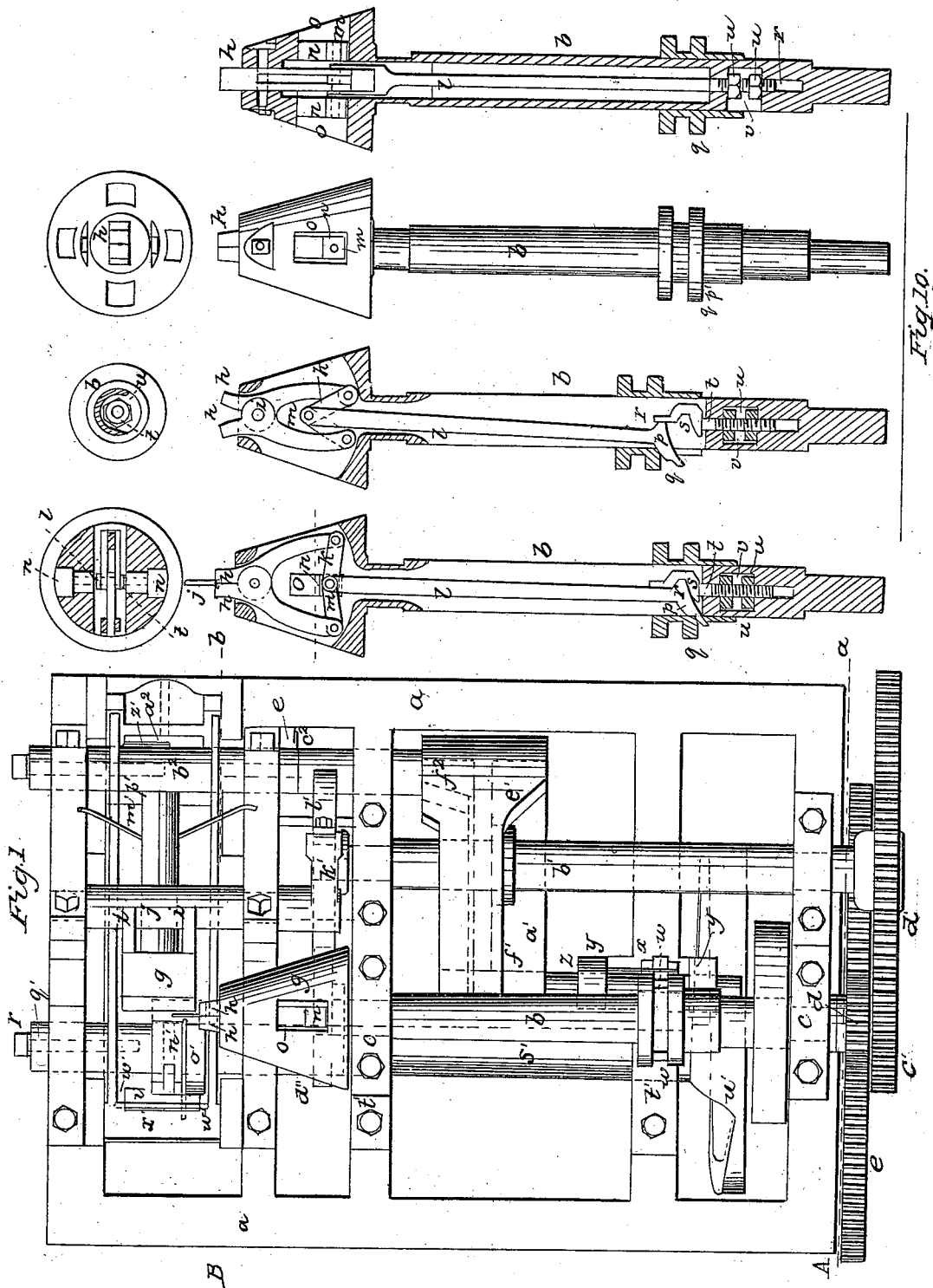


T. J. SLOAN.  
Making Wood Screws.

3 Sheets—Sheet 1.

No. 7,801.

Patented Nov. 26, 1850.

