(No Model.)

M. SCHWÄRZLER.

FEED MECHANISM FOR DRILLS.

No. 343,734. Patented June 15, 1886.

Fig. 2.

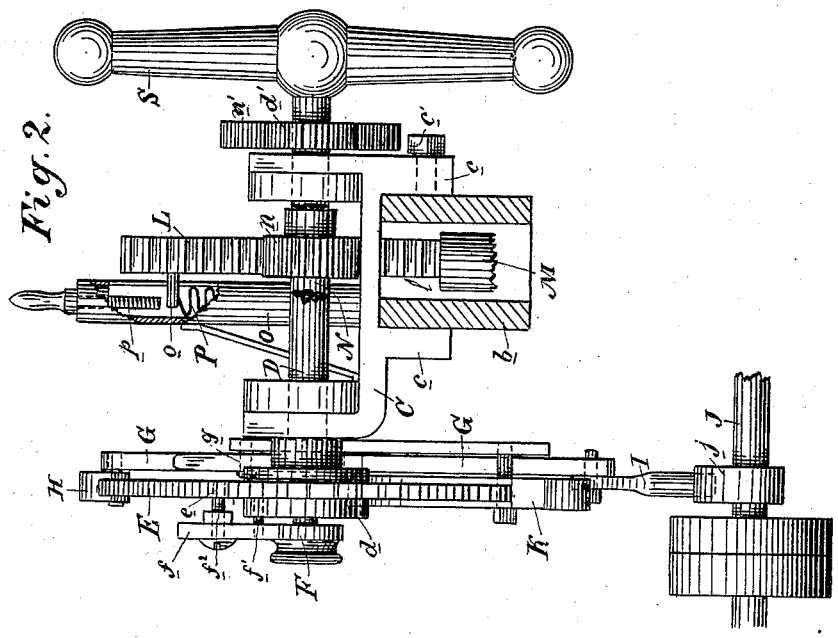
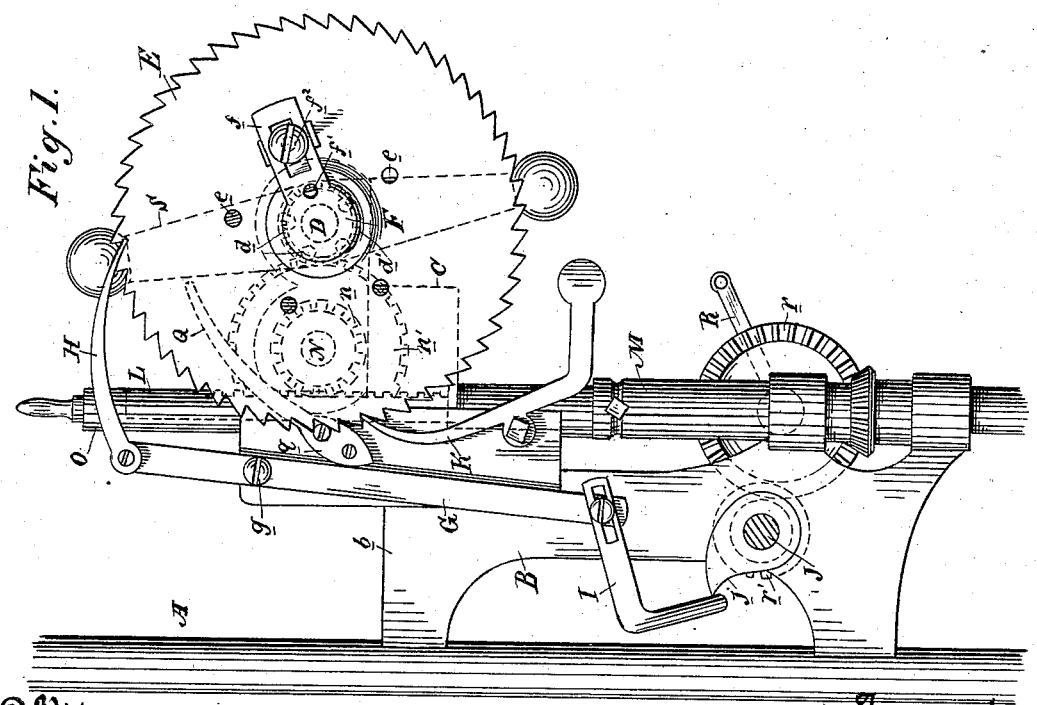


Fig. 1.



