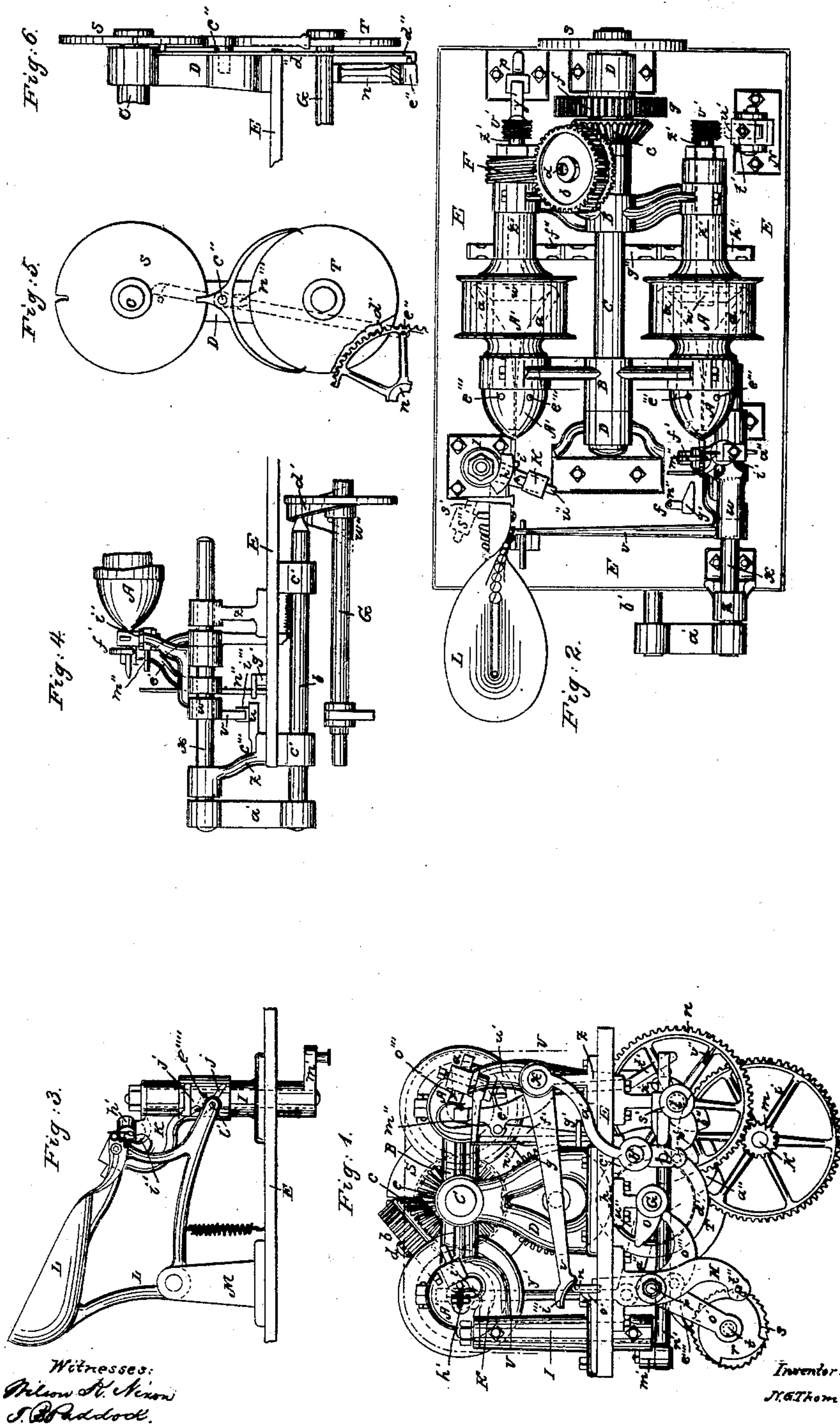


N. G. THOM.
Making Wood Screws.

No. 24,964.

Patented Aug. 2, 1859.



UNITED STATES PATENT OFFICE.

N. G. THOM, OF CINCINNATI, OHIO.

IMPROVED MACHINE FOR POINTING AND THREADING WOOD-SCREWS.

Specification forming part of Letters Patent No. 24,964, dated August 2, 1859.

To all whom it may concern:

Be it known that I, N. G. THOM, of Cincinnati, county of Hamilton, and State of Ohio, have invented a new and useful Machine for Pointing and Threading Wood-Screws; and I do hereby declare that the following is an exact and full description of the construction and operation thereof, reference being had to the annexed drawings, which make a part of this specification.

