

No. 725,227.

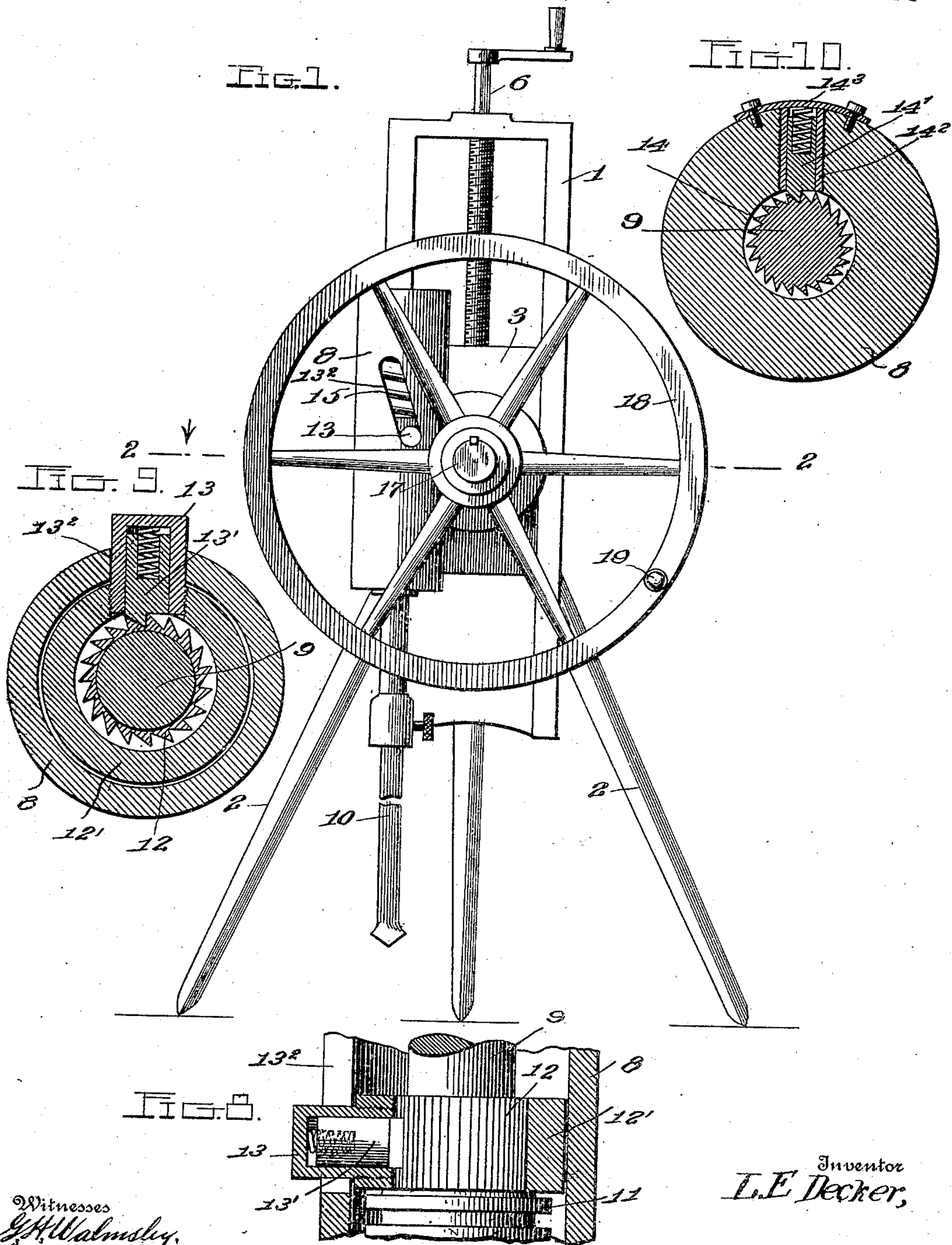
PATENTED APR. 14, 1903.

L. E. DECKER.  
ROCK DRILL.

APPLICATION FILED AUG. 21, 1902.

NO MODEL.

2 SHEETS—SHEET 1.



Witnesses  
G. H. Walmsley,  
J. E. Decker

By *A. B. Wilson & Co.*  
Attorneys

Inventor  
L. E. Decker,



No. 725,227.

