# F. H. BROWN.

## Metal-Screw Machines.

No. 156,837. Patented Nov. 17, 1874.

Fig. 1

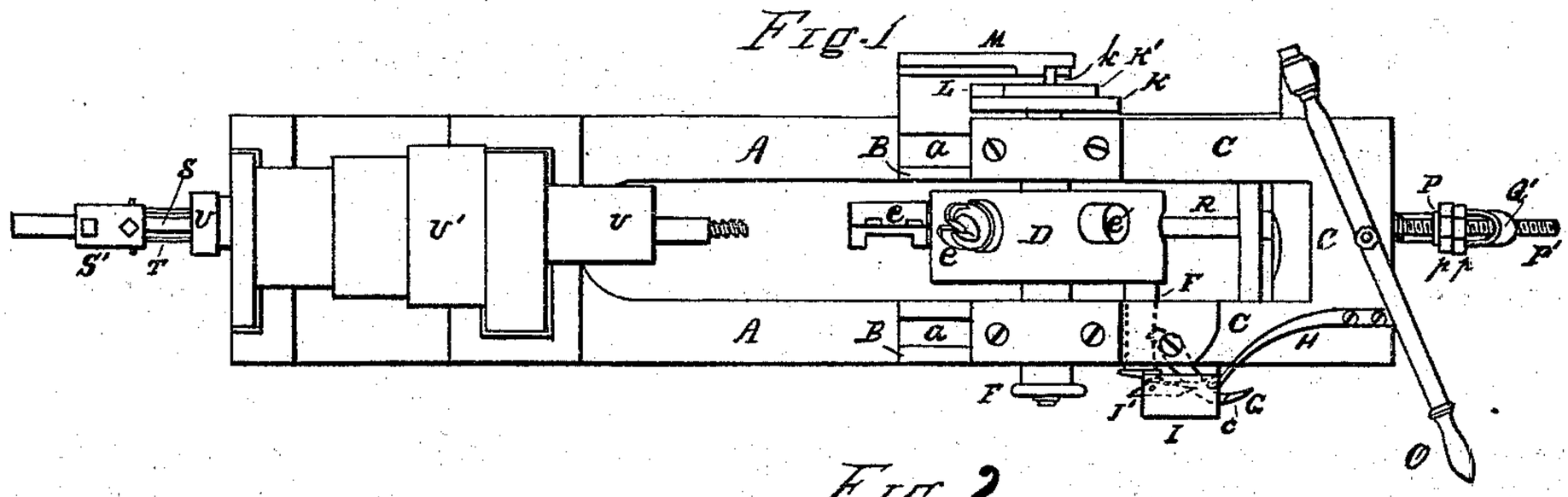



Fig. 2

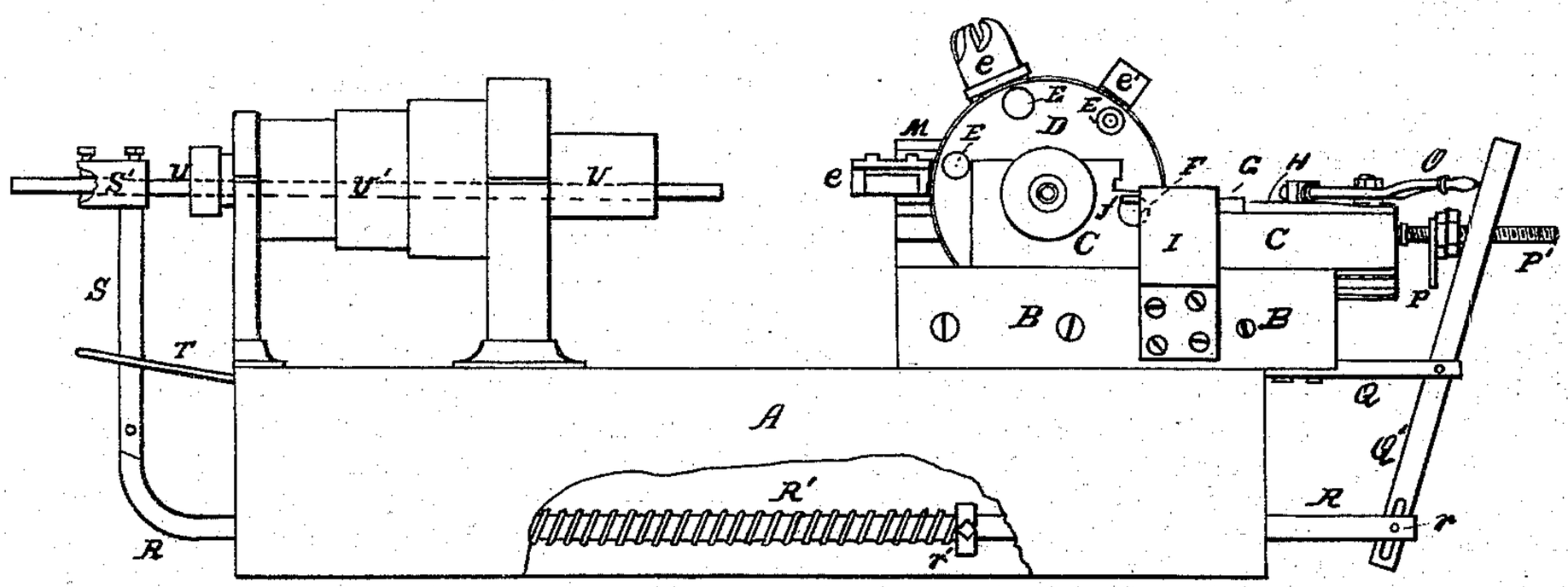



Fig. 3

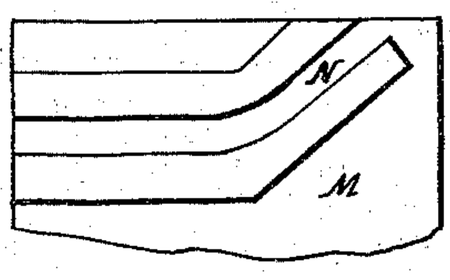



Fig. 4

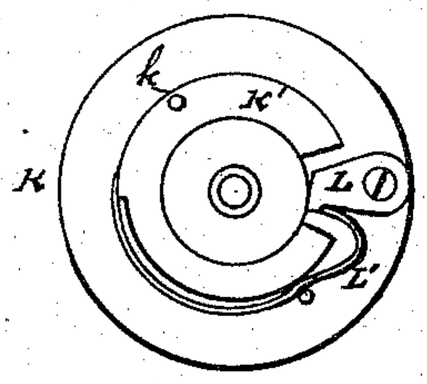



Fig. 5

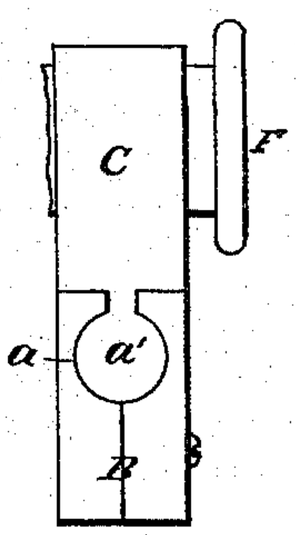
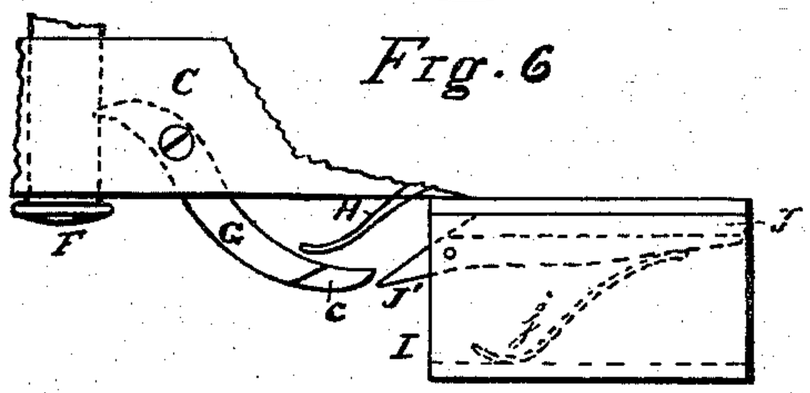



Fig. 6

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# UNITED STATES PATENT OFFICE

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## IMPROVEMENT IN METAL-SCREW MACHINES.

Specification forming part of Letters Patent No. **156,837**, dated November 17, 1874; application filed August 12, 1874.

*To all whom it may concern:*

Be it known that I, FRANKLIN H. BROWN, of Indianapolis, in the county of Marion and State of Indiana, have invented certain new and useful Improvements in Screw-Machines, of which improvements the following is a full, clear, and exact description, which will enable others skilled in the art to which my invention appertains to make and use the same, reference being had to the accompanying drawing forming a part hereof, and in which—

Figure 1 is a top or plan view of a machine embodying my invention; Fig. 2, a side elevation of the same; Fig. 3, a side elevation of the grooved wall; Fig. 4, a side elevation of the clutch device; Fig. 5, an end view of the way in which the tool-carriage rides; and Fig. 6, a top or plan view of the guides which control the lever operating in connection with the bolt or steady-pin, by means of which the tool head or holder is locked and released.

