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T. J. SLOAN.

Making Wood Screws.

No. 7,499.

Patented July 9, 1850.

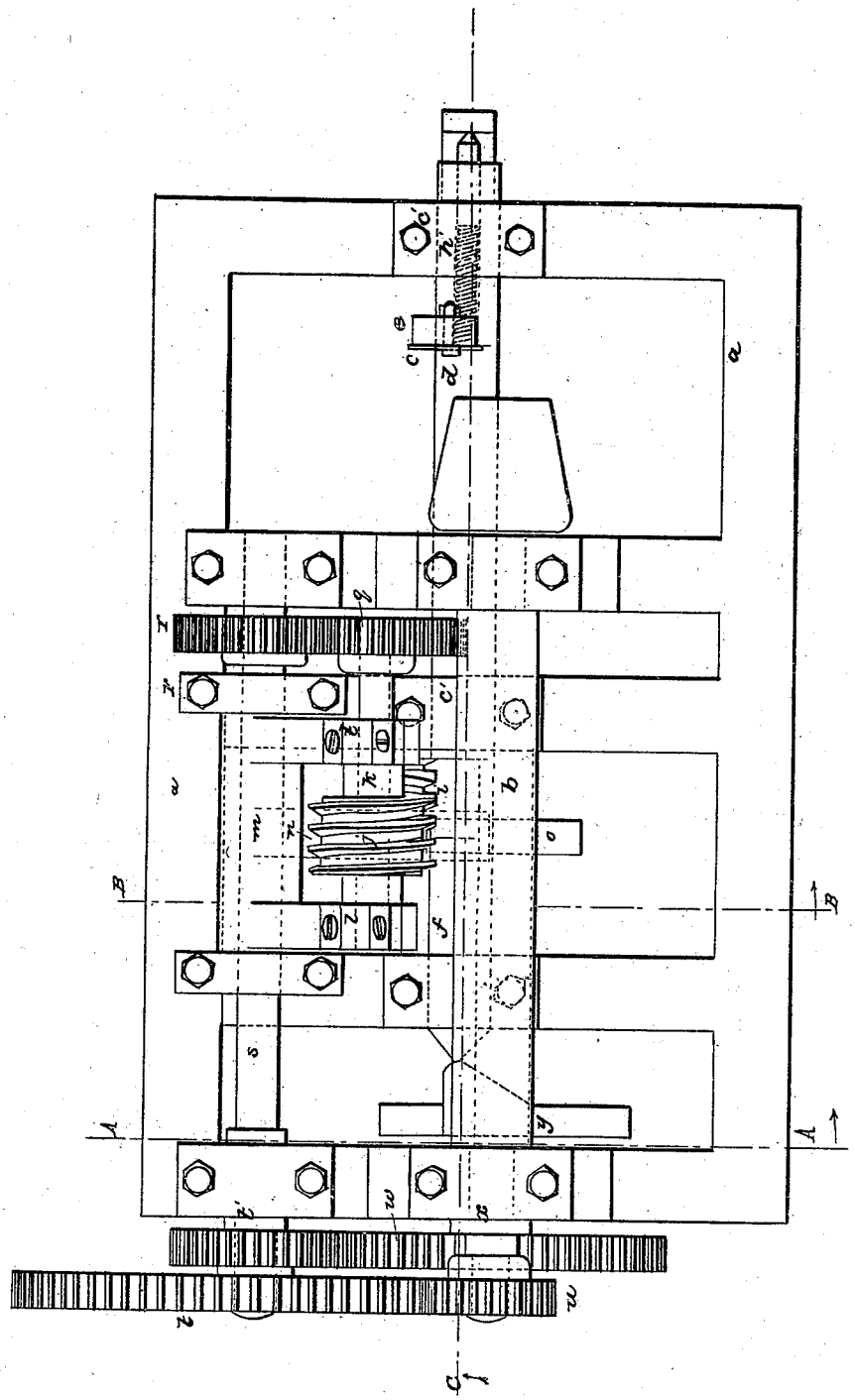

