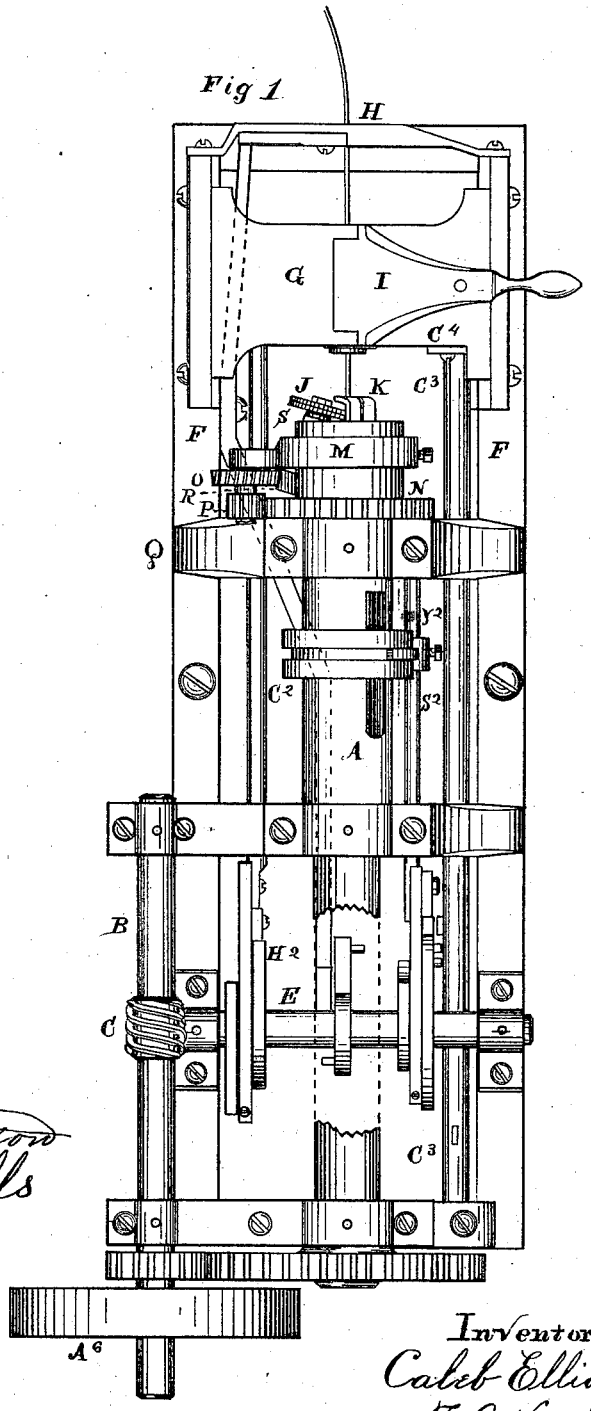
4 Sheets--Sheet 1.

C. ELLIOTT.

Wood-Screw Machine.

No. 163,059. Patented May 11, 1875.

