No. 666,695. Patented Jan. 29, 1901.

J. B. RENSHAW.

RATCHET DRILL.

(Application filed June 25, 1900.)

(No Model.) 2 Sheets—Sheet 1.

Fig. 1

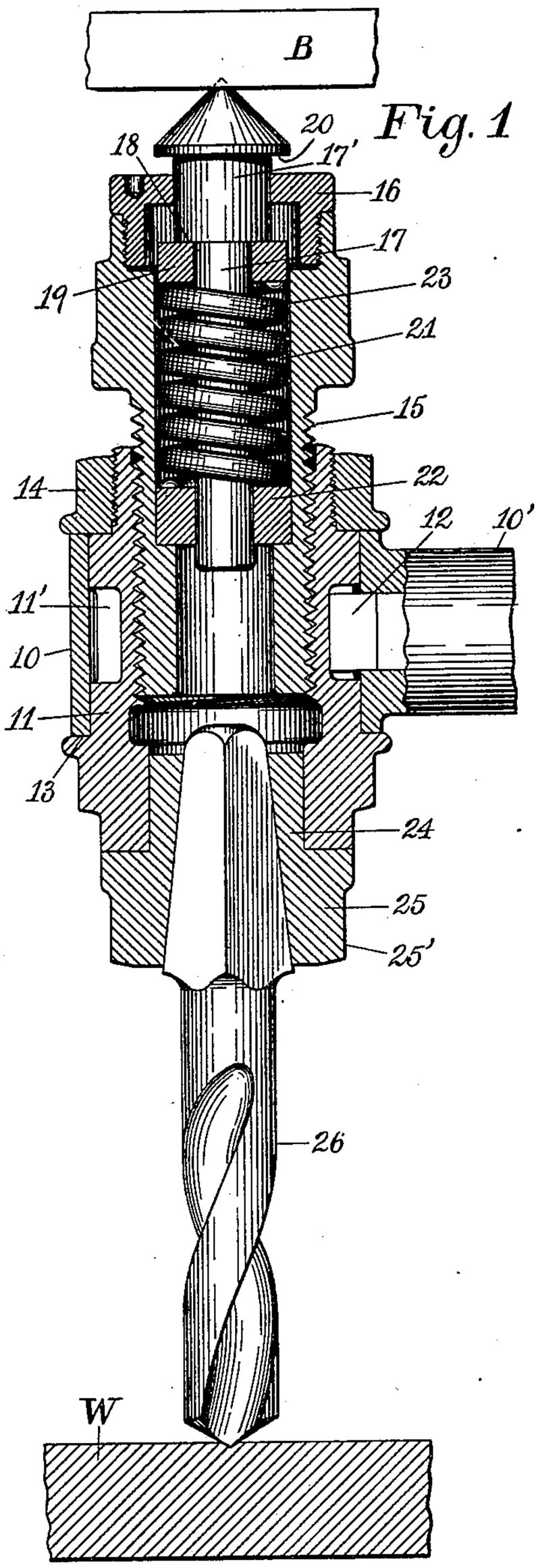
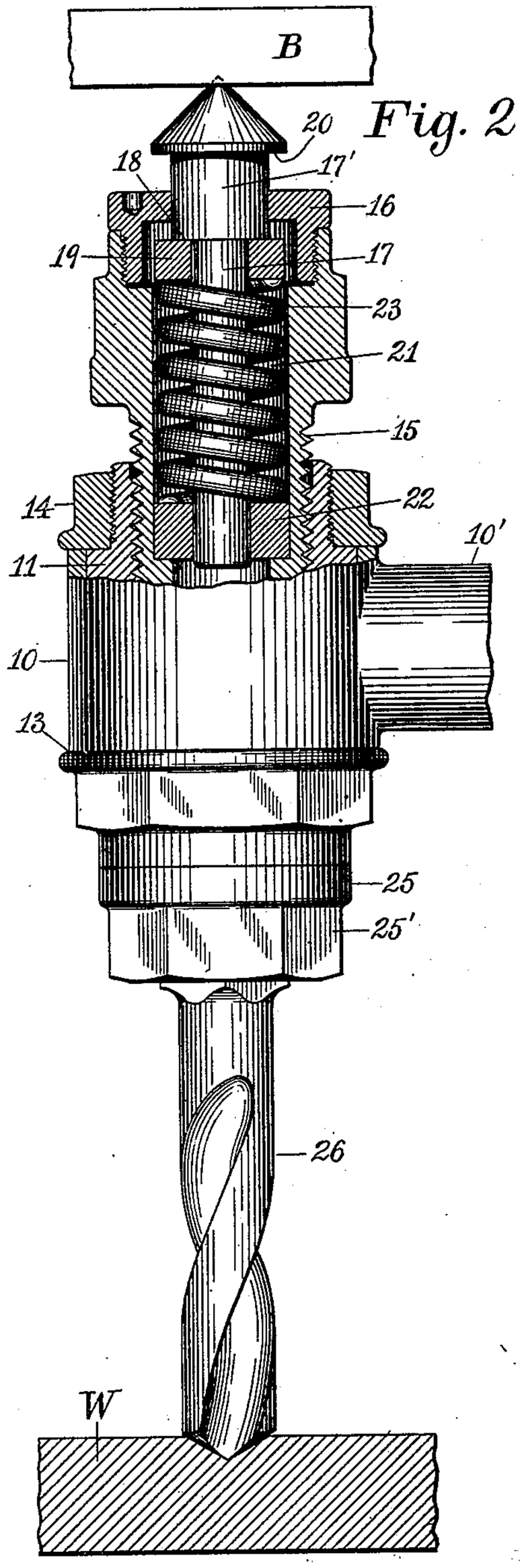


