(No Model.) 4 Sheets—Sheet 1.

G. T. HARDEN & E. S. GRANT

NAIL PLATE FEEDER.

No. 388,673. Patented Aug. 28, 1888.

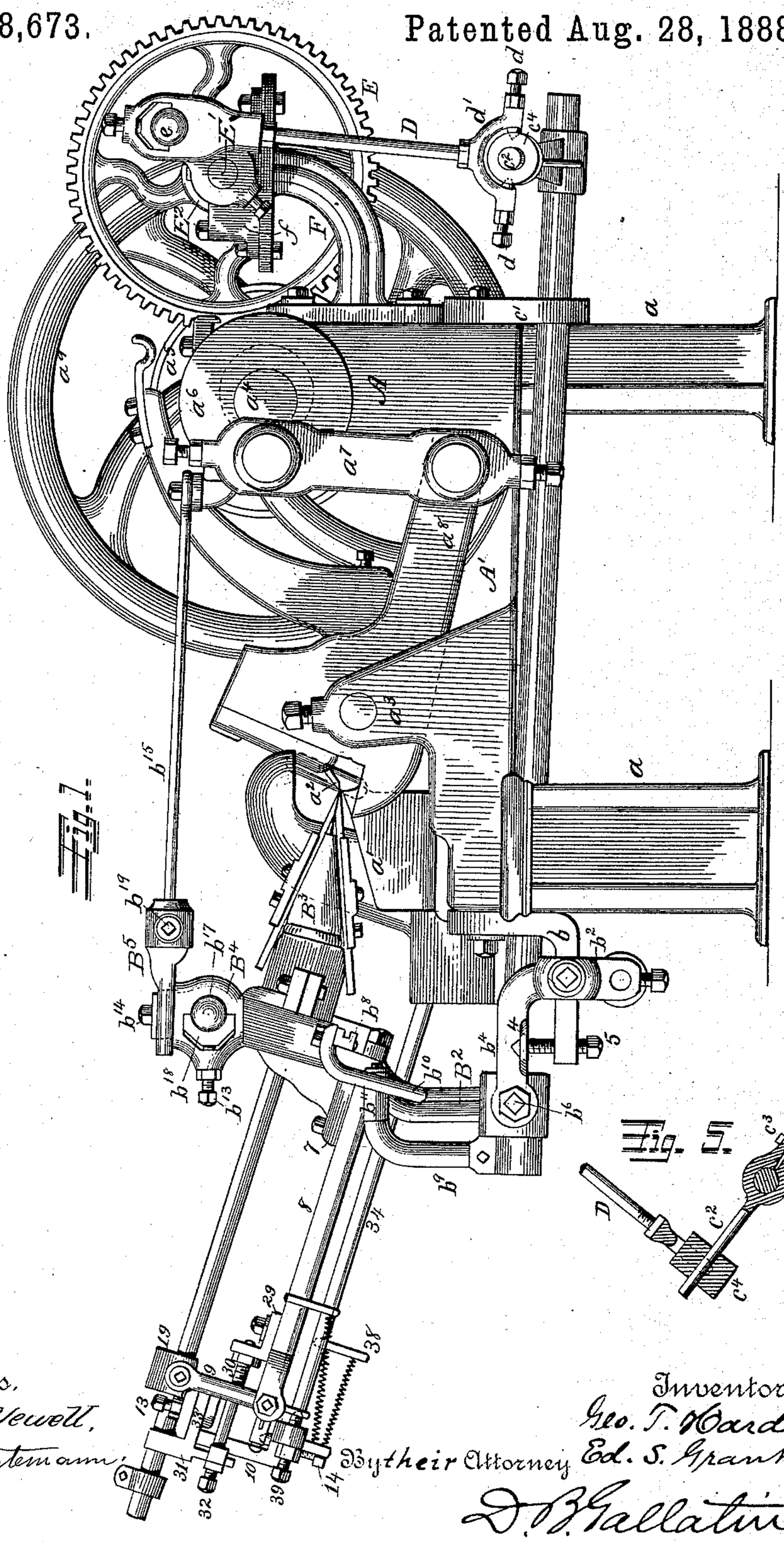


Fig. 1.

Fig. 5.

Witnesses,
Edwin L. Yewell,
Wm. F. Huntemann.

Inventors,
Geo. T. Harden,
Ed. S. Grant,
By their Attorney
D. B. Gallatin.

(No Model.) 4 Sheets—Sheet 2.

G. T. HARDEN & E. S. GRANT.

NAIL PLATE FEEDER.

No. 388,673. Patented Aug. 28, 1888.

Fig. 2.