Fig 1



Attest:
J. M. Bouton
J. A. Walls

Inventor:
Caleb Elliott,
By F. B. Hunt & Co.,
Atty's

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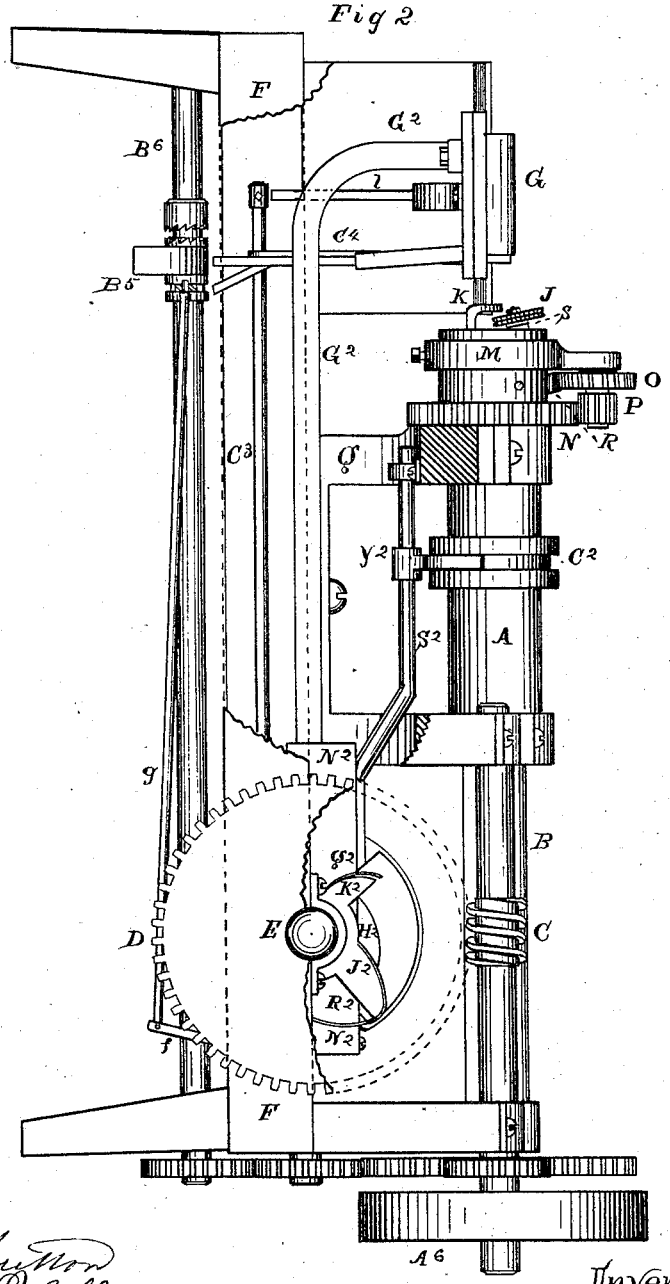
C. ELLIOTT.

Wood-Screw Machine.

No. 163,059. Patented May 11, 1875.

Fig 2



Attest:

J. H. Hutton
J. A. Walls

Inventor:

Caleb Elliott,
By F. B. Hunt & Co.,
Attys

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C. ELLIOTT.

Wood-Screw Machine.

No. 163,059. Patented May 11, 1875.

Fig 3

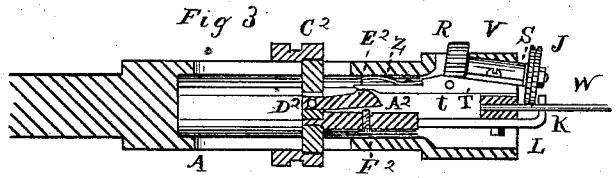


Fig 4.

