3 Sheets--Sheet 1.

E. HORTON.

Screw-Threading Machines.

No. 144,100. Patented Oct. 28, 1873.

Fig 1.

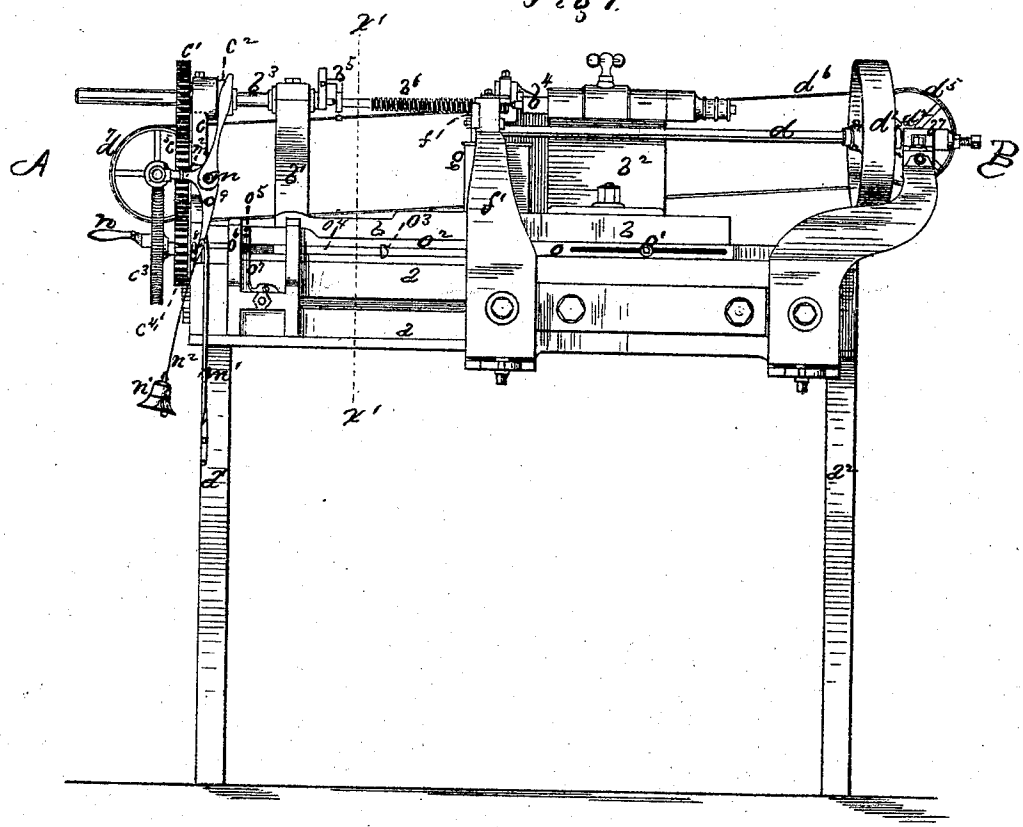

Fig 2.