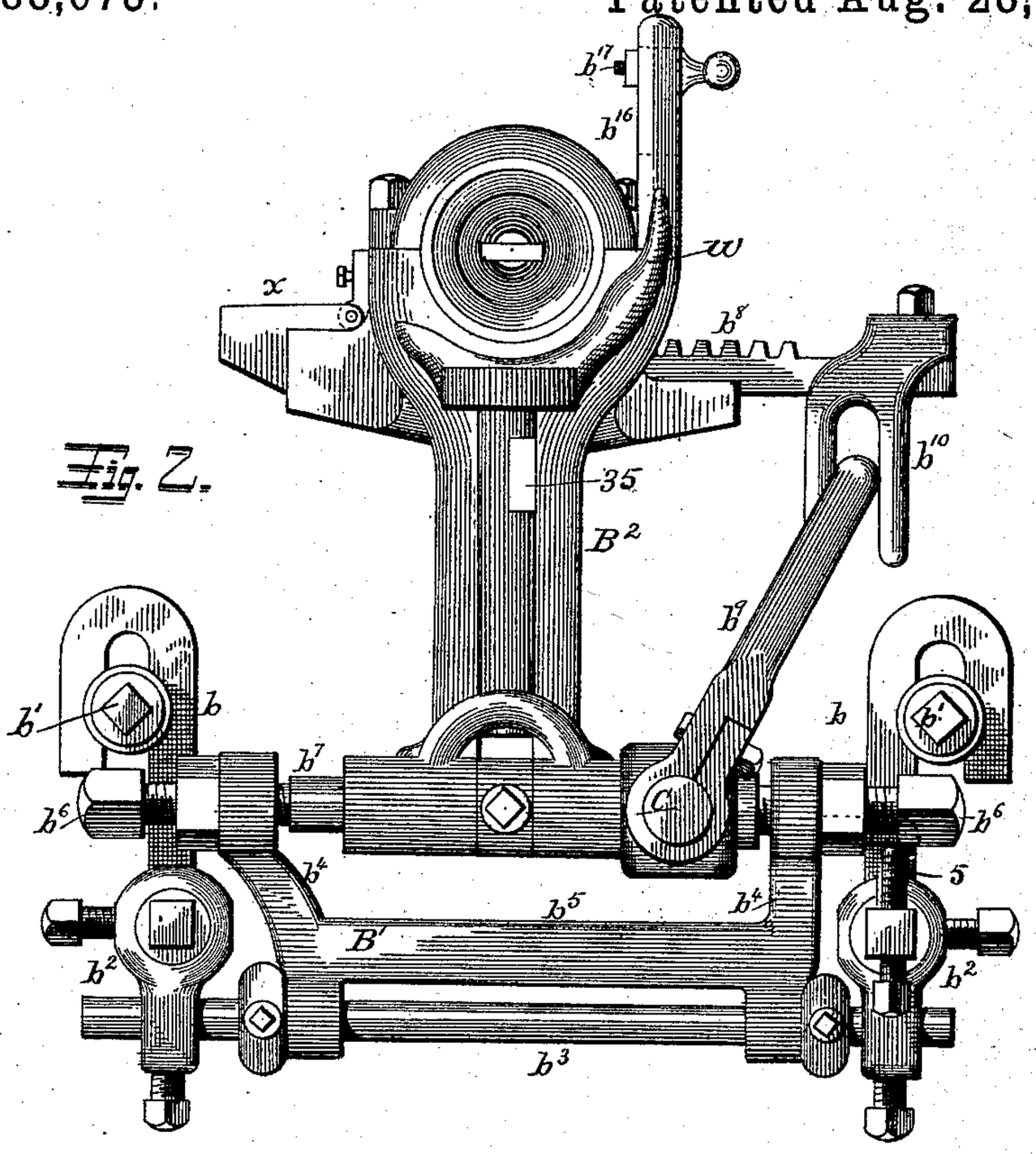


Fig. 3a.

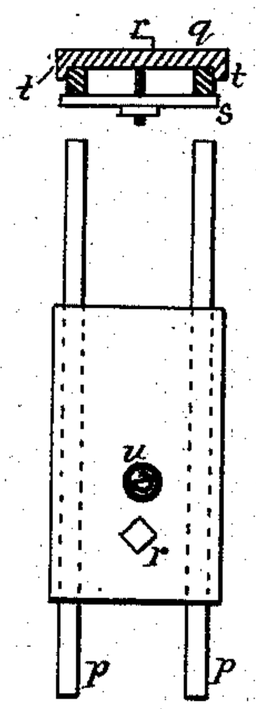


Fig. 4.

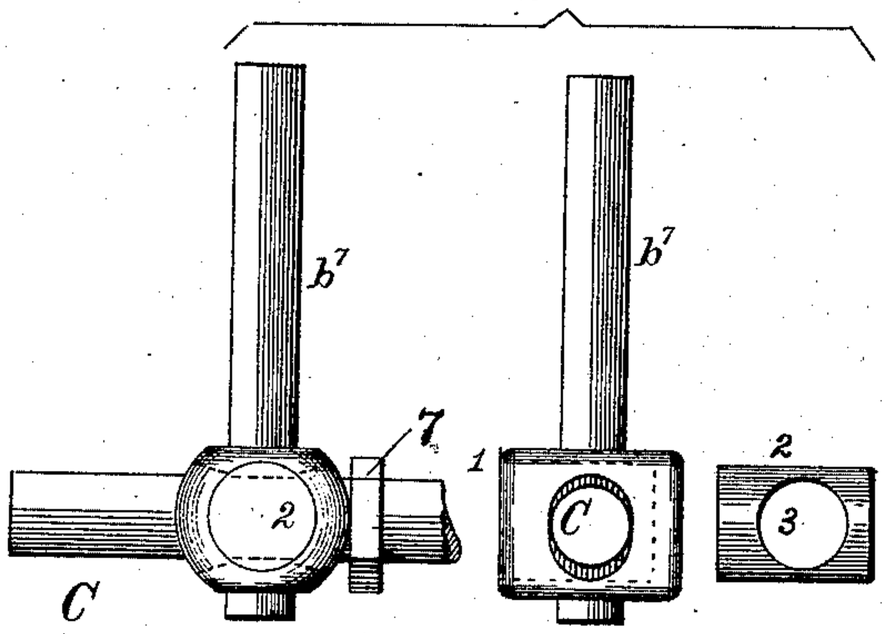
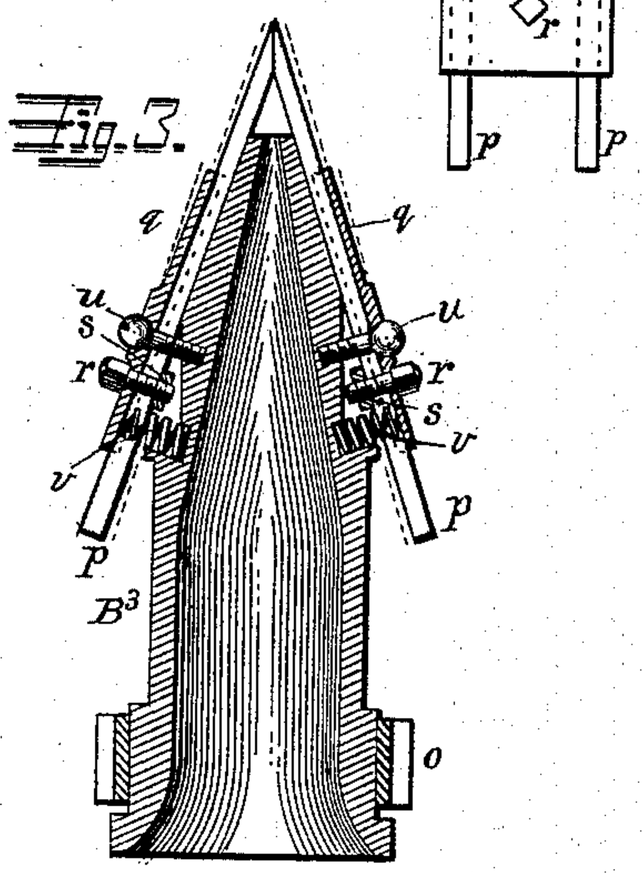


Fig. 3.



Witnesses.
Edwin L. Yewell,
Wm. T. Huntemann.

Inventors.
Geo. T. Harden,
Ed. S. Grant.
By their Attorney
D. B. Gallatin.

(No Model.) 4 Sheets—Sheet 3.

G. T. HARDEN & E. S. GRANT.

NAIL PLATE FEEDER.

No. 388,673. Patented Aug. 28, 1888.

Fig. 6.

