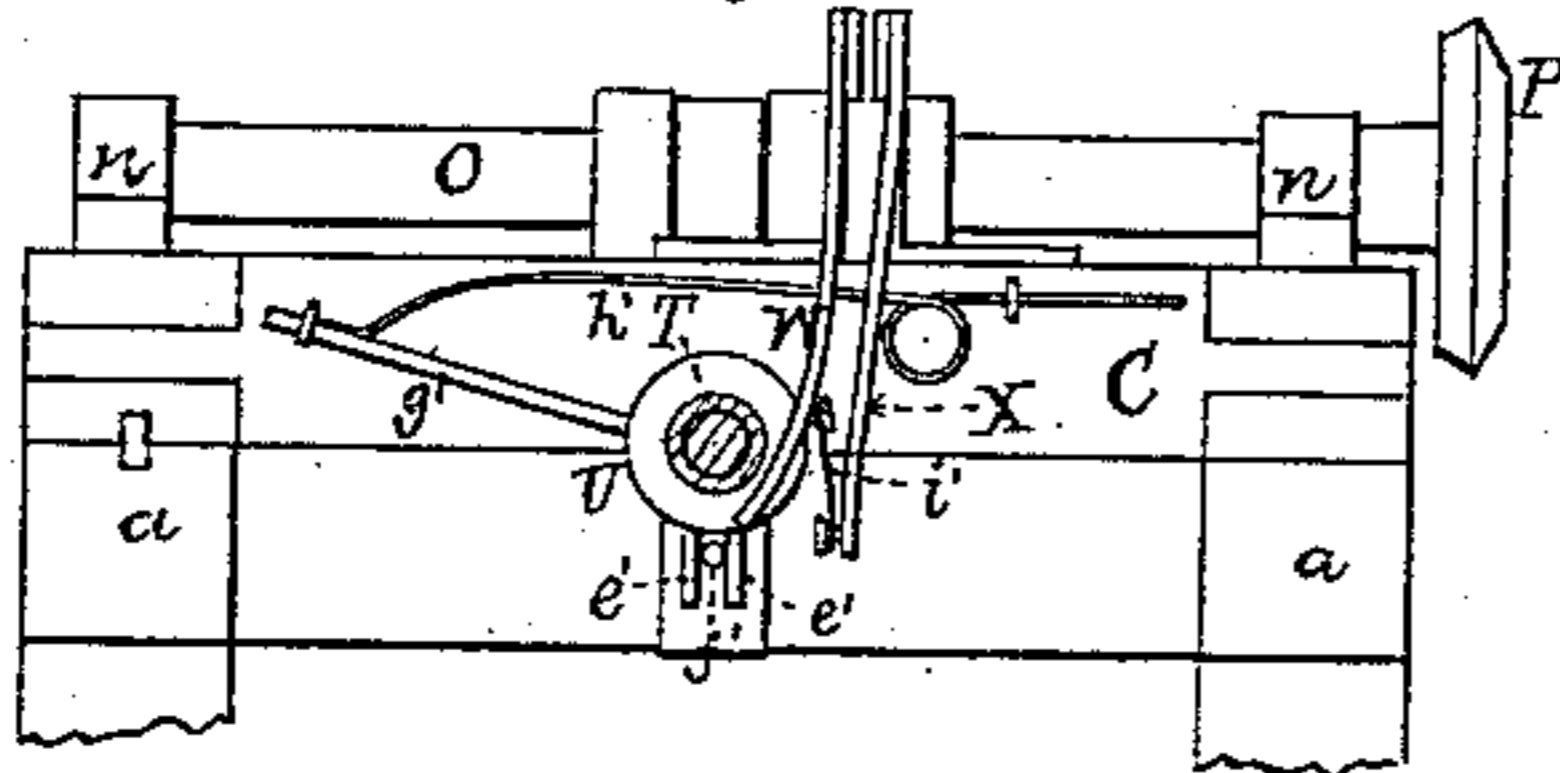


Fig. 6.

