

A. NEWTON & T. HIBBARD.

Machine for Separating and Driving Nails.

No. 230,648.

Patented Aug. 3, 1880.

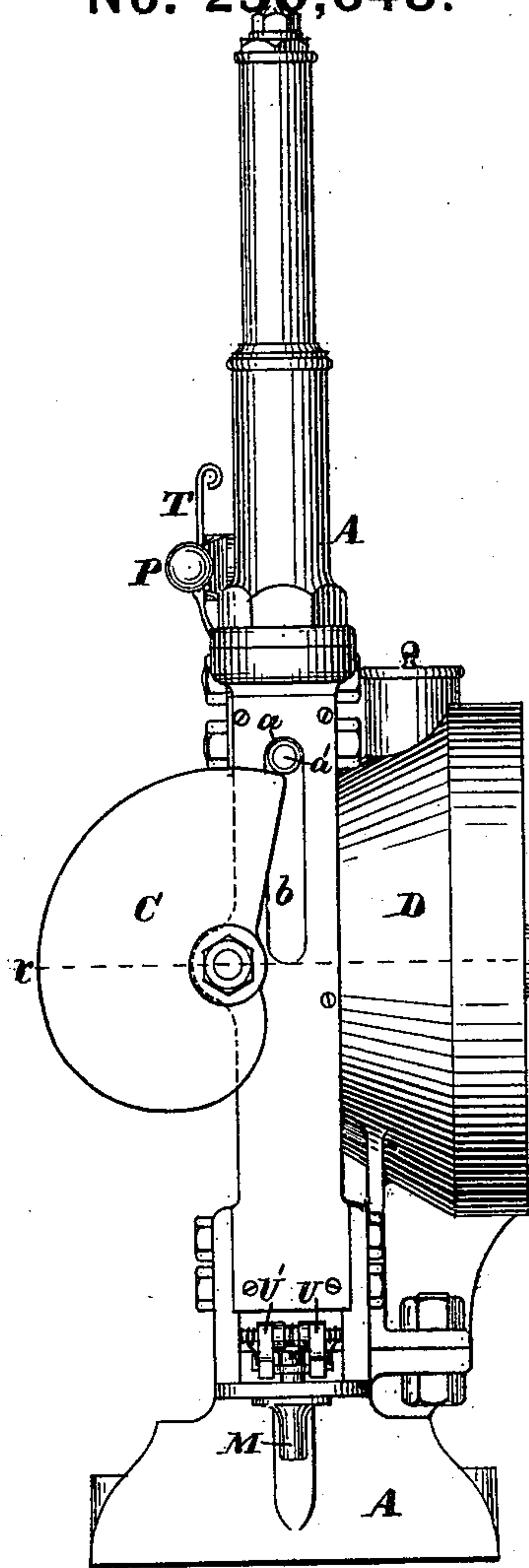


Fig. 2.

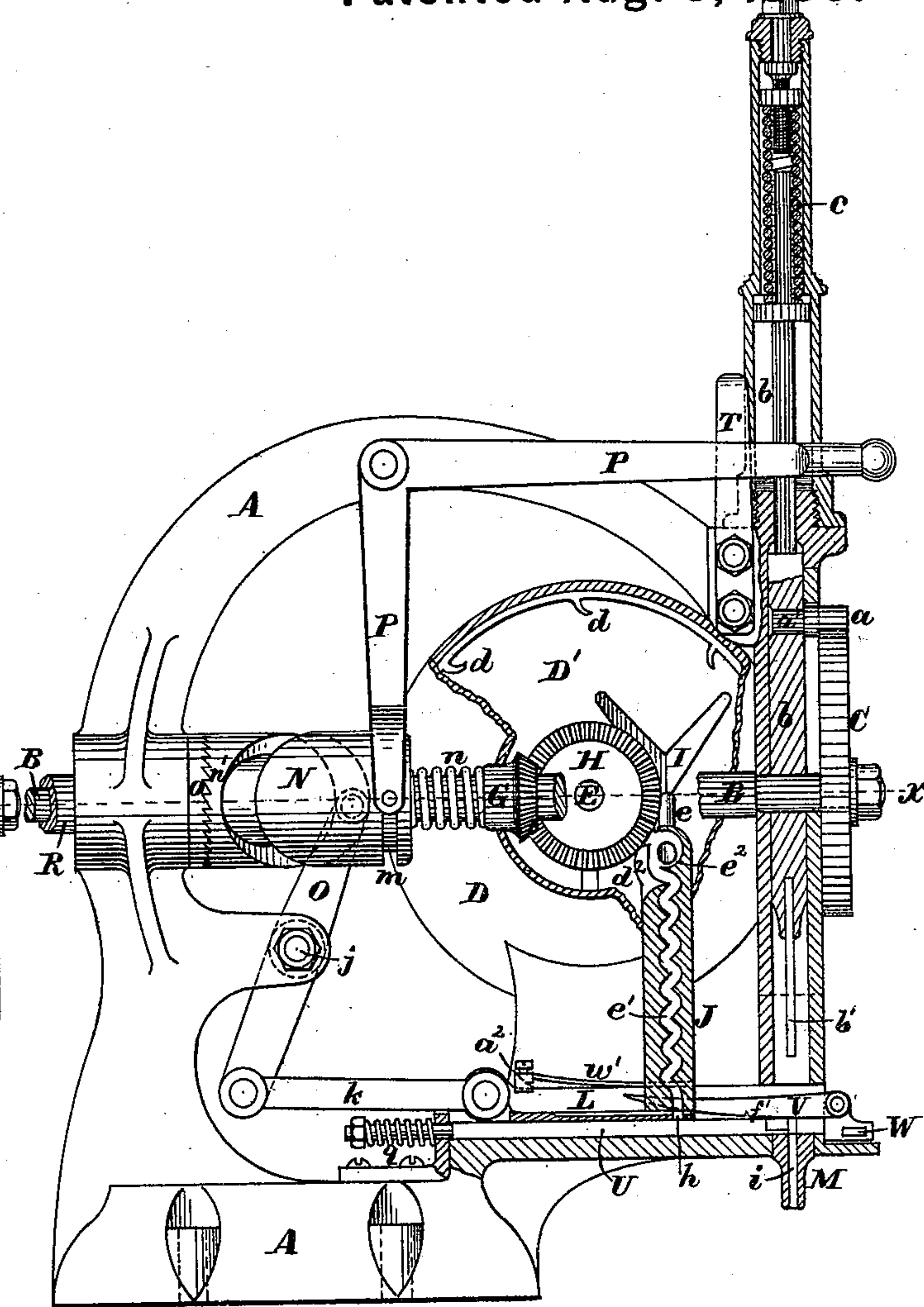


Fig. 1.