The nature of my invention consists in the use of two or more spindles or blank-holders in connection with an apparatus for changing the position of the same in the process of pointing and threading screw-blanks, arranged and operated in such manner that one blank is being pointed while another is being threaded by the same machine.

To enable others skilled in the art to make and use my invention, I now proceed to describe the construction and operation of my machine, the same letters referring to the same parts on all the drawings, the figures in brackets always referring to the different drawings in describing the operation of the machine.

Figure 1 is an end elevation, and Fig. 2 a plan, of my pointing and threading machine. Fig. 3 is an elevation of the hopper into which the blanks are put and cam for operating it and tool-stock and quadrant for pointing the blanks. The hopper is not shown in Fig. 1, as it would cover other important parts of the machine, but is shown in the plan in Fig. 2. Fig. 4 is a side elevation of the threading-tool stand, arm for removing the blanks from the grippers, threading-cam, and its connections with the tool-bar. Fig. 5 is an end elevation, and Fig. 6 a side view, of the friction-plates, spring-brake, and apparatus for working it.

Having thus generally described the different drawings, I now proceed to describe more particularly the different parts and their operations.

A A A' are the spindles, Figs. 1, 2, and 4, on which pulleys are fixed for receiving power from the driving-belt, which passes over the pulleys, as shown by the red dotted lines in Fig. 1 at U.

a a a a are the gripping-jaws for holding the blanks, (shown by dotted lines in Fig. 2,) which work upon the pins e''' e''', &c., in the spindles.

B B, Figs. 1 and 2, are the yokes or bearings in which the spindles revolve, which are made fast to the shaft C, the shaft being supported by the stands D D, attached to the bed-plate E E.

F, Fig. 2, is a worm on the spindle A', which drives the worm-wheel b on the hub of the miter-wheel c on the stud d, made fast to the shaft C and working in the miter-wheel e, which has the spur-wheel f made fast to its hub and turning loose on the shaft C. The spur-wheel f drives, by the intermediate wheel g, Figs. 1 and 2, the wheel h, (shown by dotted line in Fig. 1,) which is made fast to the threading-cam shaft G, Figs. 1, 4, and 6, and communicates motion to the feeding-cam shaft I by the gear i, pinion m, and gear n on the cam-shaft.

a''' is the threading-tool in the tool-post i'', which turns in bearings in the tool-post w, and has an arm m'' attached to it, which on its outward threading motion comes in contact with the rod n'', swinging the tool round in its bearings, giving in connection with the guide-plate u and arm v the proper curved tapering point to the screw.

v is an arm attached to the tool-stand and traversing with it, having a curved surface at its end i''', resting on the guide-plate u on the upper arm of the feed-lever. The guide-plate u has a depression on its surface, (shown at c'', Fig. 4,) which, while the arm v follows the depression in its traverse threading motion, allows the threading-tool to fall forward, giving the proper taper to the screw.

o' o'' o''' is the feed-lever, which swings on the pin p in the stand H, Fig. 1, having three arms. The arm o'' carries the guide-plate, as above described, and the arm o' carries the ratchet s and revolving cam r, made fast on the pin t and resting, when not in motion, against the square pin t'' in the stand H.

e''' is a pawl attached to the stand H, which by the reciprocating motion of the feed-lever, when acted upon by the cam o on the shaft G, works the ratchet and cam backward, causing the incline of the cam to work lower down, and, by the action of the guide-plate on the curved surface of the lever or arm v, allowing it to fall lower at each successive operation for the purpose of increasing the depth of cut of the threading-tool. When the cam o working against the arm o'' of the feed-lever throws it forward, the guide-plate

u , acting on the curved part of the arm v , forces it upward, which carries the threading-tool back from contact with the screw, while the tool-stand and its connection falls back to recommence its threading operations.

$z z z$, Figs. 1 and 2, are the stands which support the tool-bar x , which is connected to the threading-cam bar b' by the link a' and which is operated by the threading-cam d' on the shaft G , Figs. 1 and 4.

e' is a traversing stand sliding on the tool-bar x and moved by and with the tool-stand w , which, combined with the spring-lever f' , holds the screw after being threaded and released and removes it from the grippers by action of the sliding cam w'' in the threading-cam, being forced out by coming in contact with the projection v'' on the wheel n , Fig. 1, carries forward the arm and lever until the tail of the lever f' , working against the wedge g' , Figs. 1, 2, and 4, presses forward the lever f' and releases the screw.

