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T. NEWBURY.

MACHINE FOR THREADING SCREW BLANKS.

Fig. 3.

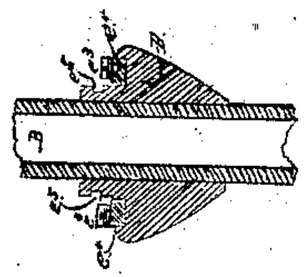


Fig. 1.

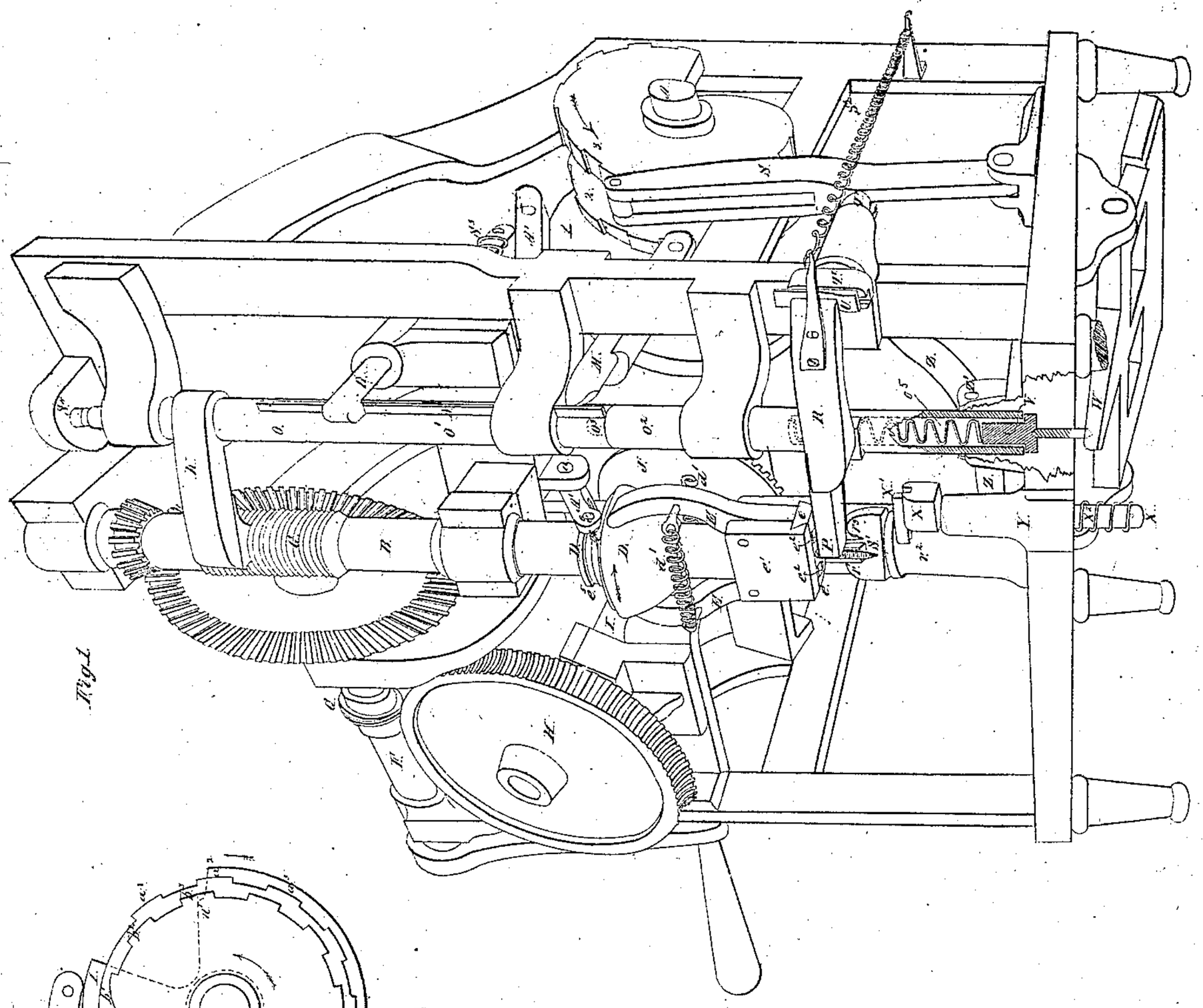
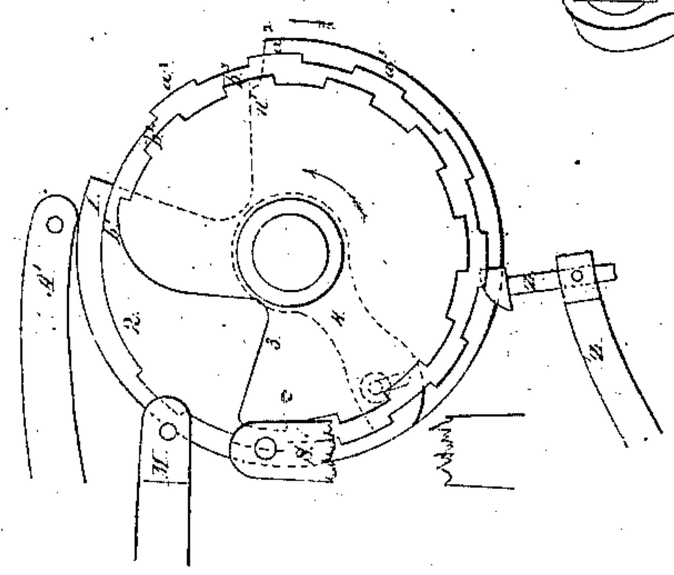


