

(Model.)

3 Sheets—Sheet 1.

F. CURTIS.

METAL SCREW MACHINE.

No. 265,395.

Patented Oct. 3, 1882.

Fig. 1.

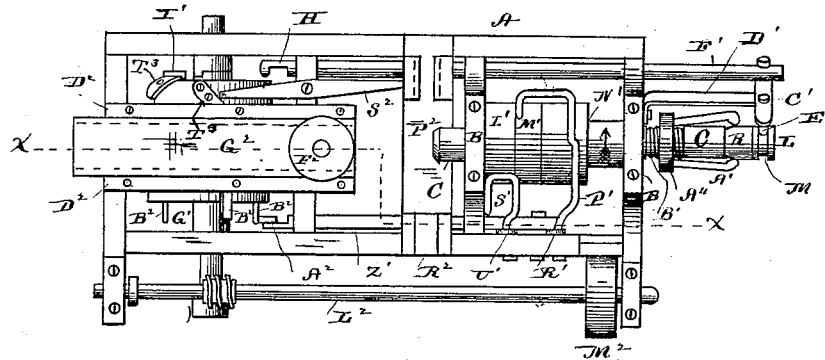


Fig. 2.

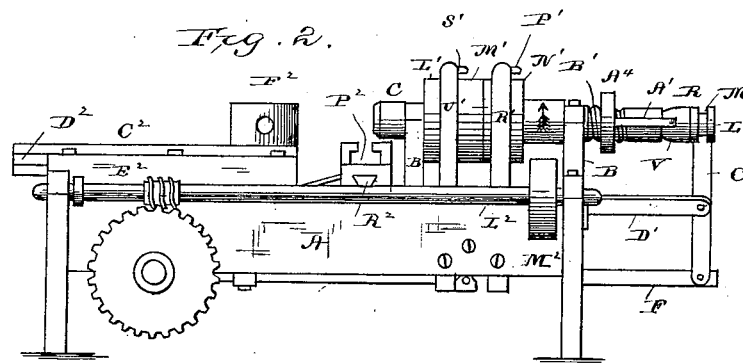
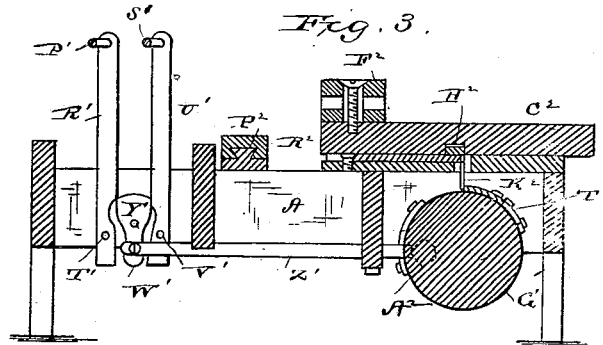


Fig. 3.