N is a stand supporting the lever t' , Fig. 2, which carries a nut u' in its upper end, which is forced into the thread v' on the rod z' of the cam w'' by the cam x' on the shaft l , Fig. 1, and by the revolution of the rod z' in the nut u' withdraws the cam w' from the grippers to release the screw.

M is a stand, Fig. 3, to support the hopper L , into which the blanks are put to be operated upon, as in Fig. 2.

$j j'$ is a cam-groove attached to the pointing-tool stock K and revolving with it, which by its reciprocal motion raises and depresses the hopper alternately by the pin l' in the groove j of the cam, for the purpose of depositing the blanks in the grooved quadrant h' on the tool-stock K .

K is the pointing-tool stock, which carries upon it the pointing-tool u'' , Fig. 2, and the grooved quadrant-arm h' , which working in a horizontal circular direction deposits the blank in the grippers and cuts the point in a curved, tapering form while supported by the circular groove in the quadrant. Motion is given to the tool-stock by the cam p' working against a pin in the hub r' on the rod n' , which is made fast to the crank m' on a shaft passing up through the stand I , Figs. 1 and 2, and to which the tool-stock K is attached.

P is a stand, Fig. 2, supporting a wedge-shaped cam-rod y' , which is worked against the end of the rod z by the action of the cam b'' on the shaft l , Fig. 1, on the crooked lever a'' , attached to the cam-rod y' , for the purpose of closing the grippers upon the blank when presented.

S and T are circular friction-plates, the plate S made fast to the shaft C , which carries the spindles, and the plate T made fast to the threading-cam shaft G , which, in connection with the spring-brake c'' , holds the spindles in position while the operation of pointing and threading is being performed. The plate S has two notches at opposite sides in its periphery, into which the head of the

spring-brake c'' is pressed by the action of the arms of the spring on the periphery of the plate T .

d'' is a rod attached to a pin in the head of the spring-brake, having a projection on its lower end, acted upon by the pin e'' on the wheel n , Figs. 5 and 6, or other device for the purpose of depressing the spring and causing it to act on the plate T to arrest its motion, and withdrawing the head from the notch in the plate S for the purpose of allowing the spindles to make a semi-revolution around the shaft C until their motion is arrested by the head of the spring-brake entering the notch in the periphery of the plate S , thereby causing the parts of the machine whose motion was arrested by the friction of the spring-brake on the plate T to recommence operation.

d' , Figs. 1 and 4, is the threading-cam for working the threading-tool a''' in the tool-stock i'' on the stand w to which the arm v is attached, and carries with it the traversing arm e' by the link a' , which connects the sliding shafts b' and x , which carries upon it the tool-stand and arm c' .

f'' , g'' , and h'' are gears shown in section on the spindles in Fig. 2 to equalize their motion.

n''' , Fig. 5, is a slot in the stand D , in which the end of the pin on which the arm d'' hangs works to prevent the brake from being moved by the strain on the plate S while the machinery is in motion.

Having described the different parts of the machine and their various purposes, I now proceed to describe its operation.

The hopper L [2 and 3] being filled with screw-blanks, motion is communicated to the machine by a belt passing over the pulleys $A A'$ on the spindles, as shown by red dotted lines at u , Fig. 1, while the worm L [2] giving motion to the worm-wheel b , its motion is communicated to the shaft l by the train of gears in the order $c e f g h i m n$, on which the cam p' is fixed for operating the pointing-tool and hopper. The pointing-tool stock K , on which is the quadrant h' , being in the position shown by the dotted lines at s'' , Fig. 2, the hopper descends by the pin l' working in the vertical slot of the cam-groove $j j'$, depositing a blank in the groove in the quadrant h' , which is held in place by the spring i' . The rod n' is then pushed forward by the cam p' working against a pin in the hub s' [1] carrying with it the crank m' , which is made fast to a shaft passing up through the stand I , and to which the tool-stock is attached. This motion brings the quadrant containing the blank around to the position indicated by the drawings in Fig. 2, presenting the blank to the grippers $a a a a$ [2] in the spindle A' . At the same time the cam b'' on the shaft l [1] operates on the lever a'' , attached to the wedge-cam y' in stand P , [2] raising it in the stand, and, coming in contact with the head of the rod z , forces in the rod to which the cam w' is attached, which,