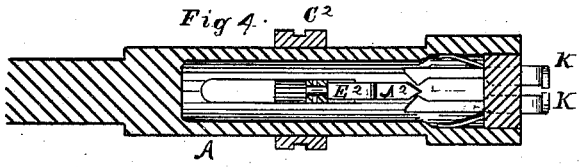


Fig 5

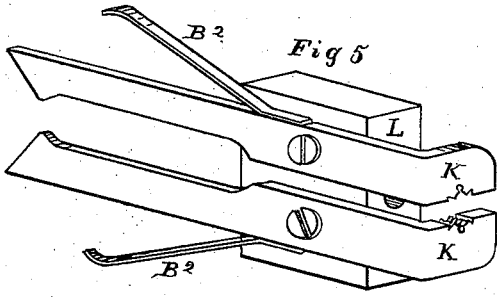


Fig 6

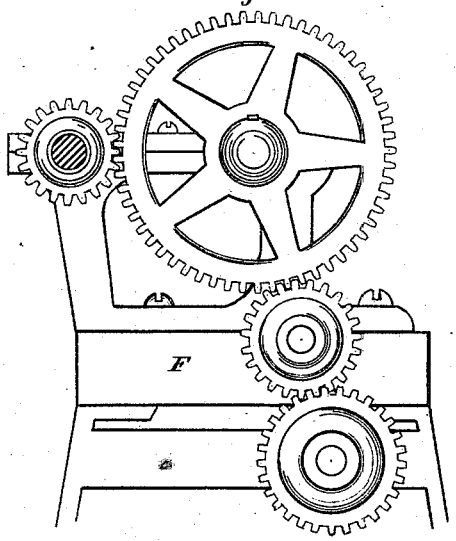
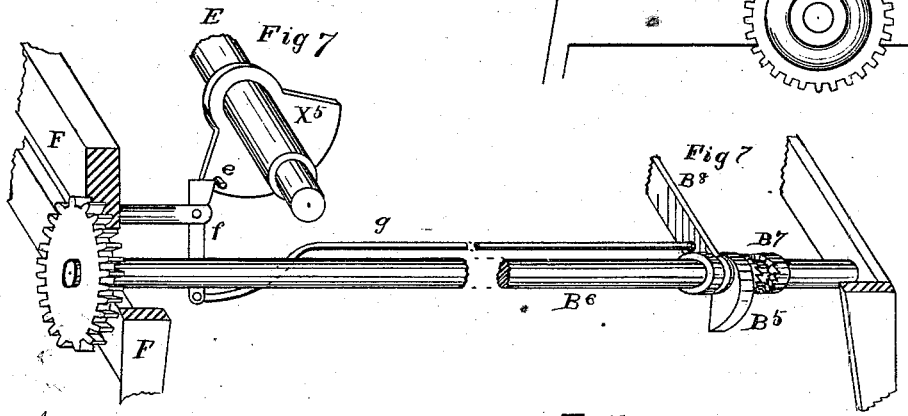


Fig 7



Attest:

J. M. Hunton

J. A. Walls

Inventor:

Caleb Elliott.

By T. B. Hunt & Co.,

Atty's.

THE GRAPHIC CO. PHOTO-LITH. 39 & 41 PARK PLACE, N.Y.

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C. ELLIOTT.

Wood-Screw Machine.

No. 163,059. Patented May 11, 1875.