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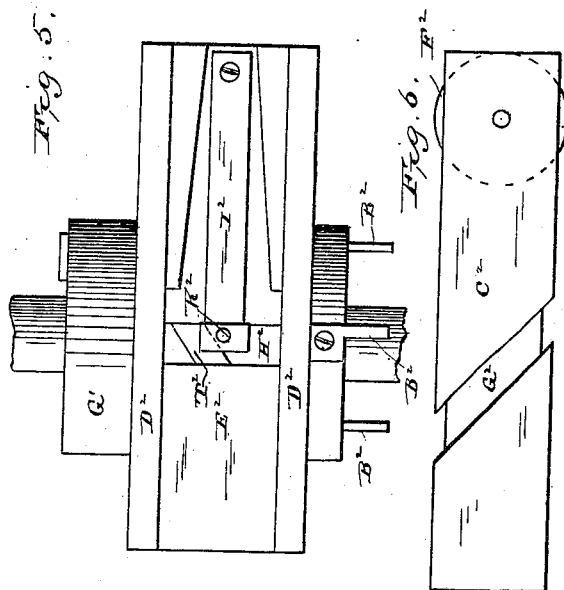
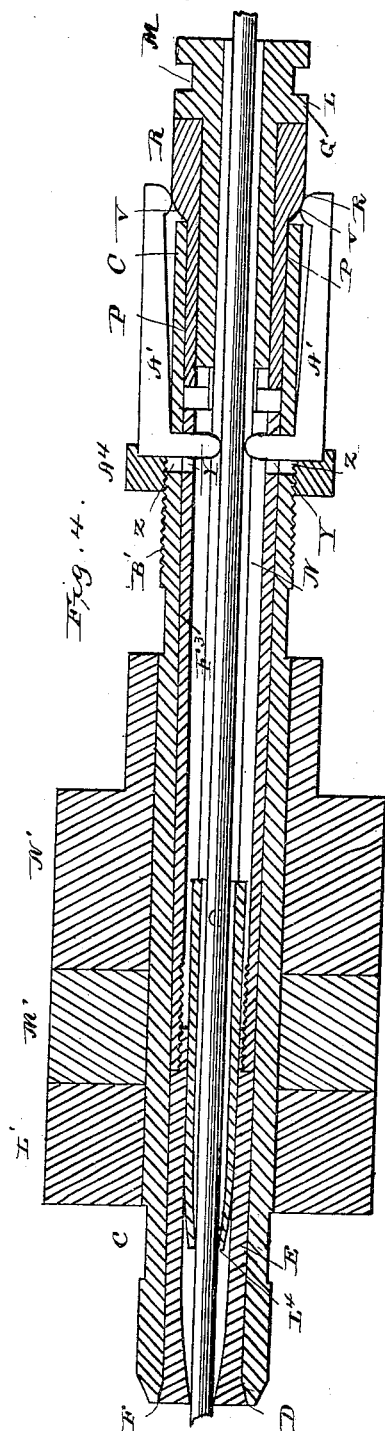
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3 Sheets—Sheet 2.

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3 Sheets—Sheet 3.

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Fig. 7.

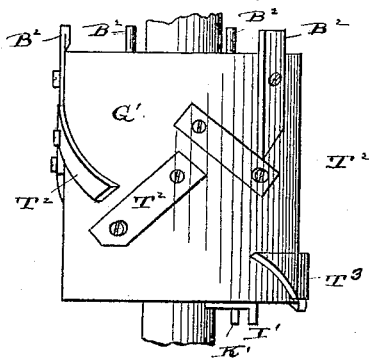


Fig. 8.

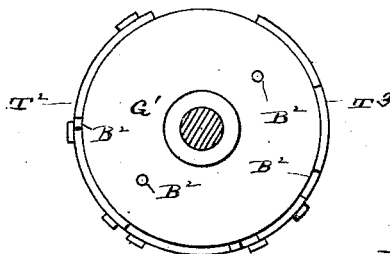


Fig. 9.

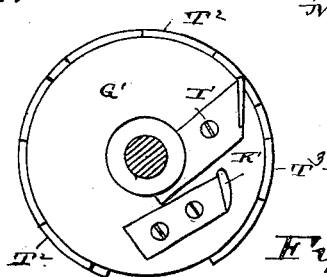


Fig. 10.

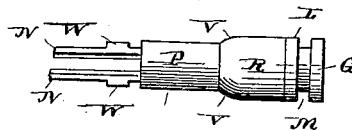
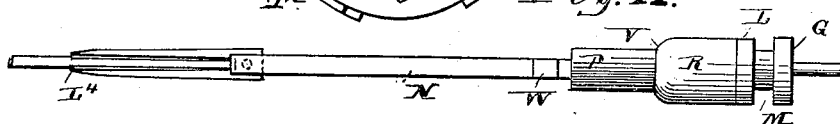


Fig. 11.



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UNITED STATES PATENT OFFICE.

FRANCIS CURTIS, OF WEST BRATTLEBOROUGH, VERMONT.

METAL-SCREW MACHINE.

SPECIFICATION forming part of Letters Patent No. 265,395, dated October 3, 1882.

Application filed April 4, 1882. (Model.)

To all whom it may concern:

Be it known that I, FRANCIS CURTIS, of West Brattleborough, in the county of Windham, and in the State of Vermont, have invented certain new and useful Improvements in Machines for Making Metal Screws; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, making a part of this specification.

