

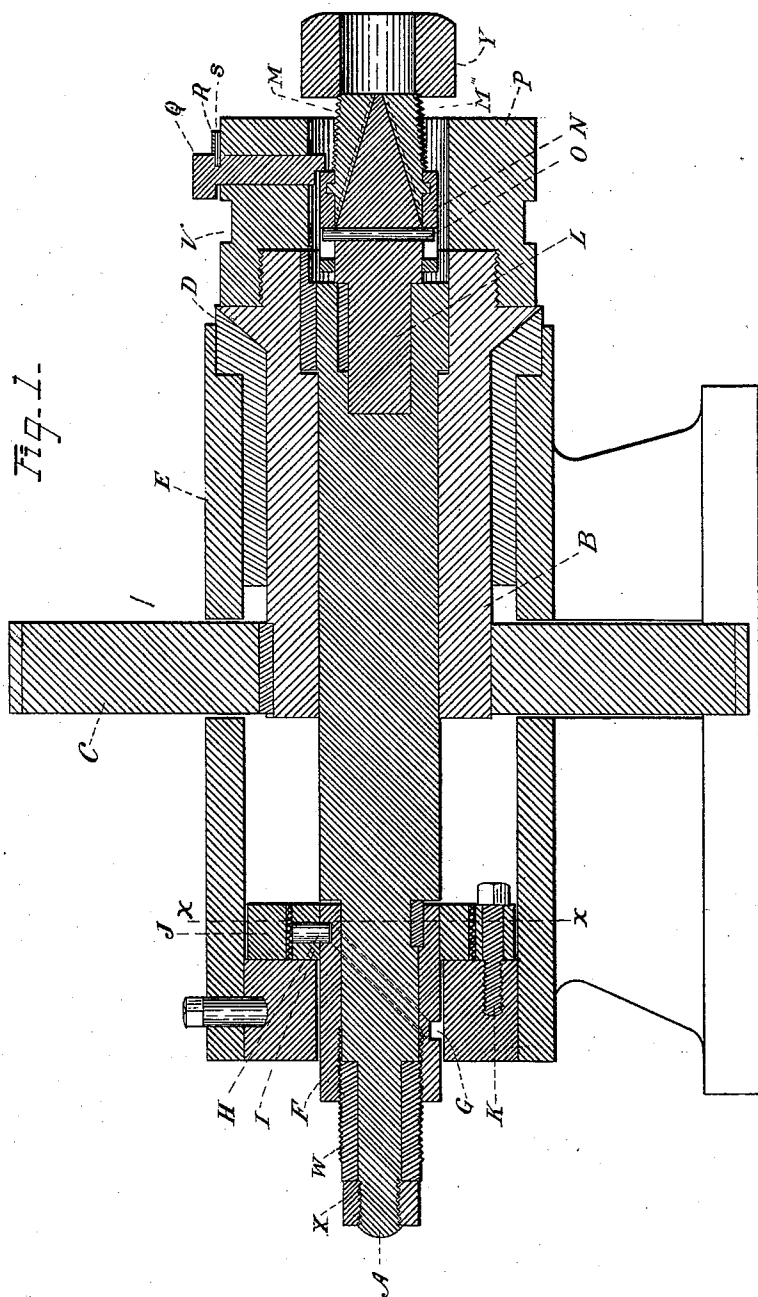
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3 Sheets—Sheet 1.

W. McILVRID & P. Y. HODGE.
TAPPING, FACING, AND REAMING MACHINE.

No. 542,307.

Patented July 9, 1895.



Witnesses

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(No Model.)

3 Sheets—Sheet 2.

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Fig. 2.