Fig 8

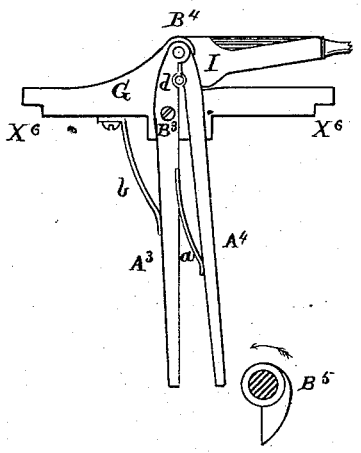

Fig 9

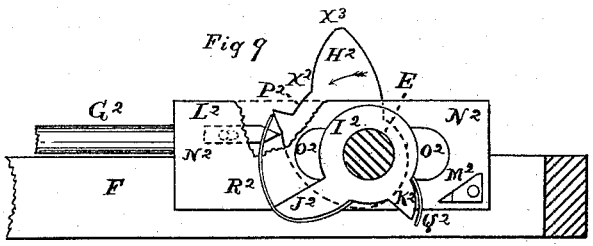

Fig 10

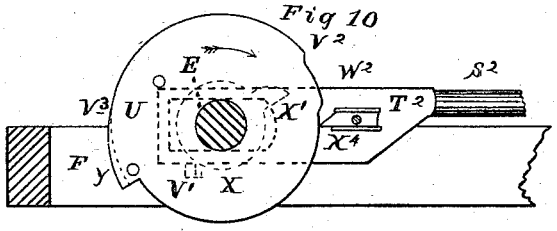

Fig 11

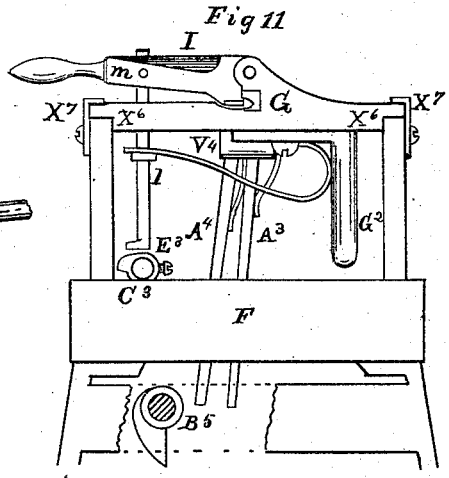

Fig 12

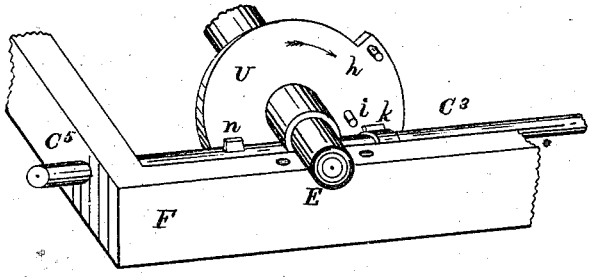

Fig 13

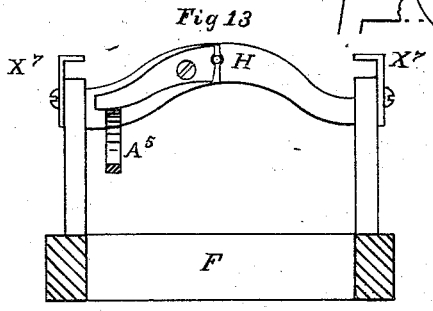

Fig 14

Attest:

J. M. Hutton

J. A. Walls

Inventor:

Caleb Elliott,

By R. H. Hunt & Co., Atty's.

THE GRAPHIC CO. PHOTO-LITH. 39 & 41 PARK PLACE, N.Y.

UNITED STATES PATENT OFFICE.

CALEB ELLIOTT, OF RICHMOND, INDIANA.

IMPROVEMENT IN WOOD-SCREW MACHINES.

Specification forming part of Letters Patent No. **163,059**, dated May 11, 1875; application filed September 25, 1874.

To all whom it may concern:

Be it known that I, CALEB ELLIOTT, of Richmond, county of Wayne and State of Indiana, have invented certain Improvements in Machines for Threading Wood-Screws, of which the following is a specification:

My invention relates to machines for threading wood-screws, wherein the cutting of the thread is done by means of mills or rotary cutters instead of pointed tools, as heretofore used, the threading being completed by going over the blank once, instead of many times, as in all other screw-threading machines now in use. The coil of wire, from which the screws are to be made, is placed upon a reel and fed into the machine automatically, as hereinafter described.

Figure 1 is a plan or top view of the machine. Fig. 2 is a side elevation. Fig. 3 is a longitudinal section of the main mandrel, showing the attachment of the rotary cutters or mills and the dies, which finish the thread of the screw. Fig. 4 is a longitudinal section of the main mandrel, showing the mechanism by which the dies are closed upon the blank. Fig. 5 is a perspective view of the dies and block, to which they are attached. Fig. 6 is a rear elevation of the machine, showing the driving-gears. Fig. 7 shows the mechanism, by which the cut-off cam is actuated. Fig. 8 is an elevation of the cross-head and clamp which straightens, brings forward, and holds the wire while the blank is being threaded, with the levers attached for clamping and cutting off the screw when completed. Fig. 9 is a side elevation of the mechanism which moves the cross-head back and forth. Fig. 10 is a side elevation, showing the mechanism which operates the sleeve on the main mandrel, Figs. 1, 2, 3, and 4. Fig. 11 is an elevation of the front end of the machine, showing the cross-head and the manner of clamping and releasing the wire; also showing the cam which actuates the cut-off levers. Fig. 12 is a perspective view of the worm-wheel shaft, showing the mechanism which operates the clamp on the cross-head. Fig. 13 is an inside view of the back clamp, which holds the wire while the cross-head passes over it in taking a new blank. Fig. 14 shows the mechanism which operates the back clamp.

A is the main mandrel; B, the worm-shaft; C, the worm; D, the worm-wheel; E, the worm-wheel shaft, and F the frame of the machine. G is the cross-head; H, the back clamp, which clamps and holds the wire while the cross-head passes over it in taking a new blank, and I is the clamp attached to the cross-head, and moving with it, which straightens the wire and holds it while it is being threaded. J is the mills or rotary cutters, one or more of which may be used; but I prefer two placed together on the same mandrel, making the space between them the proper shape to form the thread, and K is the dies which follow in the track of the mills to smooth the thread and support the wire while it is being operated upon by them.