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Fig. 2

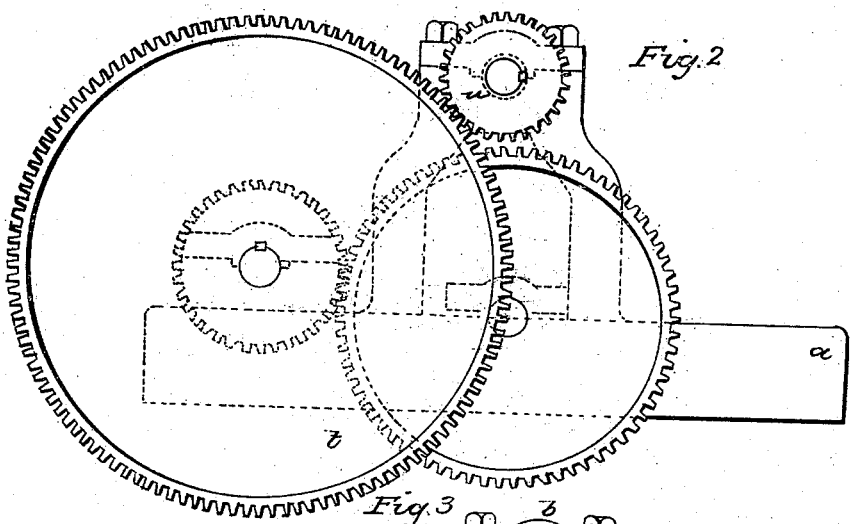


Fig. 3

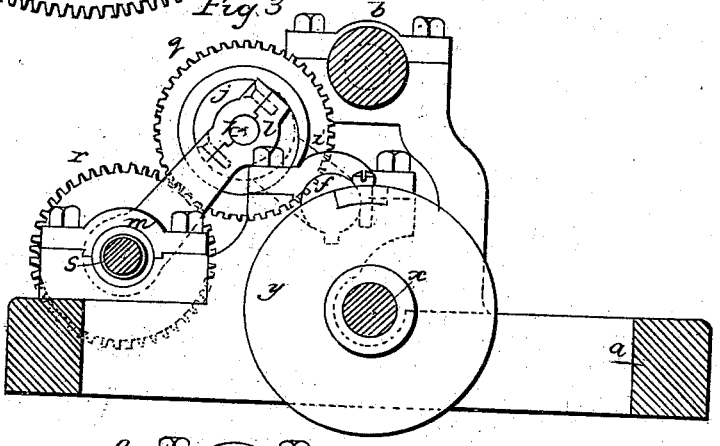
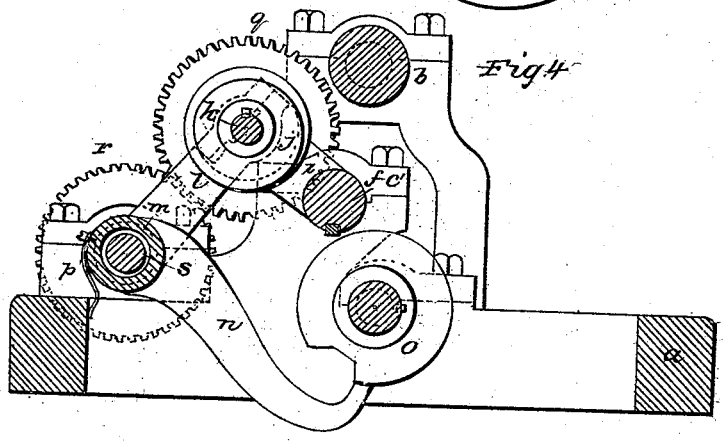


