(No Model.) 4 Sheets—Sheet 1.

F. A. SMITH & A. DOLL, Jr.

MACHINE FOR THREADING THE TAPERING POINTS OF SCREWS.

No. 300,908. Patented June 24, 1884.

Fig. 1.

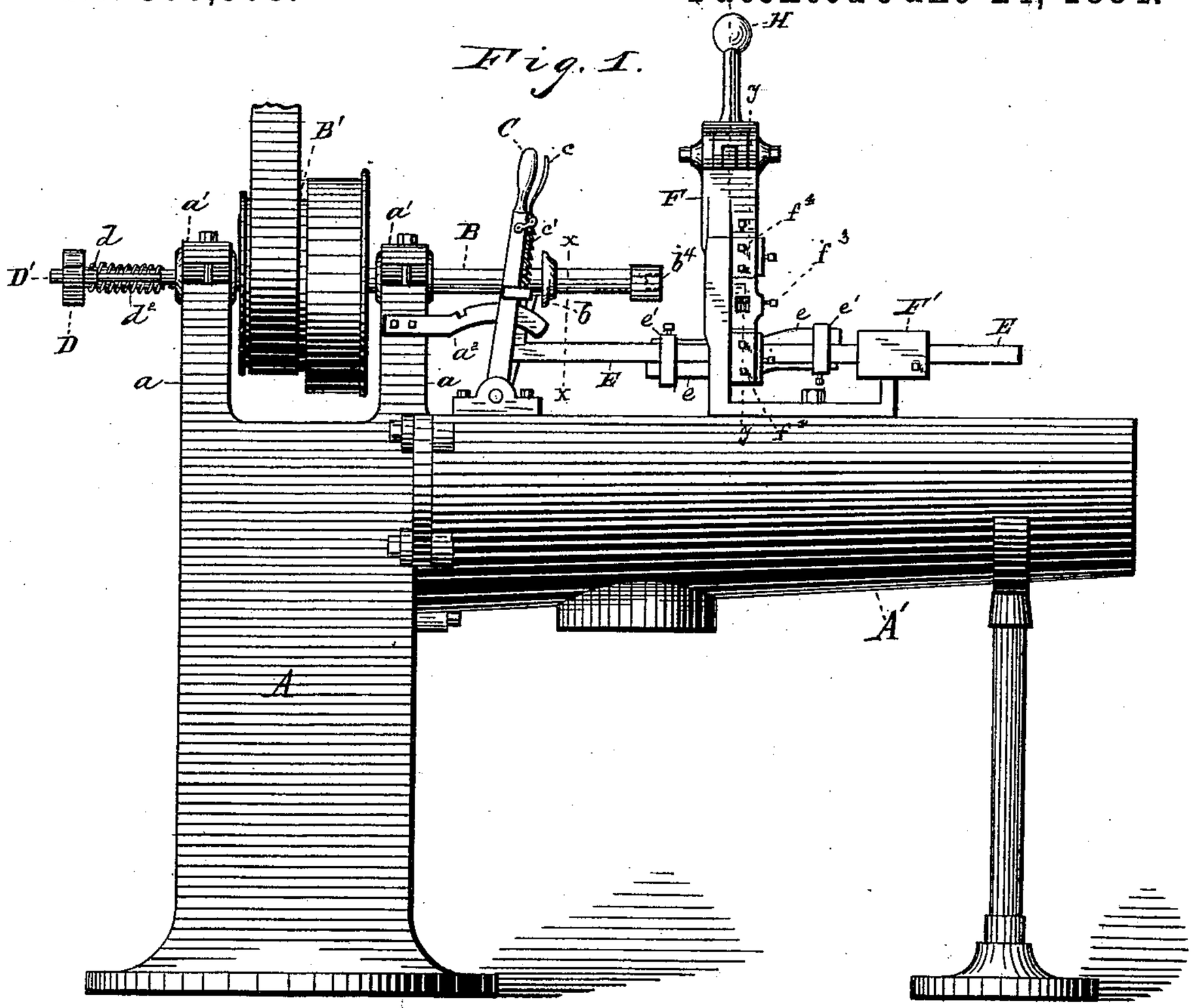

Fig. 2.

