

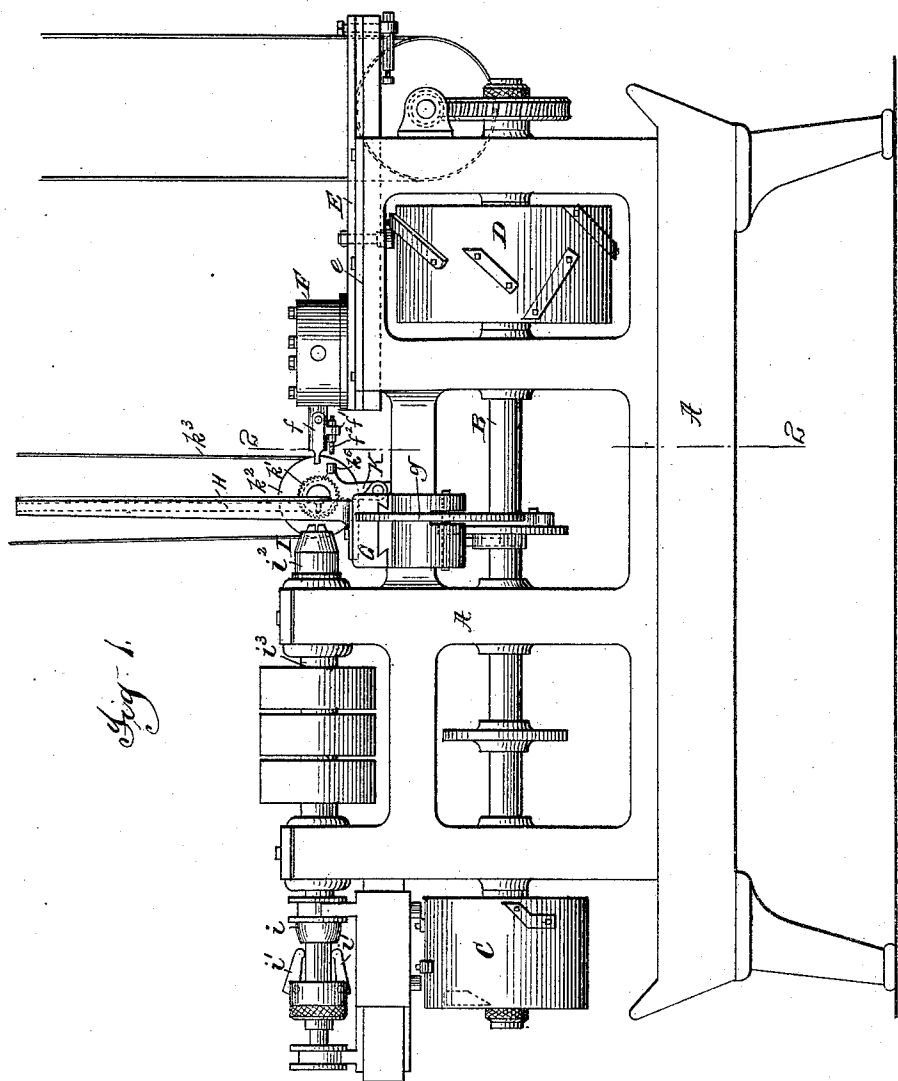
(No Model.)

3 Sheets—Sheet 1.

E. L. BOWERS & J. E. TITUS.
SLOTTING MACHINE.

No. 469,323.

Patented Feb. 23, 1892.



Attest:
Geo H Both
Annie L. Hayes.

Inventors
Edward L. Bowers
Jonah E. Titus
by their Attys
Chas. F. Dame & Co.

(No Model.)

3 Sheets—Sheet 2.

E. L. BOWERS & J. E. TITUS.
SLOTTING MACHINE.

No. 469,323.

Patented Feb. 23, 1892.

Fig. 7.

