P. F. ELLMER.

RATCHET DRILL.

APPLICATION FILED JULY 1, 1915.

1,166,665.

Patented Jan. 4, 1916.

2 SHEETS—SHEET 1.

FIG. 1.

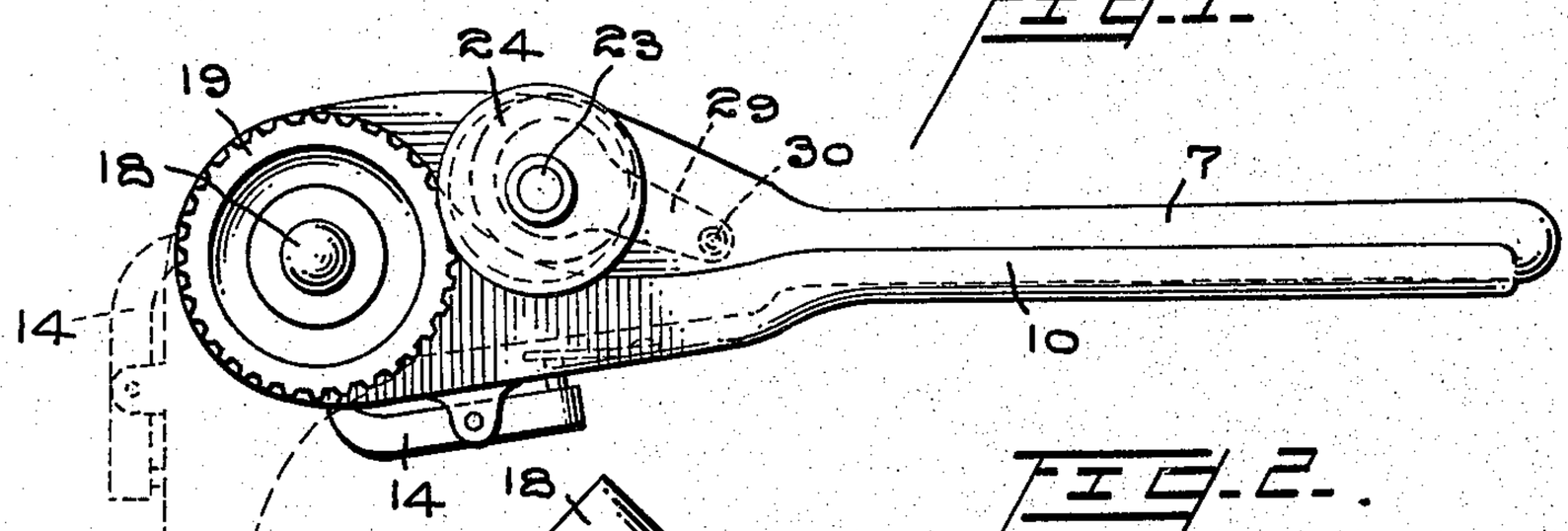
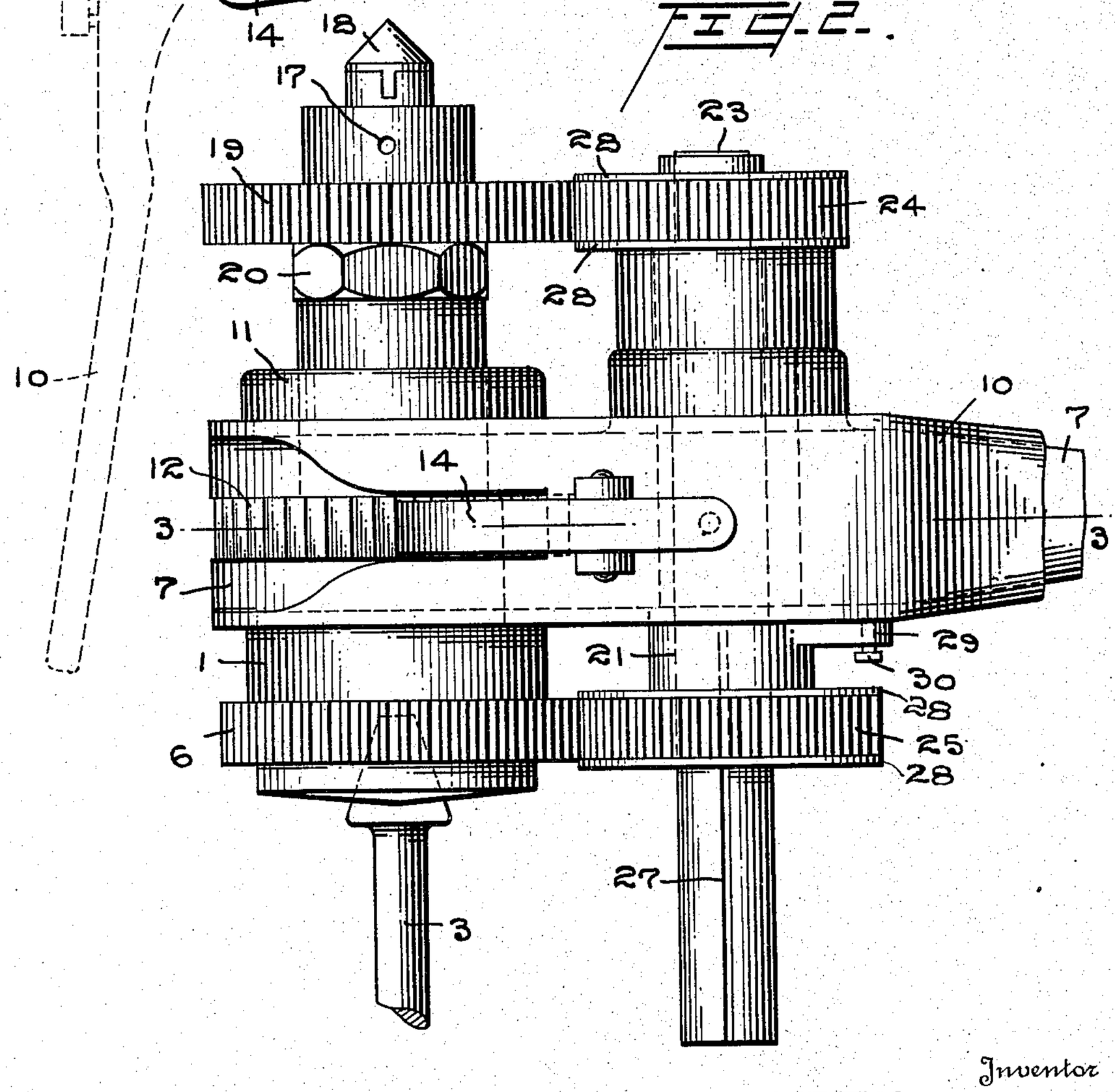