acting on the arms of the grippers, closes them upon the blank, and causes it to revolve with the spindles. The pointing-tool w'' on the tool-stock K, continuing its motion on the shaft in the stand I, while the blank is revolved, cuts the point of the blank into a curved conical form and prepares it for the threading operation. The pointing-tool then falls back into the position shown by the dotted lines in Fig. 2, s'' , and the hopper descends, as before described, depositing another blank in the quadrant to be presented to the grippers at its proper time. The pin e'' on the wheel n , [5 and 6,] now coming in contact with the projection on the arm d'' , attached to the pin in the spring-brake c'' , depresses it upon the periphery of the plate T, and by its friction causing it to revolve with difficulty, so that the moment the head of the spring-brake is withdrawn from the notch in the plate S the spindles make a semi-revolution around and with the plate S and shaft C to which the plate is attached, until the head of the spring-brake enters the opposite notch in the plate S, which has been presented by its semi-revolution, the other parts of the machine having been arrested in their motion by the action of the brake on the plate T on the cam-shaft G. By this operation the blank in the spindle A', which has been pointed, as described, is brought over to the opposite side of the machine and presented to the threading-tool a''' to be threaded. The semi-revolution of the spindles on the shaft C is caused by the withdrawing of the head of the spring-brake from the notch in the periphery of the plate S on the shaft C. At the same time the action of the brake on the periphery of the plate T on the cam-shaft arrests the motion of the gears f g h , &c., and other parts of the machine driven by them, while the spindles still being revolved by the driving-belt are carried around the miter-gear e (made stationary by action of the brake, as described) by the worm on the spindle A', driving the gears b and c until the notch on the opposite side of the plate S is presented to the head of the spring-brake, which enters it, arresting the rotary motion of the spindles round the shaft C, and thereby relieving the pressure on the plate T and allowing the machinery to recommence its motion. The threading-tool a''' on the tool-stand w is now carried forward by the action of the threading-cam d' on the shaft G, Fig. 1, carrying with it the arm v and sliding stand e' and arm m'' . On the tool a''' approaching the point of the blank in its threading operation the arm v , resting on the surface of the guide-plate u , Figs. 1 and 4, and following the depression in its surface, (shown at c''' , Fig. 4,) the point of the threading-tool is thrown forward to give taper to the point of the screw, while at the same time the arm m'' , [1, 2, and 4,] coming in contact in its traversing forward motion with the rod n , swings round the point of the tool to give the point of the screw its proper

curved taper. The threading-tool having now arrived at the end of its first cut on the blank, the cam o on the shaft G, [1,] working against the arm o''' of the feed-lever, carries it forward, together with the ratchet s and cam r , and guide-plate u , which, working against the curved surface of the lever v , raises it, together with threading-tool, out of the thread on the blank, while the threading-cam d' , having made a full revolution, the tool-stand w and its attachments are allowed to fall back into the position shown by the drawings in Fig. 2, to recommence the threading operation. The cam o [1] having now passed the tail of the lever o''' it falls back, while the pawl e''' , working in the ratchet s , moves the cam r backward, allowing it when falling back against the square pin t'' to rest lower down on the incline of the cam, causing the arm v to rest on the guide-plate u at a lower point on its curved surface, thereby increasing the depth of cut of the threading-tool at each successive operation of the cam until the desired depth of thread is produced on the screw. When the threading-tool by its successive operation has produced a sufficient depth of thread on the screw, the cam x' , Fig. 1, working against the tail of the lever t' on the stand N, [2,] forces the nut w' into the thread v' on the end of the cam-rod z , and the rod revolving with the spindles working in the nut withdraws the cam w' from the grippers a a a , &c., releasing the threaded screw, which is held between the groove in the arm e' , and the spring-lever f' , [1 and 2,] at the same time the sliding wedge-cam w'' in the threading-cam d' , Fig. 1, coming in contact with the projection v'' in the wheel n , (both being in motion,) forces the cam forward in the position shown by the dotted lines at w'' , Fig. 4, carrying forward the tool-stand and arm e' and spring-lever f' with the threaded screw until released and dropped from the arm and spring by the tail of the lever f' working against the wedge g' [1 and 2] and forcing it forward. The operation on the screw being completed and removed from the jaws, the pin e'' [5 and 6] in the wheel n or other mechanical device acting upon the projection on the lower end of the arm d'' on the pin in the spring-brake c'' depresses the brake upon the plate T, arresting its motion and the motion of other parts connected to it. At the same time the head of the brake is withdrawn from the notch in the plate S, allowing the spindles to make their semi-revolution while the threading-cam d' and other parts of the machine remain stationary until the blank which has been pointed in the opposite side of the machine, while another has been threaded, as described, has been brought over and presented to the threading-tool, when the head of the brake enters the notch in the plate S, relieving the pressure on the plate T and allowing the threading and pointing operations to continue as before. The hopper L [3] having now deposited another blank in