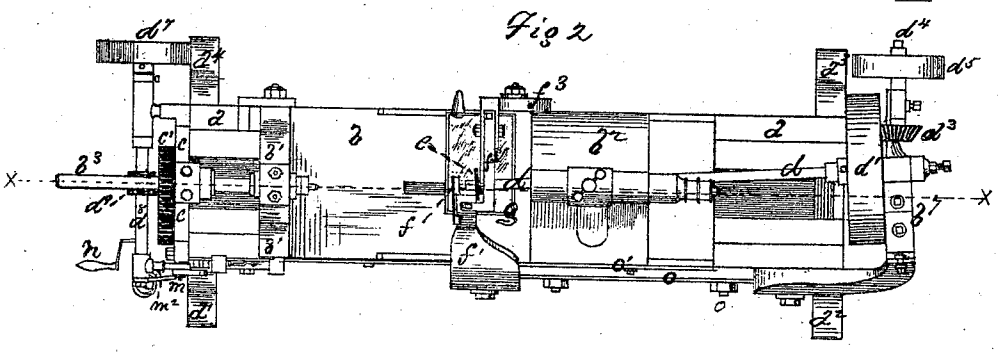

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Fig 4

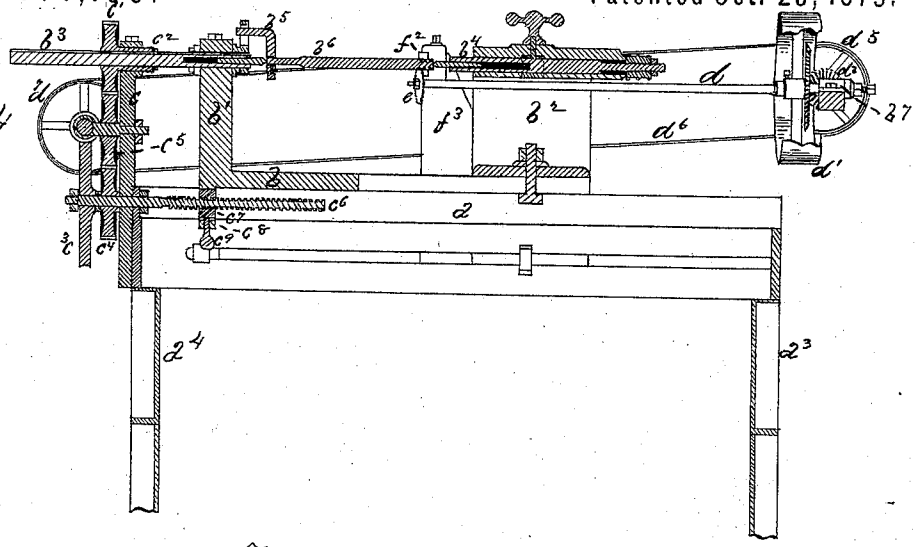

Fig 5

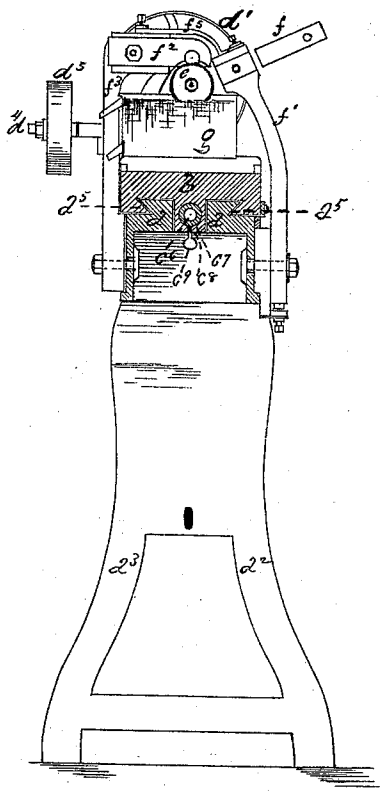

Fig 3

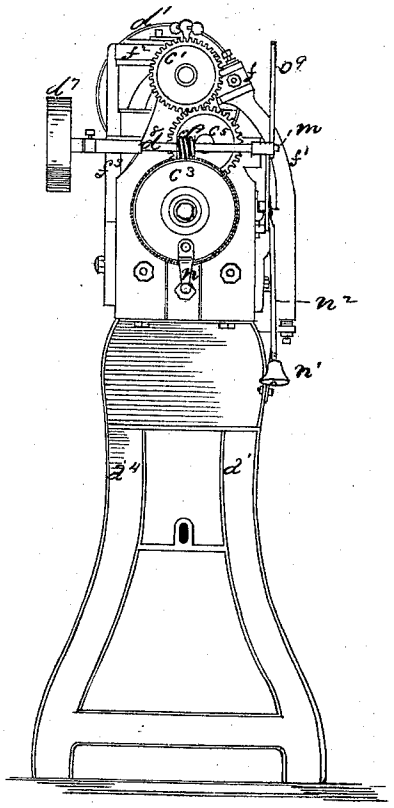

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Fig 8.