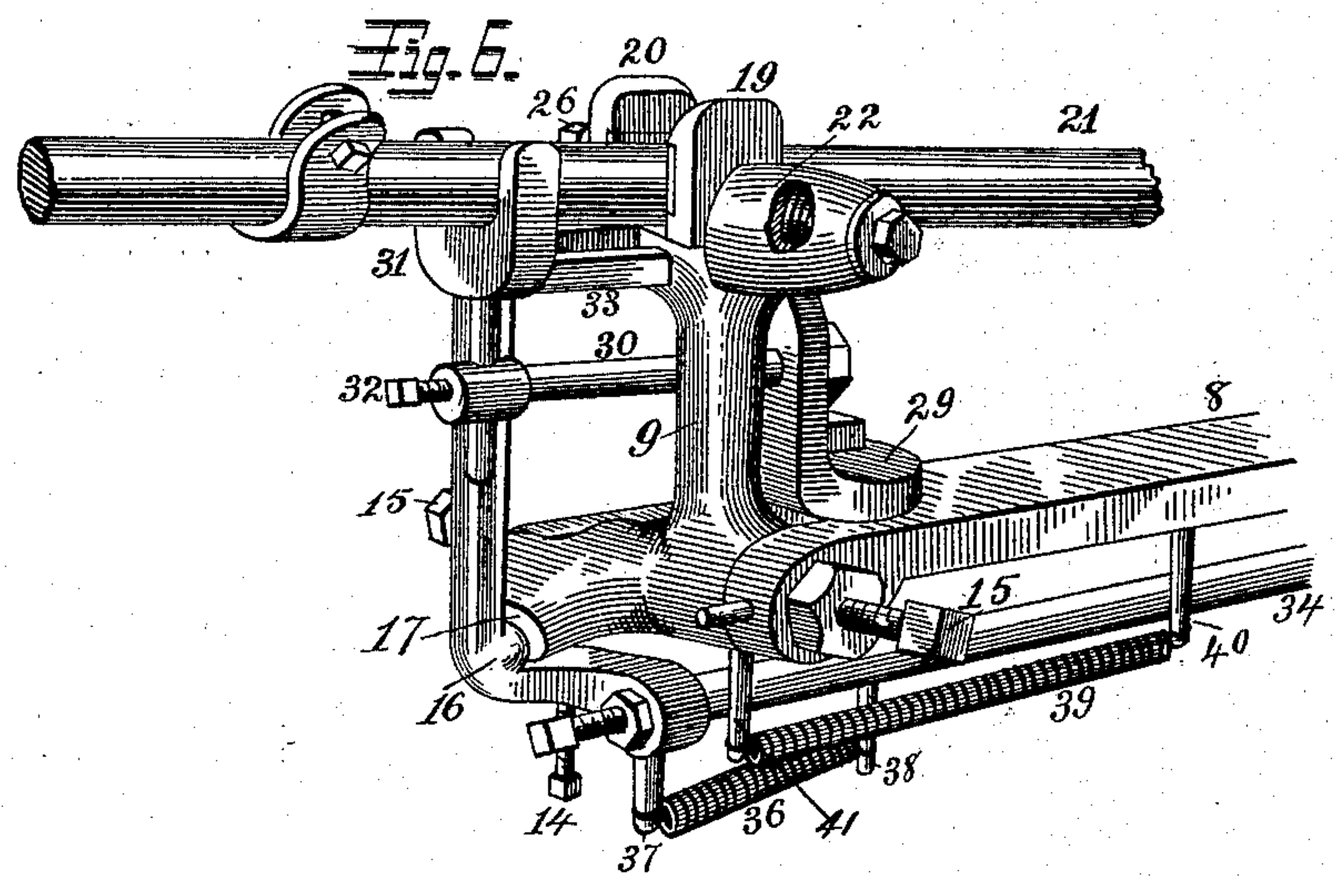


Fig. 10.

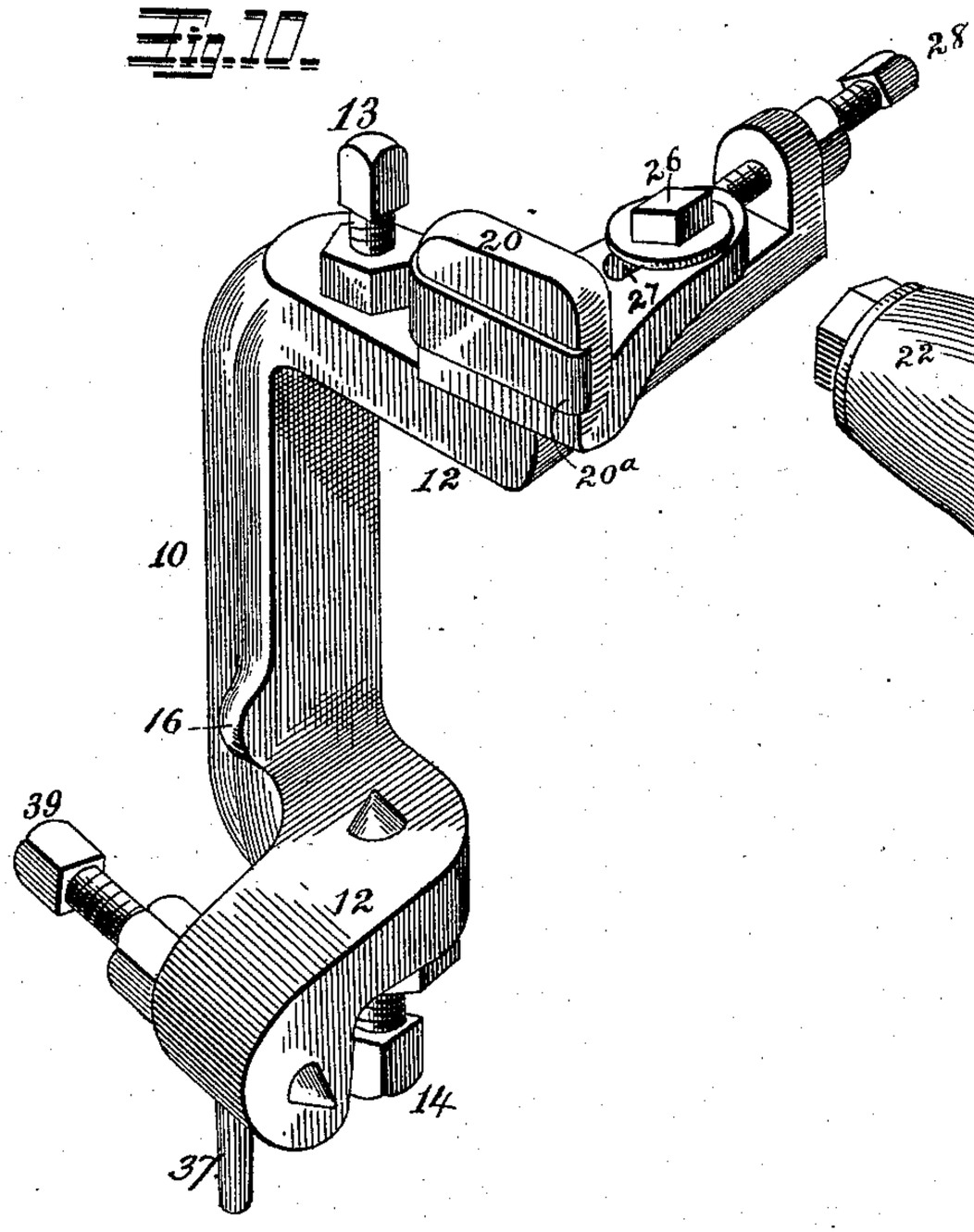
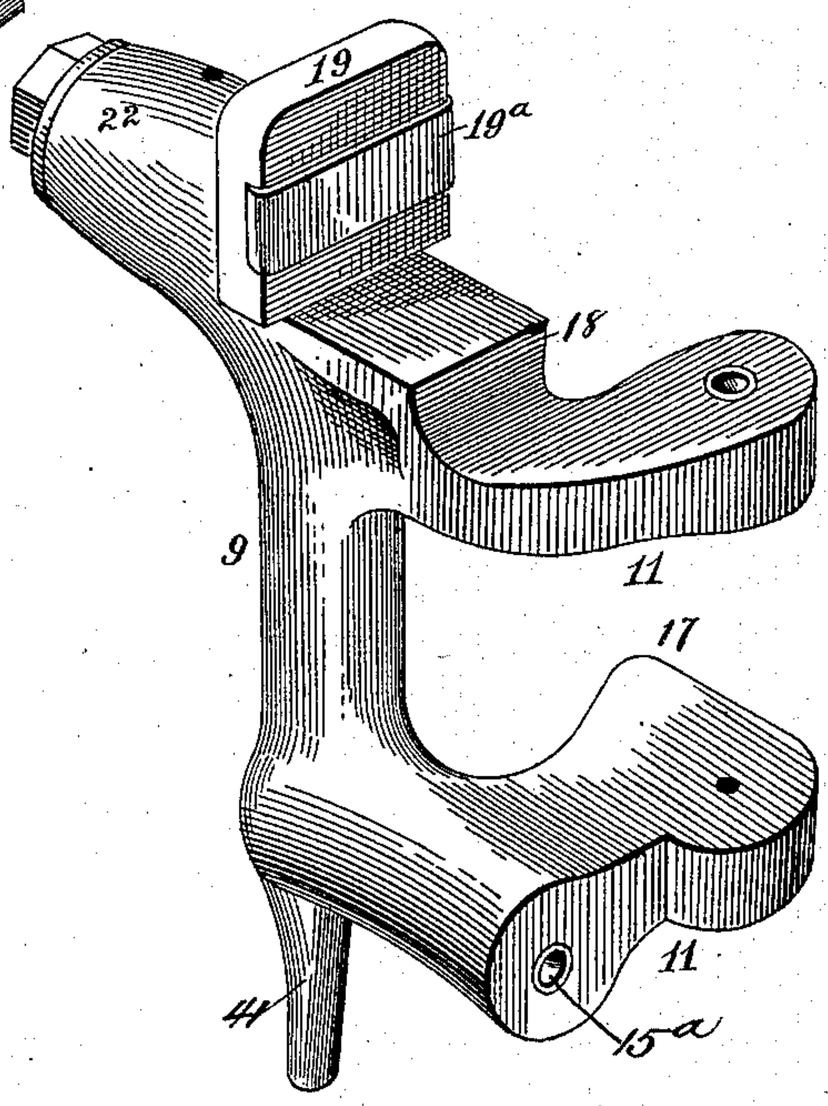