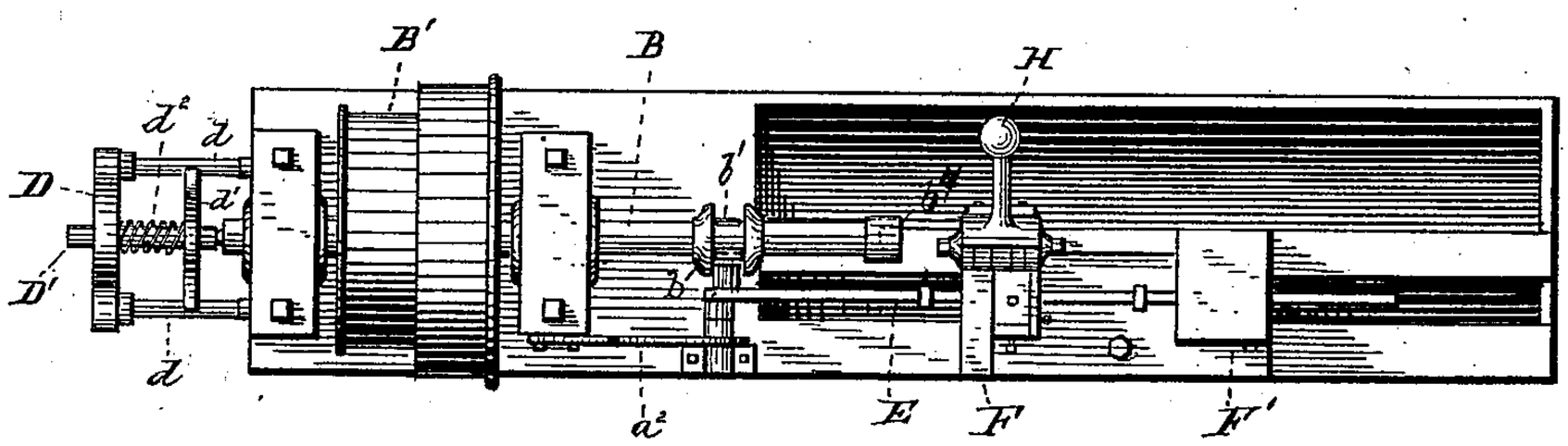

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Fig. 3.

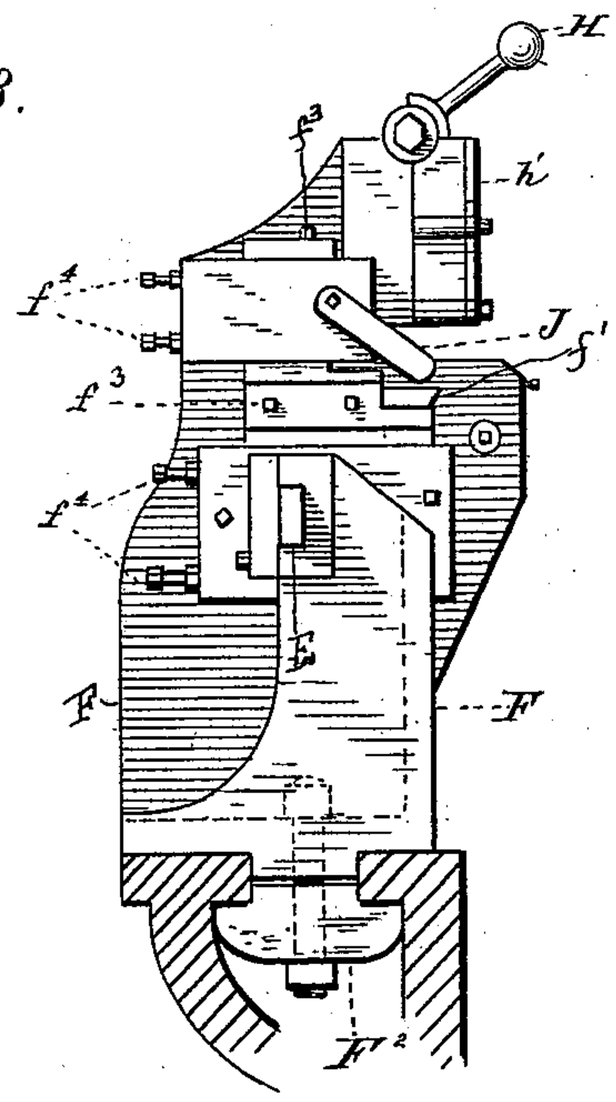


Fig. 4.