Fig 6

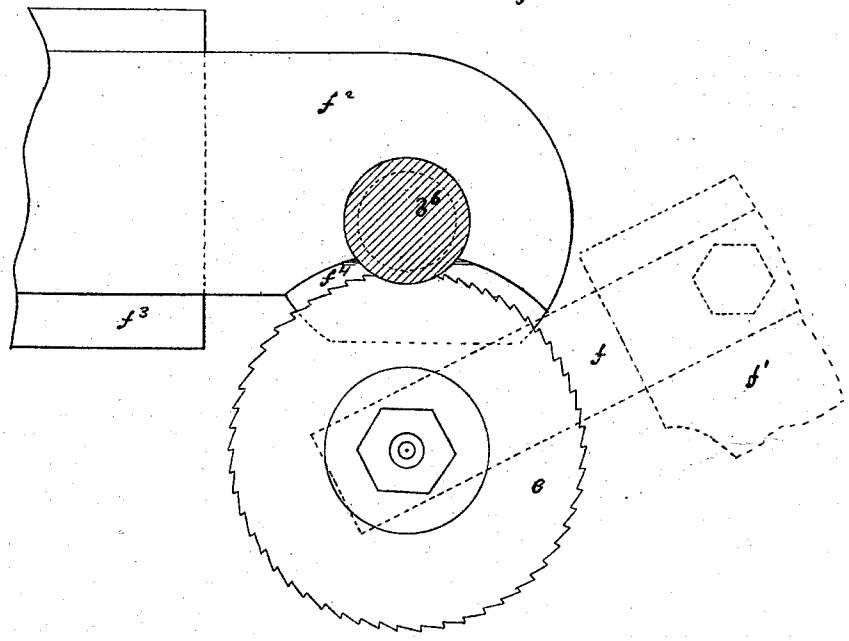
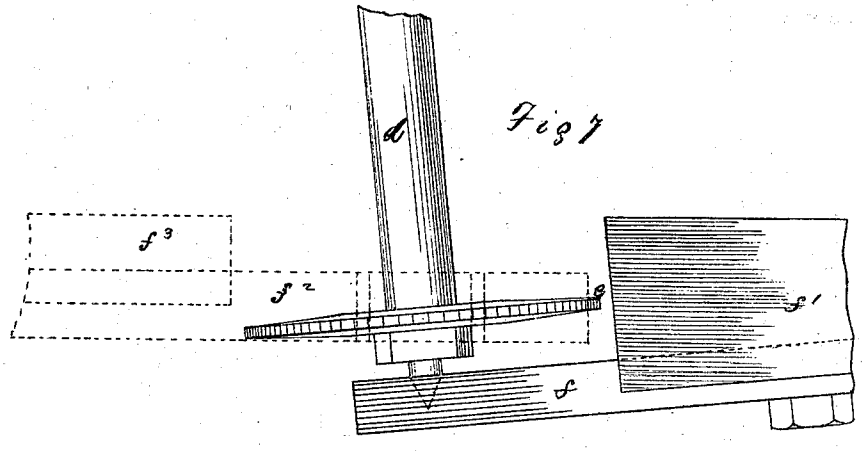


Fig 7



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UNITED STATES PATENT OFFICE.

ELI HORTON, OF WINDSOR LOCKS, CONNECTICUT.

IMPROVEMENT IN SCREW-THREADING MACHINES.

Specification forming part of Letters Patent No. **144,100**, dated October 28, 1873; application filed January 21, 1873.

