(No Model.)

W. A. PEARN.

SCREW TAP CHUCK.

No. 357,025. Patented Feb. 1, 1887.

Fig. 1.

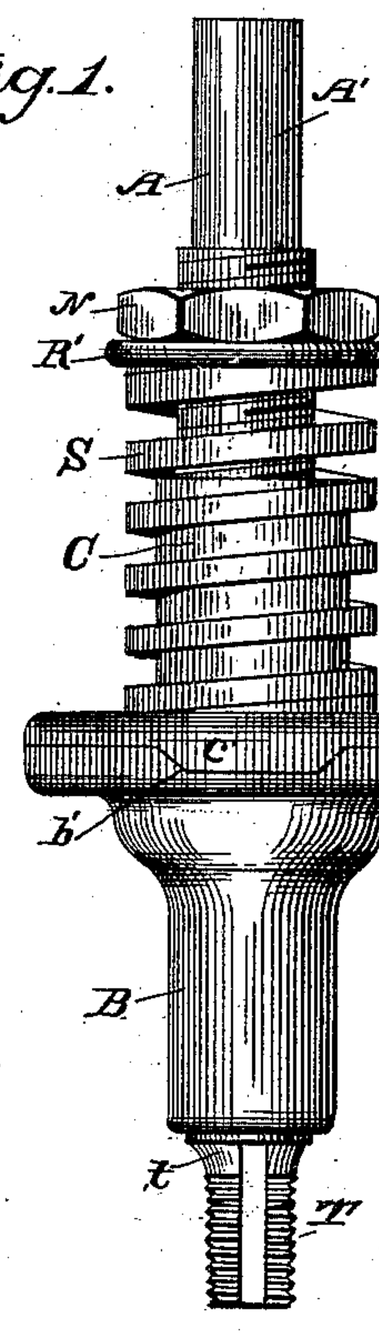


Fig. 3.

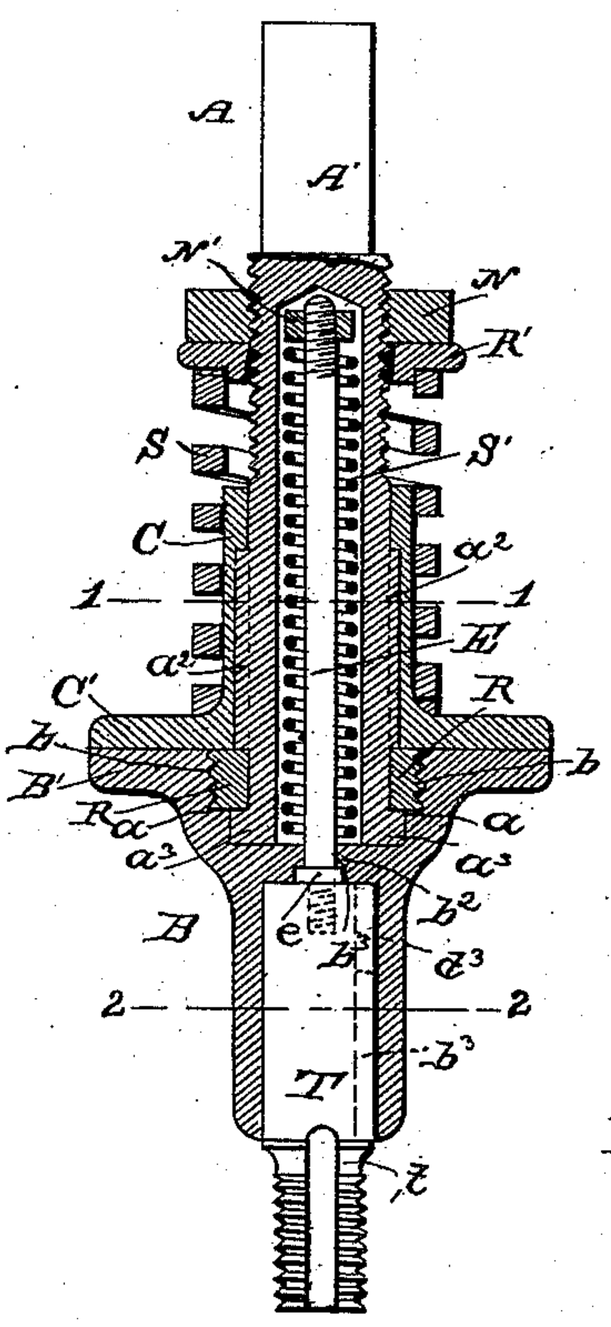


Fig. 4.

