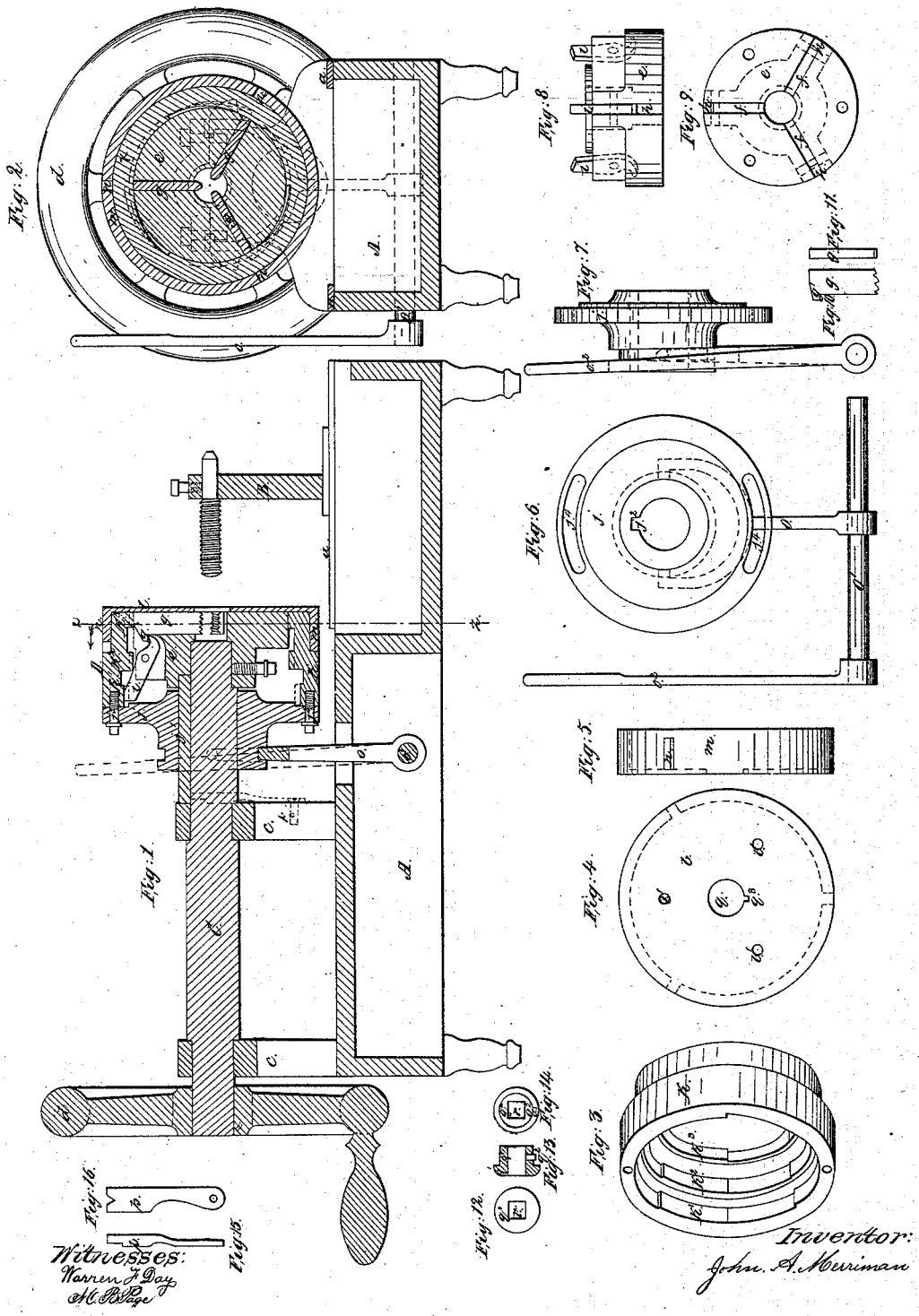
J. A. Merriman,

Cutting Screws,

No. 49,133. Patented Aug. 1, 1865



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UNITED STATES PATENT OFFICE.

JOHN A. MERRIMAN, OF CHICAGO, ILLINOIS.

IMPROVED MACHINE FOR CUTTING SCREWS.

Specification forming part of Letters Patent No. **49,133**, dated August 1, 1865.