Witnesses,
Geo. H. Strong
J. P. Sourse.

Inventor
M. Schwärzler
By Dewey & Co.
Attys

UNITED STATES PATENT OFFICE.

MARTIN SCHWÄRZLER, OF SAN FRANCISCO, CALIFORNIA.

FEED MECHANISM FOR DRILLS.

SPECIFICATION forming part of Letters Patent No. 343,734, dated June 15, 1886.

Application filed April 3, 1886. Serial No. 197,719. (No model.)

To all whom it may concern:

Be it known that I, MARTIN SCHWÄRZLER, of the city and county of San Francisco, State of California, have invented an Improvement in Feed Mechanisms for Drills; and I hereby declare the following to be a full, clear, and exact description of the same.

My invention relates to an improved feed-motion for drills, such as are used in factories, agricultural works, machine-shops, or for other purposes where an upright drill is required.

My invention consists in a bracket secured upon a drill-frame and having mounted upon it a ratchet-wheel, which is actuated by a pawl operated by a cam on the driving-shaft of the machine, a vertically-moving rack-bar, to the lower end of which the drill-spindle is coupled, and gearing, by which the power of the ratchet is transmitted to the rack-bar.

My invention consists, further, in details of construction relating to the means for coupling and uncoupling the ratchet-wheel from the shaft, the means for guiding, limiting, and raising rapidly the rack-bar to which the drill-spindle is coupled, and a lever for regulating the work of the actuating-pawl, all of which I shall hereinafter describe by reference to the accompanying drawings, in which—

Figure 1 is a side elevation of my feed mechanism. Fig. 2 is a front elevation of the same.

The object of my invention is to do away with the ordinary screw-feed which is in use in this class of machines and substitute for it an automatic rack-and-pinion feed, which is effective and can be returned to its initial position much more rapidly than the screw.

A is the pillar or standard of the machine, to the top of which is attached the usual bracket, B, having a head, *b*.

C is the bracket of my feed mechanism. This has two downwardly-extending jaws, *c*, which fit over and embrace the head *b* of the main bracket, being fixed to said head by a set-screw, *c'*, whereby it is easily adjusted.

In the bracket is journaled the shaft D, on which is loosely mounted the ratchet-wheel E.

F is a clutch by which the ratchet-wheel is connected with and disconnected from the shaft. This consists of a disk having an arm, *f*, in which is a pin, *f'*, which is adapted to engage any of the annular series of holes *d* in the outer flange of the shaft, whereby it is connected with said shaft, and a pin, f^2, which is adapted to engage any of the annular series of holes *e* in the ratchet-wheel. Thus by moving the clutch inwardly its two pins engage the shaft and the ratchet-wheel, whereby they are connected; but by moving it outwardly they are disconnected and the ratchet-wheel moves freely.

Pivoted at *g* to one side of the bracket is a lever, G, to the upper end of which is pivoted the actuating-pawl H, which engages the ratchet-wheel. To the lower end of the lever is secured a bent arm, I, with which a cam, *j*, on the main driving-shaft J of the machine comes in contact.

K is a retaining-pawl operating on the ratchet-wheel.

Mounted vertically in the body of the bracket C is a rack-bar, L, the lower end, *l*, of which has coupled to it a drill-spindle, M.

N is a counter-shaft mounted in the bracket C, having a pinion, *n*, upon it, which meshes with the rack-bar. Upon the end of this shaft N is a large gear, *n'*, with which a pinion, *d'*, on the shaft D engages. By this gearing it will be observed that the ratchet-wheel vertically reciprocates the rack-bar.

In order to guide the rack-bar properly to bring it up automatically and limit its movement in this direction, I have the tubular standard O, having a slot in its side, through which a pin, *o*, from the side of the rack-bar passes. Within the tubular standard is a spring, P, which bears up under the pin *o*, and is adapted to throw the rack-bar upwardly. *p* is a limiting-screw threaded in the top of the standard, and against which the pin *o* of the rack-bar comes in contact, whereby its upward movement is limited.

