(No Model.)

B. M. KEPLER.

RATCHET DRILL.

No. 510,542. Patented Dec. 12, 1893.

Fig. 1.

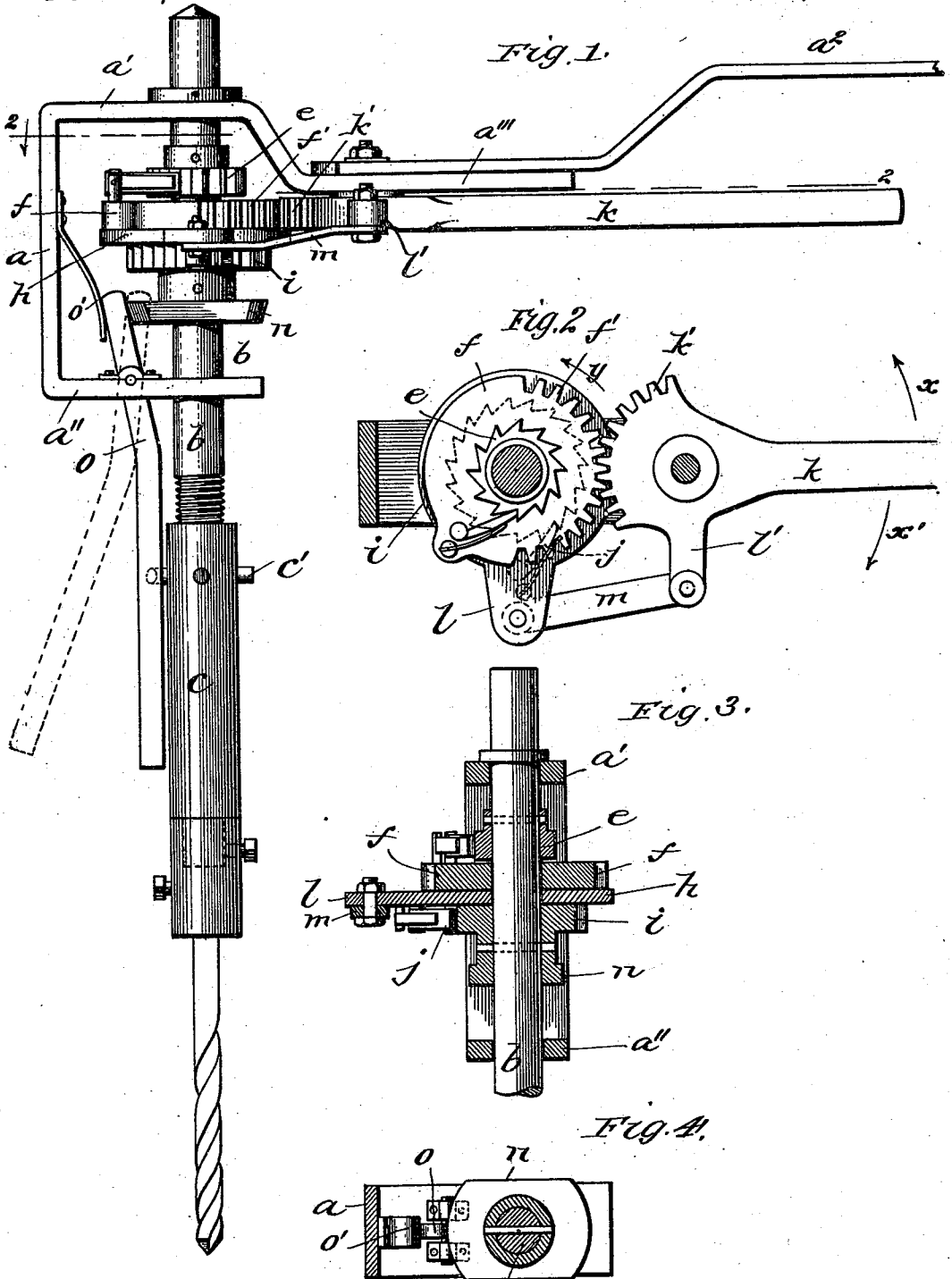

Fig. 2.