Fig. 11.



Witnesses,
Edwin L. Yewell,
Wm. F. Huntemann.

Inventors.
Geo. T. Harden,
Ed. S. Grant.
By their Attorney
D. B. Gallatin.

(No Model.) 4 Sheets—Sheet 4.

G. T. HARDEN & E. S. GRANT.

NAIL PLATE FEEDER.

No. 388,673. Patented Aug. 28, 1888.

Fig. 7.

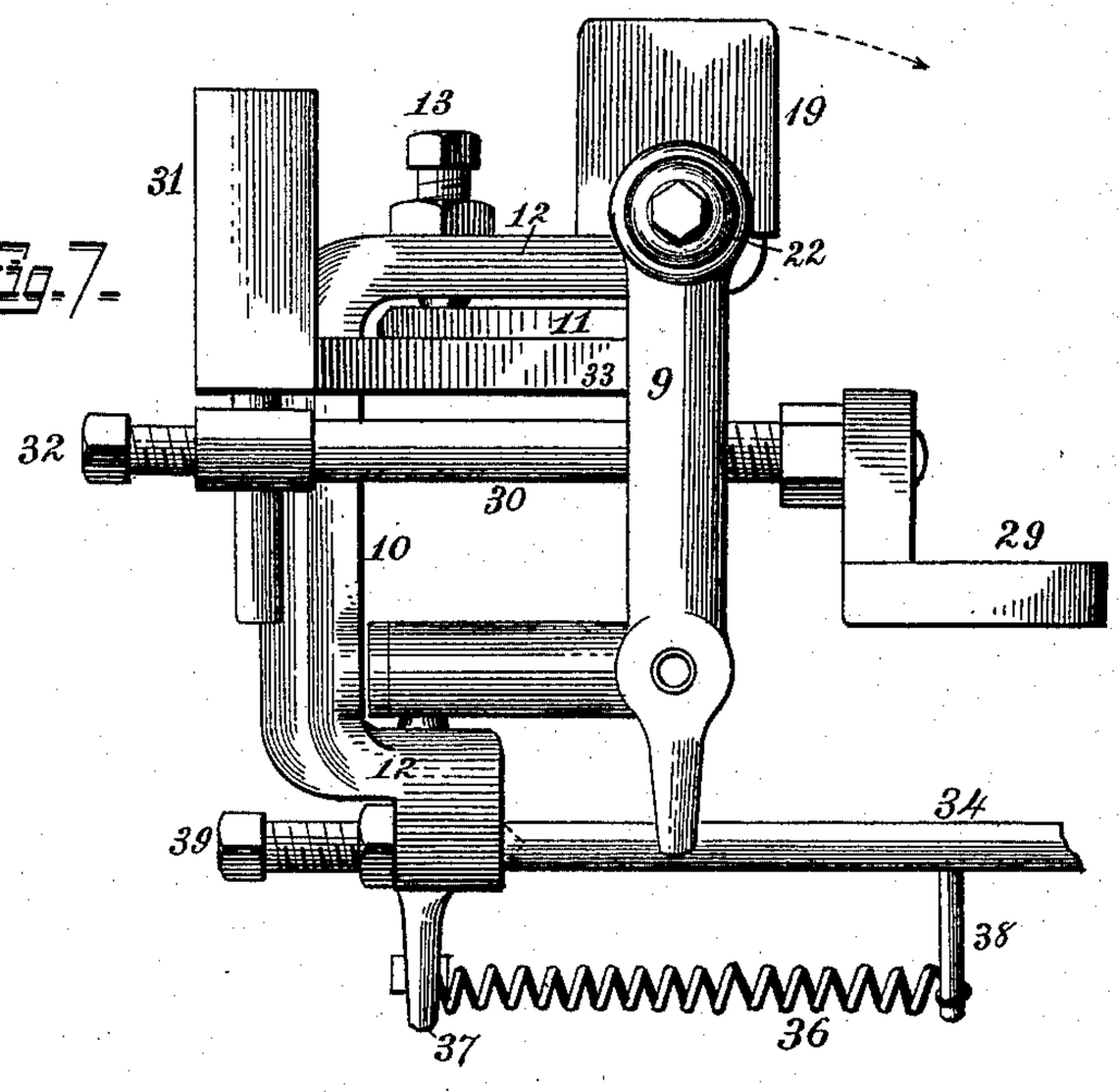


Fig. 8.