FIG. 2.



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2 SHEETS—SHEET 2.

FIG. 3.

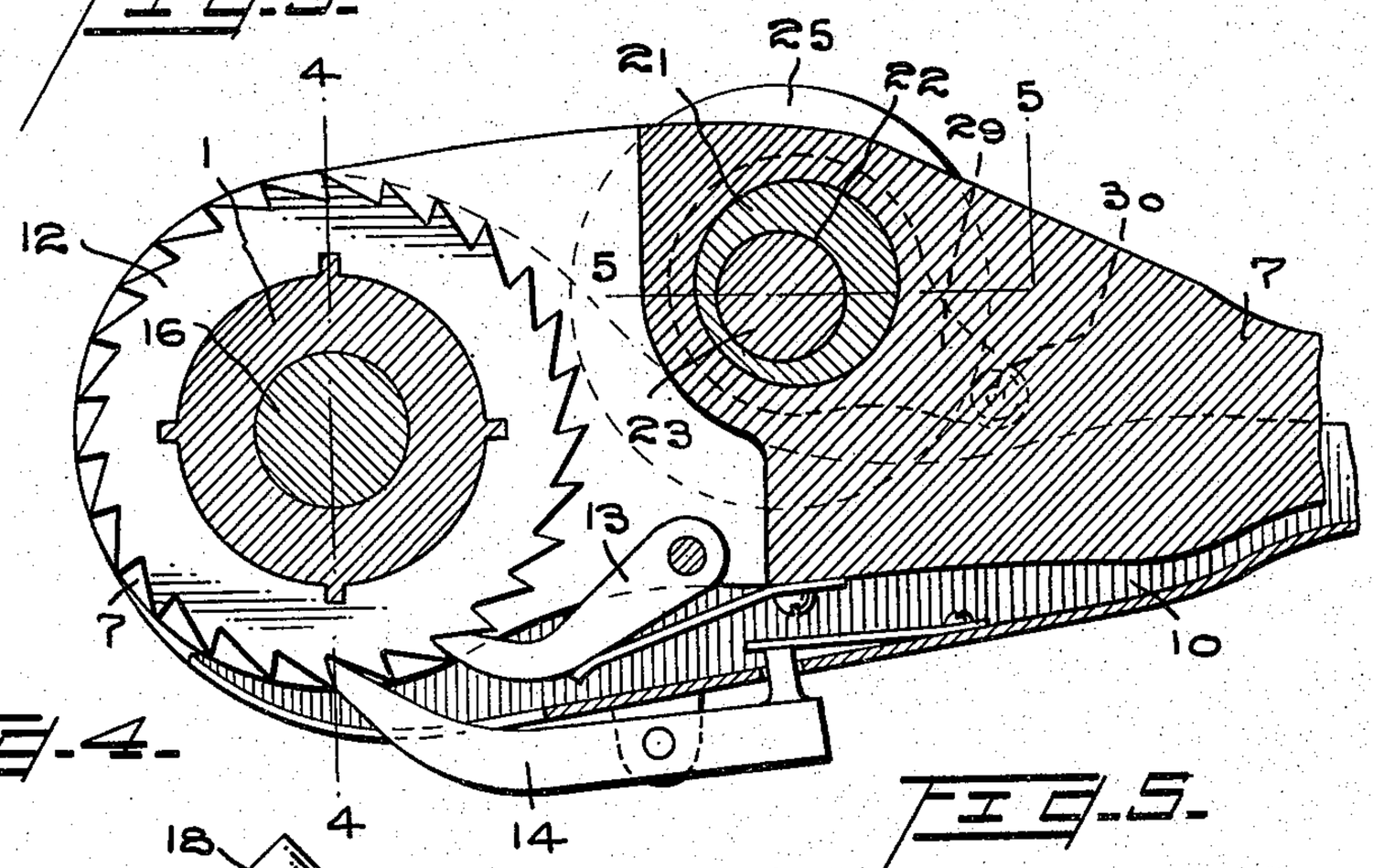


FIG. 4.