Fig. 2.



UNITED STATES PATENT OFFICE.

THOMPSON NEWBURY, OF TAUNTON, MASSACHUSETTS.

IMPROVEMENT IN MACHINES FOR THREADING SCREW-BLANKS.

Specification forming part of Letters Patent No. **9,677**, dated April 19, 1853.

To all whom it may concern:

Be it known that I, THOMPSON NEWBURY, of Taunton, Bristol county, Massachusetts, have invented certain Improvements in Machines for Pointing and Threading Wood-Screws, of which the following is a full description, reference being had to the accompanying drawings.

Figure 1 is an elevation in perspective, taken from the front of the machine. Fig. 2 is an end view of the cam-shaft A, exhibiting the principal cam movements of the machine. Fig. 3 is a vertical section of the grip-cone or the cone for operating the jaw-levers or the levers which seize and hold the screw-blanks.

The spindle B, which rotates the screw-blank, carries the leader C, which gives the pitch of the thread, the grip-cone D, which operates the jaw-levers E, and the jaws *e*, for holding the screw-blanks. This spindle receives its motion from the driving-shaft F by means of bevel-gear, as represented, or otherwise in any suitable manner.

The cam-shaft A receives its motion from the driving-shaft through endless screw G, gear-wheel H, shaft I, bevel-gear J, and a corresponding bevel-wheel upon shaft A, which is hidden from view by wheel J.

The cam No. 1 upon shaft A, Figs. 1 and 2, operates the jaw-levers for seizing and holding the screw-blanks through the action of the grip-cone D and the cam-lever A′, which has its fulcrum at *a*.

The cam No. 2 upon shaft A, Figs. 1 and 2, operates the comb-arm K to press and keep it upon the leader C and relieve it from the same at the proper time through the agency of the pusher or sliding rod M and the puller or spring-hook L, which act in opposition to each other upon the spline or rib N upon the tool-post O.

Cam No. 3 upon shaft A operates the tool P, with its carrying-arm R, through the means of cam-lever S and the sliding rod T, to which is attached the former U. The tool-post O is in two parts—an upper and a lower—o' o^2, which have independent motions on their axes, but move simultaneously up and down. They are connected by the ordinary device of a pin and socket o^3. In the lower part o' of this detached tool-post a spiral spring o^5 is inserted, this spring being checked above by a shoulder within the cavity of this part of the tool-post, and the lower end of the spring being checked by the follower V, attached to the short arm of a weighted lever W.

The tool x' for pointing the screw is connected with the sliding tool-carrier, which is guided within and supported by the sheath Y. This sliding tool-carrier is operated through the cam-lever Z, the fulcrum of which is at z', by cam 4 on shaft A, Fig. 2. The cam-lever Z takes hold of the tool-carrier through a vertical slot in the sheath Y, concealed from view.