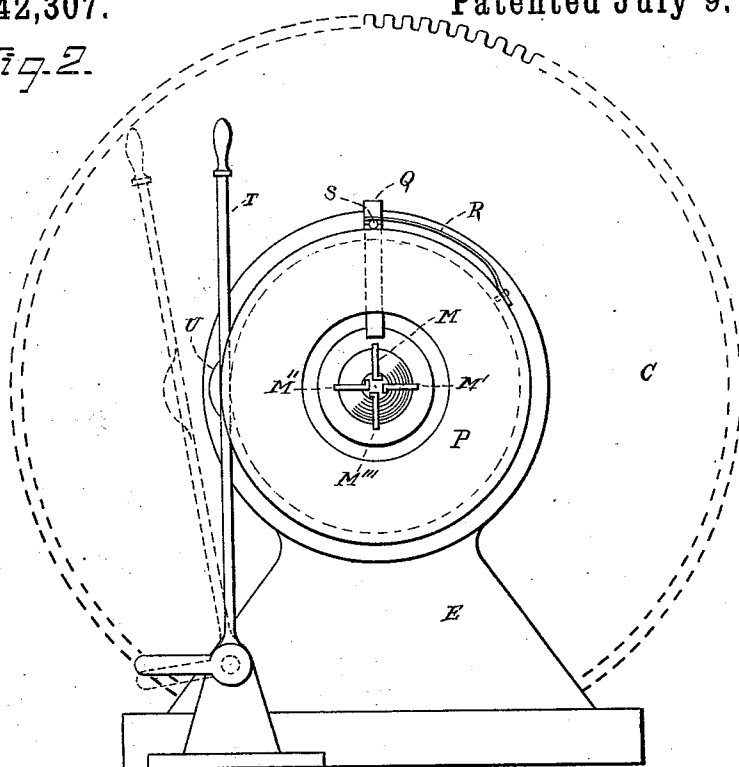
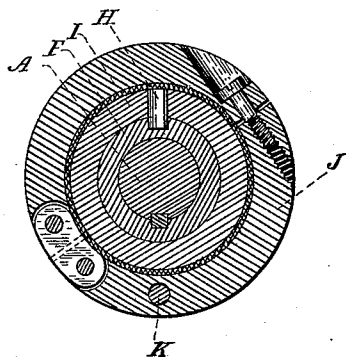


Fig. 3.



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Fig. 4.

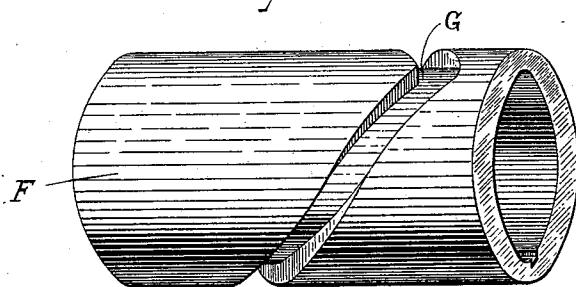
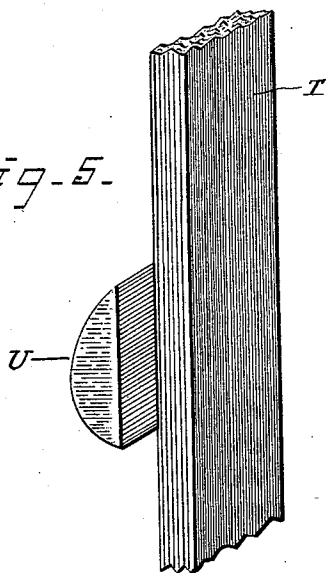


Fig. 5.



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UNITED STATES PATENT OFFICE.

WILLIAM McILVRID AND PERRY YATES HODGE, OF JERSEY CITY, NEW JERSEY, ASSIGNORS TO THE A. A. GRIFFING IRON COMPANY, OF SAME PLACE.

TAPPING, FACING, AND REAMING MACHINE.

SPECIFICATION forming part of Letters Patent No. 542,307, dated July 9, 1895.

Application filed April 13, 1895. Serial No. 545,596. (No model.)

To all whom it may concern:

Be it known that we, WILLIAM McILVRID and PERRY YATES HODGE, citizens of the United States, residing at Jersey City, in the county of Hudson and State of New Jersey, have invented certain new and useful Improvements in Tapping, Facing, and Reaming Machines; and we do 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, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

The invention relates to tapping, facing, and reaming machinery; and our object is the production of a simple and effective machine for tapping nuts or doing other analogous or similar work.

The invention consists in the construction hereinafter fully described, and pointed out in the claims.

Figure 1 is a longitudinal section of the machine. Fig. 2 is a front end view, and Fig. 3 is a cross-section, of the machine on the line *x x*. Figs. 4 and 5 are enlarged views in perspective, showing details of the device.

Referring to the drawings, A represents the spindle, having a sleeve B loosely keyed thereto and encircling the same, by which sleeve the spindle is made to revolve.

The sleeve is firmly keyed to the driving-gear wheel C and is supported in the part D, which is attached securely to the frame E of the machine.

Near the rear end of the spindle A is a sleeve F, having a cam-groove G, engaging with the cam-pin H on the inside of the ring I, which surrounds the sleeve F. The ring I is held in a friction-band J, which is firmly attached to the frame E of the machine by a screw or bolt K. The friction-band is leather-lined and is formed in two parts hinged together on one side and united on the other side by an adjusting-screw.