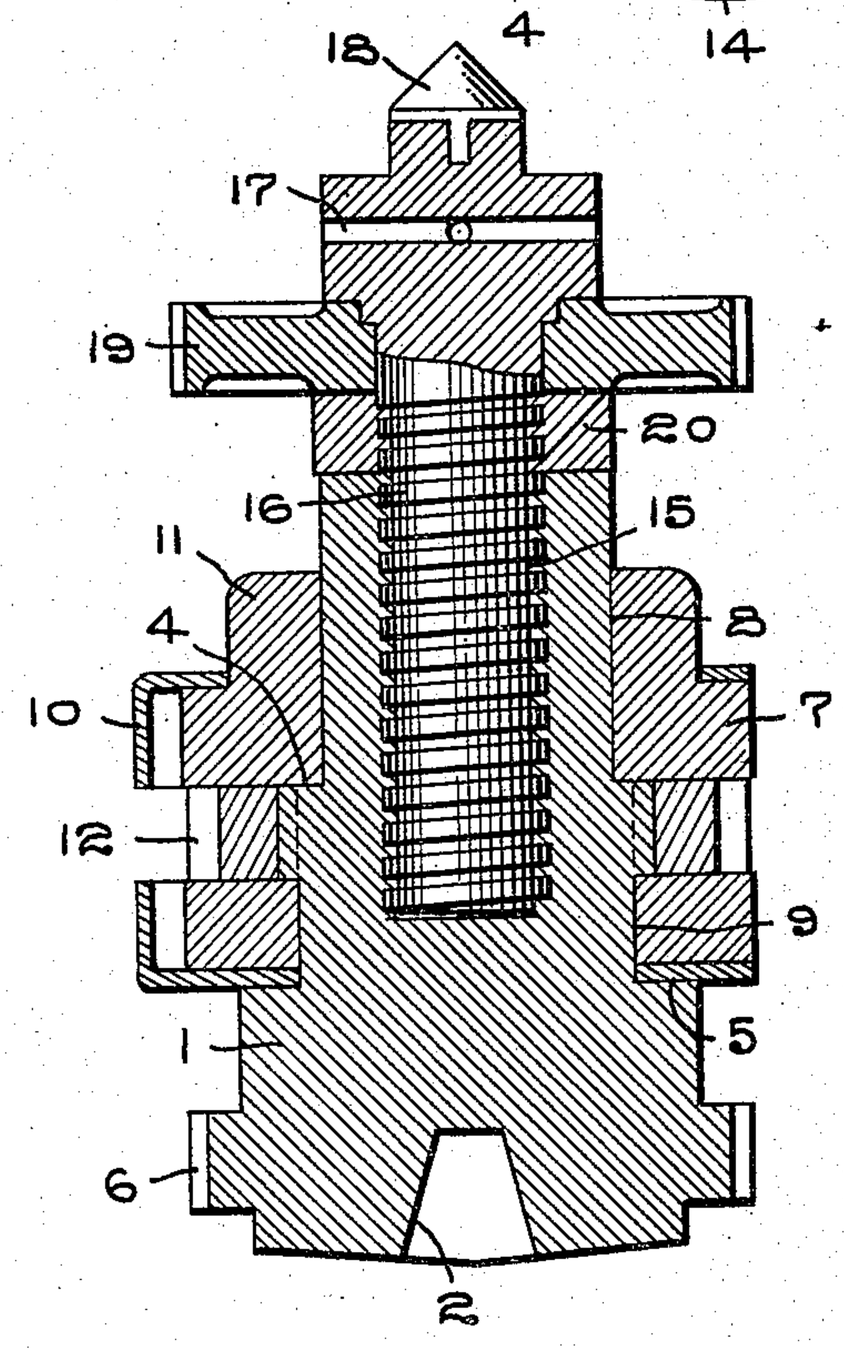