This invention relates to certain improvements in machines for making machine-screws; and it has for its objects to provide an improved combination and arrangement of devices whereby the wire from which the screw is to be formed may be fed to the screw-forming devices, the various parts of the screw successively formed, and the screws cut off, as will be more fully hereinafter described, and set forth in the claims.

The above-enumerated objects I accomplish by the machine illustrated in the accompanying drawings, in which—

Figure 1 represents a top view of my improved machine; Fig. 2, a side elevation thereof; Fig. 3, a longitudinal vertical sectional view on the line *xx* of Fig. 1; Fig. 4, a longitudinal sectional view of the wire-feeding device enlarged; Fig. 5, a detached view of a portion of the mechanism for advancing and retracting a reciprocating bed which carries a turret or tool-holder. Fig. 6 represents a bottom view of the turret-bed. Figs. 7, 8, 9, and 10 represent detached views of the mechanisms for operating the turret and feed devices of the machine; Fig. 11, a detail view of the sleeve-tube and its attached extensions and spring-clamp in side elevation.

The letter A indicates the frame of the machine, which is provided with bearings B, in which is journaled a hollow mandrel, C. The said mandrel at its forward extremity is inwardly beveled a short distance, as indicated by the letter D in Fig. 4. The forward part of the mandrel has located within it a spring-chuck, E, the forward end of which is outwardly beveled, as indicated by the letter F, the chuck being formed with a series of elastic jaws by splitting the metal of the chuck longitudinally for a portion of its length. The chuck is ca-

pable of a slight longitudinal movement in the mandrel, and is screw-threaded and inserted in the tubular internally-threaded end of the bifurcated spring arms or legs F³, the said legs extending to near the rear end of the mandrel.

The letter G indicates a short tube, having a head, L, which is provided with an annular groove, M, for the purpose hereinafter explained. The said tube G at its forward end is provided with longitudinal spring-extensions N N of a length equal to that of the legs or bifurcated spring-arms F³, the said extensions being adapted to be inserted (with a portion of the tube G) within the mandrel at the rear of the chuck, the extensions occupying the spaces between the said legs.

The tube G, with the exception of its grooved head, is surrounded by a loose sleeve, P, having a head, R, and beveled shoulder V, the forward end of the sleeve sitting loosely in the rear end of the mandrel, and being capable of a longitudinal movement therein, and said sleeve being also capable of a slight longitudinal movement on the tube G, its motion being limited by the head L on said tube and suitable lugs, W, on the extensions N N.

The forward ends of the extensions N N have attached to them a bifurcated tapering spring-clamp, L⁴, which is adapted to hold the wire or rod from which the screws are to be formed.

The rear ends of the legs F³ of the chuck are provided with openings Y and the mandrel with openings Z, which openings in the legs and mandrel, respectively, are opposite each other when the chuck is in place.

The letter A' indicates two dogs or pawls having bent ends, the forward ends setting through the openings in the mandrel and legs F³, and being confined therein by means of a screw-collar, A⁴, mounted on the screw-threaded portion B' of the mandrel, and having a recess in its forward face, into which the ends of the dogs set, and by the wall of which they are confined. The forward ends of said dogs bear against the head R and shoulder V of the sleeve P, before mentioned, and are operated thereby, as more fully hereinafter specified.

The letter C' indicates a lever fulcrumed to a bracket, D', secured to the frame A. The said lever is provided with a swiveled lug, E', which sets in the groove in the head of the

sleeve P, the other end of said lever being pivoted to a rod, F', extending back through suitable bearings in the frame to the end of the cam-drum G'. The said rod near its free end is recessed, as indicated by the letter H, Fig. 1, so as to be engaged by the reversely-operating lugs I' and K', and reciprocated in order to reciprocate the feed devices of the mandrel, as more fully hereinafter explained.