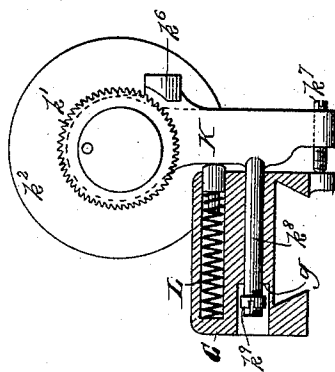


Fig. 8.

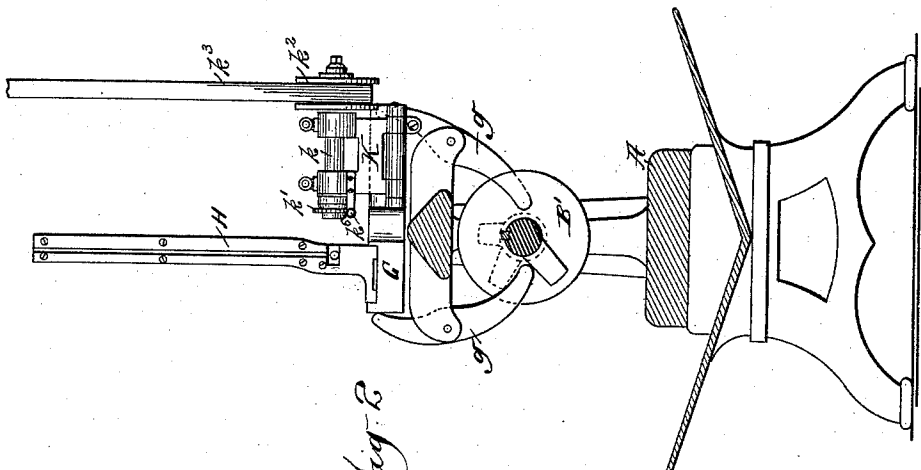
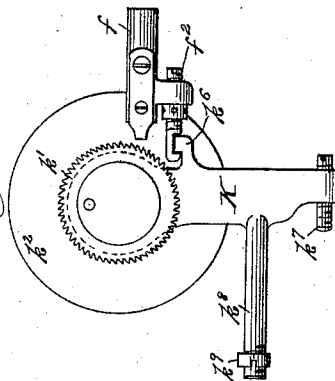


Fig. 9.

Attest:
Geo H. Pitt
Amie C. Hayes

Inventors
Edward L. Bowers
Jonah C. Titus
by their Attys
Chas. F. Davis & Co.

