(No Model.)

P. T. COFFIELD.

TAP

No. 428,803. Patented May 27, 1890.

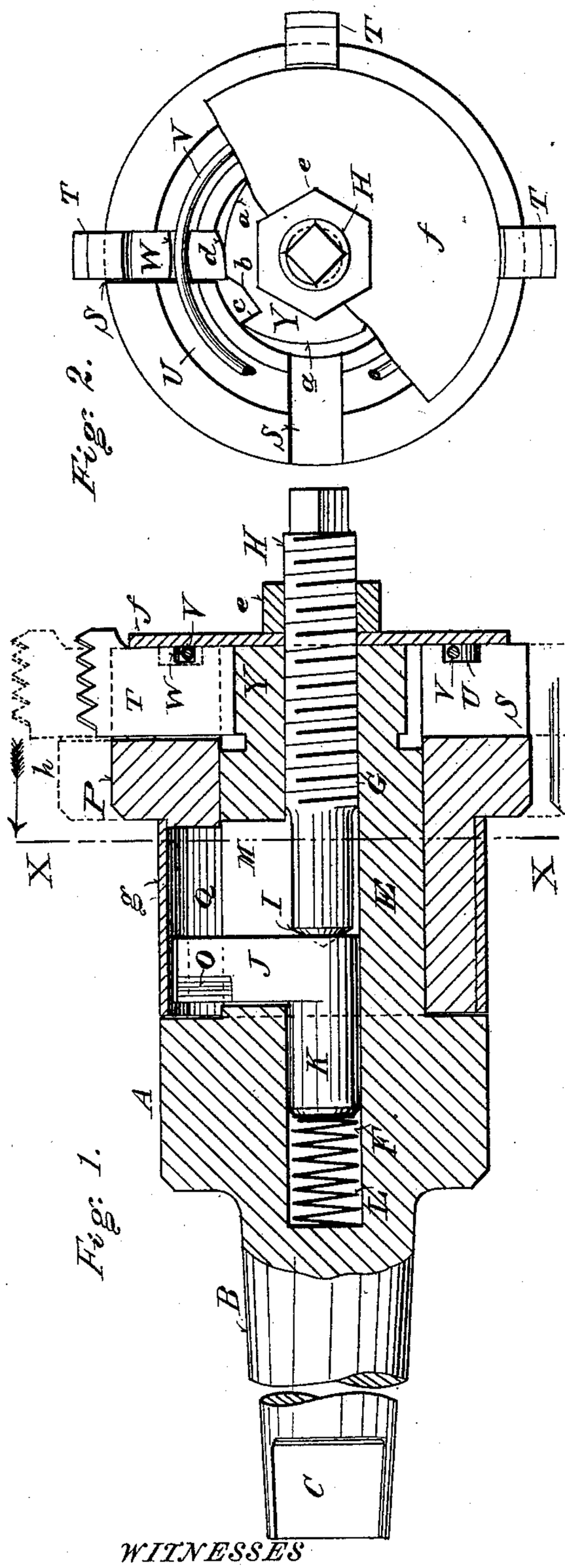

Fig: 2.

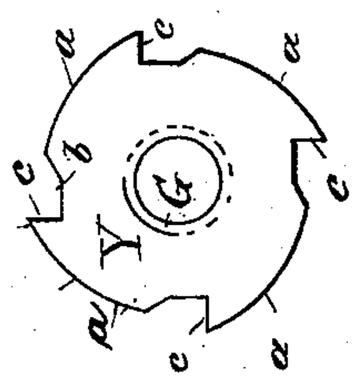

Fig: 5.

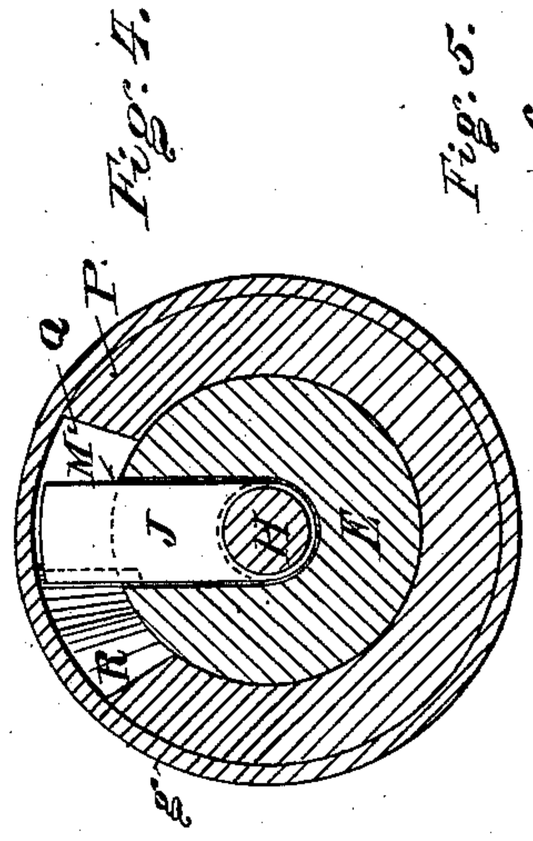

Fig: 4.