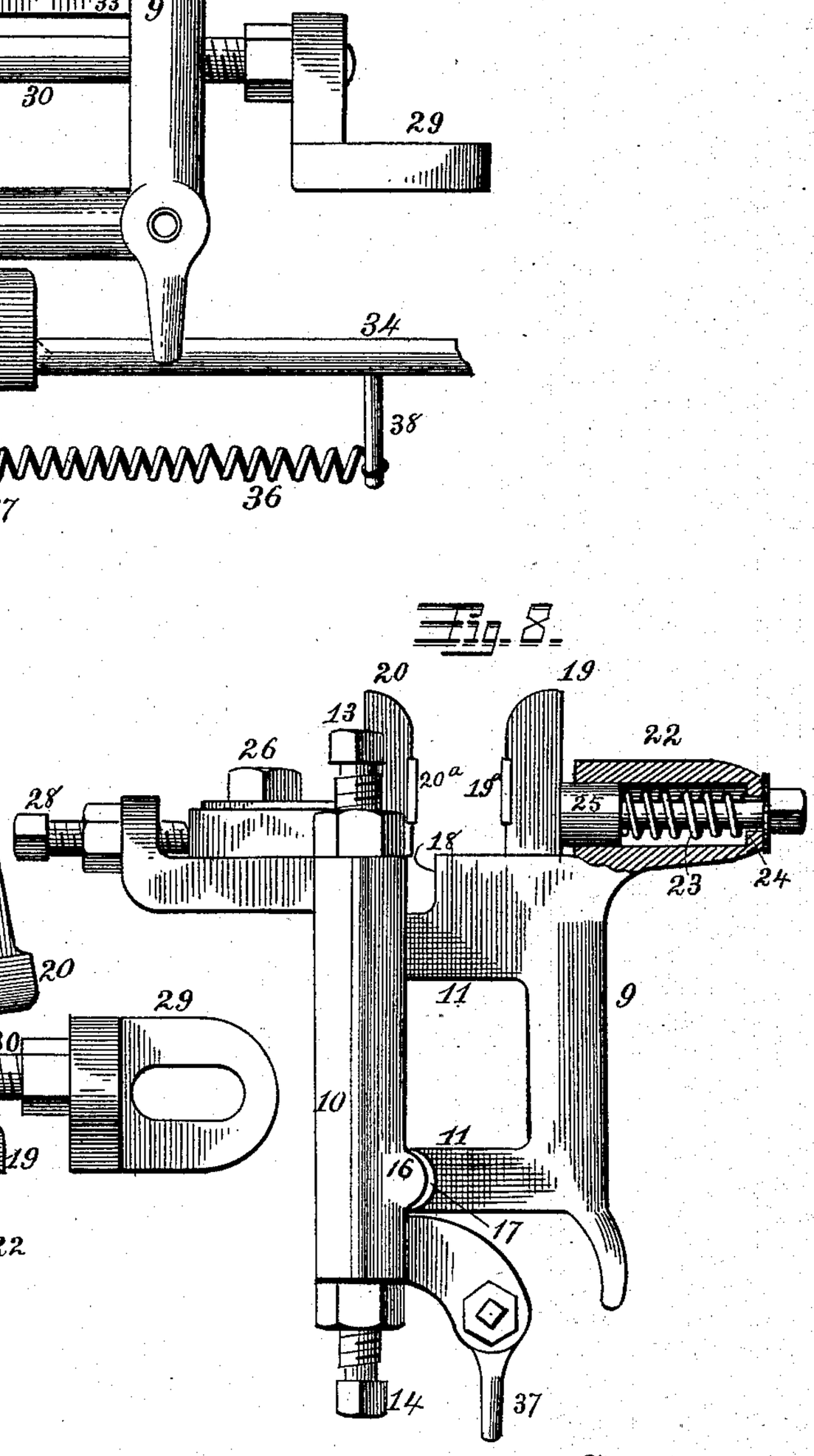
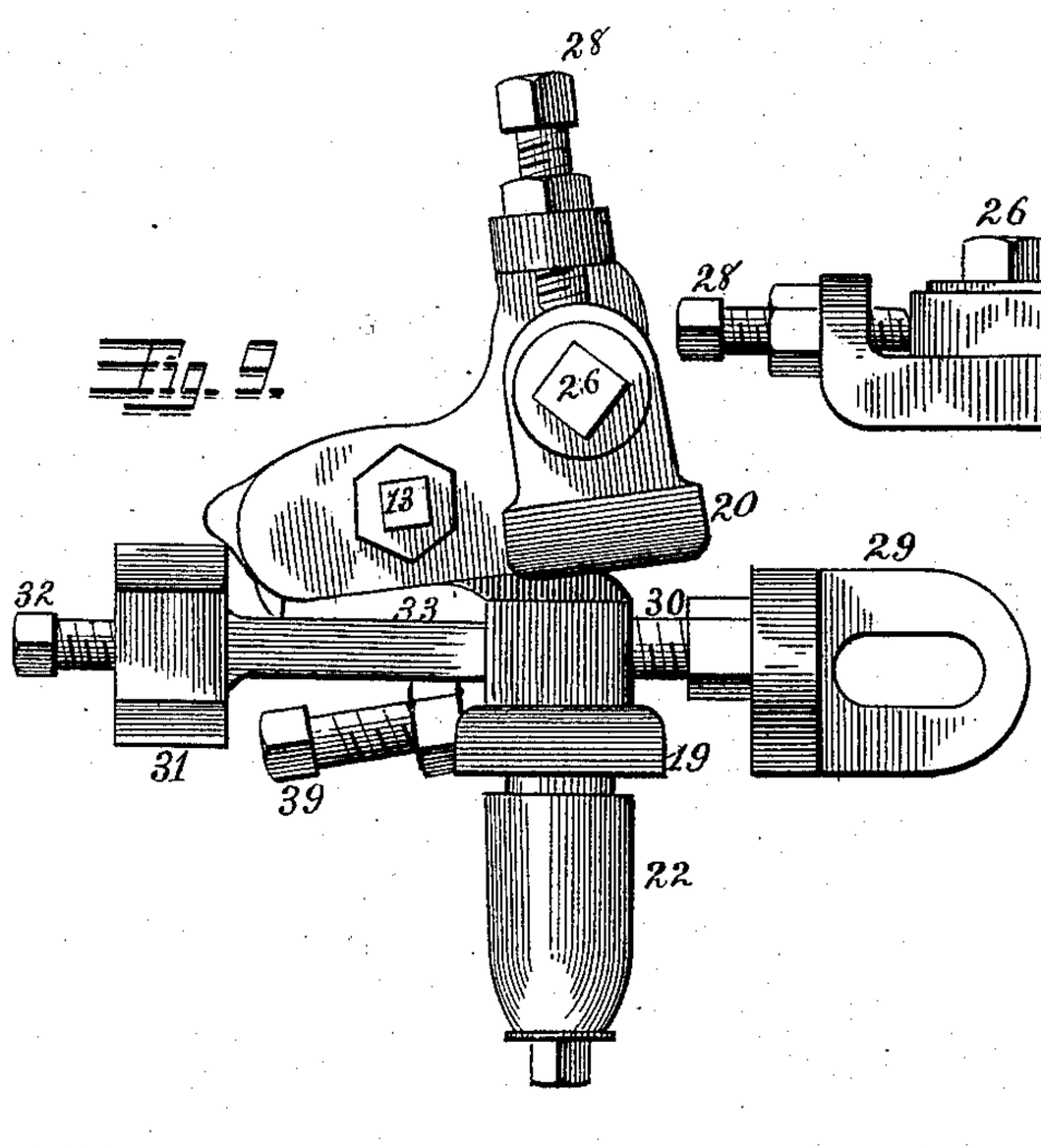


Fig. 9.



Witnesses.
Edwin H. Yewell,
Wm. F. Huntemann.