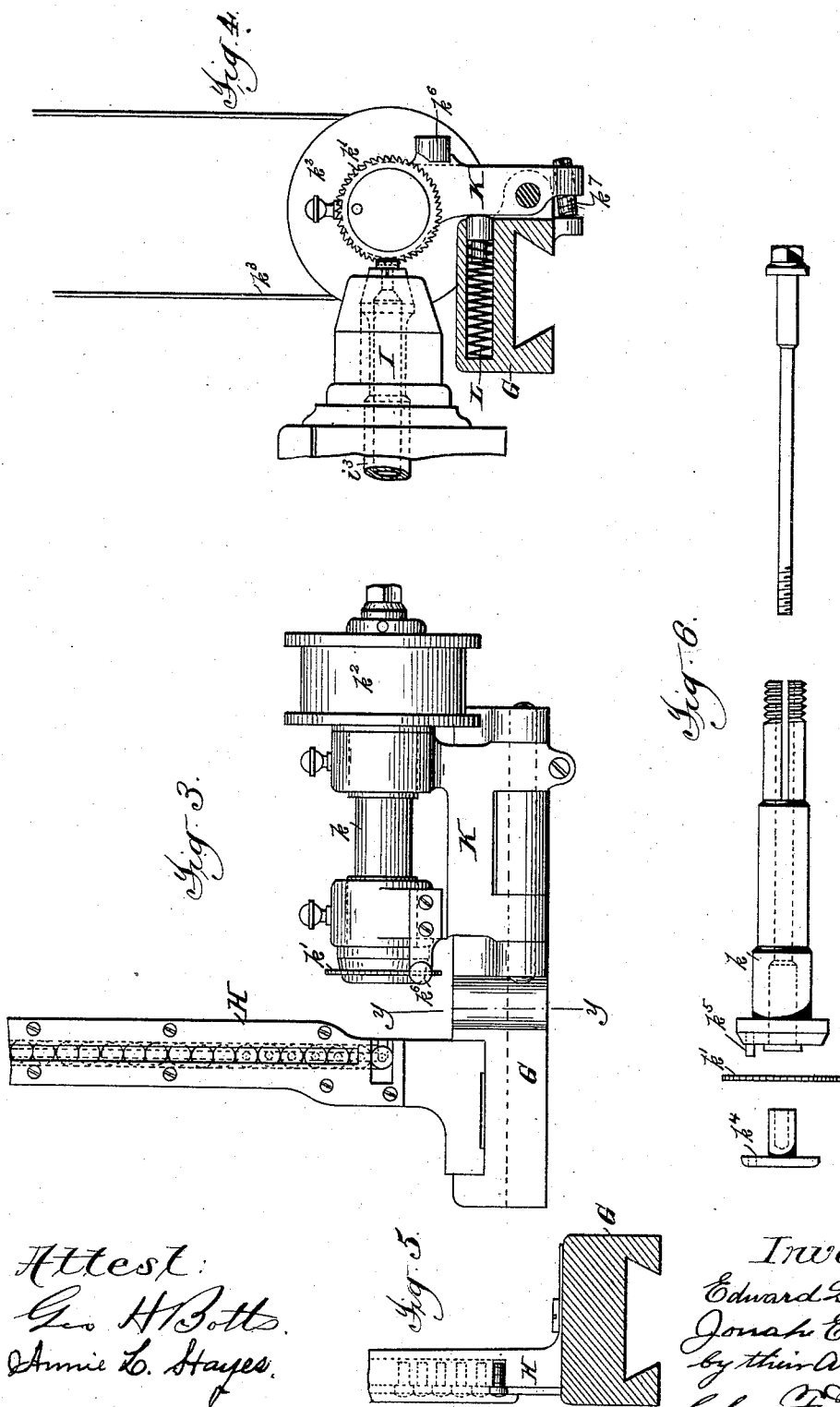
(No Model.)

3 Sheets—Sheet 3.

E. L. BOWERS & J. E. TITUS.
SLOTTING MACHINE.

No. 469,323.

Patented Feb. 23, 1892.



Attest:
Geo. H. Botts.
Annie L. Hayes.

Inventors
Edward L. Bowers
Jonah E. Titus
by their Attys
Chas. F. Lane & Co.

UNITED STATES PATENT OFFICE.

EDWARD L. BOWERS AND JONAH E. TITUS, OF ORANGE, MASSACHUSETTS,
ASSIGNORS OF ONE-THIRD TO WILLIAM L. GROUT, OF SAME PLACE.

SLOTTING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 469,323, dated February 23, 1892.

Application filed March 30, 1891. Serial No. 386,954. (No model.)

To all whom it may concern:

Be it known that we, EDWARD L. BOWERS and JONAH E. TITUS, citizens of the United States, residing at Orange, county of Franklin, and State of Massachusetts, have invented new and useful Improvements in Slotting-Machines, of which the following description, taken in connection with the drawings herewith accompanying, is a specification.

Our invention relates to that class of machines usually provided with a magazine or other receptacle mounted on a cross-slide in which the screws or other pieces to be operated upon are placed, a chuck and mechanism for automatically opening and closing the same, and suitable jaws or gripping device carried by the usual turret, monitor, or tool-carrier for removing the screws or other pieces located in the magazine and placing the same in the chuck to be operated upon by suitable tools or mechanism with which the machine may be provided, said parts operating automatically in their relation to each other; and our invention consists in the combination, with a machine provided with mechanism of a character above referred to, of a mechanism constructed to operate in conjunction with said parts, adapted for slotting the heads of screws and other pieces, said mechanism consisting, essentially, of a sawing mechanism carried by the cross-slide, and means for operating said sawing mechanism in a manner which will hereinafter be more fully described, the objects of our invention being to provide a machine whereby the screws or other pieces to be slotted may be handled, presented to the proper tools operated upon, and be ejected from the machine automatically.