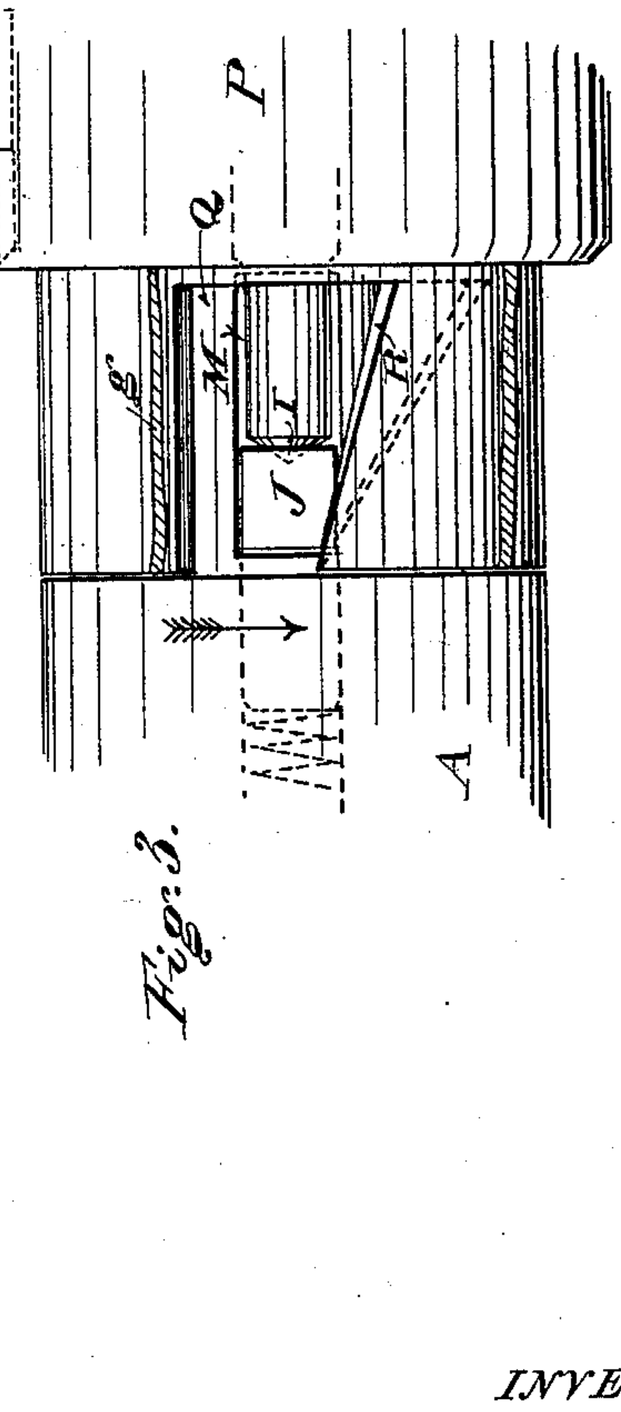

Fig: 3.

Fig: 1.

WITNESSES

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UNITED STATES PATENT OFFICE.

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TAP.

SPECIFICATION forming part of Letters Patent No. 428,803, dated May 27, 1890.

Application filed November 11, 1889. Serial No. 329,837. (No model.)

To all whom it may concern:

Be it known that I, PETER T. COFFIELD, a citizen of the United States, residing at New Carlisle, in the county of Clark and State of Ohio, have invented certain new and useful Improvements in Expansible and Collapsible Taps, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to certain new and useful improvements in expansible and collapsible taps for cutting screw-threads, and specially internal or female threads, the tool being adapted to be mounted in the spindle of a drill-press or lathe.

The object of the invention is to provide a simple and inexpensive device so organized that the taps may be readily adjusted in and out through the manipulation of a single central adjusting-bolt and intermediate devices, which, upon operating the bolt, permit a change of the position of the heels of the taps on tangential cam-surfaces, whereby the adjustment of the taps is effected.