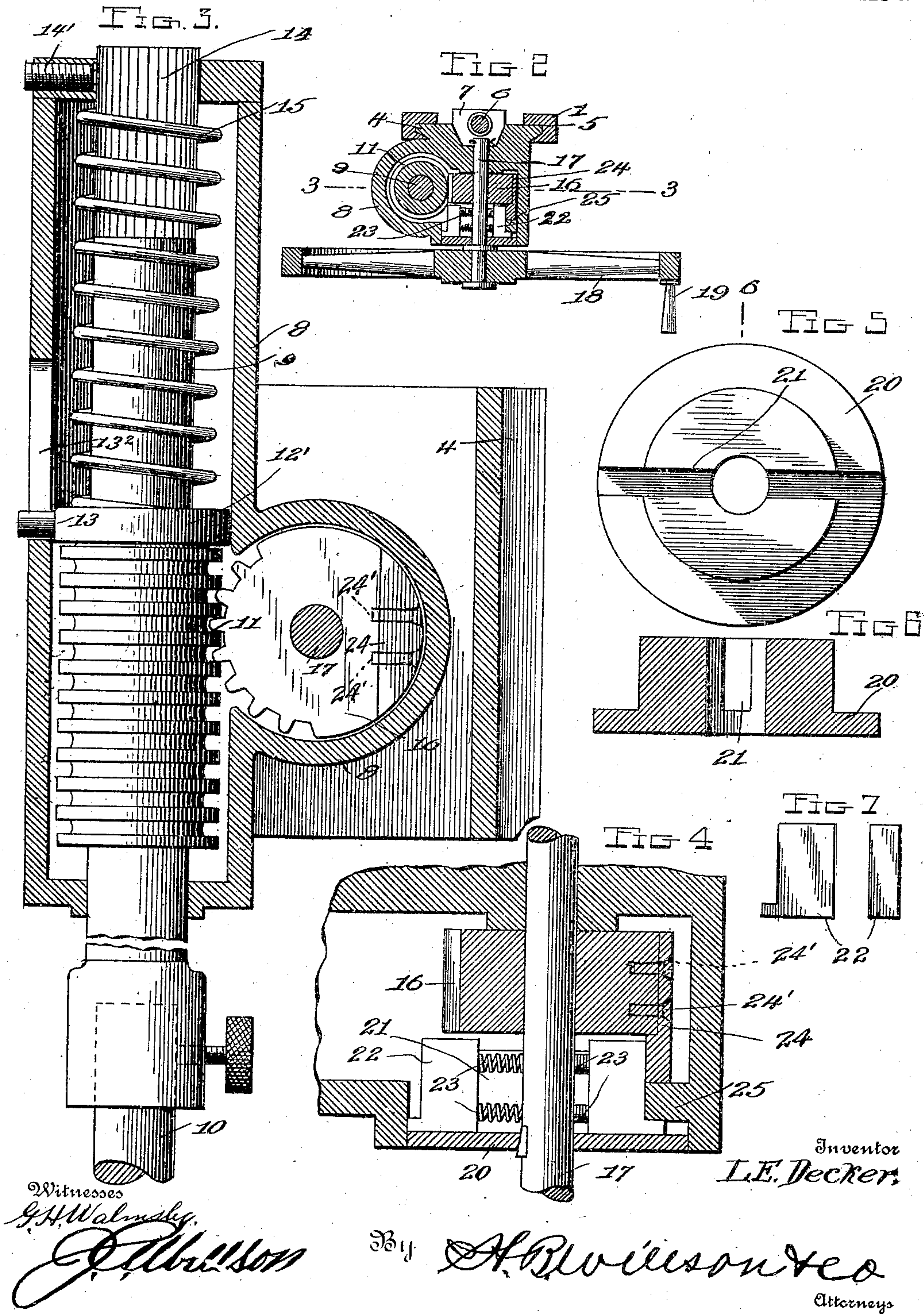
PATENTED APR. 14, 1903.

L. E. DECKER.  
ROCK DRILL.

APPLICATION FILED AUG. 21, 1902.

NO MODEL.

2 SHEETS—SHEET 2.





# UNITED STATES PATENT OFFICE.

LUCIOUS EDWARD DECKER, OF CHATTANOOGA, TENNESSEE, ASSIGNOR OF  
THREE-FOURTHS TO P. B. GRIFFIN AND C. V. HOOVER, OF CHATTA-  
NOOGA, TENNESSEE, AND C. B. ROGERS, OF BESSEMER, ALABAMA.

## ROCK-DRILL.

SPECIFICATION forming part of Letters Patent No. 725,227, dated April 14, 1903.

Application filed August 21, 1902. Serial No. 120,525. (No model.)

*To all whom it may concern:*

Be it known that I, LUCIOUS EDWARD DECKER, a citizen of the United States, residing at Chattanooga, in the county of Hamilton and State of Tennessee, have invented certain new and useful Improvements in Rock-Drills; and I 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.

This invention relates to improvements in portable hand-power drills of that kind in which the drill is actuated by the reciprocatory motion of a plunger.

The object of the invention is to provide a drill which is simple of construction, comparatively inexpensive of production, quick and efficient in action, and adapted to be operated by the rotation of a crank-wheel or analogous driving element.