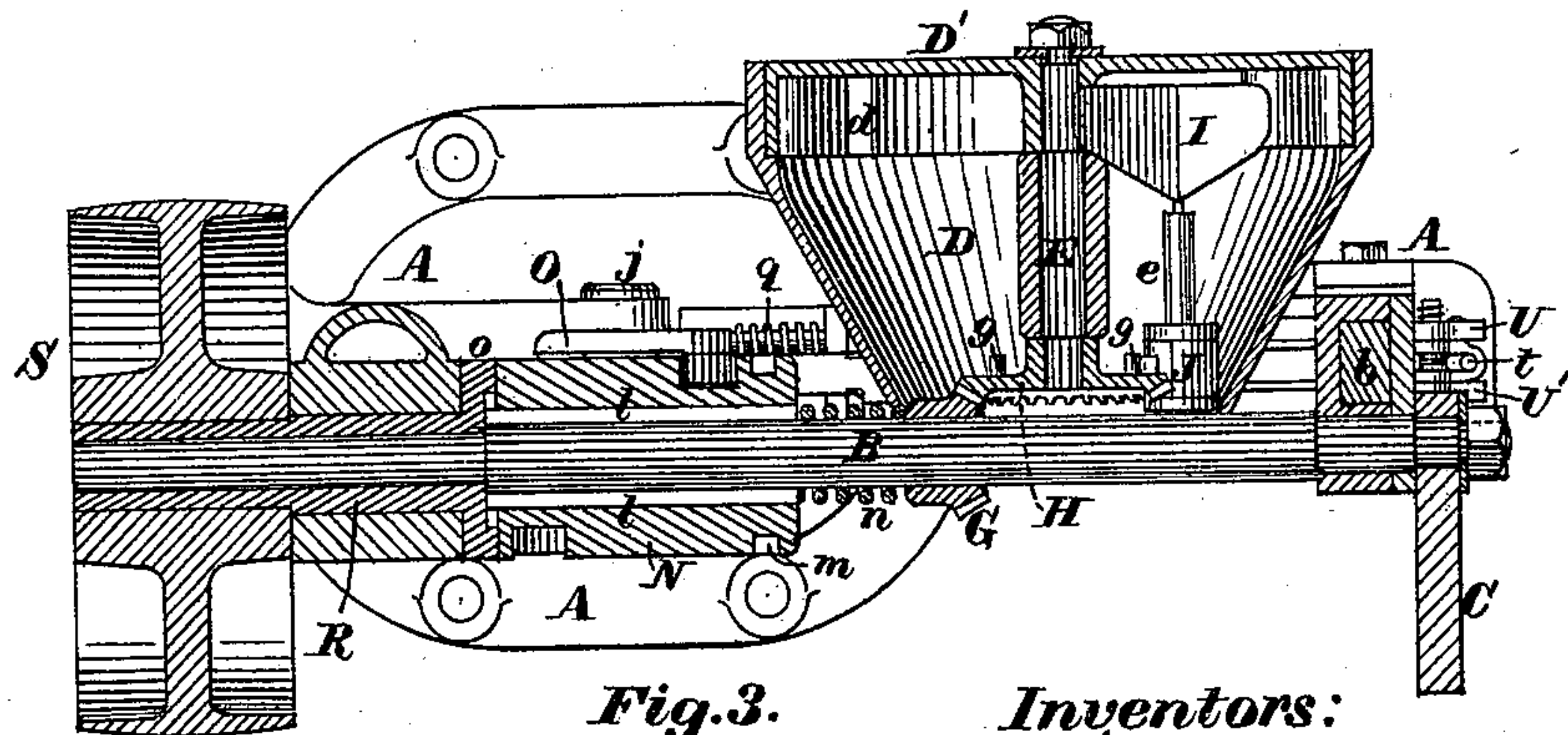


Fig. 3.