Like letters of reference indicate like parts.

My object is to improve the construction and operation of those parts of the machine by means of which the wire is gaged and fed to the tools, and also of the means employed to regulate the action of the tool head or holder; and to that end my invention consists in certain novel features, substantially as hereinafter specified, relating to the mechanism above referred to.

In the drawing, A represents that part of the frame which supports the working or moving parts of the machine. For convenience, the part A is usually supported upon standards. B B are ways rigidly mounted upon one end of the frame, and *a a* are circular grooves or bores cut longitudinally near the upper faces of the said ways, and terminating in slots or channels sunken from the said faces, as is clearly represented in Fig. 5. C is the tool-carriage, consisting of a three-sided frame, provided with ribs or rods *a' a'*, fitted nicely into the grooves *a a*. D is the tool head or holder, and *e e* are tools arranged therein. *e'* is a stop or gage, also arranged in the holder. The tool-holder is rigidly attached to its axle or arbor, which extends across the carriage and rests freely in bearings therein.

It will be observed, from reference to the drawing, that the tool-holder is arranged for rotation in a vertical plane, that it is provided with firm and solid bearings, and that the tools are capable of passing between the sides of the frame during the rotation of the holder.

E E are sockets sunken into one of the lateral faces of the holder, and F is a steady-pin, sliding bolt, or stop carried by the carriage, and arranged to enter the sockets E E. G is a catch or lever pivoted to the carriage and engaging the bolt F. H is a spring attached to the carriage, and resting against the lever G in such a manner as to press the pin F into the sockets E E. *c* is a lug or projection extending upward from the outer end of the lever G. I is a bracket attached to one of the ways B B, and J is a rib fixed to the under face of the bracket-leaf, and beveled at each end, in the manner shown in Fig. 6. J′ is a piece pivoted to the under face of the bracket-leaf, and beveled and arranged in the manner shown. The piece J′ is held against the part J by means of a small spring, *j*. K is a disk loosely mounted on the arbor of the tool-holder, and K′ is a hub or annular concentric rib on the outer face of the disk K. *k* is a pin projecting from the rib K′. L is a clutch or dog pivoted to the disk K, and resting on the arbor of the tool-holder. L′ is a spring holding this clutch against the arbor. The clutch L inclines toward the spring L′, and its lower end is a little out of a line passing radially from the center of the arbor through the center of the pivot, on which the clutch is hung. M is a vertical wall adjacent to the outer face of the disk K, and N is a cam-groove in the face of this wall, and into this groove the pin *k* projects. O is a lever passing freely and horizontally through a vertical stud or pin turning freely in a bearing on the frame A. This lever is also centrally pivoted to the cross-bar of the carriage C. P is a horizontally-adjustable stop run upon a screw-threaded rod, P′, extending from one end of the carriage, and this stop is locked in its position by means of the nuts *p p*, and depends sufficiently for contact with the cross-bar connecting the ways B B, when the carriage is moved forward. Q is a horizontal arm or rod extending from the end of the frame A, and Q′ is a vertical lever pivoted to said arm.

The upper end of this lever is looped or slotted to receive the rod P′, and its lower end is also slotted, for the purpose hereinafter mentioned. R is a horizontally-sliding rod or bar, passing freely through the lower part of the frame A, in which it rests. *r* is a pin passing through the rod R, and through the slot in the lower end of the lever Q′. R′ is an open spiral spring on the rod R, and *r′* is a collar, against which one end of this spring rests, the other end resting against the frame A. S is a tilting arm, to the upper end of which the hollow clutch or rest S′ is attached, and the lower end of which is jointed to the rod R, the latter being bent into a vertical position at its junction with the said arm, as shown in Fig. 2. The arm S is united to the rod R by means of a knuckle-joint, so constructed as to allow the said arm to tilt to and from the frame, but not beyond a vertical line while moving toward it. T is a loop to limit the tilting movement of the arm S during its movement from the frame when the screw-wire is removed. U is a hollow spindle, and U′ is a driving pulley or cone rigidly mounted thereon. In connection with my improvements suitable cut-off mechanism and a clutch or chuck for grasping and rotating the wire may be used in the manner in which they are usually employed in devices of this class.