L, Fig. 5, is a block placed in the front end of the main mandrel, having a hole in its center, into which the blank passes to steady it while being threaded; the dies K being also pivoted to this block. M is an arm, attached to the front end of the main mandrel by means of a set-screw, which carries the gears O and P, the pinion P meshing into the circular cog-rack N, which is firmly attached to the head-stock Q of the machine, and communicates motion to the mills J, through the pinion P, gear O, and pinion R attached to the rear end of the mill-mandrel S. The bearing V of the mill-mandrel S, Fig. 3, is firmly attached to the jaw-lever T, which vibrates on the pin *t*. When the blank W, firmly held to the cross-head G by the clamp I, is introduced into the block L for the purpose of being threaded, the sleeve C^2, connected with the plunger A^2 by the cross-bar D^2, passing through a slot in the main mandrel, all actuated by mechanism hereinafter described, moves forward, bringing the leaf E^2 of the plunger in contact with the first incline on the under side of the rear end of the jaw-lever T, closing the mills upon it. The plunger A^2 consists of two sections or leaves, the under one of which, Fig. 3, is rigidly attached to the cross-bar D^2, while the upper one E^2 is pivoted to it, in order to admit of adjustment by means of the set-screw F^2. The under leaf is made wedge shape at the end to actuate the die-levers, as shown in Fig. 4, while the upper one is simply beveled on top to meet

the two inclines on the under side of the jaw-lever T.

Fig. 5 represents the manner of pivoting the dies K to the block L, together with the springs B^2, for the purpose of opening them when the plunger is withdrawn. The backward and forward movements of the cross-head G are communicated to it through the rigid connection G^2, Figs. 2 and 9, by means of cams H^2 and I^2, operating against adjustable pawls L^2 and M^2, secured to opposite sides of the slide-head N^2, which fits closely between said cams, the slot O^2 in the slide-head also fitting closely to the worm-wheel shaft. The cam H^2, starting with the pawl L^2 at the point nearest its center, gives the pitch to the thread of the screw, by moving the cross-head, together with the blank, backward at the proper speed to give the pitch required. Upon the completion of the threading, the back-clamp H closes upon the wire, and at the same instant the clamp I releases it, when the cushioned spring Q^2, of the leaf K^2, of the cam I^2, comes in contact with the pawl M^2, drawing the cross-head G forward over the wire (for the purpose of cutting the screw the proper length) and the pawl L^2 into the recess or dead space P^2 in the cam H^2, when the screw is cut from the wire. The pawl L^2, in traversing the space from the point X^2 to the point X^3 on the cam H^2, moves the cross-head back over the wire to procure a new blank, when the clamps H^2 and I^2, having reversed their relation to the wire, the leaf J^2 of the cam I^2 comes in contact with the pawl M^2, and brings the blank forward to be threaded, the spring R^2, having sufficient tension to keep the pawl L^2 against the face of the cam H^2.

The circular plate U, Figs. 10 and 12, provided with cams W^2, V^2, and Y, operating on the pawl X^4, secured to the side of the slide-head T^2, moves the sleeve C^2 forward by means of the connection S^2 and adjustable yoke Y^2, forcing the mills and dies into position for threading. The projection X^1 of the plate-wheel X, shown in dotted lines, and working on the opposite side of the slide-head T^2 from the circular plate U, comes in contact with the lug V^1, and, moving the sleeve C^2 back, withdraws the plunger A^2 from contact with the jaw-lever T and dies K after the operation of threading the screw has been completed, when the springs B^2 and Z throw the dies and mills open, ready to receive a new blank. Immediately upon the introduction of the blank into the front end of the main mandrel the cam W^2 of the circular plate U comes in contact with the pawl X^4, moving the sleeve C^2 and its attachments forward, closing the mills upon it. In the interval, while the pawl X^4 is traversing the space from W^2 to V^2, the mills make about two circuits of the blank, when the cam V^2 acts upon the pawl, closing the dies. While the pawl X^4 is traversing the space from the cam V^2 to the point V^3 the screw is being threaded. Then the pawl comes in contact with the cam Y, which, moving the sleeve and plunger slowly forward, brings the leaf E^2 of the plunger in contact with the second incline on the under side of the jaw-lever T, gradually closing the mills on the blank, forming a gimlet-point to the screw.