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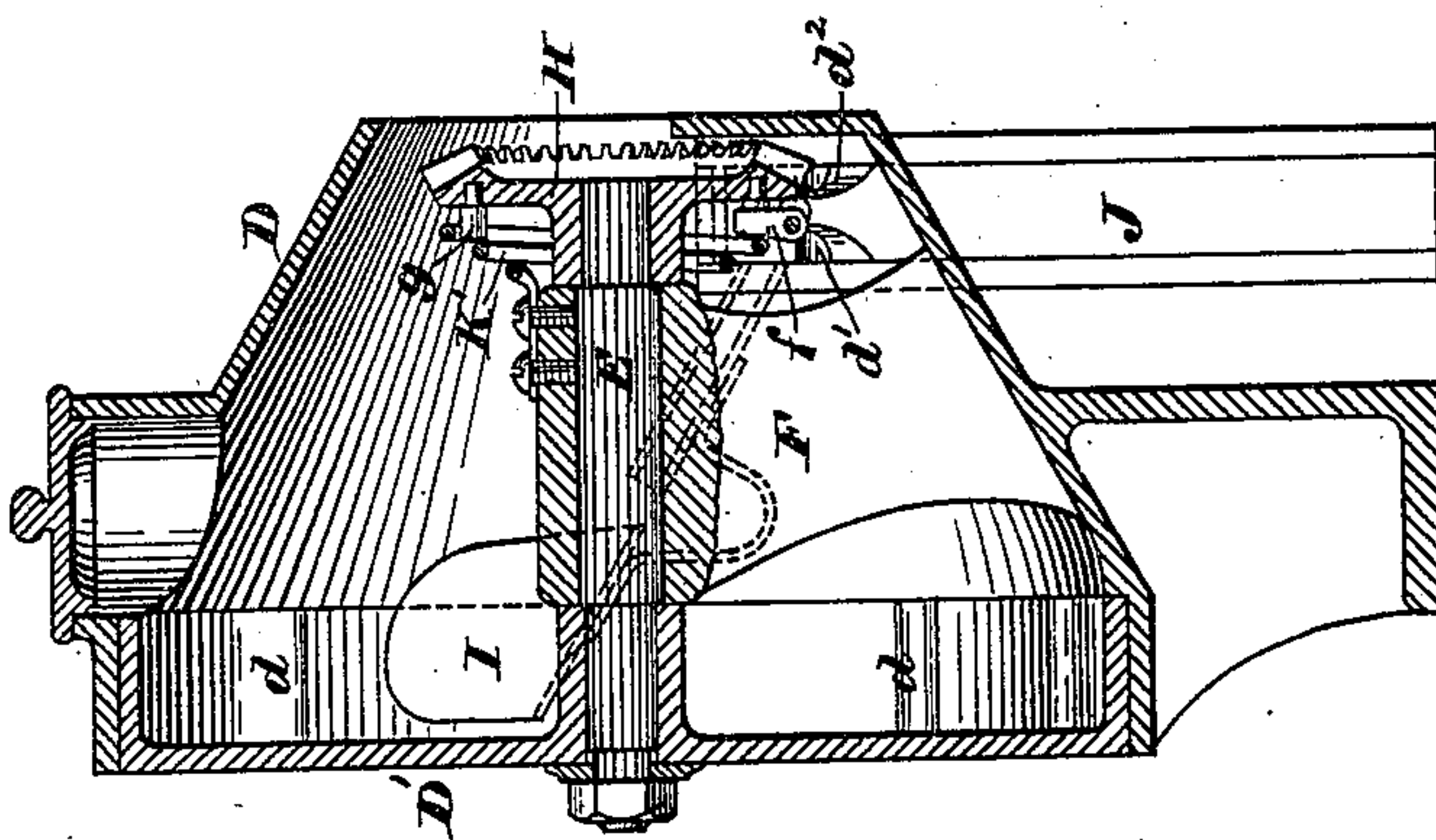


Fig. 5.

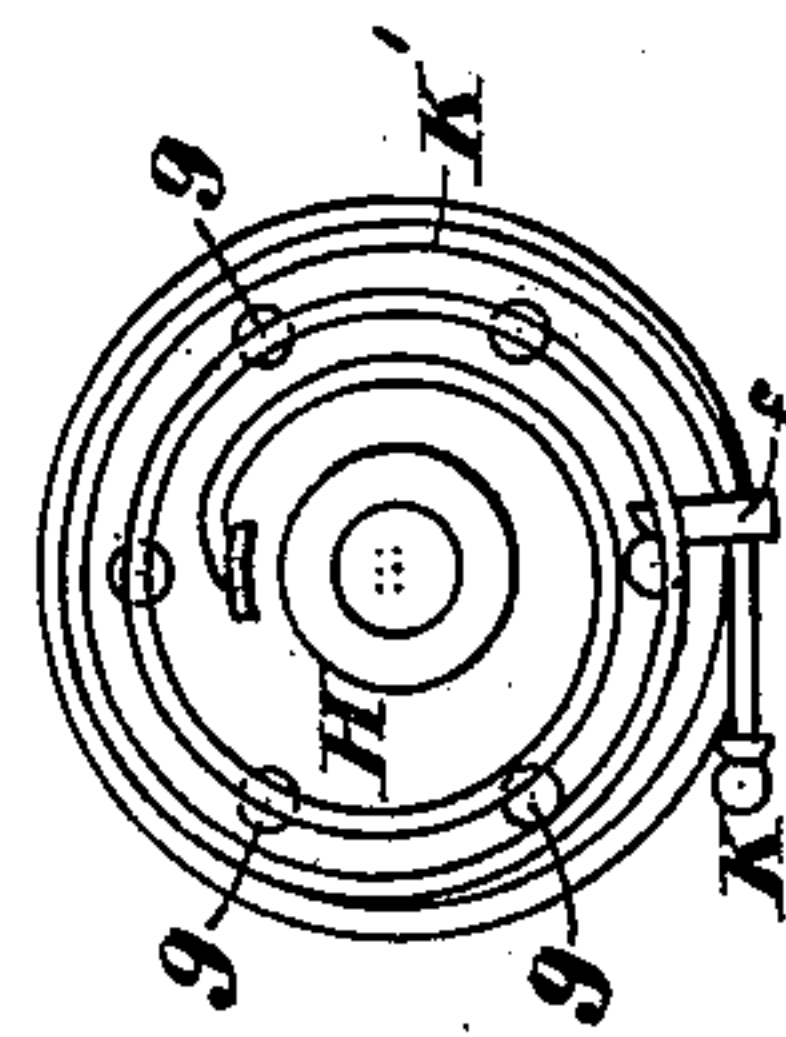


Fig. 7.