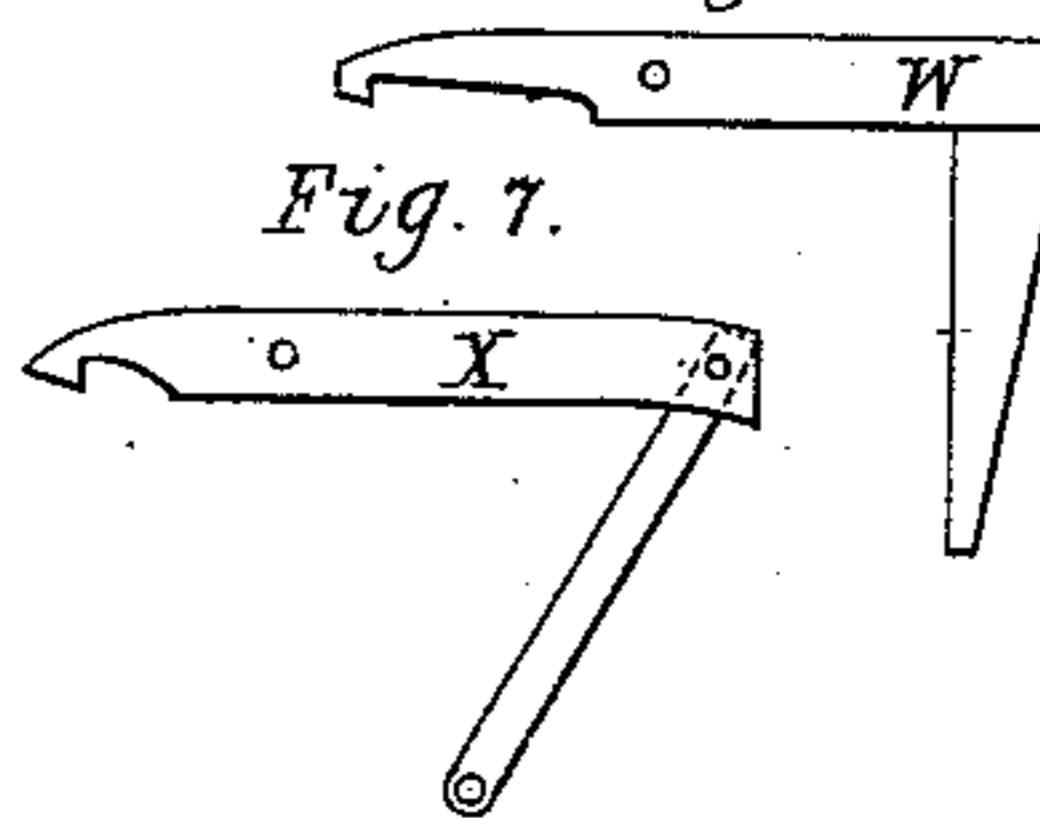
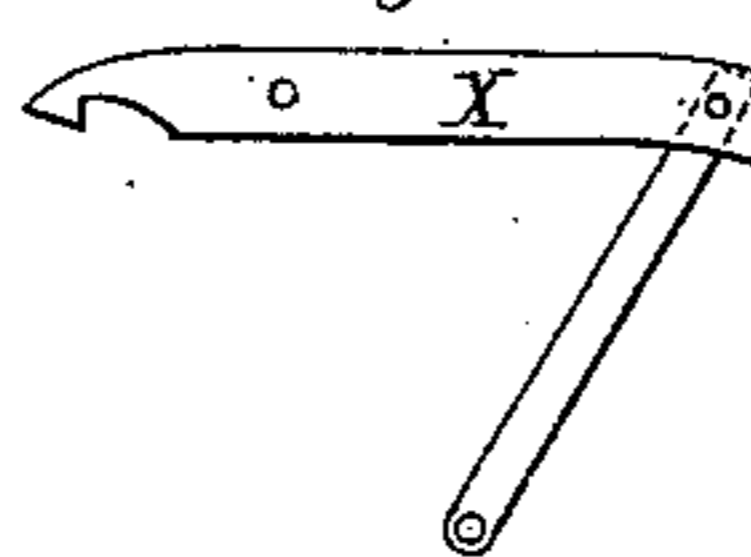


Fig. 7.



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ISRAEL H. HATCH, OF NORTH MARSHFIELD, MASSACHUSETTS.

IMPROVEMENT IN BOX-NAILING MACHINES.

Specification forming part of Letters Patent No. **212,096**, dated February 11, 1879; application filed October 28, 1878.

To all whom it may concern:

Be it known that I, ISRAEL H. HATCH, of North Marshfield, of the county of Plymouth, of the State of Massachusetts, have invented a new and useful machine for nailing together the parts of a wooden box; and do hereby declare the same to be described in the following specification, and represented in the accompanying drawings, of which—

Figure 1 is a top view, Fig. 2 a front elevation, Fig. 3 a longitudinal section, and Fig. 4 a rear elevation, of such machine.

My invention is an improvement in the class of machines adapted for nailing at one operation or simultaneously one end and two side pieces of a box, or to fasten such to a box-bottom; and for such purpose it has two sets of nail-drivers and two sets of nail-carriers for holding and driving the nails. It also has rests, jaws, and other devices for holding and supporting the work, all of which, as well as what I claim as my invention, are hereinafter explained.