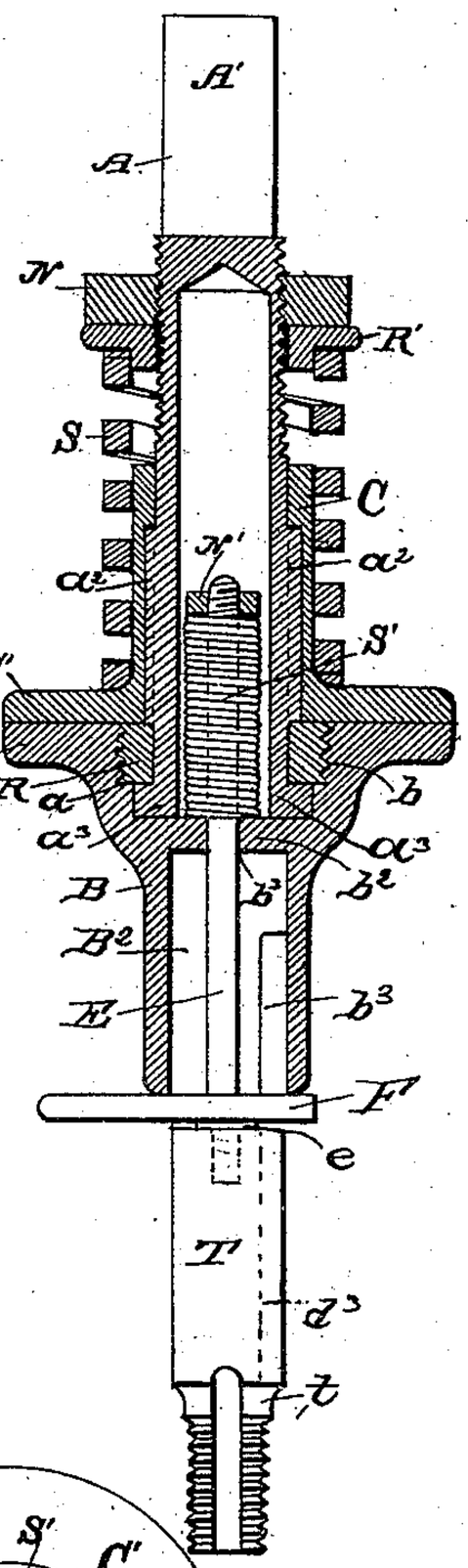


Fig. 6.

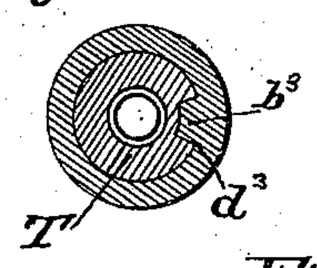


Fig. 2.

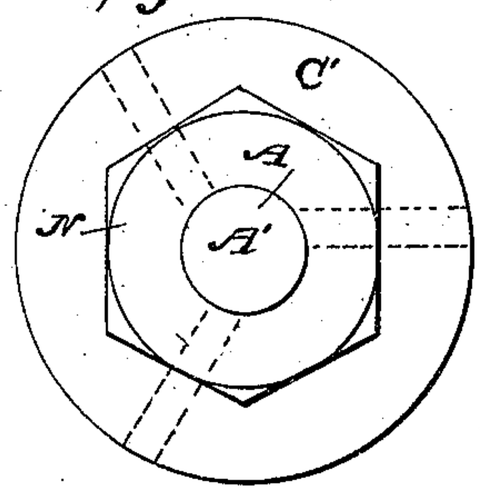
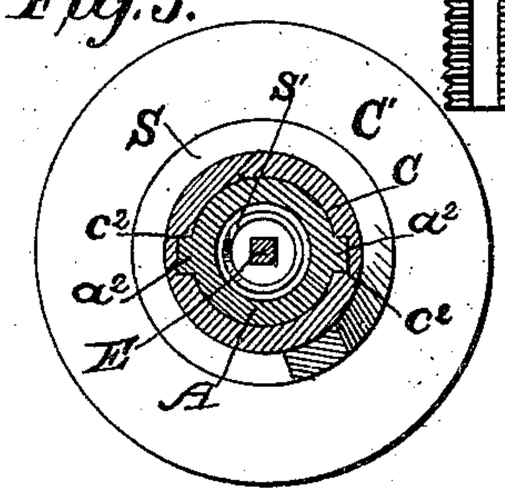


Fig. 5.



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UNITED STATES PATENT OFFICE.

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SCREW-TAP CHUCK.