To all whom it may concern:

Be it known that I, ELI HORTON, of Windsor Locks, in the county of Hartford and State of Connecticut, have invented certain new and useful Improvements in Machines for Cutting Screw-Threads upon Round Bars, of which the following is a specification, reference being had to the accompanying drawings, in which—

Figure 1 is a front elevation of a machine containing my said improvements. Fig. 2 is a top or plan view of the same. Fig. 3 is an end view of the same from the end A. Fig. 4 is a view of the machine in central vertical longitudinal section through the dotted line *x x* in Fig. 2. Fig. 5 is a view of the same in transverse vertical section through the dotted line *x' x'* in Fig. 1. Fig. 6 is an enlarged detached detail view of the cutter made use of, the rest for the bar on which the thread is being cut, the said bar in section, and (in dotted lines) the arm which supports one end of the cutter-spindle. Fig. 7 is a top view of the parts shown in Fig. 6. Fig. 8 is a view of the under edge of the said rest for the bolt or bar.

The letter *a* indicates the bed or frame of the machine, supported upon legs a^1 a^2 a^3 a^4. On this bed *a* sets the reciprocating bed *b*, sliding upon dovetail ways a^5, (best seen in Fig. 5.) From this reciprocating bed rises the standard b^1, which I will call the reciprocating head-stock, as it moves back and forth with the bed. To this reciprocating bed the tail-stock b^2 is fastened, so that it also moves back and forth with the reciprocating bed. In the standard b^1 runs the rotating shaft b^3, which is stationary, so far as any lengthwise movement is concerned, in the standard b^1. The rotary movement of this shaft is given by the gear c^1, which is fast upon the sleeve c^2, which turns in the stationary standard *c*, the gear c^1 having a feather fitting into a spline on the surface of the shaft b^3, so that this shaft is free to move lengthwise back and forth in the sleeve c^2. Motion is communicated to the whole mechanism by a belt running upon the pulley d^1, which is fast on the cutter-spindle *d*, and from which motion is communicated by the bevel-gears d^2 d^3 to the shaft d^4 and the pulley d^5, from which the belt d^6 communicates motion to the pulley d^7 and worm-shaft d^8, which, by means of the worm d^9, communicates motion to the gears c^3, c^4, c^5, and c^1, which last gear gives rotary motion, as hereinbefore described, to the shaft b^3. The gears c^4 and c^1 move with equal velocity. The shaft c^6, which turns with the gears c^3 c^4, has a screw-thread upon its inner part or end, which is of precisely the same pitch as the thread which the machine is to cut on the bar above. This male thread runs in a nut, c^7, which rests in a socket in the lug c^8 projecting from the under side of the reciprocating bed *b*, the nut being held in place by the set-screw c^9. The turning of the shaft c^6, therefore, gives the reciprocating motion to the bed *b*, and with it the head-stock b^1 and tail-stock b^2. The screw-shaft c^6 and the nut c^7 can both be changed so as to adapt the bed to the cutting of different shapes and kinds of screws. The bar or bolt on which the thread is to be cut is centered at the ends and suspended between centers in the spindle b^3 and the tail spindle b^4, in the ordinary manner that a shaft, to be turned or otherwise worked upon, is fastened in a lathe. The bar is made to rotate with the spindle by means of a common dog, b^5, taking hold of a projection from the spindle b^3, in the usual manner. The letter b^6 indicates a bar upon which a thread has been cut by the machine, and then drawn back nearly to the starting-point. The cutter *e*, which cuts the thread upon the bar b^6, is a circular milling-tool, with its circumference fitted to cut the desired kind of thread, V-shaped, square, or bastard. In the drawings it is shown as fitted to cut a bastard-thread. The cutter *e* and the bar b^6 rotate in the same direction.

It will be observed (see top view, Fig. 2) that the cutter-shaft *d* does not lie in the same line with the bar b^6, but is obliqued off to one side; and that the cutter is similarly obliqued. This is for the purpose of giving the cutter the same obliquity as the thread which it is cutting. This obliquity can be regulated at pleasure by shifting the rear end of the shaft *d* back and forth. This end rests in a bearing, b^7, which is adjustable back and forth.