Fig. 8 represents the mechanism for cutting the completed screw from the wire. The clamp-lever A^3 is pivoted to the cross-head G at B^3, while the lever A^4 is pivoted to the lever A^3 at B^4, and they are held in position to admit of the blank passing freely between them at *d* by the springs *a* and *b*. The cam B^5, Figs. 2, 7, 8, and 11, hangs loosely on its shaft B^6, and is held out of the clutch B^7 by the spring B^8 until the blank is threaded, when the pin *e* on the plate X^5, Fig. 7, which is secured to the worm-wheel shaft and rotates with it, Figs. 7 and 14, comes in contact with the upper arm of the lever *f*, throwing the cam into the clutch by means of the rod *g*, causing it to rotate and act upon the clamp-lever A^4, closing the clamp on the screw at *d*, both levers then moving together on the fulcrum B^3, severing the screw from the wire.

The clamp I is operated by means of the cam B^3, Fig. 11, on the front end of the rod C^3, Figs. 1, 11, and 12, supported by a hanger, C^4, Figs. 1 and 2, the upper end of which is firmly attached to the cross-head G, moving the rod longitudinally with the motion of the same. The rear end of the rod C^3 passes directly under the worm-wheel shaft E, and is supported by a bearing in the frame F, as shown at C^5, Fig. 12. When the threading of the screw is completed, the pin *h* in the circular plate U comes in contact with the upper side of the feather *k*, turning the cam E^3 under the foot of the pendant-rod *l*, which is pivoted to the clamp I at *m*, lifting it from the wire, the back-clamp H closing upon it at the same time. The cross-head G having moved back over the wire to procure a new blank, the pin *i* in the circular plate U comes in contact with the under side of the feather *n*, releasing the cam E^3, when the spring V^4 brings the clamp I down upon the wire. The back-clamp H, Figs. 13 and 14, is operated by means of the pin *p* on plate X^5, through the crooked lever A^5, which holds the clamp closed upon the wire while the pin *p* traverses the arc *q*, attached to the rear end of the lever.

A^6, Figs. 1 and 2, is the driving-pulley. (Not shown in the rear elevation, Fig. 6.) The ends of the cross-head G are rabbeted, as shown at X^6, Figs. 8 and 11, and held in place by the gibs X^7, Figs. 11 and 13.

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

1. The combination of the main mandrel A with the circular cog-rack N, pinion P, gear O, pinion R, and mills or rotary cutters J, substantially as shown and described.

2. In combination with the block L, the dies K, jaw-lever T, and mills or rotary cutters J, substantially as and for the purpose set forth.

3. The combination of the sleeve C^2 with the plunger A^2, dies K, jaw-lever T, and mills or

rotary cutters J, substantially as shown and described.

4. The plunger A^2, consisting of two sections or leaves, the upper one E^2 being adjustable by means of the set-screw F^2, substantially as shown and described.

5. The clamp-lever A^3, pivoted to the cross-head G, in combination with the clamp-lever A^4, pivoted to the lever A^3 at B^4, substantially as shown and described.

6. The cam B^5, in combination with the levers A^3 and A^4 and springs *a* and *b*, substantially as shown and described.

7. The combination of the cam-leaf J^2 and spring R^2, as and for the purpose set forth.

8. The cam-leaf K^2 and spring Q^2, in combination with the pawl M^2, cam H^2, and slide-head N^2, for the purpose set forth.

9. The rod C^3, attached to the cross-head G by means of the hanger C^4, as shown in Figs. 1 and 2, and sliding through the bearing C^5, in combination with the pins *h* and *i* and feathers *k* and *n*, as shown and described.

10. The cam H^2, in combination with the pawl L^2, connection G^2, cross-head G, and clamp I, as and for the purpose described.

CALEB ELLIOTT.

Witnesses:

J. M. HUTTON,

WM. P. HUTTON.