Fig. 2



Witnesses:

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Fig. 3

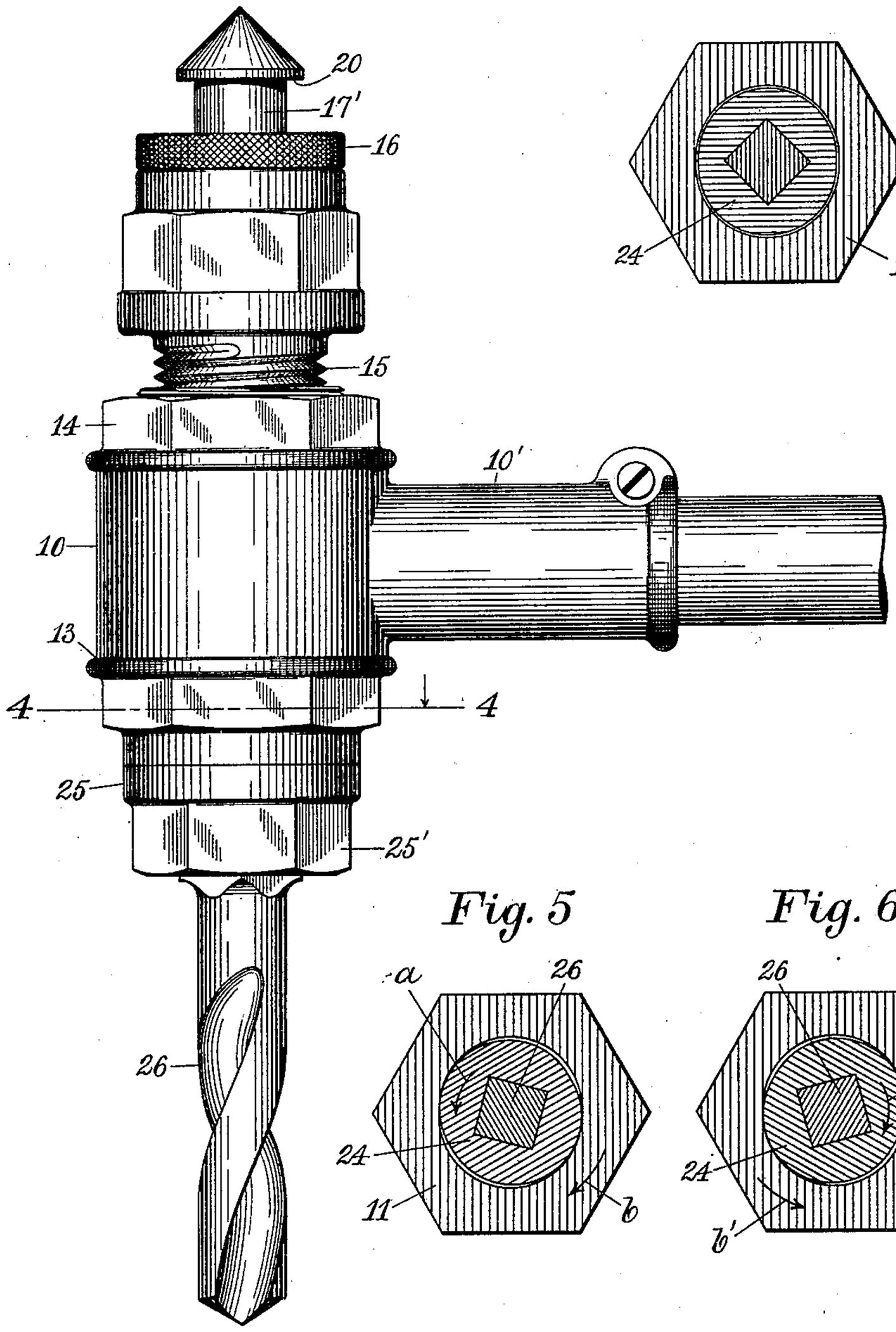

Fig. 4

Fig. 5

Fig. 6

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UNITED STATES PATENT OFFICE.

JOSEPH B. RENSHAW, OF HARTFORD, CONNECTICUT.

RATCHET-DRILL.

SPECIFICATION forming part of Letters Patent No. 666,695, dated January 29, 1901.

Application filed June 25, 1900. Serial No. 21,441. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH B. RENSHAW, a citizen of the United States of America, and a resident of the city and county of Hartford, in the State of Connecticut, have invented certain new and useful Improvements in Ratchet-Drills, of which the following is a specification.

This invention relates to ratchet-drills, and has for one object the provision of an improved tool of this class in which the drill is automatically fed into the work for a predetermined distance during its cutting operation.

A further object of my invention may be found in the improved organization of the device, whereby greater or less feeding-pressure may be exerted upon the drills, according to the various sizes employed and also according to the different materials to be operated upon.

My invention has, furthermore, for its object the provision of means whereby a drill, tap, or similar cutting-tool may be retained in proper engagement with the operating-spindle of the device, as will be hereinafter described, and pointed out in the claims.

In the drawings accompanying and forming a part of this specification, Figure 1 is a central longitudinal section of a ratchet-drill constructed in accordance with my invention, the several parts being shown in position at the commencement of the drilling operation. Fig. 2 is a view similar to Fig. 1 and illustrates corresponding positions of the several parts after the drill has cut its way into the work to a certain extent. Fig. 3 is a side view of the device. Fig. 4 is a section on line 4 4, Fig. 3. Figs. 5 and 6 are similar sections illustrating the manner in which the drill-receiving socket is held against movement in the spindle in either direction.