With this and other objects in view, which will readily appear as the nature of the invention is better understood, said invention consists in certain novel features of construction and combination and arrangement of parts, which will be hereinafter fully described, defined in the appended claims, and illustrated in the accompanying drawings, in which—

Figure 1 is a view in side elevation of a drill embodying my invention. Fig. 2 is a horizontal section of the same on line 2 2 of Fig. 1. Fig. 3 is an enlarged vertical section on line 3 3 of Fig. 2. Fig. 4 is a horizontal section similar to Fig. 2, showing the main features thereof on an enlarged scale. Figs. 5 and 6 represent a plan and a sectional view of the clutch-disk. Fig. 7 shows a side and an edge view of one of the dogs. Fig. 8 is a detail vertical section showing the pawl-and-ratchet mechanism for turning the plunger. Fig. 9 is a horizontal section through the same. Fig. 10 is a horizontal section through the upper end of the casing and plunger, showing the stop-pawl and ratchet.

Referring now more particularly to the drawings, the numeral 1 represents the frame of the machine, which is mounted upon a tripod or suitable legs 2 and is rectangular

in form and open to receive a sliding carriage 3, provided with dovetailed edges 4 to fit and slide within dovetailed ways 5, formed in or upon said frame. The carriage is made vertically adjustable by means of a screw-shaft 6, which works in a threaded opening in a lug or projection 7, formed upon the carriage.

Mounted to reciprocate vertically in a tubular casing or chamber 8, formed upon the carriage 3, is a plunger 9, which carries the drill-bit 10. This plunger is provided with a toothed surface or rack 11 and immediately above the same with ratchet-teeth 12. A collar 12' surrounds these ratchet-teeth 12 and has threaded therein a casing 13, containing a spring-actuated pawl 13', which engages the ratchet-teeth. This casing fits and slides in an inclined slot 13<sup>2</sup>, formed in the wall of the chamber 8. The collar 12' rests upon the shoulder formed by the uppermost rack-tooth 11, and when the plunger is elevated the pawl and its casing travel in the inclined slot 13<sup>2</sup>, and as the pawl engages the straight face or shoulder of one of the ratchet-teeth 12 the plunger is given a partial turn or rotation, thereby causing the bit to strike in a different place each time the plunger is operated. In order to prevent the plunger from being turned back to its original position upon the downward movement of the plunger, the upper end of said plunger is provided with ratchet-teeth 14, and with which engages a spring-actuated pawl 14', sliding in a casing 14<sup>2</sup>, fitted in a threaded aperture in the casing 8 and closed at its outer end by a plate 14<sup>3</sup>. Upon the upward movement of the plunger the pawl 14' rides over the inclined faces of the teeth 14 and allows said plunger to be turned by the pawl 13'; but on the downward movement of the plunger the pawl 14' engages the straight faces of the teeth 14 and holds the plunger from rotation, so that the pawl 13' in sliding downward in the slot 13<sup>2</sup> will ride over the inclined faces of the teeth 12 and will thereby be prevented from giving a retrograde rotation to the plunger. On the downward movement of the plunger the collar 12' turns on the plunger, allowing the pawl 13' to move freely in the slot 13<sup>2</sup>. Surrounding the upper end of the plunger between the collar or



shoulder 12 and the top wall of the casing 8 is an impelling-spring 15, which is adapted to be compressed upon the upward movement of the plunger and when the plunger is released by the disconnection therefrom of the actuating mechanism to exert its expansive force in impelling the plunger downward or on the outstroke.

The rack or toothed surface 11 is engaged by the toothed or cogged surface of a gear-segment or mutilated gear-wheel 16, mounted loosely on a drive-shaft 17, extending horizontally through and journaled in the main portion of the carriage 3, said shaft having keyed thereto a crank-wheel 18, provided with a suitable handle 19, whereby the wheel is adapted to be rotated to communicate motion to said shaft. The mutilated gear 16 is arranged upon the shaft alongside a clutch-disk 20, which is keyed or otherwise fixed to the shaft 17 and provided at diametrically opposite sides with radial slots 21, in which fit to slide dogs 22, which are normally held outward or projected by means of springs 23 and are adapted to engage a projection 24, secured by one or more screws 24' on the gear-wheel 16 to cause said gear-wheel to turn with the shaft and disk 20. When in the operation of the shaft 17 one of the dogs 22 comes into contact with the lug 24, the gear-wheel 16 will be caused to turn with the shaft, and its toothed surface engages the rack 11 of the plunger and forces said plunger upwardly against the tension of the spring 15, which is thereby compressed. This upward or inward movement of the plunger also causes the lug or projection 13 to travel in the cam-slot 13<sup>2</sup> and to give a partial rotation to the plunger to turn or twist it to bring it into proper position for the next stroke. When the plunger reaches the limit of its upward movement, the dog 22, which is in engagement with the lug 24, comes into contact with a trip 25, fixed to the wall of the casing 8, which acts to force said lug inward against the tension of the spring 23 and to thereby move it out of the path of the projection 24, thus leaving the gear-wheel 16 free to move loosely on the shaft 17. When this action takes place, the plunger 9, which has been held from outward movement under the action of the spring 15, is released by the disengagement of the gear-wheel 16 from the clutch-disk 20 and is free to be impelled by the expansion of the spring 15, the gear-wheel 16 turning loosely on the shaft 17, so as to allow the plunger to be projected. As shown, the dogs 22 are located at diametrically opposite points upon the clutch-disk 20 and are adapted to engage the projection 24 on the gear-wheel 16 at each half-revolution of the shaft 17, thus giving two complete strokes of the plunger on each revolution of the crank-wheel 18. It will thus be seen that the disk 20 and the dogs carried thereby co-act with the lug 24 in forming a clutch con-