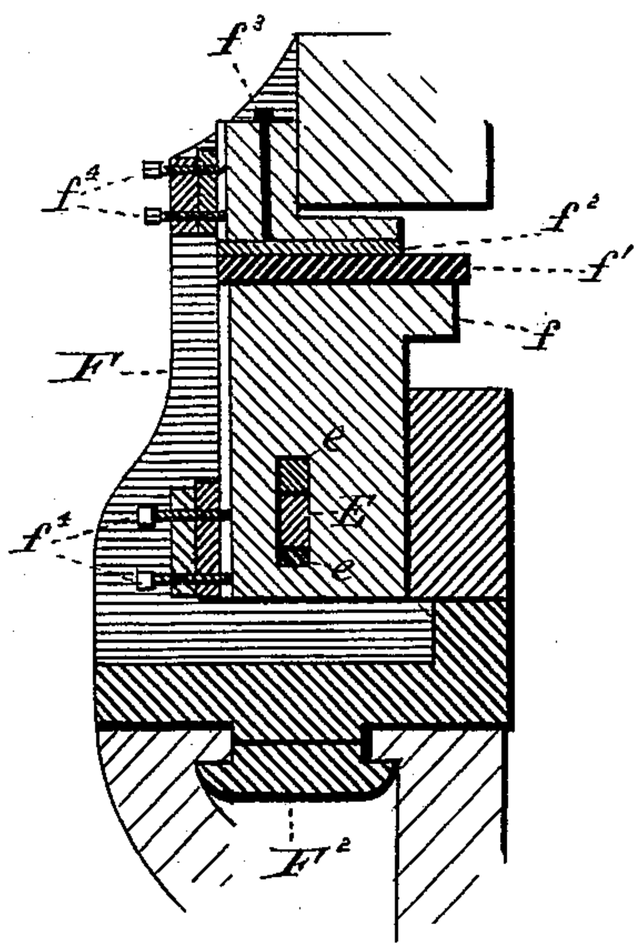
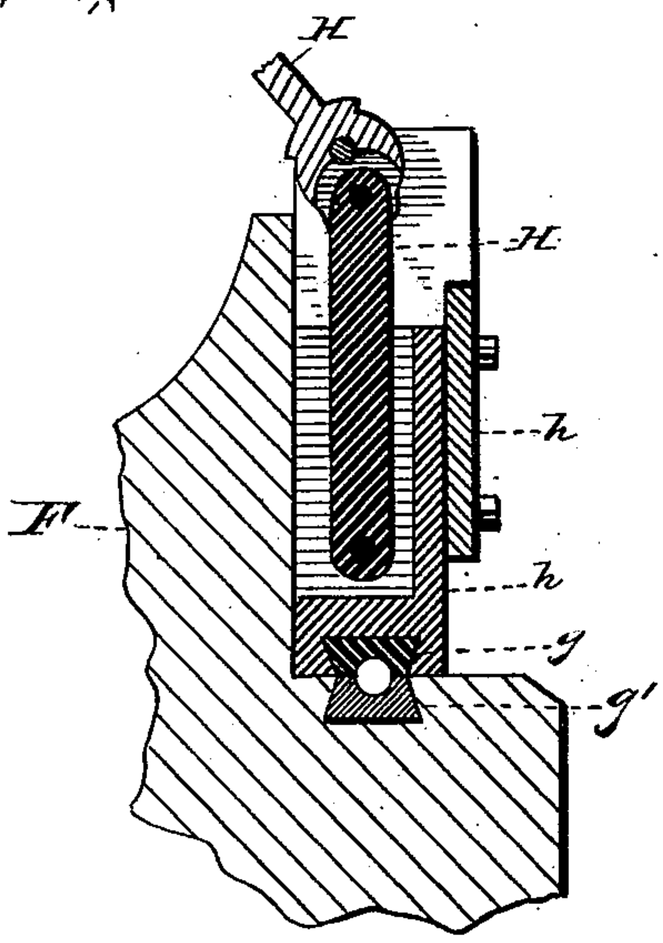


Fig. 5.



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MACHINE FOR THREADING THE TAPERING POINTS OF SCREWS.

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Fig. 6.