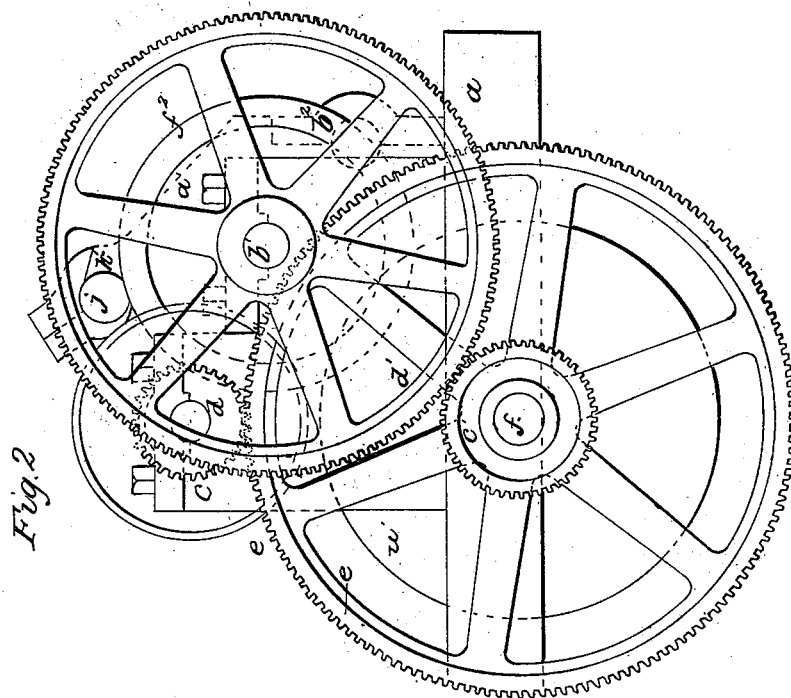
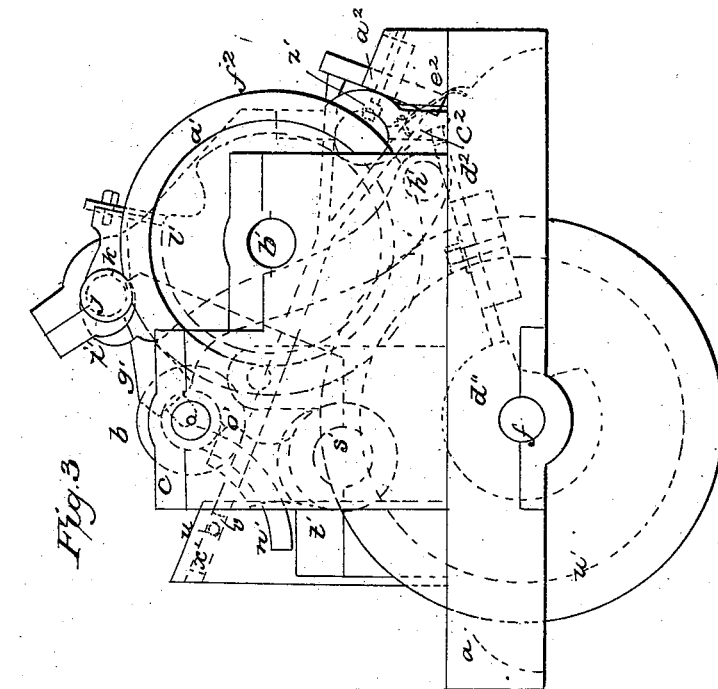


T. J. SLOAN.  
Making Wood Screws.

3 Sheets—Sheet 2.

No. 7,801.

Patented Nov. 26, 1850.