nection between the shaft 17 and the gear-wheel 16, whereby said gear-wheel is fixed to the shaft to force the plunger upwardly and is disengaged from the shaft to allow the plunger to be projected by the spring under the action of the trip 25, which throws the clutch mechanism out of engagement. After the plunger has been projected upon the retraction of one of the dogs 22 the partial revolution of the gear-wheel 16 under the action of the plunger brings the other dog 22 into position to engage the projection 24, whereupon a repetition of the operation above described ensues and the gear-wheel is again fixed to the shaft to retract the plunger and compress the spring 15.

From the foregoing description, taken in connection with the accompanying drawings, it is thought that the construction, mode of operation, and advantages of my improved drill will be readily apparent without requiring a more extended explanation.

It will be seen that the invention provides a drill which is simple of construction, comparatively inexpensive of production, and adapted to be rapidly operated upon the rotation of the wheel 18 with a minimum expenditure of power.

Various changes in the form, proportion, and the minor details of construction may be resorted to without departing from the principle or sacrificing any of the advantages of this invention.

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

1. In a drill of the character described, the combination of a suitable support, a reciprocating plunger provided with rack-teeth, and a spring adapted when compressed to project the plunger, a gear element engaging the rack-teeth on the plunger, a drive-shaft on which the gear element is loosely mounted, a clutch operating at predetermined intervals for rigidly connecting the gear-wheel to the shaft to operate said gear-wheel to retract the plunger, and means for throwing the said clutch mechanism out of operation, substantially as described.

2. In a drill of the character described, the combination of a support, a drive-shaft, a plunger provided with rack-teeth and mounted to reciprocate in the support, a spring adapted to be compressed to project the plunger, a gear-wheel in mesh with the rack-teeth on the plunger for retracting the same and compressing the spring, a drive-shaft on which the gear-wheel is loosely mounted, radially-movable dogs carried by said shaft for engaging the gear-wheel to lock the same thereto, and means for retracting the dogs to release the gear-wheel, substantially as described.

3. In a drill of the character described, the combination of a support, a plunger provided with rack-teeth mounted to reciprocate there-



in, a drive-shaft, a gear-wheel loosely mounted upon the drive-shaft and meshing with the rack-teeth on the plunger, a spring adapted when compressed to project the plunger, 5 a disk carried by the shaft, clutch devices mounted upon the disk and adapted to engage the gear-wheel to fix the same to the shaft and to effect the retraction of the plunger and compression of the spring, and means 10 for throwing said clutch devices out of action, substantially as specified.

4. In a drill of the character described, the combination of a support, a plunger provided with rack-teeth and mounted to reciprocate 15 therein, a spring adapted to be compressed to project the plunger, a drive-shaft, a gear-wheel loosely mounted upon said shaft and meshing with the rack-teeth on the plunger, a disk keyed to the shaft and provided 20 with radial slots, spring-actuated dogs sliding in said slots and adapted to engage the gear-wheel to lock the same to the shaft, and a trip device on the support for retracting said dogs against the tension of their springs

to release the gear-wheel, substantially as set 25 forth.

5. In a drill of the character described, the combination of a supporting-frame, a carriage slidably mounted in said frame, means for 30 adjusting the carriage, a reciprocating plunger mounted upon the carriage and provided with rack-teeth, a spring for projecting said plunger, a drive-shaft journaled in the carriage, a gear-wheel loosely mounted upon said shaft and meshing with the rack-teeth on the 35 plunger and adapted when fixed to the shaft to retract the plunger and to compress said spring, clutch mechanism for locking said gear-wheel to the shaft, and means for retracting the clutch mechanism, substantially 40 as specified.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

LUCIOUS EDWARD DECKER.

Witnesses:

NORRIS HEADRICH,  
J. M. BROWN.