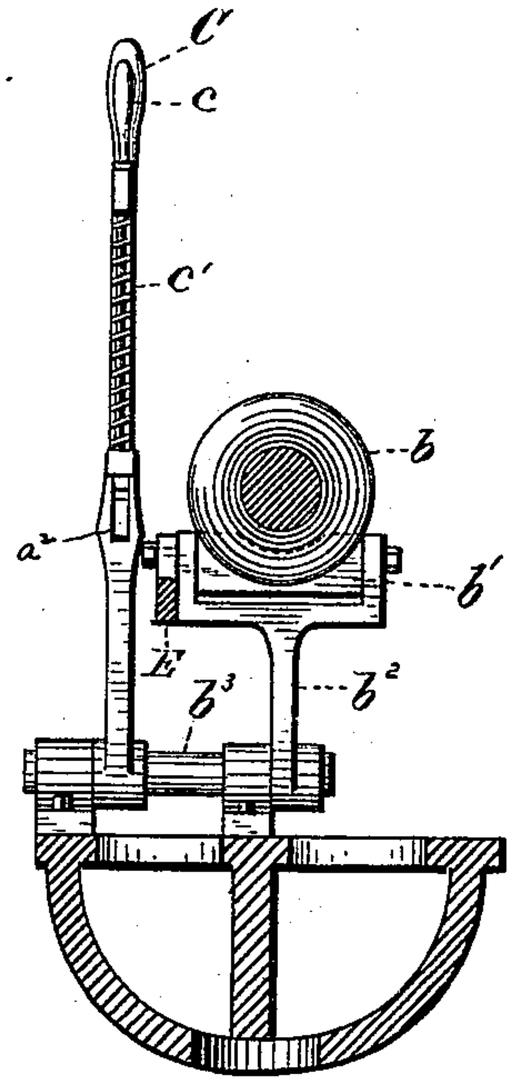


Fig. 7.

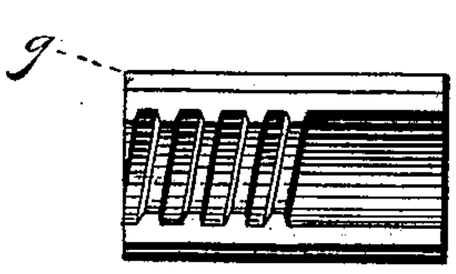


Fig. 8.

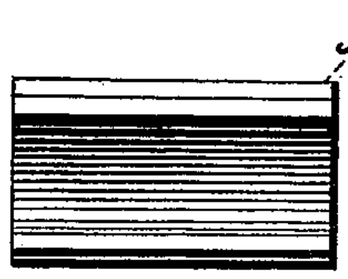


Fig. 10.

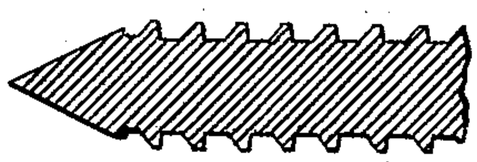


Fig. 11.

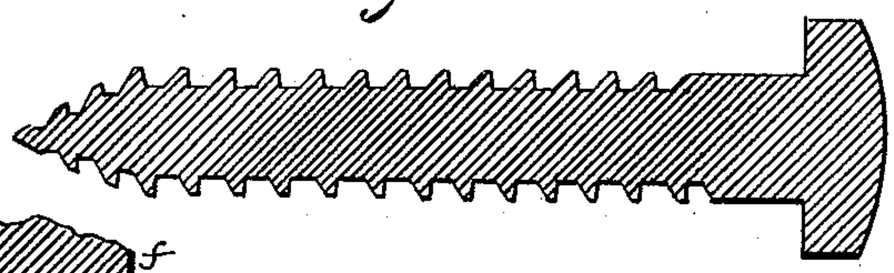
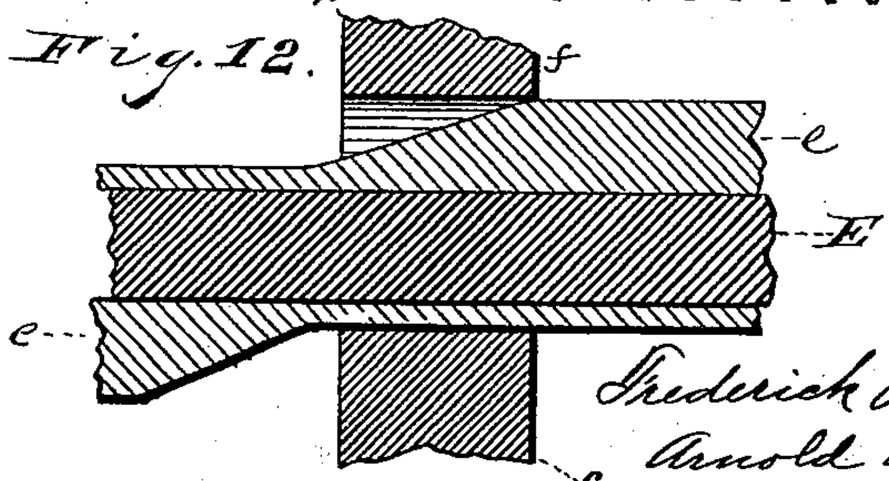


Fig. 12.



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F. A. SMITH & A. DOLL, Jr.

MACHINE FOR THREADING THE TAPERING POINTS OF SCREWS.

No. 300,908. Patented June 24, 1884.