Fig. 4



3 Sheets—Sheet 3.

T. J. SLOAN.

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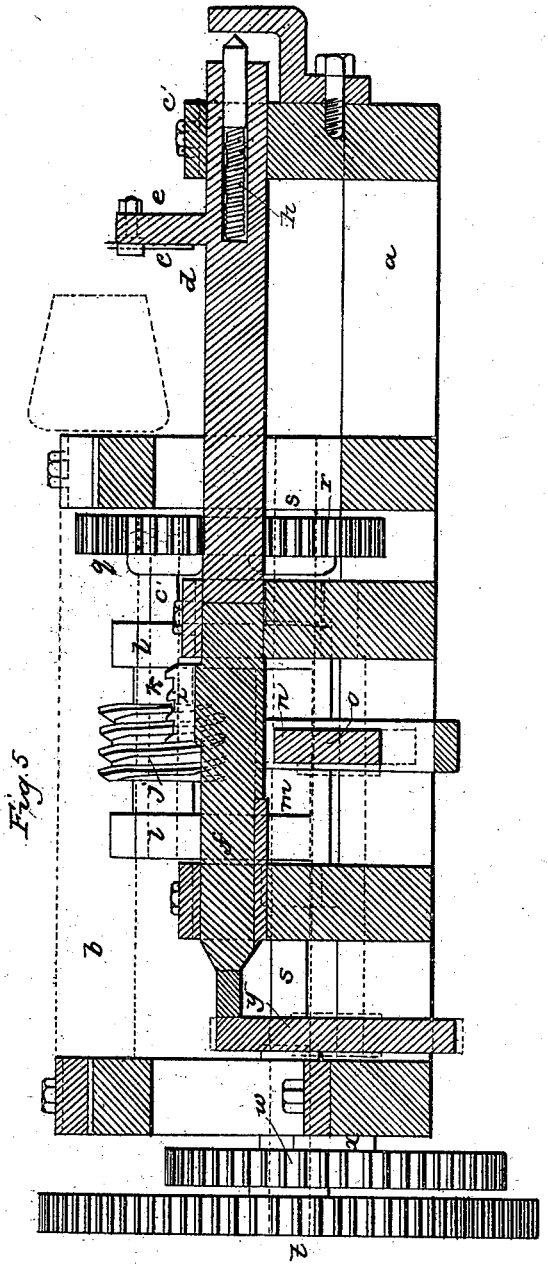

Fig. 5

UNITED STATES PATENT OFFICE.

THOMAS J. SLOAN, OF NEW YORK, N. Y.

IMPROVEMENT IN MACHINES FOR CUTTING SCREWS.

Specification forming part of Letters Patent No. **7,499**, dated July 9, 1850.

To all whom it may concern:

Be it known that I, THOMAS J. SLOAN, of the city, county and State of New York, have invented a new and useful Improvement in the Machine for Threading Wood-Screws; and I do hereby declare that the following is a full, clear, and exact description thereof, of the principle or character which distinguishes it from all other things before known, and of the method of making, constructing, and using the same, reference being had to the accompanying drawings, making part of this specification, in which—

Figure 1 is a plan of my improved machine, Fig. 2 an elvation of the rear end, and Figs. 3, 4, and 5 vertical sections taken at the lines A *a*, B *b*, and C *c* of Fig. 1.

The same letters indicate like parts in all the figures.

In my improved machine, the pitch of the thread is determined by a screw, termed the "leader," placed on a rotating shaft, the threads of which leader engage the teeth of a comb on a sliding bar connected with a chaser-head or tool-holder. The shaft of the leader has its bearings in the arms of a rock-shaft provided with an arm that bears against a cam which, at the end of the threading motion, lifts the leader out of the teeth of the comb to permit the chaser or tool to be carried back for a repetition of the threading operation, and which, at the end of the return motion, permits the leader to re-engage the teeth of the comb; and on the shaft of the cam which operates the leader to engage and liberate the comb there is what I denominate the "relief and return cam," which, at the end of the threading motion, acts on the comb-bar to push it forward to relieve the threads of the leader, that they may be lifted out of the comb-teeth without friction, and when the comb is liberated permits the gradual return of the chaser or tool and comb.

The principle or character which distinguishes my invention from all other things before known consists in determining the pitch of the threads by means of a leader, which turns in the arms of the rocking shaft operated by a cam so formed as at the end of each threading motion to disengage the threads of the leader from the teeth of a comb on a bar which operates or carries the tool-holder, and to re-engage them at the end of each return motion, when this is combined with a relief cam, which at the end of each threading motion acts upon the comb-bar and pushes it forward with greater velocity to relieve the leader preparatory to its being disengaged from the comb, and then to ease the said bar in its back or return motion.

In the accompanying drawings, *a* represents the frame of the machine, and *b* a mandrel for carrying and rotating the screw-blanks to be threaded. The jaws usually employed for gripping the blanks and the appendages for operating them are not represented, as these make no part in my invention, and may be made in any desirable and appropriate manner. Nor have I represented the means necessary to operate the chaser or tool *c* to cause it to approach the blank and recede therefrom at each successive cut, as these make no part of my present invention and may be made in any known effective way.