To all whom it may concern:

Be it known that I, JOHN A. MERRIMAN, of Chicago, in the county of Cook and State of Illinois, have invented a new and useful Machine for Cutting Screw-Threads on Bolts; and I do hereby declare that the following is a full, clear, and exact description of the construction and operation of the same, reference being had to the annexed drawings, making a part of this specification, in which—

Figure 1 represents a longitudinal vertical section of my invention. Fig. 2 is a transverse vertical section of the same, the plane of section being indicated by the line *z z*, Fig. 1, and looking in the direction of the arrow marked near that line. Fig. 3 is a perspective view of the ring or cylinder, showing its internal ways or bearings. Fig. 4 is a front elevation of the cap or face plate. Fig. 5 is a side elevation of the same. Fig. 6 is a front elevation of the sliding flange, with its levers and rock-shaft attached. Fig. 7 is a side elevation of the same. Fig. 8 is a side elevation of the die-holder, with its levers shown in perspective. Fig. 9 is a front elevation of the same. Fig. 10 is a side elevation of the die. Fig. 11 is a front elevation of the same. Fig. 12 is a front elevation of the tap-holder. Fig. 13 is a longitudinal vertical section of the same. Fig. 14 is a back elevation of the same. Fig. 15 is a side elevation of the latch. Fig. 16 is a front elevation of the same.

Similar letters of reference indicate like parts.

This invention consists in a ring or cylinder provided with internal ways or bearings, portions of which are made eccentric, in combination with a set of levers attached to the die-holder, a set of dies provided with an inclined plane and a projection or hook, a sliding flange with its connecting and operating levers, and a latch or stop, in such a manner that by working the operating-lever the sliding flange, with the ring or cylinder attached, is moved backward and forward, which causes the dies to open and close at the will of the operator, which allows of the bolt being withdrawn without stopping or reversing the machine.

By changing the position of the ring or cylinder in relation to the sliding flange the size of opening in the dies can be adjusted to compensate for wear in the dies, or to cut bolts of different sizes. By raising the latch and thus permitting the sliding flange to move a trifle farther backward the dies are all relieved, and can readily be taken out or changed.

A represents a frame, made of cast-iron or other suitable material, and provided with two guideways, *a*, to receive the movable head-block B. In this head-block the bolts are fastened to which a screw-thread is to be cut.

C is the spindle which carries the head D containing the dies. Said spindle has its bearings in two standards, *c*, rising from the frame A, and it is provided with a hand-wheel or pulley, *d*, by means of which a rotary motion can be imparted to it.

The head D is composed of seven distinct parts, which are connected to each other and to the spindle, as will be presently explained. The inner part or die-holder, *e*, is rigidly attached to the spindle with a set-screw or in any other suitable manner, and is provided with three (more or less) slots, *f*, to receive the dies *g*. These slots *f* meet or run into other slots *h*, running back the entire thickness of the die-holder *e*, and are at right angles with its face. In these slots *h*, working on suitable fulcrums, are arranged the levers *i*. (See Fig. 8.) In the rear of the die-holder *e* is the flange *j*, made to slide on the spindle C, but made to rotate with it by means of the feather j' and the slot j^2.

In front of the flange *j*, and firmly fastened to it by means of bolts j^3 passing through slots j^4, (see Fig. 6,) is the ring or cylinder *k*. (See Fig. 3.) This ring or cylinder is provided with three internal ways or bearings, k' k^2 k^3. These ways or bearings are subdivided into six (more or less) equal parts, the number of parts being twice the number of dies used. Each alternate part is made on the same circle with the ring or cylinder. The remaining parts are made eccentric with the ring or cylinder. The eccentric parts of the ways or bearings k' and k^2 are in the same position to each other and expand in the same direction with each other. The eccentric parts of the way or bearing k^3 are in the same relative position as the others, but expand in a contrary direction from them. This arrangement of the eccentrics is made to correspond to the reverse action of the levers, and the whole arrangement of eccentrics is

used only to adjust the size of opening in the dies and to compensate for wear.

The dies *g* are retained in the slots *f* by means of a cap or face plate, *l*, (see Figs. 4 and 5,) which is secured to the die-holder *e* by screws *l'*. This cap or face plate *l* has a flange or projection, *m*, at its periphery, which shuts over a portion of the ring or cylinder, thereby excluding the chips from the working parts of the machine.

Through the flange *m* are openings *n*, corresponding to the number and position of the slots *f* in the die-holder *e*. Through these openings *n* the dies are passed when it becomes necessary to remove or change them.

The sliding flange *j* is moved backward and forward by means of the forked lever *o*, (see Figs. 6 and 7,) the rock-shaft *o'*, and the operating-lever o^2, as will be readily understood. This arrangement of levers may be varied to suit different styles of machines.

A portion of the outer ends of the dies *g* is made square or at right angles with their face, and a portion is made at an angle less than a right angle with their face. The latter portion forms an inclined plane, which is prolonged beyond the back side of the die and forms a projection or hook, *g'*. The altitude of this inclined plane should correspond with the amount of movement required in opening and closing the dies. I do not wish to be understood, however, as confining myself to the exact proportions of the inclined plane, which may be varied according to circumstances. The inner ends of the dies *g* are so made as to form screw-cutting tools, which act upon the iron rod or bolt and cut a screw-thread thereon. When the dies *g* are in the position for working, Fig. 1, the projections *g'* rest upon the ends of the levers *i*, and the square part of their outer ends bear firmly against the way or bearing k^3 in the ring or cylinder *k*.