Referring to the drawings, Figure 1 represents a side elevation of a machine embodying our invention; Fig. 2, a cross-section through line 2 2 of Fig. 1, showing the cross-slide with the magazine and sawing mechanism supported thereon and the mechanism for operating the cross-slide; Fig. 3, a side elevation of the cross-slide with the magazine and sawing mechanism detached from the machine; Fig. 4, a section through line *y y* of Fig. 3, showing the front end of the

sawing mechanism, the spring for elastically holding the same in its normal position, and the end of the chuck broken away with a screw held thereby, showing its relative position to the said saw; Fig. 5, a section through line *y y* of Fig. 3, showing a side view of the magazine broken away; Fig. 6, a view of the saw and its rotating spindle in detail, showing the construction of the several parts and their mode of connection; and Figs. 7 and 8 represent modification in the construction of the sawing mechanism, as will hereinafter be described in detail.

To explain in detail, A represents the supporting-frame; B, the driving-shaft; D and C, cam-carrying pulleys located on said driving-shaft; E, the sliding carriage supported in ways *e e* on the frame A and operated by suitable cams located on the pulley D; F, the turret mounted on said sliding carriage; *f*, the gripping jaws or device carried by said turret; G, the cross-slide; H, the magazine mounted on said cross-slide; *g* and *g*, the cross-slide, operating levers pivoted on the frame A and operated to reciprocate the cross-slide through the medium of the cams located on a disk B', carried by the driving-shaft B, and I the chuck, adapted to be opened and closed in the usual manner by means of the sliding conical collar *i* and levers *i' i'* through the medium of the head *i²* and its hollow supporting-spindle *i³*.

The construction, arrangement, and operation of the above-mentioned parts being well understood by those skilled in the art and not of our present invention, it is thought to be unnecessary to describe the same in detail herein.

In the present instance, and referring more particularly to Figs. 1, 2, 3, and 4, we have pivoted to the cross-slide G at a greater or less distance in the rear of the magazine H a frame K, provided with suitable bearings, in which is loosely supported a spindle *k*, arranged at right angles to the chuck I, and provided at one end thereof with a circular saw *k'* and at its opposite end with a pulley *k²*, over which latter the driving-belt (represented at *k³*) passes to rotate the spindle and the saw supported thereby. The saw *k'* is

adapted to be secured to the spindle k , as shown in detail in Fig. 6, by means of a clamping-nut k^4 , and is prevented from turning in its relation thereto by means of a pin k^5 , connecting the same. We also provide the supporting shank or frame of the gripping device f , carried by the turret F , with a lug or projection f' on its under side, in which we locate a horizontally-arranged screw f^2 , termed the "feeding-screw," which is adapted (when the cross-slide G is moved forward to bring the saw k' in a line central with the middle of the screw or other piece held by the chuck I , as will hereinafter be described) to be carried forward by a movement of the sliding carriage E and engage with a shoulder or projection k^6 on the pivoted frame K to move the latter toward the chuck I and cause the rotating saw carried thereby to engage the head of the screw supported in said chuck and slot the same. Thereafter the feeding-screw f^2 is adapted to be moved back from engagement with the frame K or part thereof by a movement of the carriage E , and the saw k' is moved back from engagement with the head of the screw by means of a spring L , which is supported in a suitable opening in the cross-slide G (more clearly shown in Figs. 4 and 7) and adapted to exert an elastic pressure on the frame K to hold the saw carried thereby in a normal position away from contact with the screw or other piece held in the chuck I .

In the instance shown we have located a headed pin at the end of the spring L to form a more desirable bearing to operate against the frame K . The frame K is provided at a point below its pivotal connection with the cross-slide G with a stop device k^7 , consisting of an adjusting-screw, which is adapted to engage with the cross-slide G to limit the movement of the frame K when acted upon by the spring L , the object of the stop-screw k^7 being to allow a greater or less throw of the frame K to adjust the position of the saw carried thereby in its relation to the chuck and allow sufficient space for the different sizes of screws or other pieces to be held by the latter. The depth of the slot to be cut in the head of the screw or other piece is determined by the continued forward action of the saw against the same, and by adjusting the feeding-screw k^7 the forward action of the rotating saw may be adjusted and thereby the depth of slot, as will be readily understood.