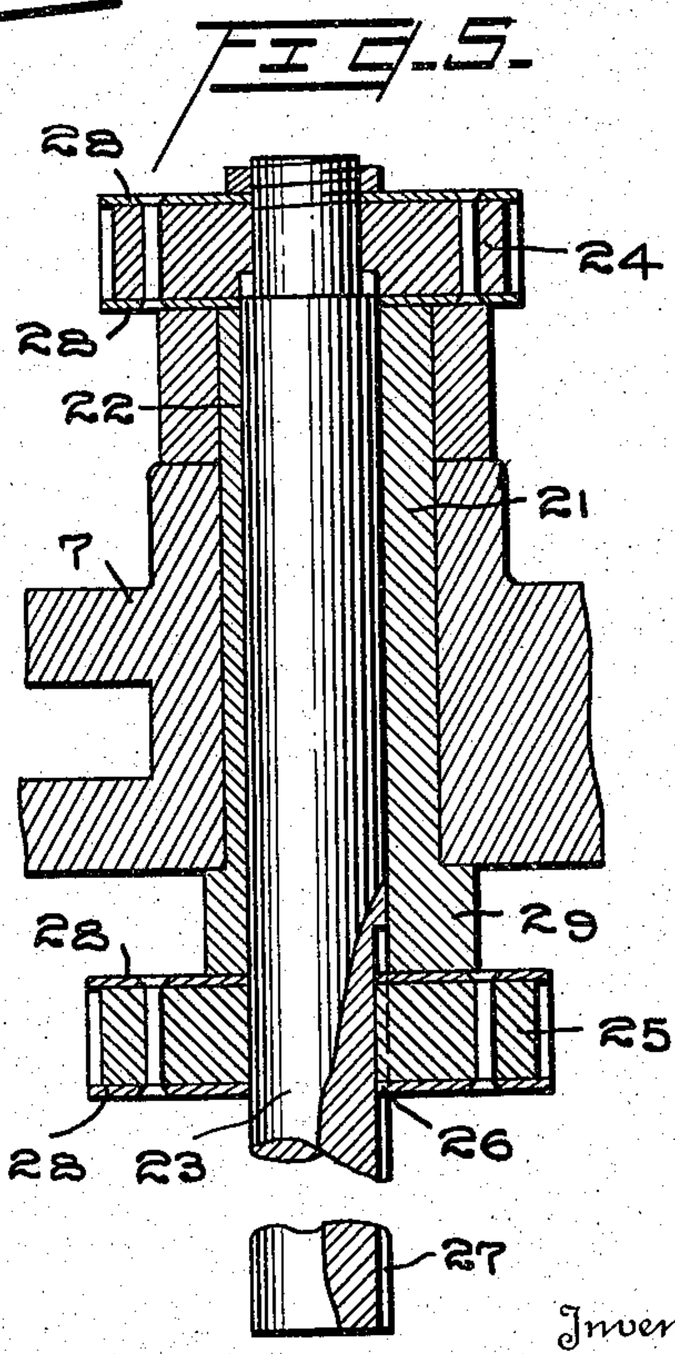