The cutter and its shaft are, in the drawings, adjusted for cutting a left-hand thread. By obliquing the shaft *d* toward the front of the machine the cutter can be adjusted for cutting

a right-hand thread. In order to permit the shaft d to have the described obliquity the tail-stock has to bear off to one side or the other—or, if the standard is double, to both sides—as it rises from the bed b.

The inner end of the shaft d rests and turns in the arm f, which projects from, and is fastened to, the upright f^1, which is bolted at its foot to the bed a, being made suitably adjustable up and down. The bar b^6 is held from chattering, and firmly in its place, while being threaded, by passing through a hole in the rest f^2, in which the bar just fits. This rest is fastened to, and supported by, the upright f^3, which is also bolted, at its foot, to the bed a. The bar b^6 takes into this rest just before the cutter takes hold; and the cutter is let into a recess, f^4, (see Figs. 6, 7, and 8,) in the rest for this purpose, the recess being obliqued into the rest, as seen in Figs. 7 and 8. The arm f^2 is made adjustable back and forth on the upright f^3. The arm f^1 and the rest f^3 are—though this is, perhaps, not positively necessary—connected, for the sake of strength, by the brace f^5. Under the cutter is set a cup, g, containing oil or other proper lubricant, in which the lower part of the cutter dips and runs, which washes off from the cutter all the milling chips, thus keeping the cutter clean and sufficiently cool.

When the desired length of thread has been cut on the bar b^6 the motion of the bed b is stopped as follows: To the side of the bed b is attached an adjusting-bar, o, by means of the set-screw o^1 passing through a lengthwise slot in the adjusting-bar, so that this bar may be adjusted to work for cutting screws of different lengths. This adjusting-bar has a hook upon one end, which, at the proper time, as the bed b moves toward the end B of the machine, brings up against a hook on the sliding bar o^2, which is attached to the bed a by headed screws o^3 passing through a lengthwise slot, o^4, in the bar o^2, so that it has a longitudinal motion or movement. The hooks upon the ends of the bars o and o^2 are behind the upright f^1, so that they cannot be seen in this drawing.

The motion of the bar o^2, in the direction toward the end A, is limited by the pin o^5 striking against the stop o^6. The spring o^7, pressing against the pin o^5, tends to hold the pin always against the stop o^6. On the end of the bar o^2 is a cam piece, o^8, fitting against a corresponding cam piece on the lower end of the lever o^9, which is pivoted on the pin m. The spring m^1 presses the lower end of the lever o^9 constantly outward toward A. From the lever o^9 projects an arm, m^2, in the end of which is hung one end of the shaft d^8, on which is the worm d^9, meshing into the worm-gear c^3. At the proper time the bar o, by means of the hooks mentioned, pulls the bar o^2 a little backward, toward the end B, thus unshipping the cam-point o^8 from the cam-end of the lever o^9, and the action of the spring m^1 throws the shaft d^8 upward—the bearing of this shaft next the pulley d^7 permitting this—thus unmeshing the worm d^9 from the worm-gear c^3, thus stopping the movement of the bed b. The operator now, by means of the crank n, runs the bed b back to its original starting-point, removes the threaded bar, and puts in a fresh one. He pulls back the lever o^9 into mesh, and the machine again commences to operate. When the movement of the bed b stops, the sudden unmeshing of the lever o^9 rings the bell n^1, which is attached, by a spring, n^2, to the lower end of the lever, and thus gives notice that a fresh bar should be put in.

I claim as my invention—

The combination of the tail-stock, the cutter shaft d, running underneath the tail-spindle b^4, the cutter e, and the oil-box g, underneath the cutter, all constructed, arranged, and designed to operate substantially as described.

ELI HORTON.

Witnesses:
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WM. E. SIMONDS.