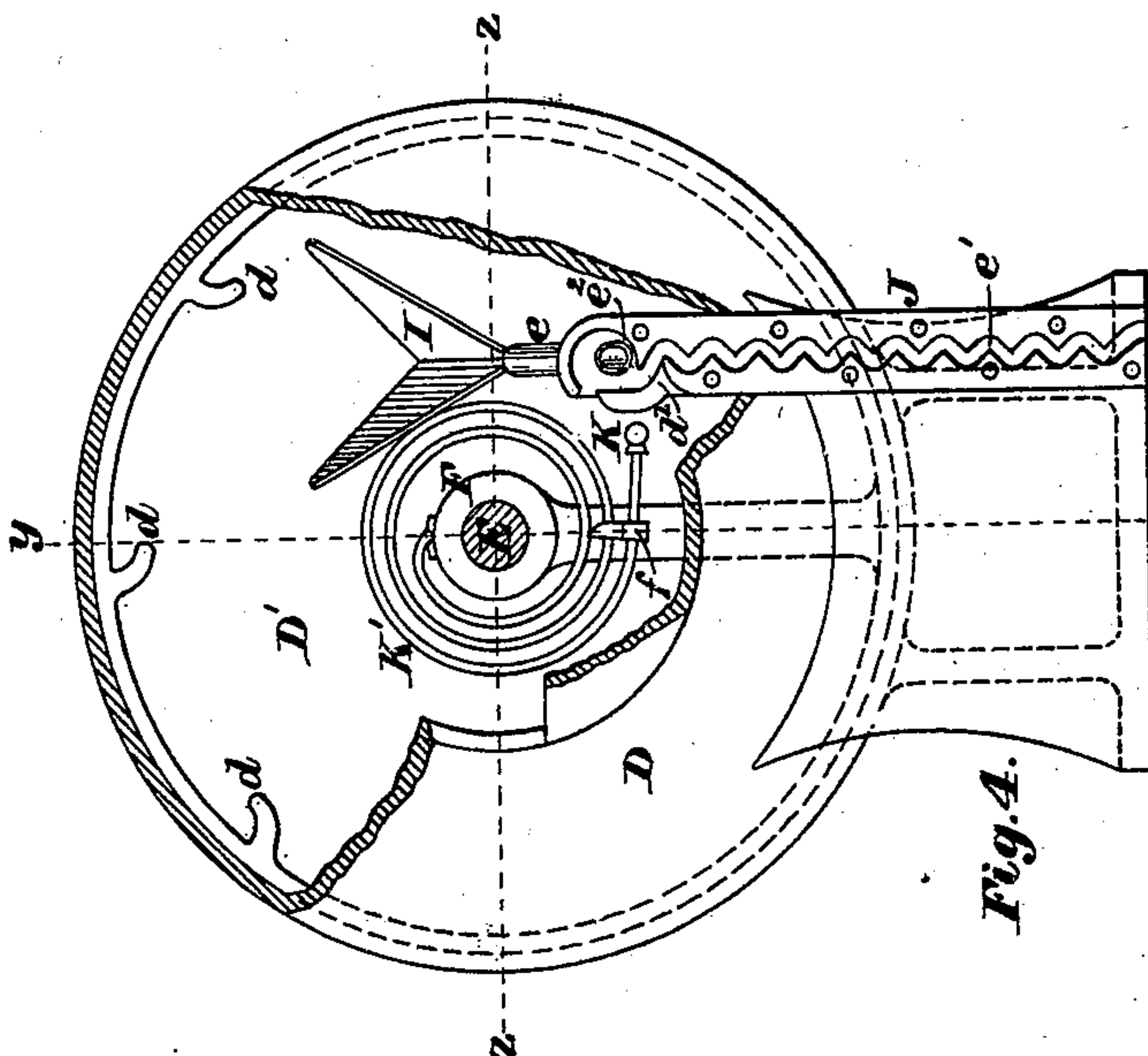


Fig. 4.