On the front end of the spindle A, firmly held in a socket by means of a spline and groove, is the head L, carrying the chasers M M' M'' M''', which slide in grooves arranged

equidistant from each other around the tapering front end of said head, each of said grooves having in the bottom thereof a recess which fits and engages a flange on the chaser, which slides therein to prevent it from falling out as the head revolves. The chasers are so formed that when they are in their grooves the cutting-edges are not quite parallel with each other, but converge slightly toward the front of the machine, and they are each provided with a lug near their rear end.

A collar N, having an internal groove near its front end engaging the lugs on the chasers, loosely surrounds the head L, so as to permit of a longitudinal movement thereon, the movement being limited by the pin O, which is tightly driven into a hole through the head L and projects on both sides thereof into slots in the rear of the casing N.

The sleeve B has an extension P screwed onto its front end, through which loosely passes a detent Q, having a lug normally held against the outside of the extension P by the spring R, which presses down upon a pin S projecting out from said detent.

Near the front end of the frame of the machine is fulcrumed a long lever T, which has a cam-lug U on one side thereof, by means of which the detent Q will be lifted as it revolves whenever the lever T is pressed into the recess V on the outside of the extension.

A collar W, screw-threaded on the outside, surrounds a reduced portion of the rear end of the spindle A, engages the internally screw-threaded rear end of the sleeve F, and is held in place by a nut X. The turning of this collar causes the spindle A to advance or retreat relatively to the cam-movement, so that the chasers may tap a large or a small hole.

The operation of the machine is as follows, viz: The piece to be operated upon is properly held and centered in front of the chasers by any well-known means. Motion is communicated to the spindle A, through the sleeve B, by the driving-gear wheel C. As the spindle revolves a longitudinal reciprocating motion is imparted to it by the cam device on its rear end, the forward thrust of which is each time interrupted by the detent Q. When the for-

ward movement of the spindle A is thus checked, the cam-groove G in the sleeve F can no longer move relatively to the cam-pin H, and the ring I, which carries the cam-pin, is caused to rotate in opposition to the restraining influence of the friction-band J. As soon as the collar N strikes the detent Q its forward movement ceases, and, the spindle continuing to move, the tapering head L thereof expands the chasers to their full limit. The machine is now in condition for tapping a hole or for doing other similar work, the cam-movement at the rear of the spindle continually operating to press the spindle forward with a force equal to the friction offered by the friction-band H. The work having been placed in position, the lever T is operated and the detent Q is lifted from engagement with the collar N. Under the thrust of the cam-movement the spindle is quickly forced toward the work and the chasers caused to enter and engage the hole therein. From this point on the screw-like portions of the chasers operate to cause the forward movement of the chasers until the tapping is completed, and it is really immaterial whether the cam-movement is feeding or not, except that it must operate to its full limit in one direction before a return movement can begin. The parts are so adjusted that when the tapping is completed the cam-pin H will be at the beginning of the return portion of the cam-groove G, and the continued rotation of the spindle will cause the pin H to follow the groove, thus tending to withdraw the tapering head L of the spindle from between the chasers and allowing them to become disengaged from the newly-cut screw-threads. When the spindle has moved rearward so far that the pin O reaches the rear ends of the slots in the collar N, the chasers will be pulled out of the newly-tapped hole and the collar N will retreat far enough to allow the detent under the influence of the spring R to return to its original position, where it can act to intercept the forward movement of the collar N, as before.

The described operation is repeated each time a new piece of work is placed in position. The spindle and cam-movement are relatively adjusted for different sizes of work by the means already described, the adjustment being rendered necessary by the fact that the cam-groove G and pin H may not always be in such relation to each other that the rearward movement of the spindle begins when the tapping of a hole is completed.

The cutting-edges of the chasers converge, and the sizes of the holes which are to be tapped may vary, as the distance between corresponding portions of the edges of opposite chasers vary. For a small hole the chasers begin to cut at their front ends, but for a larger hole the cutting does not begin until the more rearward portions of the thread-cutting edges has entered it. The detent Q is, however, so situated that whether the hole to

be tapped is large or small, the chasers will always be wedged apart by the tapering head, and firmly held by the collar, before the tapping begins.

The machine may be employed for facing and reaming by simply substituting cutting-tools for the chasers, the cam-movement in these operations acting to feed and withdraw the said tools to and from their work as in the operation of tapping.