In the drawings, A denotes the frame of the machine, upon which there are placed one stationary carriage, B, and one movable carriage, C, with the latter resting on parallel rails or ways *a a*, to guide it in its movements toward and away from the former, which compose part of the frame. Applied to the inner edges of such carriages are two rails, D D, upon which the parts to be nailed together are to rest, such parts, for instance, being one end and two side pieces of a box. In arranging such parts on the two rails or rests, the end part would be placed horizontally and the two side parts vertically on such rests, the end part being between and against the two side parts, and held down upon them by an arm, E, projecting horizontally from a vertical rod, G, arranged as shown. Over the arm E is another arm, F, which also extends from the rod G, and is provided with auxiliary elastic arms *b b*, to bear down upon the upper ends of the box side pieces to be nailed to the end part.

Each of the arms E F is adjustable vertically on the rod, and is provided with a clamp-screw, *c*, to confine it thereto. The rod slides freely in bearings *d d*, and at its lower end is pivoted to a pedal, H, arranged as shown.

There is also attached to the rod a spring, *e*, for elevating it or pressing it upward.

Alongside of the two rests D D, and extending a little above them, are two jaws or plates, I I, which are respectively fastened to the tops of the carriages B C. Each of these plates has a dovetailed groove, *f*, extending through it lengthwise to receive corresponding dovetails from a set of nail-carriers, K K, which slide freely on their plates, and may be provided with clamp-screws or other proper devices for clamping them in place after being properly adjusted. Each nail-carrier has a passage or hole, *g*, going longitudinally through it, such hole being provided with a lateral mouth, *h*, extending upward from it. The nails to be driven are to be dropped into the mouths, so as to fall therefrom into the said passages, and in advance of drivers or rods L, that extend into the passages from adjustable heads or slides *i i*, arranged in dovetailed grooves *k k*, formed horizontally in the inner faces of two plates or carriages, M M, such carriages being supported by and so as to slide freely on guide-rods *l*, arranged as represented.

Connecting-rods N N are jointed to the carriages M M, and to the wrists of two bell-cranks, *m m* applied to two transverse shafts, O O, arranged in bearings *n*, supported by the two carriages B C.

Beveled gears P P, fixed on the shafts O O, engage with bevel-pinions Q Q', arranged on a third shaft, R. One of the pinions is fastened to the said shaft, and the other, Q', is movable thereupon longitudinally of it, and is applied to it by a feather-connection, such as will admit of the said pinion Q', while in engagement with the shaft, being moved thereon lengthwise of it. The pinion Q' is so connected with the carriage C as to be movable with and by such carriage when the latter is in movement on its supporting-rails.

On the shaft R is a loose driving-pulley, *o*, and a sliding clutch, *p*, the latter being to engage such pulley with the shaft, so as to cause the shaft to be revolved by the pulley at proper times while such pulley may be in motion. The clutch *p*, applied to the shaft by a feather-connection, has a groove in and around it to receive an arm, *q*, extending up from a slide-

rod, *r*, supported on bearings *s t*, arranged as shown. (See Fig. 4.) The rod *r* at its inner end rests against an arm, *u*, projecting up from a transverse shaft, *v*, provided with an arm or handle, *w*, all being arranged as shown. There is also applied to the rod *r* a helical spring, *x*, for forcing it against the arm *u*, which, when the clutch is out of engagement with the loose pulley, rests against a stud, *y*, projecting from the frame.

Furthermore, there is pivoted to the frame a lever-latch, *S*, which, by a spring, *z*, is forced up to the rod *r*. The said rod is provided with a notch, *a'*, to receive the latch-head *b'*. The upper arm of the latch extends upward against the back side of the larger next adjacent bevel-gear, from which a stud, *c'*, projects. In order to cause the clutch to engage the driving-pulley (whose hub is notched to receive the teeth of the clutch) the arm or handle *w* is to be pulled upward until the latch *S* may enter the notch *a'*. Just previous to the termination of the backward movements of the nail-drivers the stud *c'* will be borne against the latch, and will force it out of engagement with the rod *r*. Immediately on this taking place the spring *x* will move the rod, so as to cause the clutch to be slid out of engagement with the driving-pulley.

The next part of the machine to be described is the mechanism for adjusting the movable carriage *C* relatively to the fixed carriage *B*, and also that for not only backing the carriage *C* a little preparatory to the introduction of a box or its parts between the holding-jaws and upon the rests, but for subsequently forcing up the carriage, so as to cause the box or its parts to be nailed to be clamped between the jaws or inner edges of the plates *I I*.