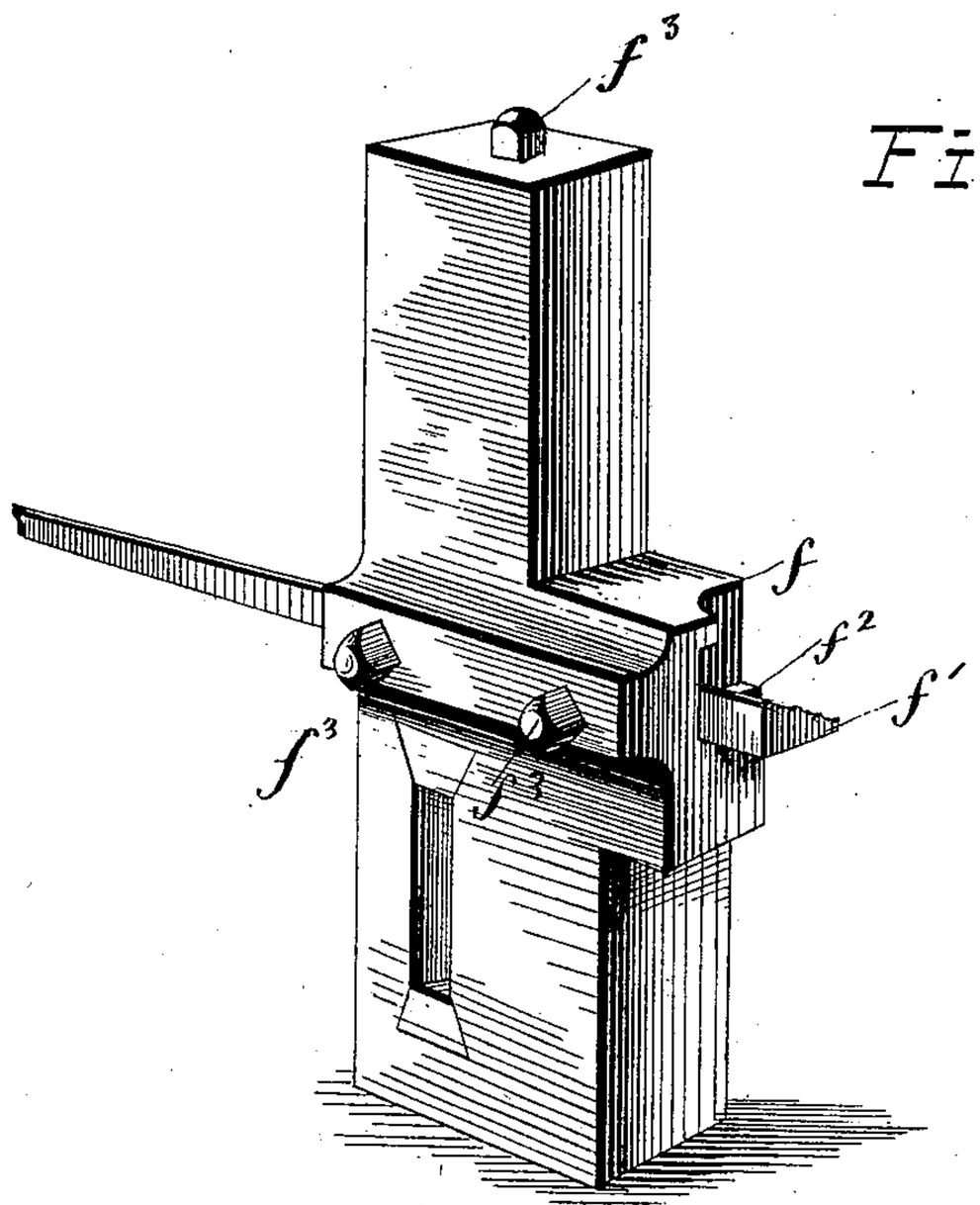

Fig. 9.

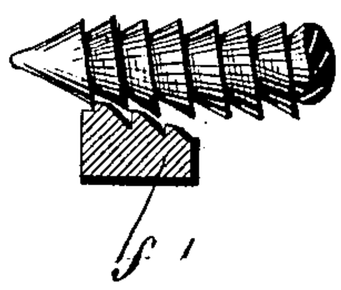

Fig. 14.

