

C. M. SPENCER.

Machines for Making Metal Screws.

No. 147,291.

Patented Feb. 10, 1874.

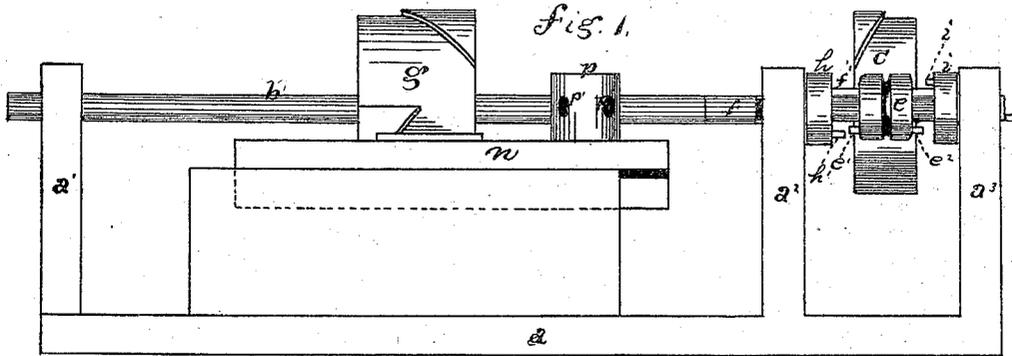


Fig. 2.

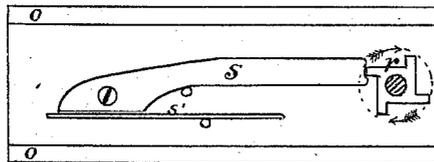
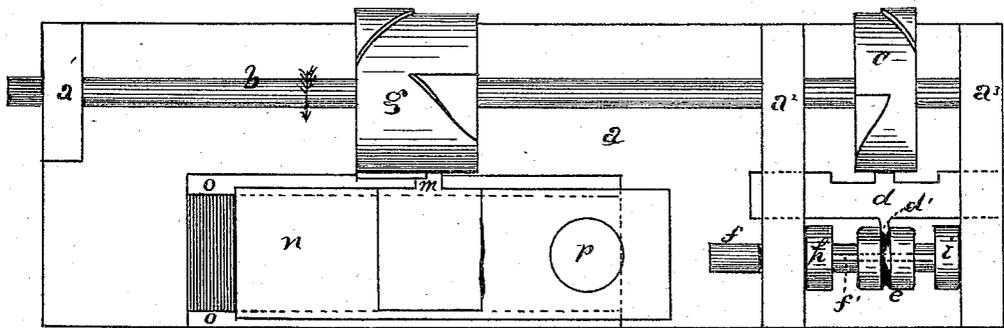


Fig. 3.

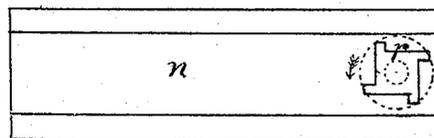


Fig. 4.

Witnesses.

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# UNITED STATES PATENT OFFICE.

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## IMPROVEMENT IN MACHINES FOR MAKING METAL SCREWS.

Specification forming part of Letters Patent No. 147,291, dated February 10, 1874; application filed December 17, 1873.

*To all whom it may concern:*

Be it known that I, CHRISTOPHER M. SPENCER, of Hartford, in the county of Hartford and State of Connecticut, have invented certain new and useful Improvements in Machines for Making Screws, of which the following is a specification, reference being had to the accompanying drawings, where—

Figure 1 is a front elevation of a machine embodying my said improvement. Fig. 2 is a top view of the same. Fig. 3 is a top view of the bed and ways for the reciprocating tool-carriage. Fig. 4 is a bottom view of the tool-carriage.

The machine is more particularly intended for making metal or machine screws. The invention consists in an arrangement for reversing the motion of the spindle through which the rod off which the screws are made is fed; and in a combination of this arrangement with another arrangement for giving motion to the tool-carriage and rotating the tool-bearing turret.