FIG. 5.



Witnesses -

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UNITED STATES PATENT OFFICE.

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RATCHET-DRILL.

1,166,665. Specification of Letters Patent. Patented Jan. 4, 1916.

Application filed July 1, 1915. Serial No. 37,482.

To all whom it may concern:

Be it known that I, PAUL F. ELLMER, a citizen of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Ratchet-Drills, of which the following is a specification.

My invention relates to improvements in ratchet drills, an object of the invention being to provide a drill of the character stated in which an improved handle coöperates with the lever in compelling the drill to revolve and feed, and also operates as a holding means to sustain the drill in proper position.

A further object is to provide improved means for imparting movement to the spindle, and improved means for permitting a quick adjustment of the drill whenever desired.

A further object is to provide a drill of the character stated which embodies various novel details of construction, and which consists in certain novel features and combinations and arrangements of parts as will be more fully hereinafter described and pointed out in the claims.

In the accompanying drawings: Figure 1 is a top plan view of my improved drill illustrating the handle in dotted lines in the position it will assume during the normal operation of the drill. Fig. 2 is an enlarged fragmentary view in side elevation. Fig. 3 is a view in section on the line 3—3 of Fig. 2. Fig. 4 is a view in transverse section on the line 4—4 of Fig. 3, the feed screw being shown partly in elevation, and Fig. 5 is a fragmentary view in section on the line 5—5 of Fig. 3.