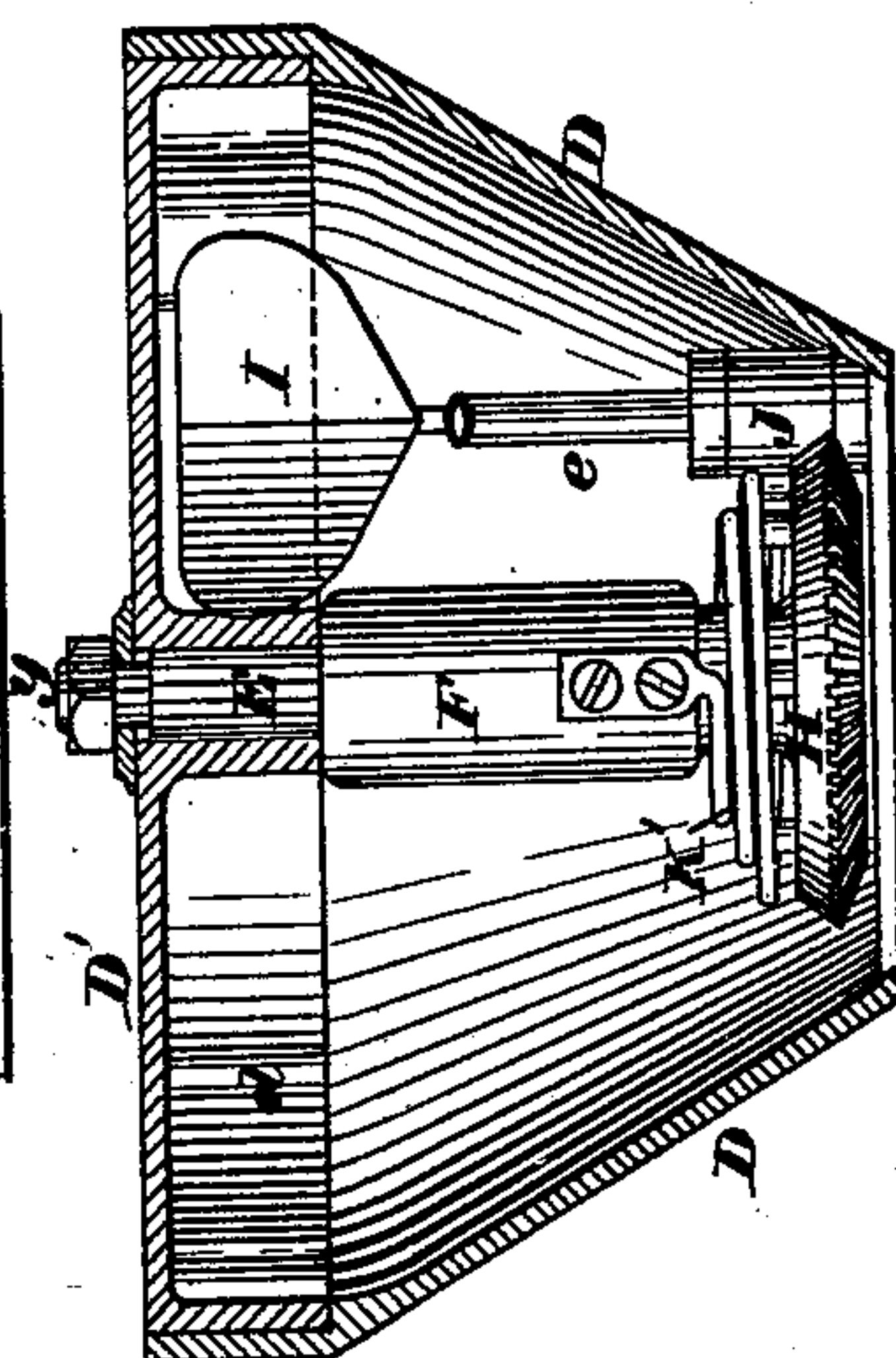


Fig. 6.

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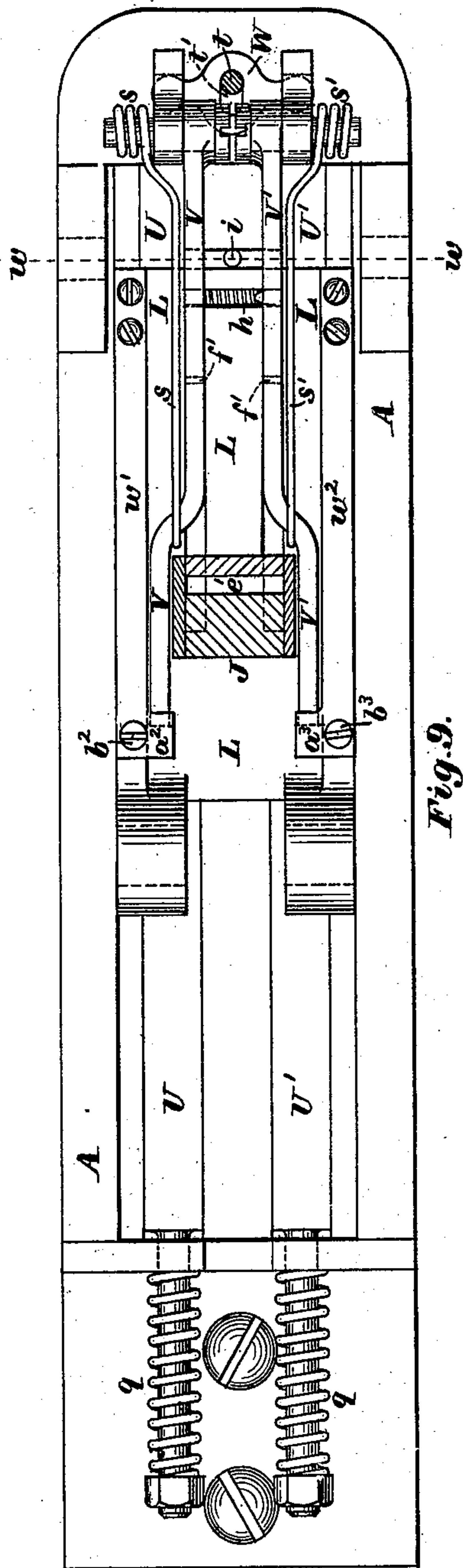
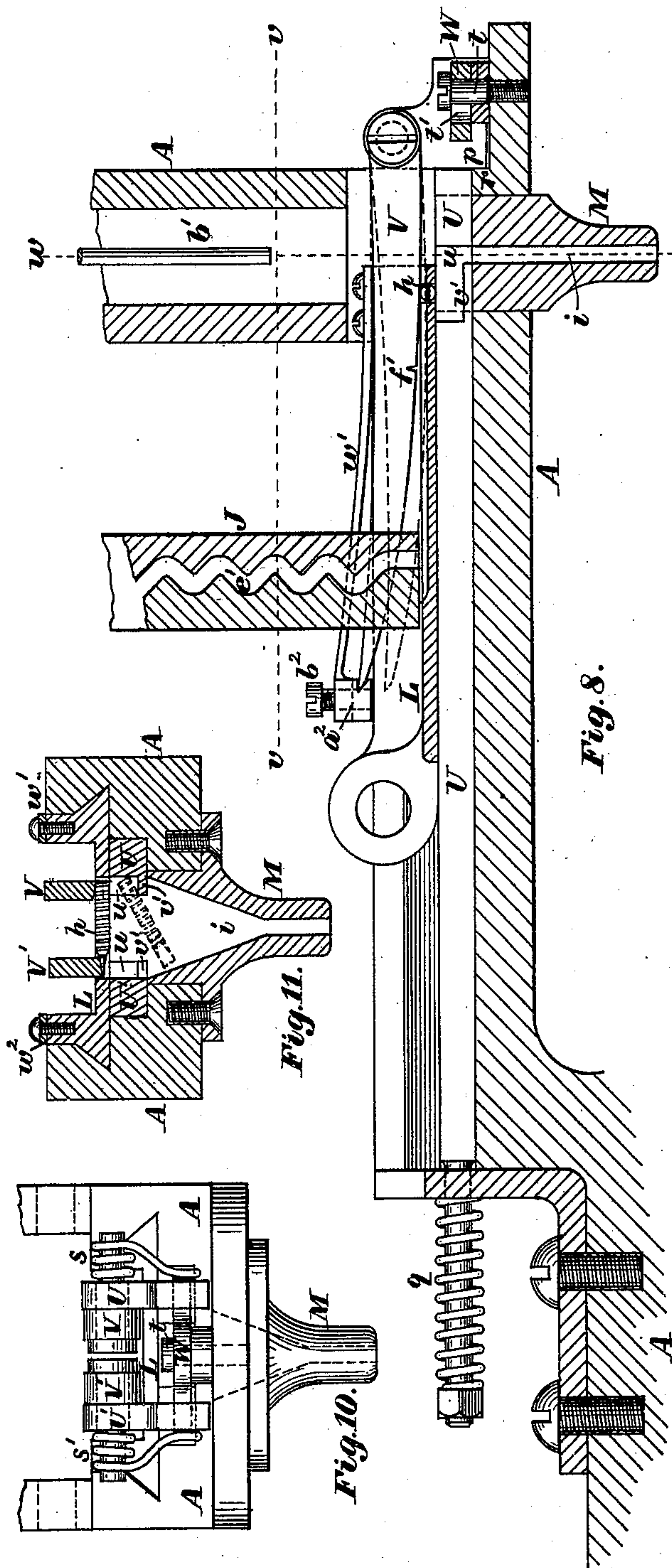
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## MACHINE FOR SEPARATING AND DRIVING NAILS.