The operation of the machine described as a whole is substantially as follows: The screws to be slotted are placed in the magazine H , and the latter at the proper time is moved forward in a line between the chuck I and the gripping jaws or device f by one of the cross-slide-operating levers. Thereafter the gripping jaws or device f is caused to be moved forward by the action on the sliding carriage E or part thereof of one of its operating-cams and engage the screw in the magazine and hold the same while the latter is again moved forward, (an opening in the lower end of the magazine allowing of the removal of the screw therefrom.) After such movement of the magazine the gripping-jaws by a movement of the sliding carriage E are again carried forward between the magazine and the end of the rotating spindle k to place the screw held thereby in the chuck, (the latter being adapted to automatically open and close to receive the screw and allow the same to be ejected therefrom,) after which the gripping-jaws by a movement of the sliding carriage are caused to recede, leaving the screw in the chuck to be operated upon. Thereafter the cross-slide is again moved forward to bring the rotating saw in a line central with the screw held in the chuck, and the feeding-screw f^2 by a movement of the sliding carriage is then moved forward to engage the shoulder or projection k^6 on the frame K and push the latter forward or toward the chuck to cause the rotating saw carried thereby to engage with and slot the head of the screw. The feeding-screw f^2 by a movement of the sliding carriage is then caused to move back from engagement with the frame K , and the latter, acted upon by the spring L , is then moved back to its normal position to move the rotating saw from engagement with the screw. The chuck is then opened and the screw ejected therefrom.

Referring to Figs. 7 and 8, we have shown our improved mechanism in a slightly-modified form, as it is obvious that slight changes in the construction and arrangement of the several parts might be made without departing from the spirit of our invention. In this instance we have provided the frame K with a tongue or arm k^8 , adapted to extend within a corresponding opening in the cross-slide G to support the frame in lieu of being hinged or pivoted thereto, as hereinbefore described. The frame when thus supported may be operated in one direction by the feeding-screw f^2 and in the opposite direction by the spring L , as hereinbefore described, it being limited in its backward movement when acted on by said spring by means of a nut or shoulder k^9 , located on the end of its supporting-tongue, which engages a shoulder g' in the said opening in the cross-slide. By adjusting the position of the nut k^9 on the tongue k^8 to engage with the shoulder g' sooner or later the movement of the frame K may be adjusted, as will be readily understood. We have also shown in said Fig. 8 a modified means for operating the frame K . In this instance we provide the shoulder k^6 on the frame K with a projection on its upper side and provide the feeding-screw f^2 with a corresponding slot or opening in its under side. The parts when thus constructed are adapted to operate in their relation to each other as follows: The feeding-screw is adapted to be carried forward by a movement of the sliding carriage to bring the slot or opening therein in a line with the projection on the frame K . The latter is then

carried forward by a movement of the cross-slide to bring the said projection thereon within the slot or opening in the feeding-screw. The latter is then moved forward by the sliding carriage to move the frame K forward and cause the saw carried thereby to engage the head of the screw held in the chuck and slot the same. Thereafter the feeding-screw is caused to recede with the connecting-frame K and draw the saw from engagement with the screw. The frame K is then moved rearwardly to disengage with the feeding-screw and the latter is caused to recede by the action of the sliding carriage. When the frame K is operated in the last-described manner, the spring L is unnecessary and may be dispensed with, as will be readily understood. The feeding-screw f^2 may be supported in the proper position to engage with the frame K by any suitable arm or frame projecting from the turret F or sliding carriage E, in lieu of being supported by the gripping device f , as shown, without departing from the spirit of our invention.

It will be readily understood by those skilled in the art that the cross-slide G and the sliding carriage E may be caused to move or operate in their relation to each other, as desired, and at the proper time by properly arranging the operating-cams.