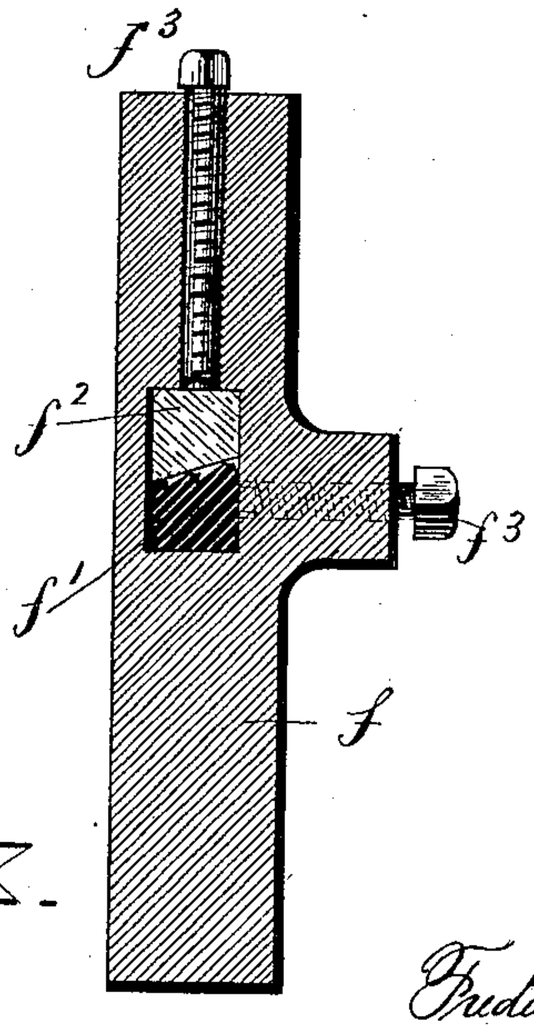

Fig. 13.

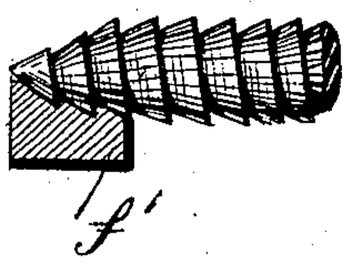

Fig. 15.

WITNESSES

Wm Monroe

Geo. W. King

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Leggett & Leggett ATTORNEYS

UNITED STATES PATENT OFFICE.

FREDERICK A. SMITH AND ARNOLD DOLL, JR., OF CLEVELAND, OHIO, ASSIGNORS TO THE HOTCHKISS & UPSON COMPANY, OF SAME PLACE.

MACHINE FOR THREADING THE TAPERING POINTS OF SCREWS.

SPECIFICATION forming part of Letters Patent No. 300,908, dated June 24, 1884.

Application filed May 8, 1883. (No model.)

To all whom it may concern:

Be it known that we, FREDERICK A. SMITH and ARNOLD DOLL, Jr., of Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Machines for Threading the Tapering Points of Screws; and we do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

Our invention relates to improvements in screw-cutting mechanism; and it consists of certain features of construction and in combination of parts hereinafter described, and pointed out in the claims.

In the drawings, Figure 1 is a side elevation of a machine embodying our invention. Fig. 2 is a ground plan of the same. Fig. 3 is an end view of the tool-post. Fig. 4 is a vertical cross-section on the line of *y y*, Fig. 1. Fig. 5 is a vertical cross-section on the line of *z*, Fig. 1. Fig. 6 is a vertical cross-section on the line of *x x*, Fig. 1. Fig. 7 is the threaded part, and Fig. 8 is the blank part of the feed nut or thimble. Fig. 9 is a perspective view of the thread-cutting tool and holder. Fig. 10 is a longitudinal sectional view of a portion of a screw with the pointed end in blank. Fig. 11 is a longitudinal sectional view of a lag-screw after the pointed end has been threaded. Fig. 12 is a vertical longitudinal section of the bar and inclines that feed or actuate the tool-stock. Fig. 13 is a view in vertical section of the thread-cutting tool and holder. Fig. 14 is a view showing the position of the cutting-tool as it first engages the screw, and Fig. 15 is a similar view showing the position of the parts when the screw is completed.

A represents a standard with a broad base, and terminating above in the arms *a*, that are provided with the boxes *a'*, for the support of the shaft B. To the said standard is attached the trough A', that furnishes a receptacle for lubricants, and also provides a bed for portions of the machine. The shaft B is provided with the cone-driving pulley B', attached to the shaft by means of a feather and groove or equivalent device, as the shaft is required to have end-play through its boxes and this pulley. The shaft is provided at *b* with collars, between which operates the pivoted guide-block *b'*, that is connected by means of the forked arm b^2 and rock-arm b^3 to the hand-lever C, by means of which the end motion of the shaft may be controlled. (See Fig. 6.) The lever C is provided with a pawl, that, engaging a notch on the ratchet-arm a^2, holds the parts in position with the shaft B drawn back. This pawl is forced downward and held in its notch by the coil-spring *c'*, and may be raised by pressing the small lever *c* against the lever C. The studs *d* support the cross-piece D and guide the cross-head *d'*, that in turn guides one end of the stop D', while the other end is guided by passing through the cross-piece D. Between the cross-piece D and the cross-head *d'* operates the coiled spring d^2, by means of which the stop D' and the shaft B are forced forward.

