

(No Model.)

H. HUBBELL.  
AUTOMATIC TAPPING MACHINE.

No. 576,404.

Patented Feb. 2, 1897.

Fig. 1.

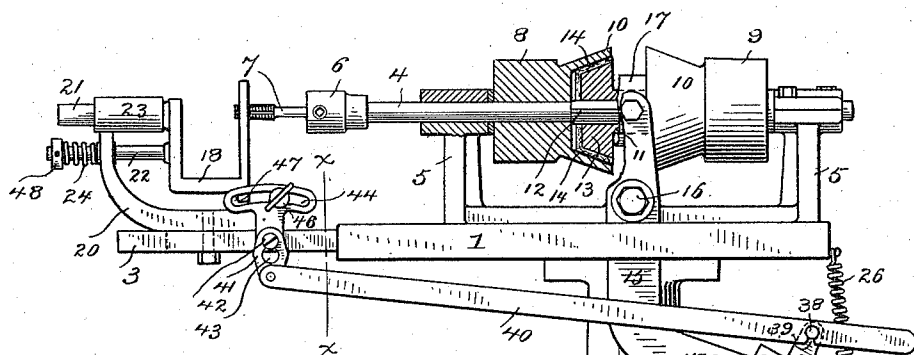
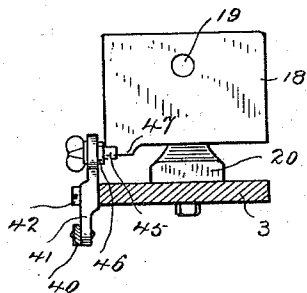


Fig. 2.



WITNESSES

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## AUTOMATIC TAPPING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 576,404, dated February 2, 1897.

Application filed October 17, 1896. Serial No. 609,195. (No model.)

*To all whom it may concern:*

Be it known that I, HARVEY HUBBELL, a citizen of the United States, residing at Bridgeport, in the county of Fairfield and State of Connecticut, have invented certain new and useful Improvements in Automatic Tapping-Machines; and I 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.

My invention has for its object to produce a simple, inexpensive, and durable machine which shall be adapted for light rapid tapping and which shall be so constructed as to be capable of tapping a hole to any required depth and will stop automatically the instant the tap has entered to the predetermined depth.

With these ends in view I have devised the novel machine of which the following description, in connection with the accompanying drawings, is a specification, numbers and letters being used to designate the several parts.

Figure 1 is an elevation, partly in section, illustrating the construction of my novel machine; and Fig. 2 is a section on the line X X in Fig. 1.

1 denotes the bed, 2 a standard by which it is supported, and 3 an extension of the bed, which supports a carrier for the piece of work to be tapped.

4 denotes a spindle journaled in standards 5 and extending upward from the bed, and 6 a chuck of ordinary construction which carries the tap, which I have indicated by 7.

8 and 9 denote belt-pulleys, which are loose on the spindle and each of which is provided on its inner side with a hollow cone 10. Belts, (not shown,) and one of which is crossed to impart motion in opposite directions, pass over the belt-pulleys.

11 denotes a sleeve on the spindle, which is fastened thereto by a key 12, so that the spindle will be carried by rotation of the sleeve, but the sleeve will be free to move longitudinally on the spindle. At the opposite ends of this sleeve are cones 13, which are preferably provided with facings 14 of leather. These cones are adapted to be placed in engagement with the respective hollow cones, the facings causing them to form frictional

contact therewith, so that the sleeve and spindle will be rotated in either direction, as may be, depending upon which hollow cone is engaged by the corresponding cone upon the spindle.

15 denotes a reversing-lever, which is pivoted upon the bed, as at 16, and carries at its upper end a shoe 17, the opposite faces of which bear upon the cones 13 upon sleeve 11. It is obvious that movement of this lever in either direction will cause one of the cones to engage the corresponding hollow cone and will thereby communicate motion to the spindle.

18 denotes the work-carrier, which is provided with a hole 19, through which the tap passes. This carrier is supported by an arm 20, which is detachably secured to extension 3.

21 and 22 denote rods which extend rearward from the carrier. Rod 21 slides freely in a sleeve 23 at the upper end of the arm, and rod 22 passes through the arm and carries a spring 24, one end of which bears against the arm and the other against a collar 48, secured at the outer end of rod 22. The action of this spring is to draw the carrier backward away from the chuck. The movement of lever 15, which controls the longitudinal movement of sleeve 11 and cones 13, is produced by a treadle 25 and treadle-rod A in one direction and by a spring 26, one end of which is connected to the lever and the other to the bed in the opposite direction. In order to insure that the downward pull of the treadle upon lever 15 shall be yielding instead of positive, I make treadle-rod A in two parts, which are designated specifically as 27 and 28. Part 27 is a rod, one end of which is attached to the treadle, the other end passing through ears 29 and 30 on part 28.

31 denotes a spring surrounding the upper portion of part 27, one end of which bears against ear 29 on part 28 and the other against a collar 32 on part 27.