Another object of the invention is to adapt that part of the tool called the "sleeve," which carries the taps, to be made of various external diameters, and carry different lengths of taps to constitute the various standard sizes, and to adapt the said different-sized sleeves to be used upon the same arbor.

In the accompanying drawings, forming a part of this specification, and in which like letters indicate corresponding parts, Figure 1 represents a longitudinal sectional view of my improved tool; Fig. 2, a front elevation thereof with a portion of the cap broken away to show the arrangement of the parts; Fig. 3, a view looking down upon the tool, as seen in Fig. 1, with a portion of the sleeve broken away; Fig. 4, a transverse sectional view on the line X X of Fig. 1, looking in the direction of the arrow; and Fig. 5, an end view of the cam.

The letter A designates the head of the tool, from one end of which projects a tapering mandrel B, having its extreme end flattened at C, and adapted to be carried by the spindle of a drill-press or of a lathe, and having projecting from the other end a stout arbor E. This arbor is centrally bored at F, the portion G of which is screw-threaded to receive the adjusting-bolt H, whose outer end is adapted to receive a wrench and whose inner end is preferably somewhat pointed, as shown at I, whereby it conveniently engages with a sliding dog J. The shank K of this dog is fitted to slide in the central bore of the arbor, and is normally projected toward the adjusting-screw by means of a spring, preferably a spiral spring L, located in the bore behind the shank, as seen in Fig. 1. The arbor is slotted at M, and the dog is projected through this slot and somewhat beyond the arbor, and is beveled on one side, as shown at O.

The letter P designates a stout sleeve, which is rotatably fitted upon the arbor E and is slotted at Q, one wall R of the slot being oblique to the axis of the tool and adapted to be engaged by the dog J when the head is rotated in a forward direction, being that indicated by the arrow in Fig. 3. By this means the sleeve is caused to rotate with the head and its arbor. The sleeve is radially slotted at S to receive the taps proper T, whose shanks are slidingly fitted in these slots. The face of the sleeve has an annular recess or chamber U, in which is fitted an expansible spring-ring V, whose ends meet but are not joined. Each tap has a notch W, in which this ring is placed, and its tendency is to draw the taps inward and toward the center.

I will now refer to the tangential cam-surfaces by which the taps are expanded, the spring-ring V acting to collapse them, as just suggested. These cam-surfaces are formed on the periphery of the arbor E and near its front end, as shown at Y. Each cam, of which there is one for each tap, comprises a curved face *a* and a depression *b*, and terminates in a shoulder *c*. Each tap has its inner face curved to form a cam-face *d*, which rides upon a cam Y. The part of the cams which is in contact with the taps, respectively, determines the diameter from one diametrical tap to the other. This position is determined by the adjustment of the dog J in the slot M and with respect to the wall R of the slot Q. This adjustment is effected by means of the

spring L and the bolt H. It will be observed that when the tool is operated the arbor will rotate within the sleeve without moving the latter until the dog J reaches the wall R, and this it will do sooner or later, according to its position in the slot. When near the rear or upper end of the slot, (according to whether the tool is in a horizontal or vertical position,) it will reach the wall after a very short movement of the arbor, and therefore the cams will move but a very slight distance and cause the taps to expand but slightly. Should, however, the dog be adjusted to the other extreme end of the slot, the cams will rotate a greater distance within the sleeve before the dog will reach the wall R, and therefore the whole extreme diameter of the cams will pass into contact with the taps, and hence expand them to a greater degree.

It will also be understood that a reversed motion of the arbor will carry the dog against the axial wall of the slot Q, and hence move the contracted diameter of the cam into contact with the taps and finally bring the depressions *b* opposite to the taps. During all this reversed motion the contracting force of the spring-ring V has been collapsing the taps, so that they are drawn into the depressions *b* and freed from the threads which they have cut in the article undergoing treatment. The shoulders *c* by this time reach the taps and they and the sleeve are rotated in the reverse direction with the arbor as the latter is run in a longitudinal direction by backing the drill-spindle. If the tool is used in a lathe-spindle, the reverse movement would collapse the dies in the manner just described, when the tail-stock of the lathe or slide-rest, whichever might be carrying the article under treatment, would be backed away from the tool. A jam-nut *e* is carried by the bolt H and serves the purpose of locking the bolt, as also that of holding in place the cap-plate *f*, which is a metallic disk fitting against the end of the arbor and extending over the taps and covering the ring V. It keeps the taps from dropping out of the slots S and prevents the ring from working out of the notches W in the taps. I also prefer to place a collar or band *g* over the sleeve, so as to cover the slots M and Q and inclose the dog and inner end of the bolt H.