SPECIFICATION forming part of Letters Patent No. 230,648, dated August 3, 1880.

Application filed December 5, 1879.

*To all whom it may concern:*

Be it known that we, ARTHUR NEWTON and THOMAS HIBBARD, both of Boston, in the county of Suffolk and State of Massachusetts, have jointly invented certain new and useful Improvements in Machines for Separating and Driving Nails, of which the following, taken in connection with the accompanying drawings, is a specification.

Our invention relates to a machine for separating and driving pointed and headless cylindrical shoe-nails; and it consists in a peculiar combination and arrangement of devices for separating the nails one at a time from a quantity placed in a hopper in bulk and delivering them successively, point downward, beneath the driver, which devices will be best understood by reference to the description of the drawings accompanying this specification, in which—

Figure 1 is a sectional side elevation of so much of a machine as is necessary to illustrate our invention. Fig. 2 is a front-end elevation. Fig. 3 is a horizontal section on line *x x* on Figs. 1 and 2. Fig. 4 is a front-side elevation of the hopper with portions broken away, and showing the reservoir in elevation with its front plate or cover removed. Fig. 5 is a vertical section on line *y y* on Fig. 4. Fig. 6 is a horizontal section on line *z z* on Fig. 4. Fig. 7 is a back or rear side elevation of the bevel-gear wheel upon the hopper-shaft and the hammer for rapping the reservoir to insure the falling of the nails. Fig. 8 is a longitudinal vertical section of a portion of the base of the machine, the nail-carrier, a portion of the nail-reservoir or zigzag chute, and the driver-tube. Fig. 9 is a horizontal section on line *v v* on Fig. 8, showing the nail-carrier and its appendages in plan with driver-socket removed. Fig. 10 is a front-end elevation of the parts shown in Fig. 9, and Fig. 11 is a vertical section on line *w w* on Figs. 8 and 9 with the carrier moved farther forward.

As the standard upon which the machine-head is supported, the jack for supporting the last with the shoe thereon, and the feed mechanism form no part of our present invention, they are not shown.

A is the frame of the machine-head, having mounted in suitable bearings therein the shaft

B, upon the front end of which is firmly secured the cam C, which acts upon the anti-friction roll *a* upon a stud, *a'*, set in the side of the driver-bar *b*, to raise said bar against the tension of the spring *c* surrounding its upper end, said driver-bar being fitted to a bearing in the frame A in a vertical position, and having set in its lower end the steel driver *b'*, which strikes upon and drives the nail when the driver-bar *b* is suddenly forced downward by the tension of the spring *c*, all of these parts being constructed, arranged, and operating substantially as in other well-known nailing-machines.

D is a hopper in the form of a frustum of a hollow cone, arranged with its axis horizontal and at right angles to the shaft B in a fixed position, and having its larger end closed by the circular cover D', provided with a series of buckets, *d*, projecting inward therefrom, and adapted to pick up nails from the lowest part of the hopper and carry them upward as the bucket-wheel is moved around the axis of the shaft E, upon the rear end of which it is mounted, said shaft E having its bearing in the stand F, which rises from the wall of the hopper D, as shown in Figs. 4 and 5.

G is a bevel-gear pinion secured upon the shaft B, and engaging with and adapted to impart motion to the larger bevel-gear wheel H, firmly secured to the front end of the shaft E, and thus cause the bucket-wheel D' to be revolved.

I is a short inclined chute, made V-shaped in cross-section, and placed in the proper position to receive the nails as they fall from the buckets *d* of the bucket-wheel D', and a short distance above and away from the upper end of the inclined tube *e*, the lower end of which is attached to and communicates with the upper end of the nail-reservoir J, the interior of which consists of a rectangular zigzag passage, *e'*, extending from the top to the bottom thereof, said passage being of a width and thickness sufficient to permit the nails which enter its top through the tube *e* to roll down said passage in a horizontal position.

K is a hammer attached to one end of the coiled or scroll spring K', the opposite end of which is made fast to the top of the stand F, said scroll-spring being provided with the lug



*f*, with which a series of pins, *g*, set in the back side of the bevel-wheel *H*, engage successively as said wheel revolves, each moving the hammer back till the pin passes said lug, when the tension of the scroll-spring causes the hammer to strike a blow upon the upper end of the reservoir to insure the passage of the nails to the bottom of the reservoir as fast as they are deposited therein.

*L* is the nail-carrier plate, fitted to and adapted to be reciprocated horizontally in guideways in the base of the frame *A*, its central portion being made of a thickness equal to the diameter of the nails, and has cut through its forward end a transverse slot, *h*, of sufficient length to receive the longest nail when said slot is directly below the zigzag passage in the reservoir *J*, said nail resting upon the surface of the bottom of the guideway in which the carrier *L* moves, said pocket *h* being adapted to maintain the nail in a position at right angles to its line of forward movement.