33 denotes another collar on part 27 below ear 29, which limits the upward movement of the treadle and part 27, said parts being returned to their normal position by spring 34, one end of which is connected to the treadle, the other to standard 2. Near the upper end of part 28 is a shoulder 35, which is adapted

to engage a plate 36 on lever 15, part 28 being held at its operative position by a guard 37 on the lever, the opening through the guard being large enough to permit sufficient play of part 28 to engage and disengage the shoulder from the plate. At the upper end of part 28 is a stud 38, which is adapted to engage a recess 39 in a rod 40. The stud in practice is provided with a head which retains rod 40 in engagement with part 28, except when the rod is lifted vertically. The other end of rod 40 is pivoted to a lever 41, which is pivoted on a stud 42, projecting from extension 3. Stud 42 is likewise provided with an enlarged head. The lever is provided with an opening 43, through which the head passes freely. A slot (not shown in the drawings) extends upward from this opening and receives the body of the stud. I provide this construction in order that the lever may be readily engaged and disengaged from the extension. The upper part of lever 41 is enlarged to provide for an arc-shaped slot 44. 45 is a stop which is adjustable in said slot, and is locked in position after adjustment by a nut 46 engaging a thread (not shown) on the stop. This stop in practice is engaged by a lug 47 on work-carrier 18.

The operation is as follows: The parts are shown in their operative position, *i. e.*, a position in which the tap is threading a piece of work. The operator places the piece of work to be tapped in the carrier and moves the carrier forward by hand against the power of spring 24. Motion is imparted to the chuck and tap by a downward movement of the treadle. The operator in practice places his foot thereon and holds it against the power of spring 34, as shown in the drawings. This movement tilts lever 15 against the power of spring 26 and places the right cone on sleeve 11 in engagement with the right hollow cone, thereby imparting forward movement to the chuck. By making the treadle-rod in two pieces and providing a spring connection the operator is enabled to press the treadle entirely down and hold it during the tapping operation, the cone being held in engagement with the hollow cone by a yielding rather than a rigid pressure. The operator presses forward the work-carrier and the piece of work thereon by hand until lug 47 upon the carrier comes in contact with stop 45 upon lever 41, the depth to which the hole in the piece of work is tapped being determined by the adjustment of this stop. The instant lug 47 comes in contact with the stop, lever 41 is tilted on its fulcrum and rod 40 is drawn toward the left, as seen in Fig. 1. This movement of rod 40 drags the treadle-rod toward the left also and disengages shoulder 35 from plate 36. The instant this disengagement is effected spring 26 acts to lift the lower end of lever 15 and consequently to throw the right cone on sleeve 11 out of engagement with the right hollow cone and to place the left cone in engagement with the left hollow cone, which

causes the spindle to rotate in the opposite direction and permits the tap to be drawn out from the piece of work by moving the carrier and work backward.

The action of the spring 24 is to assist in returning the carrier and work to the normal position and to control the forward movement thereof, the forward movement being against the power of this spring. The instant shoulder 35 is disengaged from the plate the operator lifts his foot from the treadle and spring 34 will return the treadle to its normal position ready to reverse the movement of the tap again and tap another hole. It will be obvious from the construction of the parts that the instant the treadle rod and lever 15 have resumed their normal position shoulder 35 will again engage plate 36.

Having thus described my invention, I claim—

1. The combination with the spindle, belt-pulleys and hollow cones, of a sleeve rotating with said spindle, and having longitudinal movement thereon and carrying cones adapted to engage the hollow cones respectively, a lever carrying a shoe the opposite faces of which engage the cones on the sleeve, a treadle-rod detachably connected to said lever, a sliding work-carrier and mechanism intermediate the work-carrier and the treadle-rod for disconnecting the treadle from the lever substantially as described.

2. In a machine of the character described the combination with a chuck, spindle and tap, of a sliding work-carrier, a lever 41 carrying an adjustable stop adapted to be engaged by said carrier, reversing mechanism and mechanism whereby the latter is caused to act the instant the tap has reached the depth to which the stop is set.

3. In a machine of the character described the combination with the work-carrier, lever 41 carrying a stop engaged by the work-carrier, and rod 40 pivoted to said lever, of reversing-lever 15, spring 26 for returning said lever, a treadle and a treadle-rod connected to rod 40 and detachably secured to the reversing-lever so that when the work-carrier engages the stop lever 41 will be tilted, the treadle-rod will be disengaged from lever 15 and spring 26 will return the latter to its normal position.

4. The combination with the work-carrier, lever 41 carrying an adjustable stop adapted to be engaged by the work-carrier and a rod 40 pivoted to said lever, of a reversing-lever 15, treadle 25, springs for returning said parts to their normal position and a two-part treadle-rod consisting of a part 27 which passes through ears on a part 28, a collar 32 on part 27 and a spring bearing on said collar and upon one of the ears, said treadle being connected to rod 40 and detachably connected to lever 15, substantially as described.

5. The combination with the work-carrier, lever 41 carrying an adjustable stop adapted to be engaged by the work-carrier and a rod

40 pivoted to said lever, of a reversing-lever 15 having a plate 36 and guard 37, a treadle 25, springs for returning said parts to their normal position and a treadle-rod the upper end of which is connected to rod 40 and which is provided with a shoulder adapted to engage the plate:

6. The combination with the work-carrier, lever 41 carrying a stop adapted to be engaged by the work-carrier and a rod 40, pivoted to said lever, of a reversing-lever 15, a treadle, and a two-part yielding treadle-rod which is connected to rod 40 and detachably connected to lever 15.

7. In a machine of the character described the combination with a chuck, spindle and tap, of a sliding work-carrier, having a lug 47, a lever 41 carrying an adjustable stop adapted to be engaged by said lug, reversing mechanism and mechanism whereby the latter is caused to act the instant the tap has reached the depth to which the stop is set.

In testimony whereof I affix my signature in presence of two witnesses.

HARVEY HUBBELL.

Witnesses:

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SUSAN V. HELEY.