It will be observed that a simple manipulation of the bolt H, whose location makes it easy of access, is all that is needed to adjust the taps outward, which makes the tool convenient and easily adjusted in practical use.

It will be observed from the dotted lines shown at *h* in Fig. 1 that the diameter of the sleeve may be increased over that shown in full lines, for the purpose of supporting and properly holding longer taps, so as to increase the diameter of the tool measured by diametrical taps. It will also be observed that the diameter of the sleeve may be decreased as compared to that shown in full lines, so as to make a smaller tool. It will be understood in this connection that the same mandrel and arbor may be used with the various sizes of sleeves, so that while the tool will be manufactured of the standard sizes as regards the sleeves and the lengths of the taps the same head will answer for the various sizes. This has, among other advantages, that of economy in manufacture, while covering a wide range of sizes.

Following the subject of adjusting the taps, it will be understood that the primary purpose of adjusting them outward is to compensate for the reduction in the diameter occasioned by the wear of the taps and the sharpening of them from time to time. By the manipulation of the bolt H the dog J and its operation in connection with the oblique wall R, as also by the operation of the cam Y, this adjustment of the taps is quickly and effectively made. Incidentally this adjustment of the taps will suffice to compensate for different sizes; but the main object of the adjustment is to maintain the standard size or diameter from tap to tap, notwithstanding the constant wear of the taps.

It will be noticed that the forward end wall of the slot Q stands within the length of the slot M, and that the length of the shank portion of the dog, measured from the extreme ends, is sufficient to prevent the shank proper of the dog from getting out of the bore before the dog is opposed by said forward wall.

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

1. In an expansible and collapsible tap, the combination, with a head having an arbor, an adjusting screw, an adjustable dog, and cams carried by the arbor, of a sleeve mounted upon the arbor and having an oblique wall with which the dog engages, taps carried by the sleeve, and means to collapse the taps, the oblique wall admitting of different parts of the cams being adjusted to the taps.

2. In an expansible and collapsible tap, the combination, with a head, its mandrel and its arbor, the latter having cam-surfaces, a central bore and a radial slot, an adjusting-screw, a sliding dog, and an actuating-spring for the latter mounted in said bore, the dog projecting through said slot, of a sleeve mounted upon the arbor, having a slot with an oblique wall adjacent to said dog and radial slots, taps mounted in said slots, and means to collapse them and maintain their contact with the cam-surfaces.

3. In an expansible and collapsible tap, the combination, with a head, its mandrel and its arbor centrally bored and radially slotted, and having tangential cam-surfaces with notches and shoulders, an adjusting-bolt, a sliding dog, and its actuating-spring mounted in said bore, the dog extending through said slot, of a sleeve rotatably mounted on the arbor, having a slot with an oblique wall and engaged by the dog, radial slots, taps mounted therein, a spring-ring to collapse the taps, a

covering-plate, and a jam-nut carried by the bolt.

4. In an expansible and collapsible tap, the combination, with a head, its mandrel and its arbor having a central bore and a radial slot, a sleeve, and tap, of a dog slidingly mounted in the bore and extending through the slot, a spring to actuate it, and an adjustable bolt mounted in the bore.

5. In an expansible and collapsible tap, a head, its mandrel and its arbor, the latter having tangential cam-surfaces, a central bore, and a radial slot, a sleeve, and tap.

6. In an expansible and collapsible tap, the combination, with an arbor and a sleeve mounted thereon, an oblique wall and a longitudinally-adjustable dog arranged so that the adjustment of the dog to a position along and against the wall will vary the position of the sleeve on the arbor in a radial direction, and means to adjust the said dog.

7. In an expansible and collapsible tap, a head, a sleeve provided with a radial slot, one wall of which is oblique, and with an encircling band or collar applied to the exterior of the sleeve and adapted to inclose said slot, and taps carried by the sleeve.

8. In an expansible and collapsible tap, the combination, with an arbor having a central bore and a radial slot, of a sleeve mounted upon said arbor and having a radial slot, one end wall of which stands within the length of the slot in the arbor, taps carried by the sleeve, and a dog slidingly mounted in the central bore and of greater length in the shank portion than the clearance of the slot in the sleeve.

9. In an expansible and collapsible tap, the combination, with an arbor and a central bolt and a dog fitted to the arbor, of a sleeve mounted upon the arbor, the taps carried by the sleeve, a plate on the bolt which holds the sleeve from slipping off the arbor, and a nut on the bolt which holds the plate.

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

PETER T. COFFIELD.

Witnesses:

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WARREN HULL.