Fig. 3.

Fig. 4.

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RATCHET-DRILL.

SPECIFICATION forming part of Letters Patent No. 510,542, dated December 12, 1893.

Application filed March 25, 1893. Serial No. 467,579. (No model.)

To all whom it may concern:

Be it known that I, BEROTH M. KEPLER, a citizen of the United States, residing at Renovo, in the county of Clinton and State of Pennsylvania, have invented certain new and useful Improvements in Ratchet-Drills, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to a new and improved ratchet drill and it has for its object to provide improved means for automatically and intermittently feeding the drill, and it consists in the novel combination and arrangement of parts hereinafter described and particularly pointed out in the claims appended.

In the drawings:—Figure 1 is a side elevation of my improved drill. Fig. 2 is a plan thereof, the framing being in section. Fig. 3 is a vertical section on line 3—3 of Fig. 1, and Fig. 4 is a detail of the feed operating cam.

Referring to the parts the letter *a* designates the supporting frame which is formed with the upper and lower bars *a'* and *a''*.

b is a vertical shaft mounted to turn in bearings in the bars *a'* and *a''*, the lower end of this shaft extending a suitable distance below the bar *a''*, said lower end being screw threaded.

c is a sleeve which is internally threaded and screws on the shaft *b*.

d is the drill holder which is removably secured to the reduced lower end of sleeve *c*.

e is a ratchet wheel rigidly secured on shaft *b* between the bars *a'* and *a''* of the supporting frame.

f is a disk loosely mounted on the shaft *b* below the ratchet-wheel *e*, said disk having formed on its inner side a suitable number of cog-teeth *f'*.

g is a spring controlled pawl carried by the disk *f*, and engaging the ratchet *e*.

h is a disk loosely mounted on the shaft *b* directly below the disk *f*.

i is a ratchet wheel rigidly secured to shaft *b* directly below disk *h*.

j is a spring-controlled pawl which is carried by the disk *h*, on the under side thereof, and engages the teeth of the ratchet *i*.

k is the operating handle which is pivoted on the under side of the inwardly extending bar *a'''* of the supporting frame.

k' is a cogged segment formed on the outer end of the handle *k*, the teeth of which mesh with the cog-teeth of the disk *f*.

l is an outwardly extending lug formed on the disk *h*, and *l'* is an outwardly extending arm formed on the handle *k* adjacent to the pivot of said handle.

m is a link connecting the arm *l'* and lug *l*.

n is a cam which is formed with two cam-surfaces, one on each side of the shaft *b* directly opposite each other, each of said ends forming a portion of a circle, said cam being mounted on the lower end of a sleeve which is carried by the ratchet wheel *i*.

o is a lever which is pivoted on the lower bar *a''* of the frame *a*, its upper end projecting into the path of the cam *n*, and its lower end extending a suitable distance below the cross-bar *a''*.

c' are four radial pins set equal distances apart and around the sleeve *c* near the upper end thereof and each of these pins is engaged successively by the lower end of lever *o* as said lever is operated on by the cam *n*, to intermittently hold the sleeve against rotation, which permits the shaft *b* to revolve independently of the sleeve and thereby feed the drill. The lever *o*, below the bar *a''* of the frame *a*, is bent as shown in Fig. 1 in order that it will extend parallel with and close to the sleeve *c* when its upper end is operated on by the cam *n*. The pins *c'* and the inner edge of lever *o* are beveled as shown to assist in guiding the lever to the proper side of the pins should it by accident strike them on their points.

o' is a spring which bears against the upper end of the lever *o* and normally holds the lower end out of engagement with the pins *c'*.

a² is a supporting bar which may be grasped to hold the drill in operative position.