The rotating mandrel is provided with a loose pulley, L', a fast pulley, M', and a double loose pulley, N', by means of which the mandrel is operated through the medium of suitable belts, as more fully hereinafter described. The periphery of the larger portion of the pulley N' is about twice the width of that of the pulley M', and it is adapted to be rotated alone by means of a belt running directly upon such broad periphery or in conjunction with the fast pulley M' by running the belt on both, the belt being shifted by a belt-shifter, P', to one or both pulleys automatically, as required. The belt-shifter is secured to the upper end of a lever, R', fulcrumed to the frame at T'. The loose pulley L' is driven in an opposite direction from M' by means of a narrow belt, which is arranged to be shifted by means of the shifter S' to the fast pulley M' at the same time the belt of said pulley M' is shifted wholly to the pulley N', so as to reverse the rotation of the mandrel, for the purpose more fully hereinafter set forth. The shifter S' is secured to the end of a lever, U', which is fulcrumed at V' to the frame A. The two levers are operated simultaneously in the proper directions by means of a short cam-lever, W', fulcrumed at Y' to the frame A between the respective levers before mentioned, the said lever being connected by means of a longitudinal rod, Z', which is provided with a cam-shaped piece, A², on its rear end adapted to be operated alternately to reciprocate the rod in opposite directions by means of the studs B² on the end of the drum G'.

The letter C² indicates a reciprocating bed adapted to move between ways D² upon a stationary bed, E², located on the frame directly in front of and in line with the mandrel. The said reciprocating bed, near its end opposite the mandrel, is provided with a rotating tool-holder or turret, F². The said bed on its lower side is provided with an oblique groove, G², (see Fig. 6,) in which is adapted to travel a swiveled block, H², Fig. 5, secured to the end of an oscillating lever, I², the lever on its lower side at the free end being provided with a pin, K², which is operated by the cam-lugs T², to reciprocate the bed C² in proper time to act in conjunction with the movements of the mandrel and the feed mechanism.

The letter L² indicates the driving-shaft of the machine, which is provided with a pulley, M², which receives motion by means of a belt from loose pulley N', and transmits it to the driving-shaft, from which it is communicated to the cam-drum by a worm and worm-wheel.

The letter P² indicates a transverse sliding cutting-tool-carrying bed adapted to travel

back and forth upon a stationary bed, R², and which is actuated by means of a lever, S², operated by the cams T³ on the periphery of the drum.

The various parts of my improved machine are arranged to work isochronously, and the operation is as follows: The parts being in position, as indicated in Fig. 1, the broad belt running over the pulleys M' N' will drive the pulleys in the direction of the arrow in Fig. 1. This will cause the feed mechanism to feed the blank forward. The traveling bed at the same time will be moved toward the wire, so as to carry the threading-die, which is located in the turret, up on to the wire and cut the screw. When the screw is cut a proper length the broad belt is automatically shifted wholly to the broad pulley and the narrow belt is shifted to the fast pulley, causing the motion of the mandrel to be reversed, the traveling bed being automatically moved back and the die, as it is drawn backward, keeping from the threaded portion of the wire. The transverse cutting-tool is then automatically advanced to the wire and severs the screw.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

1. In combination with the rotary mandrel, the longitudinally-movable chuck, and the spring-legs connected therewith, the longitudinally-movable tube and its spring-extensions and spring-clamp, the longitudinally-movable sleeve and the pawls operated thereby, the collar for confining the pawls and the mechanism for operating the same to feed the wire, substantially as specified.

2. In a machine for making screws, the combination of the reciprocating tool-bed having an oblique groove on its under side, an operating-lever, a tool-holder, the transversely-moving cutting-tool-carrying bed, and the operating-lever, and the cam-drum adapted to impart motion synchronously to the said tool-bed, substantially as specified.

3. In a machine for making screws, the combination of the rotary mandrel C, the longitudinal movable chuck E, fitting therein, and the feeding-tube G, having spring-extensions M N, the sleeve R, and pawls A', lever C', and reciprocating rod F', with the reciprocating bed G² and its tool-holder F², the transversely-movable cutting-tool-carrying bed P², and mechanism for operating the whole, consisting of a driving-shaft, L², a rotating cam-drum, G', and intermediate means, substantially as shown and described, for connecting the drum with and imparting its motion to the respective parts, all arranged to operate for the purpose and in the manner set forth.

In testimony whereof I affix my signature, in presence of two witnesses, this 20th day of March, 1882.

FRANCIS CURTIS.

Witnesses:

H. AUBREY TOULMIN,
CHAS. D. DAVIS.