Inventors.
Geo. T. Harden,
Ed. S. Grant.
By their Attorney
D. O'Gallatin.

UNITED STATES PATENT OFFICE.

GEORGE T. HARDEN AND EDMUND S. GRANT, OF MIDDLEPORT, OHIO; SAID HARDEN ASSIGNOR TO JAMES S. BOGGESS, OF SAME PLACE.

NAIL-PLATE FEEDER.

SPECIFICATION forming part of Letters Patent No. 388,673, dated August 28, 1888.

Application filed March 5, 1887. Serial No. 229,772. (No model.)

To all whom it may concern:

Be it known that we, GEORGE T. HARDEN and EDMUND S. GRANT, citizens of the United States, residing at Middleport, in the county of Meigs and State of Ohio, have invented certain new and useful Improvements in Nail-Plate Feeders; and we do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

Our invention relates to attachments to nail-cutting machines for automatically feeding the plates from which the nails are cut, which attachments consist of organized mechanisms known in the art as "nail plate feeders," and are designed to be attached to any of the ordinary nail-cutting machines.

The objects of the invention are to simplify the construction, to secure greater ease of adjustment, greater uniformity of feed, and greater durability; and to these ends it consists in certain details of construction and in novel arrangements and combinations of parts, as will be hereinafter described, and pointed out in the claims.

In the accompanying drawings, which are herein referred to, and which form a part of this specification, Figure 1 represents a side elevation of a nail-cutting machine with our improved feeder attached thereto. Fig. 2 represents a front elevation of the feeder; Fig. 3, a longitudinal section of the oscillating barrel and its spring-jaws; Fig. 4, detail views of the connection between the rock-shaft and the barrel stock support; Fig. 5, a detail sectional view of the connection between the rock-shaft and the driving-wheel; Fig. 6, a perspective elevation of the feeding-fork; Fig. 7, a side elevation, Fig. 8 a front elevation, and Fig. 9 a plan view, of the same; Figs. 10 and 11, perspective views of the main parts of the feeding-fork detached and separated.

A represents the frame of a nail-cutting machine supported by standards or supports *a*. A′ is the bed of the machine; *a′*, the stationary knife, which is fixed on the bed of the machine, and a^2 the movable knife, the latter being mounted in standards a^3, which rise from the sides of the bed. a^4 is the main shaft of the machine; a^5, the drive-pulley on the main shaft through which power is applied to the machine; a^6, a crank-disk on the main shaft from which the heading-lever is operated through a pitman, a^7, which connects the crank-disk with the lever a^8. a^9 is the fly-wheel on the main shaft. This machine is of the usual construction, and is well known. It involves no part of our invention, which, as above stated, relates to the feeding attachment, and need not, therefore, be minutely described.

b b designate two right-angled brackets, preferably made of square wrought-iron, the vertical arms of which are hook-shaped, as represented in Fig. 2, to hook over clamping-screws *b′ b′*, by which they are attached to the bed of the machine, at the front end thereof, as represented in Fig. 1. By making these brackets of wrought-iron they may be altered and bent to any angle to adapt them to any machine. The hooks are of sufficient length to permit the necessary vertical adjustment. The horizontal arms of the brackets receive sliding bearing-blocks b^2, which support a transverse rod, b^3, upon which is mounted a saddle, B′, which in turn supports the barrel-stock and its barrel, the front end of the oscillating shaft C, which operates the barrel, and the connections between the barrel and shaft through which motion is imparted to the barrel.

The saddle B′ consists of two bent arms, $b^4 b^4$, connected by a transverse bar, b^5. The arms are perforated at their lower ends to receive the rod b^3, and the upper and forward ends carry center screws, b^6 b^6, which support between them a short shaft, b^7, which passes through the foot of the barrel-stock B^2 and supports the same.

The barrel B^3 is supported and oscillates in a bearing at the upper end of its stock B^2, oscillatory motion being imparted thereto by a rack, b^8, which engages a circumferential gear, *o*, on the barrel, and which reciprocates in a guideway formed transversely through the lower part of said bearing, in the usual manner. The rack b^8 is reciprocated by a vibrating arm, b^9, on the end of the oscillating shaft C, the upper end of said arm being bent backward, so as to stand substantially paral-

lel with the shaft and working in a depending fork, b^{10}, which is bolted to or formed on the end of the rack. The end of the arm b^9 carries a rolling sleeve, b^{11}, which forms an anti-friction bearing between the parts to prevent wear.

The oscillating shaft C is located beneath the bed of the nail-machine, and is supported at its rear end by an adjustable hanger, c', which is bolted to the bed of the machine, as shown in Fig. 1. At its rear end it is provided with an adjustable arm, c^2, which is adapted to be adjusted both angularly and longitudinally, being formed for this purpose with a clamp-socket which receives the shaft, and by which it is clamped to the latter. This socket is formed of two jaws, as represented in Fig. 5, which are drawn together by a screw, c^3, to tightly clamp the shaft.

On the arm c^2 is a sleeve, c^4, which is engaged by center screws, $d\ d$, in the arms of a fork, d', which is connected with or formed on the end of a pitman, D, that connects the arm c^2 with a crank, E^2, on the shaft E′ of the drive-wheel E. The sleeve c^4 is adapted to be moved in or out on the arm c^2 in order to regulate the oscillation of the shaft C without changing the stroke of the pitman, such movement being permitted by the center screws, $d\ d$.

The upper end of pitman D is connected by a ball-and-socket joint with the pin e of a crank, E^2, which is on the shaft E′ of wheel E. The wheel E meshes with and is driven by a gear-wheel (not shown) on the main shaft of the nail-machine.

The shaft of the wheel E runs in horizontally-adjustable boxes f, on vertically-adjustable brackets F, which are bolted to the rear end of the machine, as shown in Fig. 1, the adjustability of the brackets and boxes being provided for by slots through which the fastening-bolts pass. The ball-and-socket connection between the crank-pin e and the pitman D permits the lower end of the latter to be moved in or out with the sleeve c^4, while the sleeve permits the vibration of the pitman and at the same time forms a smoothly-working connection between the parts. The crank-pin e is preferably made radially adjustable in the crank in order that the stroke of the pitman may, if desired, be changed.

Behind the crank-disk a^6 is an eccentric, (shown in dotted lines in Fig. 1,) to the yoke of which is connected the rear end of a horizontal connecting-rod, b^{15}, the forward end of which is connected with the top of the barrel-stock by a ball-and socket connection, as follows: At the top of the barrel-stock and projecting above the barrel-support is a vertical slotted arm, b^{16}, in the slot of which is secured a pin, b^{17}, which has a spherical head at its outer end, and with which is connected a coupling-block, B^4. This block has an opening through it, as represented in Fig. 1, in one side of which opening is formed a seat or bearing for the spherical head, and in the opposite side is located a movable block or box, b^{18}, formed with a similar seat or bearing, the said block being adapted to be set up against the spherical head by a set-screw, b^{13}, to form a close-fitting ball-and-socket joint.