The operation is as follows:—The drill is suitably supported and the operating handle *k* is swung back and forth on its pivot, which motion imparts to the shaft *b* a continuous rotary motion in one direction by means of the ratchets *e* and *i* whose teeth extend in the same direction. When the parts are ar-

ranged as shown in Figs. 1 and 2, and the handle *k* is moved in the direction indicated by the arrow marked *x* in Fig. 2, the disk *h* is carried around the shaft *b* in the same direction by means of the link *m* which connects the disk to the handle, and with the disk *h* is carried the pawl *j* which engages the ratchet *i* thereby causing the shaft *b* to be revolved. As the shaft revolves one end of the cam *n* engages the upper end of lever *o* and forces it outwardly thereby bringing its lower end close to the sleeve *c*, and into engagement with one of the pins *c'*. The cam *n* is of such proportion that the lever remains in this position until the handle *k* has completed its movement in the direction indicated, and holds the sleeve against rotation while the screw shaft *b* is turned a portion of a revolution in the sleeve *c* and thereby feeding said sleeve and the drill to the work. As the feed stroke of the handle is finished the cam *n* releases the lever *o* and the spring *o'* causes its lower end to be released from the pin *c'*, and as the lever *k* is moved in the reverse direction indicated by arrow marked *x'* in Fig. 2, the cog-teeth *k'* operate on the teeth *f'* of disk *f* and revolve said disk in the direction indicated by arrow marked *y*, and the pawl *g* carried by said disk engages the ratchet *e* and thereby continues the rotation of the shaft *b*. The cog-segment *k'* is so proportioned that it causes the shaft *b* through its connections, to turn one-fourth of a revolution and thereby carries the cam *n* around and brings its other end into position to engage the lever *o* when the next feed stroke is begun. The sleeve *c* is also revolved one-fourth of a revolution which brings the next pin *c* in position to be engaged by the lever at the beginning of the feed stroke. As the handle *k* makes the feed stroke, it operates through the disk *f* to set the mechanism for the drill stroke, and on the drill stroke it sets the mechanism for the feed stroke.

Having thus fully described my invention, what I claim is—

1. A ratchet drill consisting of a supporting frame, a drilling and feeding shaft mounted in said frame, mechanism carried by the shaft and the frame for continuously revolving the shaft in one direction, a sleeve carried on the threaded lower end of said shaft, a drill carried by this sleeve at its lower end and devices carried by the frame and operated from the shaft for automatically and intermittently holding the drill-carrying sleeve against rotation.

2. A ratchet drill consisting of a supporting frame, a shaft carried by said frame, mechanism carried by the frame and shaft for continuously revolving the shaft in one direction, a sleeve threaded on the lower end of the shaft, a drill mounted in the lower end of this sleeve, a lever carried by the frame and normally held away from the drill-carrying sleeve, and a cam carried by the shaft, said cam operating on the lever to cause it to intermittently hold the drill-carrying sleeve against rotation, substantially as described.

3. A ratchet drill consisting of a frame, a shaft carried by this frame, a drill carrying sleeve threaded on the lower end of the shaft, radial pins carried by the sleeve near its upper end, mechanism carried by the frame and shaft for continuously revolving the shaft, and devices carried by the frame for intermittently and successively engaging the pins of the sleeve and holding said sleeve against rotation, whereby the drill is automatically fed, substantially as described.

4. A ratchet drill consisting of a frame, a shaft mounted in said frame, two ratchet wheels carried by said shaft, a disk *f* having cog teeth *f'*, and another disk *h* loosely mounted on the shaft, a handle *k* pivoted on the frame and adapted to rock the disks back and forth, partially rotating them, pawls carried by the disks and operating on the ratchet wheels, a cam carried by the shaft, a lever pivoted on the frame, the cam operating on the upper end of said lever, a drill-carrying sleeve threaded on the lower end of the shaft, radial pins carried by the sleeve near its upper end and adapted to be intermittently and successively engaged by the lower end of the lever, substantially as described and for the purpose set forth.

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

BEROTH M. KEPLER.

Witnesses:
G. W. GOOD,
J. F. REILLEY.