F is a tool-post, to one end of which is attached the guide-box F', and is provided also with the clamp F^2, for holding the tool-post on any desired part of the bed.

The bar E is attached to the forked arm b^2, and is actuated thereby, and is guided at the other end by the box F', and has attached midway the inclines or wedges *e*, that are secured to the bar by the clamps *e'*. The bar E, with its inclines *e*, operates in a slot in the tool-holder *f*, and actuates it vertically. In a chamber in this holder *f* is secured the cutting-tool *f'*, by means of the set-screws f^3, two of which secure the tool sidewise, as shown in Fig. 9, while the other, as seen in Fig. 9, presses upon the plate f^2, which in turn rests upon the tool. The set-screws f^4 are for adjusting the holder *f*, so that while it may freely move vertically it will have no lateral motion.

H is a lever fulcrumed in the tool-post, and pivotally attached below the fulcrum to the link H', that in turn is attached in like manner to the slide *h*, so that by operating the lever H the slide *h* is actuated vertically. By adjusting the cap *h'* lateral motion of the slide is prevented. To the lower end of the slide *h*, as shown in Fig. 5, is attached the half-thimble or feed-nut *g*, (see also Fig. 7,) one end of which is provided with a thread or

worm of suitable pitch and shape to engage the threads of the lag-screw that is to be threaded on the pointed end. (See Fig. 10.) The half-thimble g' is attached to the tool-post, as is also shown in Fig. 5. The lettered ends of these half-thimbles are on the right-hand side when in place in the machine.

J is a stop, the use of which will be seen hereinafter.

The cutting-tool f', mentioned heretofore, is a bar of steel that may be made of considerable length, and is grooved on the top side to form teeth that are adapted to cut the desired threads; also, as shown in the end view, Fig. 9, the tool is thin on one edge and thick on the other edge, forming an incline on the top side that fits the taper on the end of the screws. The top tooth first engages the screw at the termination of the thread previously cut, (see Fig. 14,) and is followed by the other teeth, so that the thread on the tapering end of the screw is completed by passing the tool once over it. Heretofore a tool with a single tooth or point has been used for such purposes which had to be passed several times over the screw to complete the thread.

The operation of the machine is as follows, to wit: The bolts that this machine is designed to operate on have square heads, as shown in Fig. 11, and have been threaded as there shown, except the pointed end, which is as shown in Fig. 10, the object of the machine being to cut a thread on the pointed end, so that the finished screw shall be like that shown in Fig. 11, having what is known as the "gimlet point." The tool-post having first been located in proper position and fixed by means of the clamp F^2, and the movable incline e having been adjusted upon the bar E, the upper half-thimble, g, is raised by means of the lever H, and by means of the lever C the shaft B is drawn back or to the left hand. Next the head of the bolt is placed in the square socket b^4, at the end of the shaft B, while the pointed end is placed between the separated half-thimbles g and g'. By releasing the lever C the shaft B will be thrust forward by the action of the spring d^2, carrying with it the screw until the point of the said screw strikes the stop J. Next, by means of the lever H the half-thimble g is brought down, which causes its worm to engage the thread on the screw, and the motion of the machine is such as to cause the screw-bolt to back out, forcing back, also, the shaft B until the bolt disengages itself from the said worm, when it will revolve in the smooth end of the thimble, where there is no worm; but in the meantime the end motions of the shaft B, by means of the inclines and the connections already described, actuate vertically the holder f, that carries the cutting-tool. When, therefore, the point of the screw is against the stop J, both the screw and the shaft B have reached the limit of their travel in that direction, as have also the bar E and the attached inclines e. Consequently the holder f and the attached tool f' are at their lowest point and in position for the tool to engage the bolt at its largest part, and just where the tapering point commences, as shown in Fig. 14. It must be remembered that this machine runs backward or in the opposite direction from that of the ordinary screw-cutting machines, and it is therefore the bottom of the screw that turns toward the tool, and the tool therefore extends under the screw and to the center thereof, so that when the screw, by means of its engagement with the worm aforesaid, recedes and carries back with it the shaft B, and the bar E and the inclines e, the shape of the inclines are such that they raise the tool-holder f and the tool f' in just the right time and manner to cause the tool to cut a thread on the tapering end of the screw and to the extreme point thereof, as shown in Fig. 15. When the screw has turned back out of its engagement with the said worm, it has also receded from its contact with the tool, and continues to revolve in the smooth end of the thimble until it is taken from the machine. This is done by drawing the shaft B back still farther by means of the lever C, when the screw, if it does not fall from the machine by its own gravity, may be easily removed.