The carrier *L* is moved from a position with the slot *h* beneath the reservoir *J* to a position over the pocket or nail-passage *i* in the toe *M* by means of the cylinder-cam *N* on the shaft *B* acting upon the upper end of the lever *O*, pivoted at *j* to the frame *A*, and connected at its other end to the link *k*, which, in turn, is connected to the carrier *L*, all as shown in Fig. 1.

The cam *N* is so fitted to the shaft *B* that it may be moved endwise thereon, but is compelled to revolve therewith by the two feathers *l l* set in the shaft *B* and fitted to spline-grooves cut in the cam in a well-known manner, and has formed in its periphery the circumferential groove *m*, to receive the forked end of the shipper-lever *P*, by which said cam may be moved endwise against the tension of the spiral spring *n* surrounding the shaft *B* between said cam and the hub of the pinion *G*, the purpose of which will presently appear.

The cam *N* has formed upon its rear end a series of teeth, *n'*, which engage with the teeth *o* formed upon the contiguous end of the clutch-sleeve *R*, which surrounds the shaft *B*, but not secured thereto, and is mounted in a bearing in the frame *A*, and has secured thereto the driving-pulley *S*, by means of which rotary motion may be imparted to the sleeve-clutch *R*, and when the cam *N* is made to engage with the clutch *R* by the tension of the spring *n* the shaft *B* will be revolved, thereby setting in motion the operative parts of the machine.

*T* is a spring provided with a shoulder, which engages with the shipper-lever *P* when the cam *N* is disengaged from the clutch *R*, to prevent the tension of the spring *n* from causing a re-engagement of the cam and clutch till such times as the operator is ready to start up the machine again.

*U* and *U'* are two rectangular bars, fitted to grooves formed in the bed-plate of the frame *A* beneath the carrier-plate *L*, in which they may be moved endwise, said bars each being pro-

vided with a shoulder, *p*, to limit its backward movement, and with a spring, *q*, surrounding its rear end, a portion of which is made cylindrical for the purpose, which acts by its tension to move said bar toward the rear when it has been moved forward and keep the shoulder *p* in contact with a shoulder, *r*, on the bed portion of the frame *A*.

*V* and *V'* are two curved fingers, pivoted, respectively, to the bars *U* and *U'* near their front ends, and having their rear ends reduced to thin knife-edges arranged horizontally, which rear ends are depressed by the springs *s* and *s'* respectively.

The front ends of the bars *U* and *U'* are connected together by the short lever *W*, each end of which enters a slot cut through one of the bars, *U* or *U'*, and is connected to the bed of the frame *A* by the pin *t*, which passes through the slot *t'* cut through the lever, all as shown in Figs. 8, 9, and 10.

The bars *U* and *U'* are placed somewhat nearer together than the length of the nail, and each has cut through its inner face a slot, *u*, sufficiently deep to make the distance between the two inner faces of said bars at that point which should be directly over the nail-passage *i* in the toe *M* when the shoulders *p* and *r* are in contact a little greater than the length of the nail and of a width sufficient to allow a nail to drop freely through the same.

The upper portion of the bars *U* and *U'* are also cut away in the rear of said slots to the same width or thickness for the greater part of their height, leaving an inwardly-projecting shelf, *v'*, at their lower edges, as shown in Figs. 8 and 11.

To the upper side of the carrier-plate *L* are attached the two springs *w'* and *w''*, to the rear ends of which are secured the blocks *a''* and *a'''*, respectively, which project inward from the inner edges of said springs, and have formed in their forward edges *V*-shaped notches adapted to engage with the knife-edged rear ends of the fingers *V V'* when said fingers are raised to a given elevation by the passage of the nail beneath them, as will be more clearly described in explaining the operation.

The blocks *a''* and *a'''* may be adjusted vertically by means of the set-screws *b''* and *b'''*, to adapt their position to the size of the particular nail being used.

The operation of our invention is as follows: The nails being placed in the hopper in bulk and power being applied to the pulley *S* to rotate the shaft *B*, the buckets *d* in the bucket-wheel *D'* will each scoop or take up one or more nails from the bottom of the hopper and carry them upward toward the top of the hopper, where they will be discharged, and, falling downward, more or less of them will be deposited in the *V*-shaped incline chute *I*, from which they slide downward toward the tube *e*, and those of said nails which make such descent endwise and in the proper position will enter and pass through it into the upper part of the chamber in the reservoir *J*, while those



nails which fall crosswise upon the chute I, or are otherwise unfavorably situated to enter the tube *e*, will drop from the lower end of the chute I through the space between the lower end of said chute and the tube *e* into the hopper, to be again picked up and redeposited in the chute.

The majority of the nails entering the reservoir J from the tube *e* will be deposited in a horizontal position on the curved and slightly-inclined shelf *e*<sup>2</sup>, from which they roll into the zigzag passage *e'*, each nail being compelled by the form of such passage to maintain a horizontal position till it reaches the bottom of said passage and is deposited in the pocket *h* in the carrier-plate L; but if a nail should enter the reservoir in an oblique position, so as not to rest upon the shelf *e*<sup>2</sup>, such nail will be discharged through one of the side openings, *d'* or *d*<sup>2</sup>, made through the upper part of the reservoir J, and fall into the hopper again.

As the shaft B continues to revolve the cam N, acting upon the lever O, causes the carrier L to be moved toward the front end of the machine, taking the nail which has dropped into the pocket *h* along with it, said nail rolling upon the surface of the bed on which the carrier moves until its two ends come in contact with the under edges of the fingers V and V', when said fingers are raised or moved upward by the passage of the nail beneath them, said nail being so confined in the pocket *h* that it cannot be displaced; but as the nail is thicker at one end than at the other, the finger which bears upon the thick or unpointed end will be raised sufficiently high for its knife-edged rear end to engage with the V-shaped notch in the block *a*<sup>2</sup> or *a*<sup>3</sup> as the carrier is moved forward, and thereby cause said finger and the bar U or U', to which it is pivoted, to be moved forward with the carrier, while the finger which rests upon the pointed end of the nail will not be raised high enough to engage with the block *a*<sup>2</sup> or *a*<sup>3</sup>, which passes over the finger, as clearly shown in Fig. 8, where the last-mentioned finger is shown in dotted lines.