The letter *a* indicates the base of the machine, having three standards, *a*<sup>1</sup> *a*<sup>2</sup> *a*<sup>3</sup>, in which is hung the main shaft *b*, driven by appropriate power, and rotating in the direction indicated by the arrow overlying it in Fig. 2. On this shaft is the cam *c*, giving intermittent reciprocating motion to the slide *d*, the nature and time of this reciprocation being indicated by the description of its purpose hereinafter contained. This slide has a tongue, *d*<sup>1</sup>, jutting into an annular groove in the drum *e*, which has a central spline fitting on the feather *f*<sup>1</sup> upon the shaft *f*, so that this drum must rotate with the shaft *f*, but is free to move lengthwise upon it. On the shaft *f* are two loose pulleys, *h* and *i*, rotating in opposite directions, by means of belting, gearing, or friction. On the two sides of the drum *e* are clutch-pins *e*<sup>1</sup> *e*<sup>2</sup>. On the sides of the two loose pulleys, next the drum *e*, are clutch-pins *h*<sup>1</sup> *i*<sup>1</sup>.

When the drum is thrown against the pulley *h*, it is clutched thereto, and caused to revolve. When thrown against the pulley *i*, it is clutched thereto, and made to revolve in the opposite direction, the rotation of the shaft *f* changing with the rotation of the drum *e*.

Through the longitudinal center of the shaft *f* the rod off which the screws are made is fed, by means that are old and common, so far as

this present invention is concerned. On the shaft *b* is another cam, *g*, giving reciprocating motion, by means of the tongue *m*, to the bed *n*, moving on the ways *o o*. On this carriage *n* is set the turret *p*, which has a step-by-step rotation given it by means of the circular ratchet *r* attached to the foot of the turret on the under side of the carriage *n*, and engaging with the pawl *s*, kept to place by the spring *s*<sup>1</sup>. The turret is pierced with holes *p*<sup>1</sup>, one or more, (in this case four,) to hold the tools for operating on the end of the rod.

Every time the carriage *n* moves back and away from the shaft *f*, the turret *p* makes one of its step rotations, and brings another tool into position for operation. One of these holes *p*<sup>1</sup> holds the dies which cut the screw-thread upon the screw being made. When the carriage *n* has moved this tool down toward the shaft *f* far enough to cut the desired length of thread, the cam *c* reverses the motion of the shaft *f*, and thus permits the dies to run off the thread as the carriage *n* moves back. When the dies have been run off the thread, the cam *c* again changes the rotation of the shaft *f*, as it was at first, and leaves it thus till the motion needs changing again to run the dies off another thread.

The automatic reciprocation of the carriage *n*, and the automatic rotation of the tool-bearing turret *p*, is shown, and intended to be claimed in other and previous Letters Patent of mine; and it is only the combination of these parts with other parts that is claimed here—that is, so far as this one matter is concerned.

With reference to the combination specified in the first clause of the claim hereinafter contained, I would say that I am aware that devices have hitherto been in use for reversing the motion of a rotating shaft. One is shown, for instance, in Letters Patent No. 129,806, dated July 23, 1872. In the device just referred to there are three pulleys upon the same shaft. The two outer ones are loose pulleys, and the middle one is fast on the shaft. A driving-belt runs upon each loose pulley, the two running in opposite directions. The belts are shifted by means of shippers actuated by cam-grooves made in the surface of a cylinder. One or the other of the driving-belts must be

on the fixed pulley always; and, when the belts are being shifted, the two belts will be both partly on the fixed pulley at the same time, and striving to turn it in different directions; for, before one belt is wholly off the fixed pulley, the other must be partly on. In the device referred to, this makes no difference, as the shifting is done by hand; but, in a device which, like mine, is intended to be automatic, it would be a fatal defect. Not only this, but in the device referred to there can be no interregnum of the shifting motion; while in my device such an interregnum is essential to give the cutting-tools time to operate. It will be thus seen that devices like that referred to will not fulfill the conditions required by my machine, which conditions my shifting device does fulfill; and, as my shifting device produces new results, in kind, it is a patentably-different thing.

I claim as my invention:—

1. The combination of the cam *c*, or its equivalent, slide *d*, clutch-drum *e*, made to rotate with the shaft *f*, but free to move upon it lengthwise, and the two clutch-pulleys *h i*, designed to rotate in opposite directions, all constructed, arranged, and designed for operation and use substantially as shown and described.

2. The combination of the shaft *b*, cam *c*, slide *d*, drum *e*, shaft *f*, clutch-pulleys *h i*, cam *g*, tongue *m*, bed *n*, revolving tool-bearing turret *p*, pawl *s*, and ratchet *r*, all constructed, arranged, and designed for operation and use substantially as shown and described.

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Witnesses:

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