Having thus fully described our invention, what we claim, and desire to secure by Letters Patent, is—

1. The combination of a spindle having a tapering head adapted to move longitudinally, chasers secured to and longitudinally adjustable on said head, and a movable detent adapted to detain said chasers while the head is moving forward and spreading them, substantially as described.

2. The combination of a spindle having a tapering head adapted to move longitudinally, chasers secured to and longitudinally adjustable on said head, a movable detent adapted to detain said chasers while the head is moving forward and spreading them, and means for reciprocating the spindle, substantially as described.

3. The combination of a spindle having a tapering head adapted to move longitudinally, chasers secured to and longitudinally movable on said head, a collar engaging and encircling the rear ends of the chasers and adapted to move therewith and a movable detent adapted to engage said collar, substantially as described.

4. The combination of a spindle having a tapering head adapted to move longitudinally, chasers secured to and longitudinally movable on said head, a slotted collar engaging and encircling the rear ends of the chasers, a movable detent adapted to engage said collar, and a pin secured to the head and projecting into the slots of the collar, substantially as described.

5. The combination of a spindle having a tapering head adapted to move longitudinally, chasers having lugs secured to and longitudinally movable on said head, a grooved collar engaging and encircling the rear ends of the chasers, and a movable detent adapted to engage said collar, substantially as described.

6. The combination of a spindle having a tapering head adapted to move longitudinally, chasers secured to and longitudinally movable on said head, a rotary sleeve so keyed to said spindle as to permit the latter to reciprocate, a detent having a lug thereon, and extending loosely through said sleeve and adapted to detain said chasers while the head is moving forward and spreading them and a lever having a cam lug adapted to engage the lug and lift the detent as the sleeve and spindle rotate substantially as described.

7. The combination with a spindle having cutters or chasers at its forward end and

adapted to move longitudinally, of automatic feeding mechanism for giving said spindle a forward thrust, and a movable detent for said spindle substantially as described.

8. The combination of a spindle, a tapering head at one end thereof, chasers secured to and longitudinally adjustable on said head, a movable detent adapted to detain said chasers while the head is moving forward and spreading them, and a cam device at the other end of said spindle to impart to it a reciprocating motion substantially as described.

9. The combination of a spindle, a tapering head at one end thereof, chasers secured to and longitudinally adjustable on said head, a movable detent adapted to detain said chasers while the head is moving forward and spreading them, a sleeve with a cam groove therein upon the other end of the spindle, a ring upon the sleeve with a cam pin adapted to engage the cam groove, and a friction band surrounding said ring and firmly secured to the frame of the machine substantially as described.

10. The combination of a spindle, a tapering head at one end thereof, chasers secured to and longitudinally adjustable on said head, a movable detent adapted to detain said chasers while the head is moving forward and spreading them, a sleeve upon the other end of said spindle, a ring surrounding said sleeve and connected therewith by a cam device, and a friction band, made in two parts which are hinged together on one side and joined on the other side by an adjusting screw, encircling said ring and firmly secured to the frame of the machine substantially as described.

11. The combination of a spindle, a tapering head at one end thereof, chasers secured to and longitudinally adjustable on said head, a movable detent adapted to detain said chasers while the head is moving forward and spreading them, a cam device at the other end

of said spindle, and means for adjusting the spindle longitudinally with reference to the cam substantially as described.

12. The combination of a spindle, a sleeve with a cam groove therein, a ring upon the sleeve with a pin adapted to engage the cam groove, and a friction band surrounding said ring and firmly secured to the frame of the machine substantially as described.

13. The combination of a spindle, a tapering head upon one end thereof, chasers having lugs secured to and longitudinally movable on said head, a grooved and slotted collar the grooved end of which engages and encircles the lugs of the chasers, a pin secured to the head and projecting into the slots of the collar, a rotary sleeve so keyed to said spindle as to permit the latter to reciprocate, a detent having a lug thereon and extending loosely through said sleeve and adapted to detain said chasers while the head is moving forward and spreading them, a lever having a cam-lug adapted to engage the detent lug and lift the detent as the sleeve and spindle rotate, a spring for depressing the detent, a sleeve upon the other end of said spindle, a ring surrounding said sleeve and connected therewith by a cam device, a friction band, made in two parts which are hinged together on one side and joined on the other side by an adjusting screw, encircling said ring and firmly secured to the frame of the machine, and means for adjusting the spindle longitudinally with reference to the cam substantially as described.

In testimony whereof we affix our signatures in presence of two witnesses.

WILLIAM MCILVRID.
PERRY YATES HODGE.

Witnesses:

NEWTON R. MARVIN,
CHARLES V. TUTTLES.