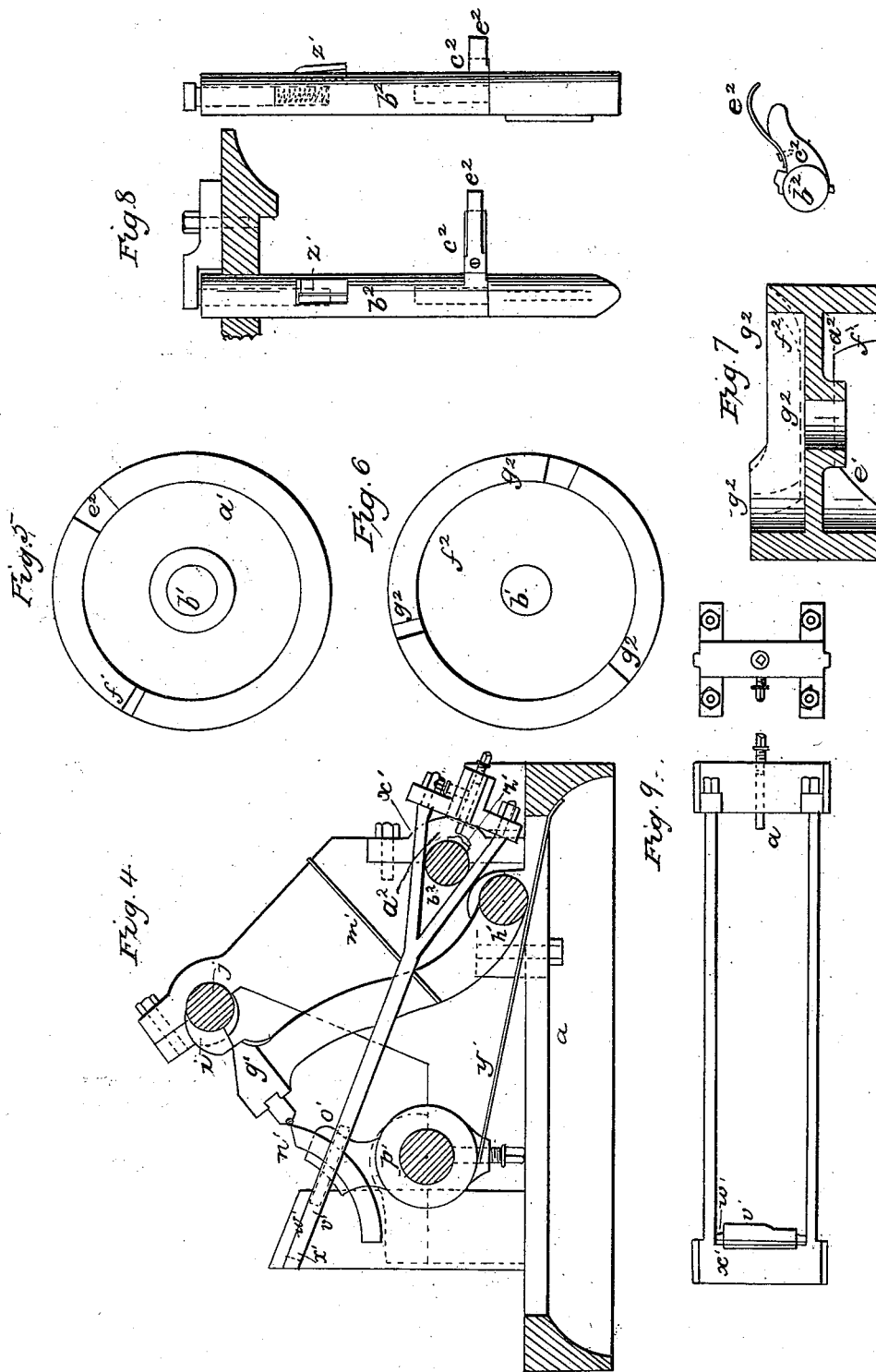


T. J. SLOAN.  
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3 Sheets—Sheet 3.

No. 7,801.

Patented Nov. 26, 1850.



# UNITED STATES PATENT OFFICE.

THOMAS J. SLOAN, OF NEW YORK, N. Y.

## IMPROVEMENTS IN SCREW-THREADING MACHINES.

Specification forming part of Letters Patent No. 7,801, dated November 26, 1850.

*To all whom it may concern:*

Be it known that I, THOMAS J. SLOAN, of the city, county, and State of New York, have invented certain new and useful Improvements in Machines for Threading Wood-Screws, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, making part of this specification, in which—

Figure 1 is a plan of my improved machine; Fig. 2, an elevation of the gearing end of the machine; Fig. 3, a vertical section taken at the line A *a* of Fig. 1; Fig. 4, a vertical section taken at the line B *b* of Fig. 1; Fig. 5, a face view of the cam for closing the jaws; Fig. 6, a face view of the cam for determining the succession of cuts; Fig. 7, a section of the two cams, Figs. 5 and 6; Fig. 8, separate views and section of rock-shaft and wedge for determining depth of cuts; Fig. 9, a plan and end view of sliding frame, which carries mold that determines shape of screw; and Fig. 10, a plan and section of mandrel with its appendages.

The same letters indicate like parts in all the figures.

My present improvement relates to the method of threading wood-screws by a series of chasing operations and for doing this on pointed screws.

The first part of my invention relates to the method of opening and closing the gripping-jaws which hold the blank in the end of the mandrel to rotate it during the operation of threading; and this consists in operating the gripping-jaws by means of a toggle-joint, to which is jointed one end of a rod that passes through the hollow mandrel, with one projecting stem passing out through a slot in the side of the said mandrel, to be acted upon by a sliding collar on the mandrel, receiving the required motion from an appropriate cam, when this is combined with a latch, notch, or recess within the mandrel, which, when the rod is drawn back by the collar, receives a second stem on the rear end of the rod, to permit the collar to pass onto a face of the first projection of the rod, which in that position is parallel and flush with the surface of the mandrel, so that when in that position the endwise pull or strain on the rod caused by the grip of the jaws shall be sustained entirely by the latch instead of the sliding collar, whereby the end pressure on the mandrel

against the boxes in which it rotates—heretofore so injurious in threading-machines—is entirely avoided.