the quadrant h' it is swung round by the action of the cam p' and rod n' , as before described, and presented to the grippers, when the pointing operation is repeated, as before described. During the forward motion of the pointing-tool and quadrant to present the blank to the jaws and point it the hopper is elevated by the pin l' working in the angular part of the cam-groove $j'j$, and rising above the latch e'''' in the groove j , Fig. 3, the latch falls, causing the pin l' to travel in the horizontal part of the groove in the backward motion of the tool-stock K until it reaches the vertical part of the groove, when it falls, depositing a blank in the quadrant h' , which is conveyed to the grippers, as before described, and pointed. Meanwhile the blanks in the other spindle having been threaded the spindles make another semi-revolution, as before described, and the same operations are repeated at each semi-revolution of the spindles in such manner that while one blank is being pointed and undergoing other necessary operations thereto another blank is being threaded in another part of the same machine, or while the thread is being cut on a screw-blank in one part of the machine the pointing of another blank and other operations necessary thereunto are being performed by another part of the same machine, substantially as described, thus allowing the threading operation to continue with little or no interruption.

I do not claim the revolutions of the spindles upon the shaft to which they are fixed, *per se*; but

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

1. The combination of a rotating head containing two or more spindles or blank-holders revolving round a central point with an intermittent motion, with an apparatus for pointing and threading screw-blanks so arranged and operated that while one blank is being pointed and undergoing the other operations necessary thereto another blank is being threaded by another part of the same machine.

2. In combination with an apparatus for pointing and threading screw-blanks simultaneously, or nearly so, by the same machine, the apparatus so constructed and operated that while the spindles are rotated or changing positions the threading-cam or other device for operating the threading-tool and its connections remain stationary, and when the motion of the spindles around the central point is arrested the other part and all necessary parts of the machine recommence motion.

3. The spring-brake C'' so constructed and operated that when the spring is being depressed to withdraw it from the notch in the plate S it acts as a brake upon the periphery of the plate T to arrest its motion and the parts connected with it, at the same time relieving the plate S and allowing it to revolve with the spindles.

4. The quadrant-shaped grooved arm on the pointing-tool stock, which in connection with the spring i' or its equivalent receives the blank from the hopper and conveys it to the grippers and supports it while being pointed, substantially as described.

5. In combination with the quadrant, the reciprocating motion of the hopper for the purpose of depositing the blanks in the quadrant to be conveyed to the grippers.

6. The triangular-grooved cam $j'j''$, in combination with the hopper L , so constructed that when moved in one direction by the action of the tool-stock or otherwise the hopper is depressed, and when moved in a contrary direction the hopper is elevated for the purpose of depositing the blanks in the quadrant or other mechanical device for receiving them.

7. In combination with an apparatus for threading and pointing screw-blanks by the same machine, the worm F , when combined with the gears b , c , and e or equivalent arrangement by which the revolution of the worm causes the spindles to rotate round a central point, substantially as described.

8. The rocking feed-lever o' o'' o''' , constructed, substantially as described, for the purpose of regulating the depth of cut of the threading-tool.

9. The ratchet s and revolving cam r , when combined with the feed-lever, substantially as described, for the purpose of raising the cutting-tool out of the thread in its backward motion and increasing the depth of cut of the threading-tool.

10. In combination with the rod for opening the grippers, the movable nut u' , which acts upon the thread in the end of the rod Z to withdraw the cam and release the screw.

11. The traversing arm e' , in combination with the spring-lever f' or its equivalent, for the purpose of removing the screw from the grippers when released.

12. The sliding cam w'' , in combination with the threading-cam for the purpose of removing the screw from the grippers and releasing it, substantially as described.

13. The arm m'' on the threading-tool stock, in combination with the threading-tool and rod n'' , or its equivalent, for the purpose of giving the proper form to the thread and curvilinear shape to the point of the screw.

14. In combination with the spindles or blank-holders, the gears f'' g'' h'' on the spindles for the purpose of equalizing their motion and causing them to revolve around the shaft C while changing their position, whether the driving-belt rests or acts on one or both the spindles.

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Witnesses:

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