To the top of the block B^4 is adjustably connected a coupling-block, B^5, which is formed with a slot, (represented by dotted lines,) through which passes a clamping-screw, b^{14}, which screws into the block B^4 and clamps the two parts together. The block B^5 is formed with a socket that receives the end of the coupling-rod b^{15}, which is secured therein by a set-screw, b^{19}. The connecting-rod b^{15} subserves the usual purpose of vibrating the barrel-stock and barrel to clear the latter from the machine, so that it may oscillate in its bearing. By the adjustability of the block B^5 on the block B^4 an easy adjustment of the feeder is provided for, while the separable connection between the rod b^{15} and the block B^5 permits the parts to be readily disconnected when for any reason it is desired to turn the barrel away from the machine.

As above stated, the forward end of the oscillating shaft C is supported by the saddle B′, and the construction of this bearing will now be described.

The transverse shaft b^7, which supports the barrel-stock, is formed with an integral enlargement, 1, which has an opening through it for the reception of the shaft C, and at right angles to said opening is formed a socket of somewhat greater diameter than the opening for the shaft, which socket receives a tightly-fitting cylindrical block, 2, with a transverse opening, 3, which, when the block is in position in its socket, registers with the opening through the enlargement 1 and forms the real bearing for the shaft, which snugly fits the same. It is sometimes necessary or desirable to adjust the rear end of the shaft C laterally, and in order to provide for such adjustment we elongate the opening through the enlargement 1 in a direction parallel with the shaft b^7, as indicated in Fig. 4. Then, in making such adjustment, the cylindrical block 2 will turn in its socket and adjust itself to the change of direction of the shaft.

The shaft b^7, with its socketed and perforated enlargement 1 and the cylindrical block 2, are preferably cast, the latter in chill-molds; but they may be made of wrought metal and hardened in the usual way.

To provide for the vertical adjustment of the barrel-stock and barrel, we form a lug, 4, (shown in full lines in Fig. 1 and in dotted lines in Fig. 2,) on one of the arms b^4 of the saddle B′, which lug rests on the end of an adjusting-screw, 5, that works vertically through the horizontal arm of one of the brackets b. The weight of the saddle and of the feeding mechanism carried thereby thus rests upon the screw 4, and by turning the latter up or down the saddle is adjusted to raise or lower the barrel-stock and barrel.

The vibrating arm b^9, that operates the rack b^8, is adjustably attached to the shaft C by a

clamp, which is formed by bending the end of the arm to form a socket for the shaft, as shown in Fig. 2. Then, by means of a clamping-screw or bolt, 6, the clamp is tightened to secure the arm in adjusted position on the shaft. The arm b^9 on one side of the shaft b^7, and a collar, 7, on the opposite side, prevent longitudinal movement of the shaft C.

The barrel-stock B^2 has a short forwardly-projecting arm, 7, to which is bolted a bar, 8, that supports the feeding-fork, which we will now describe.

The fork is composed of two principal parts, 9 10, which carry at their upper ends grasping-jaws 19 20, and have angular horizontal arms, marked, respectively, 11 11 and 12 12. The arms 12 12 of the part 10 carry center screws, 13 14, and receive between them the arms 11 11 of the part 9, which receive in suitable sockets the points of the screws 13 14, by which the two parts are connected together. This forms a hinge-connection, which permits a movement of the two parts relatively to each other, which movement is limited in one direction by a stop-lug, 16, on the part 10, which abuts against a shoulder, 17, on the lower arm of the part 9, and in the opposite direction by a shoulder, 18, on the upper arm of the part 9, which forms a stop for the forward end of the upper arm, 12.

The part 9 is secured in the forked end of the bar 8 by center screws, 15 15, the points of which enter sockets 15^a, whereby a hinge-joint is formed, which permits the backward and forward vibration of the parts 9 10.

A block, 29, which is bolted to the arm 8 back of the fork, supports a rod or bar, 30, in the forward end of which is mounted a fork, 31, which is vertically adjustable, and is secured by a set-screw, 32. This fork supports the forward end of the nipper-rod, as will be hereinafter explained. It has a backward-projecting horizontal arm, 33, which forms a stop to limit the forward vibration of the parts 9 10. A screw-connection between the block 29 and rod 30 permits a forward and backward adjustment of the fork 31 and its stop-arm 33 to regulate the vibration of the parts 9 10.

At the top of the part 9 is a spring-pressed jaw, 19, and on the outer end of the angular upper arm 12 of the part 10 is an adjustable jaw, 20, which two jaws grasp the nipper-rod 21, that holds the nail-plate.

The jaw 19 has a stem which extends through a barrel, 22, and is surrounded by a spiral spring, 23, that has a bearing at its outer end against an internal shoulder, 24, and at its inner end against a boss, 25, which fits the barrel and supports and guides the jaw. The tension of the spring 23 may be regulated by a screw-connection between the stem and the boss 25.

The jaw 20 is mounted on the upper angular arm 12 of the part 10, and is secured thereto by a screw-bolt, 26, which passes through a slot, 27, whereby adjustment of the jaw is permitted. A screw, 28, passing through a lug or standard on the outer end of the arm 12, sets against the jaw and assists in holding it in its adjusted position.

Below the bar 8, and substantially parallel therewith, is a push-bar, 34, which passes through a slot or opening, 35, in the barrel-stock. The forward end of this push-bar is seated against the end of the lower arm 12 of the part 10, and is held thereto by a spring, 36, one end of which is attached to a pin, 37, on the arm 12 and the other end to a pin, 38, on the bar. A conical-pointed screw, 39, which projects through the arm 12, enters a conical recess in the end of the bar and serves to hold it in proper position. The opposite end of the bar abuts against the front end of the nail-machine, as represented in Fig. 1, and the bar is of such length and so adjusted that when the barrel-stock and its connected parts are drawn toward the machine by the operation of the eccentric on the main shaft it will move with said parts until it is arrested by striking against the machine. This occurs just before the action of the eccentric is finished, and as the parts move still farther the rod will push against the end of the angular arm 12 and cause the part 10 during such continued movement to turn on its hinged connections with the part 9, turning its jaw 20 toward the jaw 19, thereby causing the nipper-rod 21 to be grasped by said jaws, and now, as the movement of the parts toward the machine still continues, the two parts 9 10 will be vibrated on the screws 15, causing the nipper-rod 21, which is grasped by the jaws 19 20, to be carried along a distance corresponding with the thickness of the nail to be cut, the movement of said rod being completed just as the knives begin to act. After the nail has been cut from the plate a reverse movement begins, by which the feeder is carried away from the machine, the first effect of which is to allow the jaws 19 20 to open and release the nipper-rod 21, the opening of the jaws being effected by the action of the spring 36 as soon as the parts have moved far enough to relieve them from the pressure of the push bar 34. The continued movement of the parts after the jaws have opened to the limit permitted by the stops 16 17 permits the parts 9 10 to vibrate on the screws 15 15, and for the purpose of effecting this vibration a spring, 39, is employed, one end of which is connected with a pin, 40, that projects from the bar 8, and the the other end with a pin, 41, that projects from the lower end of the part 9. If preferred, the spring 40 may be connected with the pin 37, the same effect being produced.

The jaws 19 20 are faced with steel blocks 19^a 20^a at the points where they grasp the nipper-rod to protect them against wear. These blocks may be renewed when they become too much worn for effective operation. The sockets which receive the points of the screws 13 14 15 are steel-bushed, and these bushings may also be renewed when worn out.