The second part of my invention relates to the method of regulating the motions of the chaser or cutter toward the axis of the blank. In the specification of Letters Patent granted to me on the 24th day of November, 1846, as subsequently reissued for amendment, will be found a description of what I term a "mold," which mold has a face against which the cutter or chaser head slides during the threading operation to determine the line of motion of the said cutter and thus give the required form to the body of the screw. As the face of this mold is curved and the chaser-head vibrates on a center, the relations of the one to the other are constantly varying, so that the form of the face of the mold does not give the required motion to the point of the chaser for the reason that the face of the chaser-head is not during the entire chasing motion parallel to the cross-sections of the mold. This has been found to be a serious practical defect, particularly as the face of the mold in practice is very liable to cut away, and therefore requires to be frequently ground.

The object of the second part of my invention is to avoid this practical difficulty; and it consists in fitting the mold to the stock or slide, which moves it toward and from the blank to determine the depth of cut so that it shall rock therein freely, and thus adapt its face to that face of the chaser-head which slides in contact with it, so that this latter shall be at all times parallel with the cross-section of the face of the mold during any and all parts of its vibrations.

In the accompanying drawings, *a* represents a frame adapted to the purpose, but which may be varied according to the discretion of the constructor, and *b* the mandrel which runs in boxes in standards *c c*, and which carries a pinion *d* on the rear end that engages a cog-wheel *e* on the main shaft *f*, by which the mandrel is rotated. The mandrel is hollow from near the rear end to and through the forward end or chuck *g*, in which are arranged the gripping-jaws *h h*, jointed together by a fulcrum-pin *i*, the jaws being properly formed to receive and hold the blank *j* by the head. The rear arms of these jaws are connected together by a toggle-joint *k*,

which in turn is jointed to the forward end of a rod *l* by a joint-pin *m*, which passes through guide-blocks *n n* that slide in mortises *o* in the chuck to guide the toggle in its movements. The rear end of the rod *l* has a projecting stem *p* on one side, which passes out through a slot in the mandrel and through a hole in the collar *q* that slides on the mandrel. The front face of the said stem is for a short distance oblique to the line of the rod, and then for a short distance it is parallel with the rod, and then again oblique, and the back face is parallel to the oblique line, or nearly so, of the front face, as shown in the sections, Fig. 10. And opposite to the stem *p* there is another stem *r* shorter than the first, with the front face also oblique or beveled, which last stem at the proper time fits into a latch-notch of corresponding form in the face of an adjustable bar *s*, the stem *t* of which is fitted in a hole in the mandrel. This stem is threaded and provided with two nuts *u u*, which are received in an appropriate recess *v* in the mandrel for the purpose of setting the latch-notch nearer to or farther from the chuck of the mandrel, for this position of this latch relatively to the jaws will determine the size of blank which the jaws will grip. When the collar is pushed back, it strikes against the oblique front face of the first stem, and draws back the rod and partly closes the jaws. This brings the second stem *r* into the latch-notch, and then the continued back motion of the collar, acting on the oblique or beveled face of the stem *p*, will hold the other stem *r* into the latch-notch, so that by reason of their oblique or beveled faces the rod will be drawn still farther back to increase or complete the grip of the jaws, and then the collar passes onto the part of the stem *p* which is parallel with the rod to hold it in place to continue the grip of the jaws and at the same time to avoid any endwise strain on the collar and mandrel, which, if continued during the threading motions of the machine, would press the shoulders of the journals of the mandrel against the boxes, which would not only occasion much wear but at the same time subject the moving parts to a strain very injurious to the accuracy of the motions of the machine so essential to the making of good screws. So soon as the thread is completed the collar is moved forward, which, acting on the rear face of the stem *p*, draws the stem *r* out of the latch-notch and carries the rod forward to open the jaws to discharge the screw and receive another blank. The collar is embraced by a fork *w* attached to a sliding box *x*, working in appropriate boxes *y y*, which is drawn forward by a spring *z* and pushed back by a face-cam *a'* on a shaft *b'*, which makes one rotation for each complete operation of the machine, and which receives motion from the main shaft by a pinion and cog-wheel *c' d'*. This cam has an oblique face *e'* to push back the collar to close the jaws, and then it continues in the line of ro-

tation to keep them closed during the threading operation, and at the end of this a sudden recess *f'* to permit the sliding rod to be carried back by the spring and with it the collar to open the jaws. The moment the blank is gripped in the jaws a rest *g'* on the arm of a rocking-shaft *h'* is brought up against the shank of the blank to support it by two cams *i' i'* on a rock-shaft *j'*, which at one end is provided with an arm *R'* which bears on the periphery of a cam *l'* on the shaft *b'*, which cam is so formed as to give the required motion to carry the rest up against the shank of the blank and to permit it to be drawn back by the tension of a spring *m'* at the end of the threading operation.