1 represents the spindle of my improved drill which is provided at its lower end with a socket 2 to receive an ordinary tool 3. The spindle 1 is of three different diameters, the largest portion of the spindle located at the lower end thereof, the smallest diameter of the spindle at the upper end, and the intermediate diameter midway between the ends of the spindle. These different diameters of spindle provide two annular shoulders 4 and 5 for a purpose which will hereinafter appear. The lower end of the spindle 1 is made with an integral gear wheel 6, and a lever 7 is mounted to oscillate on the spindle, and is bifurcated at its end and provided in the two members of said bifurcated end with openings 8 and 9 respectively, the latter fitting the intermediate diameter of the spindle, and the former the smallest diameter of the spindle and resting on the shoulder 4. A handle 10 is also mounted on the spindle 1, and is of general bifurcated form at one end. One member of the bifurcated end of the handle is positioned around the intermediate diameter of the spindle, and rests in the shoulder 5 between the lever 7 and said shoulder, while the other member of said bifurcated end of the handle is located around a cylindrical projection 11 on lever 7 as shown clearly in Fig. 4.

On the intermediate portion of the spindle 1, a ratchet wheel 12 is keyed and located in the bifurcated portions of the lever 7 and handle 10. A spring-pressed pawl 13 connected to lever 7, and a spring-pressed pawl 14 connected to handle 10, both engage the ratchet wall 12 as shown clearly in Fig. 3, so that pawl 14 operates to hold the spindle against movement when pawl 13 is moving backwardly to take a fresh hold.

The upper end of spindle 1 is made with a screw-threaded socket 15 to receive the feed screw 16, and the latter at its upper end is provided with transverse openings 17 for the admission of suitable devices to manually turn the same for quick adjustment on initial positioning, and a removable cone thrust 18 is supported at the upper end of the screw, and is of desired metal to sustain the wear, and can be replaced when worn.

A gear wheel 19 is keyed to the upper portion of the feed screw 16, and secured in place by a nut 20. In the lever 10, a sleeve 21 is supported to turn, and is provided with an eccentric bearing 22 in which a shaft 23 is located. This shaft 23 at its upper end has keyed thereto a gear wheel 24 which meshes with gear wheel 19, and on the lower portion of the shaft 23, a gear wheel 25 is located, and the key 26 of this gear wheel 25 is supported in a longitudinal groove 27 in shaft 23 to permit the shaft longitudinal movement relative to the gear.

The gear 25 meshes with gear 6, and as shown clearly in Fig. 5, both gears 24 and 25 are provided at opposite sides with plates 28 which overlap the teeth of the gears, and insure an intermeshing of the gears during the operation of the drill, and also prevent gear 25 from falling off of the shaft 23, but allow the shaft to move freely in the gear as the drill spindle feeds longitudinally.

An arm 29 is secured to sleeve 21, and is provided with a holding screw 30 which normally holds the sleeve in a position to maintain the gears in mesh, but whenever occasion may require, this arm 29 may be swung in a direction to turn the sleeve 21 and move shaft 23 so as to draw the gears 24 and 25 away from gears 19 and 6, and allow the spindle to be adjusted in order to initially position the drill when the parts can be returned to normal position and the drill operated as will now be described.

The handle 10 is of general U-shape in cross section, so that when the drill is not in use, the handle will lie smoothly against the lever as shown clearly in Fig. 1. When, however, the parts are in position for use, the handle 10 is swung to the position shown in dotted lines in Fig. 1, and while the handle is held with one hand, the lever 7 is oscillated with the other hand. As the lever is oscillated, the spindle will be revolved to turn the tool 3. At the same time, through the medium of gears 6 and 25, shaft 22, and gears 24 and 19, the feed screw 16 will be turned so as to feed the spindle downwardly at each oscillation, hence the feed of the spindle will be exactly commensurate with the operation of the tool, and the entire operation will be easily controlled by the handle and the lever. The handle therefore, not only prevents rearward or retrograde movement of the spindle, but it also operates as a holding means to guide the spindle and the drill, and permits a quick accurate drilling operation.

Various slight changes might be made in the general form and arrangement of parts described without departing from my invention, and hence I do not limit myself to the precise details set forth, but consider myself at liberty to make such changes and alterations as fairly fall within the spirit and scope of the appended claims.