The rest r', against which the screw bears while the threads are cut, is attached to the stand r^2. On one side of the rest and attached to the cutting-tool carrier is a guard r^3, consisting of a bent piece of metal which prevents the screw when delivered from the jaws from getting between the lower end of the spindle and the upper part of the stand r^2 and injuring the machine.

The grip-cone D moves freely up and down on the spindle B, the friction of the jaw-levers E being sufficient to cause it to revolve with the spindle. When it is forced down by the cam-lever A′, it spreads the upper arms of the jaw-levers, closes their lower arms, causing them to shut the jaws *e* upon the screw-blanks, the lower arms of these levers being mortised into the jaws, as shown at e' e', and the jaws *e* sliding in dovetailed grooves in the bottom of the spindle. When the pressure of the cam-lever A′ is relieved from the grip-cone, the contraction of the springs d' d' closes the upper arms of the jaw-levers E, and the lower arms, opening, release the screw s' after it is finished.

On the upper face of the grip-cone D is a groove (seen at e^4 in section, Fig. 3) in which plays a ring or collar having upon it two projections e^3 opposite to each other, against which rest the extremities of the arms of the forked cam-lever A′. These projections prevent the ring from turning with the spindle B. The purpose of this ring is to diminish the friction between the grip-cone and the ends of the cam-lever A′, and being received into the grip-cone it prevents the oil from being thrown out by centrifugal action. The upper portion of the grip-cone is provided with a circular groove e^5, (seen in Fig. 1 and in sec-

tion in Fig. 3,) into which project pins e^6 from the arms of lever A′, for the purpose of confining the arms to the grip-cone.

The operation of the machine is as follows: We will suppose that the friction-roller n^2 on the end of the cam-lever A′ is on the portion n' of the cam 1. In this position the jaw-levers are stationary and slightly open to admit the screw-blank between the jaws e, the blanks being fed in through the hollow spindle B. The machinery being in motion, by the revolution of the cam 1 in the direction of the arrow x the end of lever A′ is brought upon the periphery of the cam and the jaws are closed tight upon the screw-blank. Then the cam 4 begins to depress the lever Z, thereby raising the tool-carrier X for pointing the screw, which being done by tool x' while it is rising, the projection or cam 4 soon passes by the arm of lever Z and the tool-carrier X is forced down out of the way by the spiral spring x^2, attached to its lower end. During the time of feeding, gripping, and pointing the screw-blank the cams 2 and 3 are inoperative in consequence of the pusher or sliding rod M and the cam-lever S passing, respectively, over the long depressions on the surface of these cams. Meanwhile the lever A′ is still on the periphery of the cam 1. The cam 2 comes into operation when the end of the slide-rod M rides upon projection a' of this cam. This causes the slide-rod to press upon the spline N on the upper part of the tool-post, which carries the comb-arm K and brings the comb-arm into contact with the leader C. The cam 3 begins to operate at about the same time or immediately after cam 2. When the cam-lever S rides upon the projection b' of this cam, it forces the sliding rod T against the tool-carrying arm R, bringing the tool P up against the screw-blank. The upper part of the tool-post o' now begins to descend by the action of the leader C upon the comb-arm K, carrying with it the lower part of the tool-post o^2, and with it the lower part the threading-tool P. In the first part of the descent of the tool-post that end of the arm R which rests against the former U passes over a portion of the surface of the former, which is perpendicular to the same plane with the spindle B, thereby causing the tool P through this portion of its descent to cut the blank to an equal depth. The lower portion of the face of the former is raised in order to throw the tool P in toward the center of the screw-blank to cut the thread upon the point of the same. When the first cut of the thread is finished, the threading-tool P must be moved away from the screw-blank, and immediately thereafter the comb-arm K must be removed from the leader, in order to allow the tool-post to rise and bring the comb-arm and the threading-tool into a position to commence another cut. This is accomplished by means of the springs S^2 S^3, which operate, respectively, to force the pusher M and lever S into the depressions upon their appropriate cams. When both the threading-tool and comb-arm are disengaged, the tool-post rises by the action of the weighted lever W until its top strikes the adjusting-screw S^4. The comb-arm is then brought upon the leader and the threading-tool brought up to the blank by the means already specified for the first cut, and the second is performed in the same manner as the first cut; but in order to make the second cut the threading-tool must approach a little nearer to the center of the screw-blank, and this is accomplished by making the projections on cam 3 each successively a little rising or farther from the center of the cam. The operations of removing the threading-tool and the comb-arm, the rising of the tool-post, and the next cut of the thread are again repeated and as many times as may be deemed necessary to make a perfect thread. In the present arrangement provision is made for nine cuts. When these cuts are completed, the tool and the comb-arm are moved out of the way, as before, with the exception that the tool is removed farther from the screw, in consequence of the cam-lever S falling into the deep depression on cam 3, in order that the screw with its head may not strike the tool as it drops from the jaws. The tool-post having risen, the threading-tool and comb-arm stand away from the screw and leader, respectively, until another screw-blank is fed in, gripped, and pointed. This is in consequence of the pusher M and cam-lever S falling into the long depressions on their appropriate cams 2 3. At this time the friction-roller n^2 on the end of cam-lever A′ falls into the deep depression on cam 1, allowing the grip-cone D to rise on the spindle B by the action of the springs d', which close the jaw-levers E E upon the inclined surface of the grip-cone, thereby opening the jaws e e and releasing the screw, which falls into a suitable receptacle. The operation is here completed, and then repeated, as already described.