The operation of the parts now described is as follows: The wire is passed through the clutch or rest S′, and from thence through the hollow spindle, from the inner end of which it projects sufficiently to be operated upon by the tools. The tool-holder carriage is moved toward the wire by means of the lever O, and the movement of the carriage in that direction is limited at the proper time by the contact of the stop P with the cross-bar connecting the ways B B, it being understood that this stop is adjusted according to the length of the milled part to be cut upon the projecting end of the wire during the formation of the screw. This movement presents the tools to the wire in such a manner that they will operate upon it when the wire is rotated, the rotation being accomplished in the usual manner. The rearward movement of the carriage throws the lug *c* against the edges of the parts J and J′, along which it then rides, thus drawing the pin F from the sockets E E, and releasing the tool head or holder. By the time the tool-holder is thus released the pin *k* has reached the angle in the groove N, and rides up the inclined part of the groove, thus causing the rotation of the disk K, which, through the instrumentality of the dog L, turns the tool-head until another tool is presented to the wire. By this time the lug *c* has reached the rear end of the rib J, and the spring H then forces the pin F into a succeeding socket, E, and the tool is thus again locked in a horizontal position. Before the rearward movement of the carriage ceases, the nuts which lock the stop P strike the upper end of the arm Q′. By this means the force of the spring R′ is overcome, and the clutch or rest S′ is moved from the frame, so as to clutch the screw-wire and carry it toward the tool-head at the proper time. When the carriage is next moved forward the arm Q′ is released, and the clutch or rest S′ then tends to move the wire forward, owing to the action of the spring R′, and does so move it when the wire is released by the clutch or chuck which rotates it.

It will be observed, from reference to the drawing, that the rest S′ is so attached to its arm as to constantly tend to fall from the machine, it being remembered that this arm is so jointed to the rod R as to be incapable of passing a vertical position while being tilted toward the machine. For this reason the rest, when pushed from the machine in the manner described, will ride freely on the wire; but when drawn in the opposite direction, the force being applied at the lower end of the arm, the wire will be sufficiently pinched or clutched to be fed toward the tools. In the former case the arm operates simply as a pusher, and exerts no leverage on the rest. In the latter case it operates as a drag and lever, and tends to twist the rest from the horizontal line occupied by the wire; hence the latter is pinched and fed in the manner described.

It should be understood that the rib K′ is only essential for the purpose of giving the disk K a broad bearing on the arbor on which it is mounted.

During the rotation of the wire the tilting movement of the rest S′ will be overcome, and the latter will then slide freely back and forth on the wire whenever the lever Q′ is struck and released. The wire, therefore, need not be fed each time the carriage is moved back and forth, but may be so fed at any time by causing the rotation of the wire to cease, and should be fed each time a completed screw is cut from it.

During the forward movement of the carriage the pin *k*, by riding in the groove N, reverses the movement of the disk K, so that the dog L will take a new hold upon the arbor of the tool-holder during the next rearward movement of the carriage. By the time the tool is brought near enough to engage the wire the part *c* has reached the front end of the part J′, and the small spring *j* then throws the forward end of the said part into such a position that the pin F may be again drawn, in the manner described. The stop or gage *e′* may be set to gage the length of the screw by striking the end of the wire when the carriage is moved forward.

It will be observed from the foregoing description that the feeding mechanism is simple in its construction and operation, and is set in action through the instrumentality of the lever, by means of which the carriage is operated.

The tool-holder is arranged to rotate in a vertical plane, and the carriage, by being con-

structed to allow the tools to move between its sides, admits of a low and firm bearing for the tool head or holder without interfering with the action of the latter.

The means employed for the purpose of releasing the tool-holder, as well as those by means of which a partial or intermittent rotation is given to it, are reliable in their operation, and not likely to get out of order.

By providing the carriage with the rods *a a*, arranged in corresponding grooves in the ways on which it rides, the carriage is rendered more certain in its movements than if it rode on the gibs ordinarily employed for this purpose.

I am aware that tool-holders arranged for rotation in a vertical plane have heretofore been employed for the purposes set forth, and I do not claim such broadly; but,

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The combination of the yielding rod R, the tilting arm S, knuckle-jointed to the said rod, and provided with the tubular rest or clutch S′, and of the pivoted lever Q′, arranged for actuation by a push-piece on the sliding carriage, substantially as and for the purposes specified.

2. The combination of the tool head or holder, arranged for rotation in a vertical plane, and mounted on a sliding carriage constructed to receive the periphery of the holder, the disk K, loosely mounted on the arbor of the holder, and provided with the pin *k* and dog L, and of the cam-groove N in the fixed vertical wall M, substantially as and for the purposes specified.

3. The disk K, loosely mounted on the arbor of the tool head or holder, and provided with the yielding dog or clutch L, and with the pin *k*, in combination with the cam-groove N, arranged to receive the said pin, substantially as specified, and for the purposes set forth.

4. In combination, the rotary holder D, provided with the sockets E E, the yielding lever G, provided with the lug *c*, the pin F, the fixed piece J, and the yielding pivoted piece J′, substantially as specified, and for the purposes set forth.

FRANKLIN H. BROWN.

Witnesses:

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N. C. GRIDLEY.