The arbor *d* of the tool-holder *e* is cylindrical and fits in two boxes *c' c'*, and one end bears so that it can turn and slide therein to admit of giving the tool the required motions. There is a sliding bar *f*, which I denominate the "comb-bar," adapted to slide longitudinally and accurately in a standard, and one of the boxes *c'*, in which the arbor *d* of the tool-holder *e* slides, the two abutting against each other, so that by means of a spring *h*, which bears on the end of the arbor *d* of the tool-holder, the two are at all times forced backward to give the back or return motion to the tool whenever permitted by the mechanism which determines the pitch of the thread of the screws to be threaded. The said bar *f* carries or is formed with a series of comb-teeth *i*, which are inclined on their front faces and square on their back faces—that is to say, at right angles to the line of motion of of the bar—and these teeth are engaged by the threads of a leader or screw *j* on a shaft *k*, which has its bearings in two arms *l l* of a rock-shaft *m*. The teeth of this leader are made to fit accurately the comb-teeth, and are therefore the reverse of them, so that in giving the threading motion the threads of the leader act on the teeth by the faces, which are at right angles to the line of motion, to prevent any inaccuracies such as would arise from the use of beveled threads. The rock-shaft *m* is provided with another arm *n*, the outer end of which is borne up against a cam *o* by the tension of a spring *p*, and the form of this

cam is such relatively to its rotary motion that at the end of the threading motion it forces out the arm to lift the threads of the leader out of the comb-teeth, to permit the tool to be carried back by the tension of the spring *h* preparatory to another threading motion, and at the end of the return motion permits the arm to approach its axis, that the leader may re-engage the comb-teeth for a a repetition of the threading operation. The required rotary motion is given to the leader by a cog-wheel *q* on its shaft, which engages the cog of another wheel *r* of the same diameter on a shaft *s*, that passes through the rock-shaft *m*, made hollow for that purpose, that the two cog-wheels may continue in gear during the rocking motion of the arms that carry the shaft of the leader. The outer end of the shaft *s* carries a large cog-wheel *t*, which engages a pinion *u* on the rear end of the mandrel *a*, the relative proportions of the pinion *u* and cog-wheel *t*, together with the pitch of the thread of the leader, determining the pitch of the thread to be cut, so that by simply changing the relative proportions of the pinion and cog-wheel the pitch of the threads to be cut will be varied.

On the shaft *s*, just within the cog-wheel *t*, there is a small cog-wheel *t'*, which engages another cog-wheel *w* on the shaft *x* of the cam *o*, before described, and the relative proportions of these two cog-wheels will determine the length of the thread to be cut, so that by simply changing their relative proportions the machine can be adapted to the cutting of screws of different lengths.

On the shaft *x* of the cam *o* there is another cam *y*, called the "relief-cam," so formed (as shown in the drawings) that at the end of the threading motion, and just before the cam *o* lifts the leader out of the teeth of the comb, it acts on the rear end of the comb-bar *f* to push it forward faster than the motion derived from the leader, and which therefore relieves the threads of the leader before the leader is lifted out of the comb-teeth, and thus avoid the friction and wear of the threads and comb-teeth, and so soon as the cam *o* has disengaged the leader the cam *y* recedes to permit the comb-bar and tool to be carried back with an easy motion by the spring *h*. In this way the threading and return motions are given and repeated as often as may be determined by other parts of the mechanism not herein specified, as they make no part of my present invention.

The advantage of determining the pitch of a thread by a threaded or screw leader has long been known, for it is composed of a number of threads which engage the comb, preventing in a great measure inaccuracies, for the reason that any defect in any part of the thread or comb will be compensated by the other portions; but as heretofore applied the use of a leader has been attended with serious practical difficulties—such, for instance, as the wear of the edges of the thread of the leader and the comb when the two are engaged and disengaged without being previously relieved, and the serious injury which the machinery sustains when the return motion is not properly eased off, and finally the difficulty of varying the pitch of the threads of the screws to be cut. All these difficulties are avoided by my improved method of applying a leader.

Having thus specified the principle of my invention and the mode of constructing and using the same which I have essayed, I do not wish to be understood as limiting myself to the precise mode of constructing and arranging the parts, as these may be varied within the range of the principle of my invention.

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

The method, substantially as herein described, of determining the pitch of the thread of wood-screws by means of a leader, the threads of which are alternately engaged and disengaged from the teeth of a comb on a sliding bar when this is combined with a releaf and return cam, which, at the end of each threading motion, pushes the comb forward to relieve the leader before it is disengaged from the teeth of the comb, and then eases off the return motion of the comb-bar, substantially as described.

THOS. J. SLOAN.

Witnesses:
ALEX. PORTER BROWNE,
CHAS. M. KELLER.