The latch or stop *p* (see Figs. 15 and 16) is attached to the standard *c* by means of a screw, *p'*. This latch or stop prevents the flange *j* from sliding too far back and loosening the dies while the machine is in motion. The exact form of this latch may be varied to suit circumstances. When the flange *j*, with the ring or cylinder *k* attached, is moved backward by means of the operating-lever o^3 the internal way or bearing, k^2, in the cylinder *k* comes in contact with the levers *i*, and thereby causes them to act upon the dies *g* and draw them outward. The bearing k^2 does not reach the levers *i* until the bearing k^3 has left the square portion of the dies *g*. It (the bearing k^3) then recedes along the inclined portion and permits the dies *g* to be drawn outward or expanded. When the bearing k^3 has reached the point in the incline where the projection or hook *g'* begins it is arrested in its further progress by the latch or stop *p*.

Whenever it becomes necessary to remove the dies *g*, the latch *p* is raised or removed and the sliding flange *j*, with the cylinder *k* attached, is permitted to move backward until the bearing k^3 clears the projection or hook *g'*. The dies *g* are then taken out at the openings *n* in the flange *m* of the cap *l*. When the flange *j*, with the ring or cylinder *k* attached, is moved forward by means of the operating-lever O^2, the way or bearing k^3 in the cylinder *k* comes in contact with the inclined planes at the ends of the dies *g* and forces them inward until it reaches the square part, when it ceases to act upon the dies, but continues its forward movement until it reaches the cap *l*, in which position the square part of the ends of the dies *g* bears firmly against it (the way k^3) and is capable of resisting the pressure consequent upon cutting the bolt without yielding.

The position of the ring or cylinder *k* and consequent size of opening in the dies while the machine is cutting the screw may be regulated by means of the circular slots j^4, through which the bolts j^3 pass, which allows of the ring or cylinder *k* being moved in either direction and fastened in the desired position.

The outer or long ends of the levers *i* are slightly curved, so as to give to the inner or short ends a uniform motion. This becomes necessary owing to the continually-increasing distance from the fulcrum to the point where the bearing k^2 acts upon the levers *i*. After the bearing k^2 leaves the levers *i* in its forward movement, the outer ends of the levers *i* rest upon the bearings *k'*. This holds the dies in their proper position against the bearing k^3 and prevents any lost motion.

The tap-holder *q** (see Figs. 12, 13, and 14) is made to fit the central hole, *q*, in the face-plate *l*, and is provided with a flange, *q'*, which bears against the face-plate *l*. It is also provided with a stud, q^2, which passes through the face-plate *l* in the notch q^3 and enters one of the die-slots *f* in the die-holder *e*, the dies being removed. The notch q^3 being narrower than the slot *f*, the stud q^2 locks by the face-plate *l*. By this means the tap-holder is held firmly in its position. The tap-holder is also provided with a square hole or socket, *v*, in its center, in which the shank of the tap fits while in use.

The operation of this machine is as follows: The several parts being in their position, as shown in Fig. 1, the motive power is applied to the spindle C, causing it, with the head D and dies *g*, to revolve around a common center. The bolt upon which a screw-thread is to be cut is fastened in the movable head-block B, which is moved up to the dies, causing them to cut the required screw upon the bolt. When the screw has been cut the desired length upon the bolt the operator, by means of the operating-lever o^2, causes the flange, *j*, with the cylinder *k* attached, to slide backward upon the spindle C, and the bearing k^2 acts upon the levers *i*, and the levers, acting upon the dies *g*, cause them to be drawn outward or opened, which allows of the bolt being withdrawn without stopping or reversing the machine. By

moving the flange j, with the cylinder k attached, forward the way or bearing k^3 is made to act upon the incline of the dies g, and causes them to be pushed inward or closed. The machine is then ready to receive another bolt.

Having thus minutely described the construction and operation of my invention, I do not wish to be understood as confining myself to this particular construction of all the parts; but, believing the sliding bearings, acting directly upon screw-cutting dies by means of machines for the purpose of closing them, to be new,

I desire to claim, broadly—

1. Closing dies by the use of the laterally-sliding bearings k, acting directly upon the dies by means of inclines, operating substantially as and for the purposes herein specified.

2. The sliding bearings k, the levers i, and the dies g, all arranged and operating substantially as and for the purposes herein set forth.

3. The latch or stop p, in combination with the sliding bearings k and the dies g, substantially as herein shown and described, for the purpose set forth.

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