Having thus set forth our invention, what we claim as new, and desire to secure by Letters Patent of the United States, is—

1. In a machine for slotting screws and other pieces, the combination, with the supporting-frame and a chuck, of a reciprocating cross-slide mounted on said supporting-frame, a sawing mechanism carried by said cross-slide, and means for operating said sawing mechanism, substantially as described, and for the purpose set forth.

2. In a machine for slotting screws and other devices, the combination, with a supporting-frame, a sliding carriage supported thereon, a chuck, and a reciprocating cross-slide or carriage, of a sawing mechanism movably supported by said cross-slide, and means carried by said sliding carriage for operating said sawing mechanism, substantially as and for the purpose set forth.

3. In a machine for slotting screws and other devices, the combination, with a main supporting bed-frame, a sliding carriage mounted thereon, a chuck, and a reciprocating cross-slide, of a frame or support hinged to said cross-slide, a rotating spindle provided with a saw carried by said hinged frame, and means carried by said sliding carriage for operating said hinged frame, substantially as described, and for the purpose set forth.

4. In a machine for slotting screws and other pieces, the combination, with a main supporting-frame, a reciprocating cross-slide provided with a magazine mounted thereon, a chuck, and a sliding carriage carrying a gripping

device, of a frame movably supported by the cross-slide, a rotating spindle provided with a saw supported by said movable frame, and means carried by said sliding carriage for vibrating the said movable frame, substantially as and for the purpose set forth.

5. In a machine for slotting screws and other pieces, a reciprocating cross-slide, a frame movably supported by and in its relation to said cross-slide, a rotating spindle provided with a saw supported by said movable frame, and means for vibrating said movable frame, combined substantially as and for the purpose set forth.

6. In a machine for slotting screws and other pieces, a main supporting-frame, a sliding carriage mounted thereon, a reciprocating cross-slide, a frame movably supported by said cross-slide, a rotating spindle provided with a saw supported and carried by said movable frame, and means carried by said sliding carriage for operating said movable frame, combined substantially as described, and for the purpose set forth.

7. In a machine for slotting screws and other pieces, a reciprocating cross-slide, a frame movably supported by said cross-slide, a rotating spindle provided with a saw, supported by said movable frame, a sliding carriage, and an adjustable device carried by the latter for operating and adjusting the movement of said movable frame, combined substantially as described, and for the purpose set forth.

8. In a machine for slotting screws and other pieces, a reciprocating cross-slide, a frame movably supported by said cross-slide, and a rotating spindle provided with a saw, supported by a movable frame, in combination with a spring carried by said cross-slide, and a device carried by a sliding carriage for operating said movable frame, combined substantially as described, and for the purpose set forth.

9. In a machine for slotting screws and other pieces, a reciprocating cross-slide, a frame movably supported by said cross-slide, and a rotating spindle provided with a saw, supported by said movable frame, in combination with a spring supported in said cross-slide, and an adjustable feeding-screw carried by a sliding carriage for operating said movable frame, combined substantially as described, and for the purpose set forth.

10. In a machine for slotting screws and other pieces, a reciprocating cross-slide, a frame movably supported by said cross-slide, a rotating spindle provided with a saw, carried by said movable frame, a stop-screw supported by said movable frame, and means for vibrating the latter, combined substantially as described, and for the purpose set forth.

11. In a machine for slotting screws and other pieces, a reciprocating cross-slide, a frame hinged to said cross-slide, a rotating spindle provided with a saw, carried by said

frame, a stop device supported by said frame,
a device carried by a sliding carriage, and a
spring for operating said hinged frame, com-
bined substantially as described, and for the
5 purpose set forth.

12. A hollow spindle, a saw, means for
clamping said saw to said spindle, and a pin
connecting said saw and spindle to prevent

the saw turning in its relation to the latter,
combined substantially as described, and for
the purpose set forth.

EDWARD L. BOWERS.
JONAH E. TITUS.

Witnesses:

WALTER L. RANNEY,
GEORGE F. SMITH.