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

1. In a ratchet drill, the combination with a spindle having a ratchet wheel thereon, of a lever mounted to oscillate on the spindle and having a pawl engaging the ratchet wheel, a handle supported on the spindle and having a pawl engaging the ratchet wheel, an operating screw engaging the upper end of the spindle, and transmission mechanism carried by the lever and transmitting rotary motion from the spindle to the screw, substantially as described.

2. In a ratchet drill, the combination with a spindle having a ratchet wheel thereon, of a lever mounted to oscillate on the spindle and having a pawl engaging the ratchet wheel, a handle having a bifurcated end pivotally mounted on the spindle, and having a pawl engaging the ratchet wheel, an operating screw engaging the upper end of the spindle, and transmission mechanism carried by the lever and transmitting rotary motion from the spindle to the screw, substantially as described.

3. In a ratchet drill, the combination with a spindle having a ratchet wheel thereon, of a lever mounted to oscillate on the spindle and having a pawl engaging the ratchet wheel, a handle supported on the spindle and having a pawl engaging the ratchet wheel, a shaft supported in the lever, gear wheels keyed to said shaft, a gear wheel on the spindle engaging with one of said gear wheels, a feed screw operatively engaging the spindle, and a gear wheel on the feed screw meshing with the other of said first-mentioned gear wheels, substantially as described.

4. In a ratchet drill, the combination with a spindle having a ratchet wheel thereon, of a lever mounted to oscillate on the spindle and having a pawl engaging the ratchet wheel, a handle having a bifurcated end pivotally mounted on the spindle, and having a pawl engaging the ratchet wheel, a shaft supported in the lever, gear wheels keyed to said shaft, a gear wheel on the spindle engaging with one of said gear wheels, a feed screw operatively engaging the spindle, and a gear wheel on the feed screw meshing with the other of said first-mentioned gear wheels, substantially as described.

5. In a ratchet drill, the combination with a spindle having a ratchet wheel thereon, of a lever mounted to oscillate on the spindle and having a pawl engaging the ratchet wheel, a handle supported on the spindle and having a pawl engaging the ratchet wheel, said handle of general U-shape in cross section and adapted to lie smoothly against the side of the lever, a shaft supported in the lever, gear wheels keyed to said shaft, a gear wheel on the spindle engaging with one of said gear wheels, a feed screw operatively engaging the spindle, and a gear wheel on the feed screw meshing with the other of said first-mentioned gear wheels, substantially as described.

6. In a ratchet drill, the combination with a spindle having a ratchet wheel thereon, of end, and a screw-threaded socket in its other and having a pawl engaging the ratchet wheel, a handle having a bifurcated end pivotally mounted on the spindle, and having a pawl engaging the ratchet wheel, said handle of general U-shape in cross section and adapted to lie smoothly against the side of the lever, a shaft supported in the lever, gear wheels keyed to said shaft, a gear wheel on the spindle engaging with one of said gear wheels, a feed screw operatively engaging the spindle, and a gear wheel on the feed screw meshing with the other of

said first-mentioned gear wheels, substantially as described.

7. In a ratchet drill, the combination with a spindle having a gear wheel adjacent one end, and a screw-threaded socket in its other end, said spindle having a ratchet wheel thereon intermediate its ends, of a bifurcated lever mounted to oscillate on the spindle and straddling the ratchet wheel, a bifurcated handle pivotally supported on the spindle, spring-pressed pawls on the lever and on the handle engaging the ratchet wheel, a feed screw engaging in the threaded socket of the spindle and having a gear wheel secured thereto, a sleeve mounted to turn in the lever, a shaft having an eccentric bearing in said sleeve, gear wheels keyed to the respective ends of the shaft and meshing with the gear wheels on the spindle and the feed screw, an arm on said sleeve adapted to turn the same to move the gears into and out of mesh, and means for holding the arm against movement, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

PAUL F. ELLMER.

Witnesses:
HENRY DOLLER,
C. E. POTTS.