There is pivoted to the frame *A* a screw, *T*, provided at its outer end with a hand-wheel, *d'*. On the said screw is a nut, *U*, which is prevented from revolving upon the screw by two studs, *e'*, (see Fig. 5, which is an end view of the screw-nut and the carriage *C* and parts adjacent thereto, to be described,) extending down from it on opposite sides of a stationary rod, *f'*, arranged as represented. The front end of the nut is oblique to the axis of the nut, and abuts against the correspondingly oblique end of a collar or short tube, *V*, that turns loosely on the screw, and is arranged as represented. From the collar an arm, *g'*, extends radially, and has applied to it a spring, *h'*, for depressing it, so as to turn the collar on the screw. A short connecting-rod, *i'*, (see Fig. 5,) is pivoted to the collar and to the lower arm of one of two angular levers, *W X*, arranged as shown, and pivoted to standards *h' l'*, erected on the carriage *C*. The corresponding arm of the other lever (or that marked *W*) rests against the outer end of the nut *U*.

Figs. 6 and 7 are side views of the levers *W* and *X*, and Fig. 8 a side view, and Fig. 9 a top view, of the cam *m'*, with which they operate, such cam being fixed on the next adjacent shaft *O*. At their inner ends the up-

per arms of the levers *W X* are hooked, as represented, the points of the hooks resting on the periphery of the cam.

On turning the screw *T* forward, the carriage *C* will be drawn backward. On revolving the screw the opposite way the carriage *C* will be advanced toward the carriage *B*; consequently means are provided for the adjustment of one jaw and its rest at the proper distance from the other jaw and its rest, as the width of the box to be held between the jaws may require.

At a proper time, preparatory to the introduction of the parts of the box between the jaws and upon the rests, the cam will so move the lever *X* as to cause the collar to be revolved in a manner to raise its arm against the pressure of the spring thereof. This movement of the collar will allow the carriage *C* to be moved back a little by the action of the cam against the other lever, whose longer or bent arm in acting against the nut will cause such movement of the carriage. On the point of the cam passing the hook of the lever *X*, such lever will be freed from the cam, so as to enable the spring to depress the arm of the collar, and thereby turn the collar, so as to advance the carriage and cause the box previously inserted between the jaws to be held or grasped by them. Were there no mechanism to effect such small retreat and advance of the carriage it would be difficult to insert the work between the jaws and have them hold it properly, owing to the ordinary slight variations in the boxes to be nailed, especially when the stuff is more or less warped.

After having placed the work on the rest and pressed down the pedal the two sets of nail-drivers, at one and the same time, will be caused to approach each other, and will force the nails out of the nail-carriers and into the work, whereby both side pieces will be nailed simultaneously to the end piece of the box. The machine may also be employed in a like manner to nail the box-bottom to the sides when such bottom is placed between such sides.

My machine differs very materially in construction and mode of operation from that described in the United States Patent No. 157,568, in which the sets of nail-drivers are not arranged so as to approach each other while in the act of nailing together the parts of a box, as is the case in my machine. With my machine two sides may be simultaneously nailed to two ends of a box; but with the said patented machine one side only can be nailed at once to two ends. My machine also differs from the box-nailing machine shown in the United States Patent No. 187,843, which is for nailing cylindrical boxes or measures, and cannot perform the work of my machine, the nailing devices radiating from a common center.

My invention is an improvement on box-nailing machines which have two or more drivers arranged opposite to each other and to operate simultaneously, the improvement

or invention as made by me being defined in claims hereinafter presented.

I claim in the said machine as follows:

1. The movable box end and side holders E F *b b*, provided with mechanism for operating them, as described, in combination with the rests D and the two sets of nail-carriers and nail-drivers, arranged and to operate substantially as specified.

2. The combination of the two sets of nail-carriers K, the two sets of nail-drivers L, the rests D, jaws or plates I, and the movable carriage C, and its adjusting-screw T, and nut U, with mechanism for backing the said carriage a short distance to admit of the insertion of the work or box-parts to be nailed between the jaws, and for subsequently advancing the carriage, so as to cause the work to be clamped or held firmly by the jaws preparatory to it and while being nailed, such mech-

anism consisting of the spring *h'*, arm *g'*, collar V, levers W X, and cam *m'*, constructed, arranged, and applied essentially as set forth.

3. The combination of the adjusting-screw T, the nut U, collar V, arm *g'*, spring *h'*, levers W X, and cam *m'*, arranged and applied to the shaft O, carriage C, and frame A, and for adjusting and operating such carriage as set forth.

4. The combination for moving the clutch *p* into and out of engagement with the driving-pulley *o*, consisting of the studs *y c'*, latch S, spring *z*, notched rod *r*, arm *q*, spring *x*, shaft *v*, and the arms *u w* thereof, all being applied to the frame A, the clutch *p*, and the bevel-gear P, substantially as set forth.

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Witnesses:

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