It is well known in general practice that when ratchet-drills of ordinary construction are used the drill is fed into the work by hand and in such a manner that the drill will cut only as long as the hand-feed is continued. For this reason it is one of the aims of my invention to provide means whereby the drill or other cutting-tool may be automatically fed toward the work for a certain distance before it becomes again necessary to employ the hand-feed to provide for another length of automatic feed of the device.

In the preferred form shown in the drawings my improved ratchet-drill comprises the usual casing 10, adapted to receive the drill-spindle 11, having teeth 11′, which may be engaged by a suitable spring-pressed pawl 12, pivoted in the handle portion 10′ of the casing 10. The spindle 11 is rotatably supported in said casing and held against longitudinal movement therein by a shoulder 13 and nut 14. The spindle is internally screw-threaded to receive a correspondingly-formed feed-screw 15, preferably formed hollow throughout its length and having at its upper end a cap 16 in screw-threaded engagement therewith. Mounted for reciprocation in said spindle 15 is a center spindle 17, having an enlarged portion 17′ in sliding engagement with the cap 16 and forming a shoulder 18, against which a collar 19 may rest. This collar may be secured to the spindle 17 in any desired manner and serves as a means for limiting the upward-sliding movement of the spindle 17 relative to the cap 16, while a shoulder 20 may serve to limit the movement of the spindle 17 relative to the cap 16 in the other direction.

The spindle 15 is preferably counterbored or recessed, as shown at 21, to receive a loose washer 22, which constitutes an abutment-face for a device whereby said spindle 17 is caused to move relatively to the feed-screw 15. This device is a yielding one and is herein shown as a spring 23, surrounding said spindle 17 and interposed between the collar 19 and the washer 22. It will be understood that if the washer 22 is replaced by another of greater or less thickness the tension of the spring may be increased or decreased in any desired manner or a spring of different tension may be substituted.