SPECIFICATION forming part of Letters Patent No. 357,025, dated February 1, 1887.

Application filed September 10, 1886. Serial No. 213,236. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM ALFRED PEARN, a citizen of Great Britain, residing at Longsight, Manchester, in the county of Lancaster and Kingdom of Great Britain, engineer, have invented certain new and useful Improvements in or Applicable to Mechanism for Screw-Tapping; 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, reference being had to the accompanying drawings, and to letters or figures of reference marked thereon, which form a part of this specification.

Referring to the accompanying drawings, Figure 1 is an elevation of my improved tap spindle or stock. Fig. 2 is a top plan view thereof. Fig. 3 is a vertical axial section of the same, shown partly in elevation. Fig. 4 is a like view of the spindle or stock, showing the mode of attaching the tap thereto. Figs. 5 and 6 are sections taken on lines 1 1 and 2 2, respectively, of Fig. 4.

The object of my invention is to provide means for tapping screw-holes adapted for use either in the ordinary screw-tapping machines or as an attachment to drilling-machines of that class in which the rotation of the drill-stock is reversible—such, for instance, as radial drills or other drilling-machines of this class.

The invention consists, essentially, in the peculiar construction of the device and in the combination and co-operation of its several parts, substantially as hereinafter fully described, and as set forth in the claims.

My improved tap spindle or stock is composed of two sections, A and B. The section A of the tap-stock is made hollow nearly throughout its length and terminates in a shank, A′, by means of which it is connected or attached to the drill-stock of a drilling-machine in any usual or preferred manner, or to the tap-stock of a tapping-machine. Near its lower end the section A has a peripheral seat, *a*, formed by an annular flange, a^3, at the end of said section, and by vertical ribs or feathers a^2, formed on the periphery of said section A. On the seat *a* of section A is loosely mounted a coupling-ring, R, provided with vertical grooves in its inner periphery for the reception of the ribs a^2, so that the ring may be slipped over section A to its seat. By means of this ring R the section A is coupled or connected to the section B, the ring R being screw-threaded on its periphery and screwed into a correspondingly-threaded seat, *b*, formed in the lower section, B, of the drill-stock.

As shown, the upper end of the lower section, B, of the drill-stock is provided with a suitable recess to accommodate the lower end of section A.

It will be observed that by the described means of connecting the two sections of the drill-stock the upper section, A, is rotatable in the lower section, B, but is held against independent endwise motion by the ring R, as it is obvious that when the ring is slipped over the upper section, A, and screwed to its seat and said section A is rotated, so that the grooves in the ring will not register with the ribs a^2, said ring will lock the sections together.

The upper end of section B has a flange, B′, in which are formed recesses *b*′, Fig. 1, the end walls of which are inclined, and on said flange is seated a corresponding flange, C′, formed on the lower end of a sleeve or collar, C, which flange is provided with projections *c*′, seated in the recesses *b*′ of flange B′. The sleeve or collar C is connected with the section A so as to permit it to move vertically thereon and rotate therewith. To these ends the section A is provided with longitudinal feathers or ribs a^2, above referred to, and the collar with grooves c^2, for the reception of said ribs a^2, as shown in Fig. 5.

The section A, near its upper end, is screw-threaded for the reception of a nut, N, and R′ is a recessed ring or collar loose on section A below the nut N, said collar serving as an abutment for one end of a coiled spring, S, (mounted on section A,) whose other end bears upon the flange C′ of the sleeve or collar C, whereby the latter is firmly held to its seat on flange B′ of section B.

It will be observed that by means of the described arrangement of devices the section A is so connected with the section B as to rotate the latter when said section A is rotated by the drill-stock in either direction; but should the section B meet with undue resistance in

its rotation, the said resistance will arrest the movement of the section B, while section A will continue to rotate, the connection between the two being a yielding one. In other words, should the resistance to the rotation of section B become sufficiently great to endanger the operative devices of the drill or tapping machine, the projections c' on the flange C′ will move out of the recesses b' in flange B′ of section B, the spring S yielding to said resistance and allowing the sleeve C to slide vertically on section A. The sleeve C will thus be disengaged from the flange B′, and, since both sections are rotatably connected together by means of the ring R, the section A will continue its rotation, while the section B will remain stationary. Of course it will be understood that the projections c' may be formed on the flange B′ of section B and the recesses b' in the flange C′ of sleeve C, and the same results produced.