The chaser *n'* is secured in the usual or any appropriate manner to the chaser-stock *o'*, which projects from a rock-shaft *p'*, and which is also adapted to slide endwise in appropriate boxes in the frame. It is forced toward the chuck by the tension of a spring, which may be applied in any appropriate manner; but I prefer to effect this by a helical spring placed within the rock-shaft partly bored out for that purpose, and to compress the spring by means of a rod *q'* inserted in the said bore and resting against a standard or bracket *r'*. The inner end of the rock-shaft *p'* abuts against one end of a bar *s'*, which slides in boxes *t' t'*, the other end of the said bar being acted upon by the face of a regular wedge-cam *u'* on the main shaft, so that this cam at each rotation of the main shaft carries the chaser to give the threading motion toward the point of the screw and then permit it to return suddenly by the tension of the spring. This main shaft is geared to make three revolutions to one of the other cam-shaft, so as to give three successive cuts to complete the thread of a screw; but these proportions can be increased or decreased at pleasure.

To give the required form to the body of the screw, the chaser-head slides in contact with the face of a mold *v'*, which is formed according to the intended shape of the screw to be produced, and hence as the chaser moves from the head toward the point of the screw-blank, the point of the chaser will pass along a line parallel with the face of the mold. This mold is formed with journals *w' w'* at each end and in a line with the back edge, and these are fitted to turn freely in sockets in a frame *x'*, so that as the chaser-stock moves endwise and vibrates on its rock-shaft the mold, having a broad flat face, will vibrate on its bearings, that its face may adapt itself to the vibratory motion of the chaser-stock, and thus keep the faces of the two always parallel.

The frame *x'*, which carries the mold, slides in ways in the main frame, as shown in the drawings, for the purpose of moving the mold nearer the axis of the blank at each successive cut and back at the end of each cut to permit the chaser to be thrown back and out of the threads of the screw for the return mo-

tion by means of a spring  $y'$ . This back motion of the mold-frame is produced by the spring  $y'$ , which acts on the chaser-head, and its motion toward the blank for each cut is effected by a cam  $h'$ , against the face of which bears a stump  $a^2$ , attached to the lower end of the frame  $x'$ . This cam is on a rock-shaft  $b^2$ , which has an arm  $c^2$ , bearing against a slide  $d^2$ , which slide runs in guides and bears against the periphery of a cam  $d''$  on the shaft of the threading-cam before described, and this cam is so formed that at the end of each successive cut it permits the mold-frame to move back that the joint of the chaser may clear the threads in its return motion, and then draws it down again that the point of the chaser may cut into the blank; but as for each succeeding cut until the thread be finished the chaser must approach nearer to the axis of the blank, the cam  $h'$ , which draws down the mold-frame, is wedge-formed in its length, and the rock-shaft which carries it slides endwise in its bearings, so that by the tension of a spring  $e^2$  its inner end is made to bear against the face of a cam  $f^2$  on the shaft, which makes one revolution for each complete threading operation. This cam has three faces  $g^2 g^2 g^2$ —that is, one for every cut which is to be given to complete a thread—each in succession farther from the face of the wheel to which they are attached, so that each one of these faces will force the wedge-cam  $h'$  farther forward, so that when it vibrates to force the cutter toward the blank each time it will act on the mold-frame with a greater diameter by reason of its wedge-like form,

and thus at each successive time cause it to make a deeper cut.

It will be obvious from the foregoing that the various parts and arrangements of parts may be variously changed without materially affecting the principle of my invention, and therefore I do not wish to limit myself to the precise construction and arrangement so long as the essential character of what I have declared to be the principle of my invention is retained.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. The before-described method of operating the jaws for gripping and liberating the blank by means of the toggle-joint and rod connected therewith, when this is combined with the method, substantially as described, of latching and unlatching the rod by means of the sliding collar acting on the inclined or beveled stem of the rod to draw it back and force in the latch and then holding it in place by passing onto it so as to avoid an endwise strain on the mandrel against its boxes, substantially as described, and for the purpose specified.

2. So connecting the mold which governs the line of motion of the chaser with the sliding frame so that it shall be free to vibrate therein, in manner substantially as described, and for the purpose specified.

THOS. J. SLOAN.

Witnesses:

ALEX. PORTER BROWNE,  
CAUSTEN BROWNE.