The forward movement of the bar U or U', caused by the finger which rests on the head end of the nail engaging with the notch in the block *a*<sup>2</sup> or *a*<sup>3</sup>, moves its shelf *v'* over the nail-passage in the toe M in such a manner that when the nail drops into the nail-passage *i* the head end is retarded by the shelf *v'*, and the nail is compelled to fall into the passage *i* point downward, as clearly shown in Fig. 11, where a nail is shown in full lines in position under the fingers, just ready to drop, and the same nail in dotted lines in the position it assumes on coming in contact with the shelf *v'* in its descent into the passage *i*. The nail falls point downward to the bottom of the passage *i*, where it rests upon the sole or other object to be nailed till the carrier has been moved back to receive another nail from the reservoir, when the driver is released by the cam C and falls upon the nail and drives it into the sole or other object.

It will readily be seen that it makes no difference which way the nail lies in the pocket of the carrier as regards the direction of its point, as the head end will invariably be retarded in its fall by the shelf *v'*, and the nail will be deposited in the passage *i* point downward.

Any kind of pointed headless nails can be separated and deposited in position point downward under the driver in our improved machine; but for a chisel-pointed nail, such as is shown in Fig. 11, it is necessary to cut a little notch, *f'*, in the under side of each of the fingers V and V', to insure that the nail shall not slide beneath the fingers with the broadest dimension of its pointed end vertical, which would have the effect to raise the finger on that side high enough to engage with the notch in the block on the carrier and cause it to be moved forward, the same as the finger on the head end of the nail. To obviate this difficulty the notches *f'* are made too narrow to permit the head end of the nail to enter them sufficiently to prevent the engagement of the notch with the finger; but if the chisel-point is standing edgewise its topside will be caught and the nail rolled till the finger rests upon its flat side. The notches are so located on the fingers that this takes place before the blocks *a*<sup>2</sup> and *a*<sup>3</sup> reach the rear ends of the fingers, thus insuring the proper finger being caught and the nail properly tilted point downward into the toe.

If a blank or unpointed nail or a bent or otherwise imperfect nail should be carried forward in the carrier, both fingers would be raised equally high and be engaged by the notches and be moved forward with both of the bars U and U', to which they are pivoted. When only one bar, U or U', is moved forward the end of the lever or cross-bar W connected therewith moves with it, swinging on its other end as a pivot, the slot *t'* in said lever permitting its center to move a distance equal to half the distance moved by the bar U or U', at which time the pocket *h* in the carrier L is directly over the passage *i* in the toe M; but if both bars U and U' are carried forward in consequence of both fingers engaging with their respective notches the lever W is moved bodily until the back end of the slot *t'* comes in contact with the pin *t*, which takes place when the bars have moved only one-half the distance that either would move alone, when the forward motion of the fingers, bars, and carrier-plate ceases, and the resistance presented by the pin *t* is transmitted back through the carrier L, link *k*, and lever O to the cam-roll mounted upon the upper end of said lever, and as the rotation of the cam N continues the oblique wall of its path, acting upon the unyielding truck or roll, causes said cam to be moved endwise on its shaft against the tension of the spring *n* till it is disengaged from the teeth of the clutch R, when the shoulder on the spring T engages with the edge of the shipper-lever P and holds the cam in its disengaged



position till the defective nail is removed and a perfect one put in its place.

What we claim as new, and desire to secure by Letters Patent of the United States, is—

- 5 1. The reservoir J, provided with the zigzag passage  $e'$ , extending from the top to the bottom thereof, substantially as and for the purposes described.
- 10 2. The combination of the V-shaped inclined chute I, inclined tube  $e$ , arranged in line with said chute, but separated therefrom, and the reservoir J, provided with the zigzag passage  $e'$ , all arranged and adapted to operate substantially as described.
- 15 3. The carrier L, provided with the pocket  $h$  and adjustable notched blocks  $a^2$  and  $a^3$ , in combination with the two bars U and U', connected together by the lever W, and the two fingers V and V', all constructed, arranged, and adapted to operate substantially as and for the purposes described.
- 20 4. The combination of the flaring-mouthed nail-passage  $i$  in the toe M, the carrier L, provided with the pocket  $h$ , and adapted to take a nail from the bottom of a reservoir in a horizontal position and convey it in such position to a point over said nail-passage, two fingers or arms adapted to be engaged by and moved forward with said carrier, and two shelves placed below said carrier, connected with and adapted to be moved by said fingers into a position to cover a portion of the flaring mouth of the passage  $i$  upon one side or the other, substantially as described.
- 30 5. The combination of the carrier L, notched blocks  $a^2$  and  $a^3$ , fingers V and V', bars U and U', slotted lever W, pin  $t$ , link  $k$ , lever O, cam

N, and clutch R, all arranged and adapted to operate substantially as and for the purposes described.

6. The reservoir J, provided with the zigzag passage  $e'$  and shelf  $e^2$ , and having cut through its side, near its top, the openings  $d'$  and  $d^2$ , in combination with the inclined supply-tube  $e$ , all arranged and operating substantially as and for the purposes described.

7. The combination of the reservoir J, provided with the zigzag passage  $e'$ , the spring-hammer K K', and the wheel H, provided with one or more pins,  $g$ , all arranged and adapted to operate substantially as and for the purposes described.

8. The carrier L, provided with the pocket  $h$ , and adapted to take a nail from the bottom of a reservoir and convey it to a position beneath a driver with the nail lying in a horizontal position and at right angles to its line of forward movement, substantially as described.

9. The fingers V or V', provided with the notch  $f'$ , arranged and adapted to operate substantially as and for the purposes described.

10. The combination of the carrier L, notched blocks  $a^2$  and  $a^3$ , and the fingers V and V', all arranged and adapted to operate substantially as and for the purposes described.

Executed at Boston, Massachusetts, this 2d day of December, A. D. 1879.

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