In regard to the detached tool-post, there are important advantages connected with the arrangement and construction adopted. It being necessary that the comb-arm and threading-tool should have independent motions, and at the same time certain connected movements, the construction of the post in two portions detached and at the same time connected, as described, enables me to make or cast the comb-arm whole with its portion of the post and the tool-carrying arm whole with its portion of the post and to dispense with extra machinery and save room in the machine.

The mode of preventing the rebound of the tool-post is peculiar and important. If the tool-post were carried up by a weight or by a spring the post would rebound; but by interposing the spring in the peculiar manner between the post and the weighted lever the rebound is prevented. The spring within the tool-post is always under tension, tending to press the post upward and the follower down-

ward, and any tendency of the post to rebound in consequence of the vibration of the weighted lever or otherwise is counteracted by the tension of the spring operating upon the follower V, connected with the weight-lever.

The operation of the pusher direct from the cam upon the spline on the upper part of the tool-post is an improvement in this special connection and saves the introduction of an intermediate shaft and gearing used in other screw-machines for this purpose.

I have described the guard r^3 as attached to the threading-tool arm; but the same purpose may be answered by having the guard or its equivalent attached to the rest r'.

In other machines for making screws it is usual to make the rest movable, so as to withdraw it when the screw is liberated from the jaws in consequence of the liability of the screw to get between the rest and the spindle and break or derange the machine; but by means of the guard I can use a fixed rest, and by means of both I can use a high speed without danger, the guard operating to check the whirling motion of the screw, which it frequently gets on leaving the jaws. The advantage of a fixed rest over a movable one is too obvious to need explanation.

The friction-ring recessed into the upper face of the grip-cone is an improvement upon the ordinary method of a ring lying flat upon the same, or of friction-rollers, as from its extended bearing-surface and its depression below the upper face of the grip-cone it prevents the escape of the oil or lubricating material employed in this part and wears for a longer time and is not liable to get out of order.

The employment of the separate pointing-tool operated in the manner described presents a decided advantage over the usual mode of pointing with the threading-tool or one connected therewith. It saves the threading-tool for its proper function, allows of greater simplicity, and consequently steadiness of its motions, and gives greater capacity to the machine, and by adopting a motion for the pointing-tool in a line parallel with the spindle, as set forth, I avoid complication and crowding, which might otherwise arise from the use of a separate pointing-tool.

Having thus described the character and operation of the machine for threading and pointing screw-blanks, what I claim therein as my invention is—

The detached tool-posts constructed and arranged substantially as described, in combination with the comb-arm and arm for carrying the threading-tool under an arrangement and construction substantially as herein set forth.

THOMPSON NEWBURY.

Witnesses:

WM. GREENOUGH,

T. CAMPBELL.