The pawl may or may not engage the notch in the arm a^2, to hold the shaft back while placing another bolt in the machine, as suits the convenience of the operator.

It will be seen that the machine need not be stopped to take out or put in screws, and that, save in the manipulation required in changing the screws and operating the levers C and H, the machine is automatic. It will also be seen that the threads of the screw that is being operated upon, in combination with the worm of the thimble, become the actuating parts of the feed, and that when the tool and the worm are once set in their proper relative positions, the tool will always engage the screw in such a manner that the thread on the pointed end will match, or be a continuation of the thread on the body of the screw.

We are aware that it is not new to employ a thread-cutting tool having one thick edge and one thin edge and grooves to form the cutting-teeth, and hence we make no claim thereto; but

What we claim is—

1. In a machine for threading the gimlet-points of screws, the combination, with a rotary and longitudinally movable driving-shaft arranged to hold the threaded screw-blank, of a vertically-movable tool-holder carrying a thread-cutting tool, a tool-post, a thimble formed of two separable sections, one of which is plain and the other screw-threaded on its inner side, said thimble being designed to receive and feed the screw-blank during the operation of the cutting-tool, substantially as and for the purpose set forth.

2. The combination, with a rotary and longitudinaly movable driving-shaft arranged to hold the threaded screw-blank, of a vertically-movable tool-holder carrying a thread-cutting tool, a tool-post, a plain half-thimble, and a

slide mounted in said tool-post, carrying a threaded half-thimble arranged to coact with the plain half-thimble for holding and feeding the screw-blank, substantially as and for the purposes described.

3. The combination, with the tool-holder provided with a channel, and carrying a thread-cutting tool, and a tool-post carrying separable partially screw-threaded thimble, of the rotary and longitudinally movable driving-shaft arranged to carry the threaded blank, and the extension-bar carrying the inclines, and so connected with the driving-shaft as to partake of its longitudinal movements, substantially as herein described.

4. The tool-holder carrying a thread-cutting tool, and a tool-post carrying a separable partially-threaded thimble, and provided with a channel, in combination with the rotary and longitudinally movable shaft arranged to carry the threaded screw-blank, the extension-bar provided with the inclines, and so connected to the driving-shaft as to partake of its longitudinal movements, and the hand-connections, with the extension-bar and driving-shaft for controlling the longitudinal movements of said shaft and bar, substantially as and for the purposes set forth.

5. The rotary and longitudinally moving driving-shaft arranged to hold the threaded screw-blank, and a spring for throwing said shaft in a forward direction, in combination with the tool-holder, tool-post, and the separable partially-threaded thimble, and thread-cutting tool mounted in said post, substantially as described.

6. The standard A and trough A′, in combination with the shaft B, having rotary and longitudinal movements, and arranged to carry a threaded screw-blank, the tool-post F, provided with the guide-block F′, and the bar E, connected to the shaft B in such manner as to partake of its longitudinal movements, substantially as described.

7. The combination, with the standard A and trough A′, of the shaft B, the bar E, and the tool-post F, carrying the guide-block F′, and provided with the clamp F^2, substantially as set forth.

8. The combination, with the standard A, having arms *a* and studs *d*, the cross-head D, the stop D′, the follower *d′*, and the spring d^2, for the shaft B, carrying the pulley B′, and arranged to receive and hold in its forward end a threaded screw-blank, substantially as and for the purposes set forth.

9. The combination, with the rotary and longitudinally movable shaft B, and the tool-post F, provided with the guide-block F′, of the bar E, the forked lever *b′*, connected with the shaft B, so as to partake of its longitudinal movements, the rock-arm b^3, and the hand-lever C, substantially as and for the purposes specified.

10. The combination, with the driving-shaft B, the tool-post F, guide-block F′, and bar E, carrying an incline, of the tool-holder *f*, provided with a slot or channel, the slide *h*, pivoted lever H and link H′, substantially as set forth.

In testimony whereof we have signed this specification in the presence of two subscribing witnesses.

FREDERICK A. SMITH.
ARNOLD DOLL, JR.

Witnesses:
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CHAS. H. DORER.