E is a square spindle, to one end of which is secured a collar or nut, N′, that serves as an abutment for one end of a coiled spring, S′, on spindle E, the other end of said spring bearing on the inner face of the recess in the upper part of section B. The lower portion of section B is provided with a socket, B^2, in which seats the screw-tap T. In the wall b^2, that separates the recess and socket B^2, is formed a square opening, b^3, through which passes the spindle E, and by which it is held against rotation, said spindle being provided with an annular flange or collar, e, that bears against the under side of the said partition-wall b^2.

The lower end of the spindle E—that is to say, that portion below the flange e—is screw-threaded, and is screwed into the screw tap or die T, which is held against rotation in the section B of the tap-stock by a groove, d^3, and feather or rib b^3, formed in the tap and on section B, respectively, as shown in Fig. 6.

It will be seen that the tap or die T can be drawn out of the tap-stock against the stress of the spring S′, for purposes presently explained.

To secure the tap T to the spindle E the latter is drawn out of the tap-stock A B, and a fork, F, Fig. 4, is passed between the collar e of spindle E and the end of the section B, when said tap may be readily screwed to the spindle E, after which the fork is withdrawn, the spring S′ drawing the tap into its socket or seat. The nuts N and N′ also serve the purpose of adjusting the tension of the springs S and S′, respectively, as will be readily understood.

To use my improved tap-stock in a drilling-machine of the class described or in a tapping-machine, it is secured to the drill-stock, and the latter is lowered to bring the screw-tap to the hole in which a screw-thread is to be cut. The drill-stock is then rotated until the tap has taken firm hold of the metal, when the downward feed of the drill-stock may cease, since the tap is so connected with the tap-stock as to allow said tap to move out of the stock or spindle as it penetrates into the hole to be threaded.

The vertical feed of the tap is an automatic one, as above described, the tap T moving vertically out of the stock when sufficient resistance is encountered to overcome the stress of the spring S′ on spindle E, to which the tap is screwed. When the tap has reached the bottom of the hole to be threaded, or when said tap has penetrated into the hole sufficiently far to bring its flaring shoulder t in contact with the object tapped, the resistance to the rotation of the tap will be sufficiently great to overcome the stress of the spring S, and thereby disengage the flanges B′ C′, as above described, when the drill-stock will continue its rotation, while the tap-stock remains stationary. The operator then reverses the motion of the drill and tap stock to remove the tap from the threaded hole, the spring S′ assisting in this, and before the tap has moved clear out of the hole the operator moves the drill-stock up a little, so that as soon as the tap clears the hole the spring S′ will draw it up to its seat. The shock resulting from the sudden impact of the tap on its seat under the stress of its spring S′ clears the said tap of the metal particles which may adhere thereto after leaving the threaded hole, and said tap is ready for threading the next hole.

It will be seen that by means of the construction described the operator is not only made aware of the fact that the tap has reached the limit of its operative movement, but he is also relieved of the operation of feeding the tap as it cuts the thread and of cleaning the tap after the thread is cut.

I am aware that it is not broadly new to construct drill-stocks (adapted to hold a tap) in two sections and gearing the two sections in such manner that when the lower or tap-carrier section meets with inordinate resistance in its rotation said section will be thrown out of gear with the driving power on the upper section and remain stationary while said section continues to rotate.

Having now described my invention, what I desire to claim is—

1. The herein-described tap-stock, consisting of the section A, provided near its lower end with the peripheral seat a, and the section B, provided in its upper end with a screw-threaded seat, and the coupling-ring R, whereby said sections are rotatably coupled together, substantially as and for the purpose specified.

2. The herein-described tap-spindle, consisting of the sections A B, rotatably connected together, said section B being provided with an annular flange, B′, having recesses b', in combination with the sleeve C, having annular flange C′, provided with recesses c', and the spring S, substantially as and for the purpose specified.

3. The combination, with a tap-stock having a socket for the reception of the tap, a yield-

ing connection for said tap to allow end motion thereof within the socket, and a lock to lock said tap against independent rotation in its socket, substantially as and for the purpose specified.

4. The herein-described tap-stock, composed of two sections rotatably connected together and a yielding locking device to lock the sections for joint rotation, one of said sections being provided with a socket or seat for the tap, in combination with a yielding connection for said tap to allow end motion thereof within its seat, and a locking device to lock the tap to the spindle-section for joint rotation therewith, substantially as described, for the purpose specified.

5. The combination, with the sections A B of the tap-stock, constructed and connected together as described, of the spindle or rod E, and the spring S′, constructed and arranged in said sections for co-operation therewith, and with a tap, substantially as described, for the purpose specified.

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

WILLIAM ALFRED PEARN.

Witnesses:
PETER J. LIVSEY,
WILLIAM FAULKNER.