The lower end of the spindle 11 is counterbored slightly elliptical, as more clearly shown in Fig. 4, to receive loosely a similarly-formed shank portion 24 of a drill-socket 25, which may have a wrench portion 25′, whereby said socket may be rotated within the counterbore of the spindle until both parts are locked firmly together, as shown in Fig. 5. Here the socket has been turned in the direction of arrow *a* sufficiently to be held against longitudinal movement in the spindle. At the same time on account of the relative diame-

spindle cannot take place, so that the spindle 11 may be rotated in the direction of arrow *b* and with it a drill or other cutting-tool 26 held therein. In Fig. 6 the socket 25 is shown turned within the spindle 11 in the direction of the arrow *a'* until it is firmly held in the recess thereof, so that when said spindle is turned in the direction of the arrow *b'* the drill or other cutting-tool may be rotated therewith.

The operation of my improved ratchet-drill is as follows: The cutting-tool is inserted into the socket 25 and the latter is clamped by a partial rotation thereof in the elliptical recess of the spindle 11. The device may now be placed in position with the point of the center spindle 17 against a brace B and the cutting-point of the drill against the work W. The feed-screw 15 is then turned in the drill-spindle 11 to compress the spring 23, such compression being limited by the upper side of the cap 16 coming into contact with the shoulder 20 of said spindle 17. As the spindle 11 is now rotated in the direction of arrow *b*, Fig. 5, the drill will gradually cut its way into the work, the total amount of such cutting movement being limited by the under side of the cap 16 coming into contact with the upper face of the collar 19. In Fig. 2 of the drawings the drill is shown as having cut its way into the work for a short distance, and the feed-screw may now be turned again to compress the spring sufficiently, so that the latter may feed the drill into the work for another predetermined amount and under the same pressure as before.

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

1. The combination, with a tool-supporting spindle; of a center spindle mounted for reciprocation therein; and yielding means for causing said center spindle to move relatively to the tool-supporting spindle.

2. The combination, with a tool-supporting spindle; and with a feed-screw; of a center spindle mounted for reciprocation in said screw; and yielding means interposed between said center spindle and the feed-screw.

3. The combination, with a tool-supporting spindle; and with a feed-screw; of a center spindle mounted for reciprocation in said screw; and a spring for causing said center spindle to move relatively to the feed-screw.

4. The combination, with a tool-supporting spindle; and with a feed-screw; of a center spindle mounted for reciprocation in said screw; means for guiding the movement of the center spindle therein; and yielding means for causing said center spindle to move longitudinally in said feed-screw.

5. The combination, with a tool-supporting spindle; and with a feed-screw; of a center spindle mounted for reciprocation in said feed-screw; means for limiting the movement of the center spindle relative to the feed-screw; and yielding means for causing said center spindle to move longitudinally in said feed-screw.

6. The combination, with a tool-supporting spindle; and with a feed-screw; of a center spindle mounted for reciprocation in said screw; and a cap having an aperture for said center spindle and limiting the longitudinal movement thereof relative to the feed-screw.

7. The combination, with a tool-supporting spindle; and with a feed-screw having a recess; of a center spindle mounted for reciprocation in said screw; a spring seated in said recess and causing said center spindle to move longitudinally in said feed-screw; and means for varying the tension of the spring.

8. The combination, with a tool-supporting spindle; and with a feed-screw having a recess; of a center spindle mounted for reciprocation in said screw; a spring seated in said recess and causing said center spindle to move longitudinally in said feed-screw; and an interchangeable washer held in the recess and for varying the tension of the spring.

9. The combination, with a tool-supporting spindle; and with a feed-screw having a recess; of a center spindle mounted for reciprocation in said screw; a cap held in position on said screw and limiting the longitudinal movement of the center spindle therein; and a spring seated in said recess and for causing said center spindle to move relatively to said screw.

10. The combination, with a tool-supporting spindle; a feed-screw having a recess; and a cap secured to said screw; of a center spindle mounted for reciprocation in said screw and cap; and having a shoulder adapted to engage said cap; and a spring seated in said recess and causing said center spindle to move longitudinally relatively to the feed-screw.

11. The combination, with a tool-supporting spindle; a feed-screw adjustably mounted therein and having a recess; and a cap held on said feed-screw; of a center spindle mounted for reciprocation in said screw and cap; a collar held on said center spindle and adapted for engagement with the cap; and a spring seated within the said recess and operative against said collar to move the center spindle longitudinally relatively to the feed-screw.

12. The combination, with a tool-supporting spindle having an elliptical aperture; of a tool-receiving socket having an elliptical projection adapted to enter said aperture; and for locking said socket against movement in said aperture.

13. The combination, with a tool-supporting spindle having an elliptical recess; of a tool-receiving socket having an elliptical shank portion adapted to enter said recess and for partial rotation therein to lock said socket against movement in said spindle.

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