Fig. 3 illustrates the barrel in longitudinal

section. It is mounted in a bearing in the top of the barrel-stock, and has a circumferential gear, *o*, with which the reciprocating rack b^8 engages to impart oscillatory motion, as usual.

p p designate holding-bars mounted on opposite sides of the tapering nose, (two on each side,) between which the nail-plate is fed toward the knives. These bars are clamped to holding-plates *q q* by screws *r* and cross-bars *s*, as illustrated in Fig. 3ª, and the plates are provided along their edges with flanges *t t*, which overlap and hold the bars in proper position. The plates and bars are secured to the barrel by spherical-headed screws *u u*, and the barrel is cut away in front of said screws to allow the plates and bars to turn slightly, as indicated in dotted lines. Under the forward ends of the plates, between the bars *p p*, are springs *v v*, which hold the points of the bars together, and which yield to allow the points to spread apart when a nail-plate is inserted between them. These bars are not intended to possess elasticity or flexibility in themselves, as usual heretofore, but are intended to have a pivotal action on the screws *u* and to be held to their work by independent spring-pressure, as will be well understood from the drawings.

In order to afford the greatest facility for the introduction of the nail-plate into the barrel, a guard, *w*, is formed at the top of the barrel-stock on the side opposite that on which the attendant stands, which guard partially surrounds the open end of the barrel and serves to guide the nail-plate into the same. This we regard as an important feature, because it avoids the liability of the plate being run into the gearing of the machine by a careless attendant.

x indicates a hinged guard that covers the guideway in which the rack b^8 reciprocates. At the limit of the movement of the rack toward this side of the machine its end projects beyond the barrel, and in the absence of a guard or protection of some kind scraps, nails, or other substances are liable to be dropped thereon and carried into the gearing, to the injury or destruction of this part of the machine.

Having thus described our invention, we claim as new—

1. In a nail-plate feeder, the combination, with the adjustable rock-shaft C, of a transverse bar adjustably connected with the front end of the nail-machine, in connection with which the feeder is used, and a bearing for the front end of said shaft supported by said transverse bar and capable of adjusting itself to the angular direction of the shaft when the latter is adjusted, substantially as and for the purpose described.

2. In a nail-plate feeder, the combination, with the brackets by which the feeder is connected with the nail-machine and with the rock-shaft of the feeder, of a transverse bar or shaft, b^7, supported on said brackets by intermediate connections, and a bearing for the rock-shaft supported by said bar or shaft b^7 and capable of adjusting itself to a change in the angular direction of the rock-shaft, substantially as shown and described.

3. In a nail-plate feeder, the combination, with the brackets *b b*, the saddle B, and intermediate connections, of the transverse shaft b^7, pivotally mounted in the saddle, and the rock-shaft C, passing through said shaft b^7 and having a bearing therein, substantially as shown and described.

4. In a nail-plate feeder, the combination, with the brackets *b b*, the saddle carried thereby through intermediate connections, of the transverse shaft b^7, pivotally mounted in said saddle, and the barrel stock mounted on said transverse shaft and capable of vibrating or swinging thereon, substantially as shown and described.

5. In a nail plate feeder, the combination of the angular brackets *b b*, the bearing-blocks b^2, adjustably mounted on the horizontal arms of said brackets, the transverse rod b^3, carried by said bearing-blocks, the saddle B′, mounted on the rod b^3 and capable of swing thereon, the transverse shaft b^7, pivotally mounted between the horizontal arms of the saddle, and the barrel stock mounted on said shaft and capable of swinging thereon, substantially as shown and described.

6. The angular bracket *b*, formed of a wrought-iron bar and having the upper end of its vertical arm bent into hook shape and adapted to be attached to the bed of a nail cutting machine by a bolt passing through its hooked end, substantially as shown and described.

7. In a nail-plate feeder, the combination, with the barrel and its stock, of a reciprocating rack working through the barrel-stock to impart oscillatory motion to the barrel, and a hinged guard arranged to cover the guideway of the rack and to protect the latter, substantially as shown and described.

8. In a nail-plate feeder, the combination, with the rock-shaft C, and with the reciprocating rack that oscillates the barrel, of the vibrating arm formed with a clamp-socket at its lower end for the reception of said shaft, the said socket being formed by bending the end of the arm around upon itself, whereby it is adapted to be adjustably clamped upon the shaft by a screw or bolt passing through the arm and through the bent end, substantially as and for the purpose described.

9. In a nail-plate feeder, the combination, with the wheel E, its shaft E′ and crank E^2, and with the rock-shaft C, of the arms c^2, adjustably clamped upon the said shaft, the collar c^4 on said arm and capable of oscillating thereon, and the pitman D, connecting said collar with the crank E^2, substantially as and for the purpose described.

10. In a nail-plate feeder, the combination, with the rock-shaft C and its arm c^2, of the collar c^4 on said arm, the forked pitman D *d′*, connected with said collar by pointed screws *d d*, passing through the arms of its fork, and the crank E^2 on the shaft of wheel E, with

which the pitman is connected at its opposite end, substantially as shown and described.

11. The feeding-fork for nail-plate feeders herein shown and described, consisting of two main parts, 9 10, each having horizontal arms by which they are pivoted or hinged together, and grasping-jaws at their upper ends, in combination with an arm projecting from the barrel-stock, to which arm one of said parts is hinged to swing or vibrate forward and backward, substantially as shown and described.

12. The feeding-fork herein shown and described, consisting of the two parts 9 10, each having horizontal arms by which they are pivoted or hinged together, and grasping-jaws at their upper ends, one of said jaws being spring-seated, substantially as shown and described.

13. The combinion, in a nail-plate feeder, of the bar 8, projecting from the barrel-stock, the part 9 of the feeding-fork hinged to said arm to swing forward and backward, the part 10 hinged to the part 9 to swing toward and from the same, the said parts 9 10 being provided with jaws to grasp the nipper-rod, a spring to throw the connected parts 9 10 forward, and a push-bar, 34, between the nail-machine and a horizontal arm that projects below the connection between the arm 8 and the part 9, whereby, when the barrel-stock moves toward the machine, the jaws will first be closed to grasp the nipper-rod and then moved toward the machine, substantially as shown and described.

14. In a nail-plate feeder, the combination of two grasping-jaws hinged together and adapted to open and close by a swinging movement in a horizontal plane and capable of vibrating in a vertical plane, and a push-rod operating upon the arm of one jaw, for imparting motion to said jaws in both directions, substantially as and for the purpose described.

15. The combination, with the barrel of a nail-plate feeder, of the holding-bars *p p* and the plates *q q*, to which they are attached, the said plates being pivotally connected to the barrel by screws *u u*, substantially as shown and described.

16. The combination, with the barrel of a nail-plate feeder, of the holding-bars *p p* and the plates *q q*, to which they are secured, the said plates being pivotally connected to the barrel by spherical-headed screws *u u*, and springs *v v*, to press the points of said holding-bars together, substantially as shown and described.

In testimony whereof we affix our signatures in presence of two witnesses.

GEORGE T. HARDEN.
EDMUND S. GRANT.

Witnesses:
JOHN A. REDMOND,
L. W. RICHARDS.