In order to regulate the engagement of the actuating-pawl with the ratchet-wheel so that it may engage a greater or less number of teeth, there is a lever, Q, pivoted to the side of the bracket and provided with a cam-head, *q*, which bears against the lever G. By pressing down the lever Q its cam-head moves the lever back, so that the impingement of the cam *j* on the driving-shaft J against the bent arm I on the lower end of the lever will not cause said arm to move so far, and therefore

the movement of the lever is less, whereby a less number of teeth of the ratchet is engaged by the pawl. The reverse of this movement will cause the pawl to engage a greater number of teeth.

R is a hand-lever operating the gear r, which meshes with a pinion, r', on the driving-shaft J, whereby the machine may be driven by hand, when required.

S is a hand-lever on the end of the shaft D in the bracket C, whereby the feed mechanism may be operated by hand, when desired.

The operation of my feed is as follows: It is intended that the driving-shaft of the machine shall be in continuous operation, and therefore the ratchet-wheel E of the feed mechanism is operated continuously. When the machine is not in use, the clutch F is moved out, so as to release the ratchet-wheel, in order that its constant movement may not affect the feed mechanism; but when it is to be thrown into gear the clutch is moved inwardly, whereby the ratchet-wheel is connected with the shaft D, the movement of which, through the gearing described, causes the downward movement or feed of the rack-bar L, to which the drill-spindle is coupled. When the feed has progressed sufficiently, the clutch is thrown out again, whereby the feed is stopped, and the spring P within the tubular guide O immediately throws up the rack again, thus withdrawing the drill. It will be observed that this mechanism is much more effective, on account of being automatic in its feed and on account of its more rapid withdrawal, than the ordinary screw-feed.

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

1. In a feed mechanism for drills, the combination, with the bracket C, of the rack-bar L, mounted in said bracket, the drill-spindle coupled to the lower end of the rack, a pinion on a counter-shaft meshing with said rack-bar, and means, substantially as described, for operating the pinion, substantially as and for the purpose described.

2. In a drill, the ratchet-wheel E, mounted on top of the frame, and a pawl operated by the main driving-shaft of the machine, for rotating said ratchet-wheel, in combination with the rack-bar L, to the base of which the drill-spindle is coupled, and gearing between said ratchet-wheel and the rack-bar, whereby the feed is accomplished, substantially as herein described.

3. A feed mechanism for a drill, comprising the ratchet-wheel E, the pawl H, and means for operating said pawl from the driving-shaft of the machine, the rack-bar L, to the base of which the drill-spindle is coupled, the shaft D, on which the ratchet-wheel is mounted, the counter-shaft N, having a pinion, n, engaging the rack-bar, and gearing between the two shafts, whereby the rack-bar is operated, substantially as herein described.

4. A feed mechanism for a drill, comprising the removable bracket C for the head of the drill-frame, the shaft D, mounted in said bracket, the ratchet-wheel E on said shaft, the lever G, having bent arm I, operated by a cam on the driving-shaft of the machine, and the pawl H on the top of the lever engaging the ratchet-wheel, the rack-bar L, to which the drill-spindle is coupled, the counter-shaft N, having pinion n, and the gears between the two shafts, whereby the feed is accomplished, substantially as herein described.

5. In a feed mechanism for drills, the vertically-reciprocating rack-bar L, to which the drill-spindle is coupled, in combination with the shaft D, the ratchet E, loosely mounted on the shaft, the clutch F, for connecting it therewith, the pawl H, for operating the ratchet, said pawl being operated by the driving-shaft of the machine, and gearing between the shaft D and the rack-bar, substantially as herein described.

6. A feed mechanism for drills, comprising the removable bracket C, the shaft D, mounted therein, the ratchet-wheel E, loosely mounted on the shaft, and the clutch F, with its pins f' f^2, for connecting the ratchet-wheel with the shaft and disconnecting it, the pivoted lever G, having bent arm I, against which a cam on the driving-shaft of the machine operates, the actuating-pawl H, pivoted to the top of the lever, the vertically-reciprocating rack-bar L, mounted in the bracket C, and to the base of which the drill-spindle is coupled, the counter-shaft N in the bracket, having pinion n, and the gear n' and pinion d' between the shafts, substantially as herein described.

7. In a feed mechanism for drills, the vertically-reciprocating rack-bar L, to which the drill-spindle is coupled, said bar having a side pin, o, and mechanism for operating said bar, in combination with the tubular slotted standard O, into which the pin fits, the spring P within the standard bearing upwardly against said pin, and the screw-stop p in the top of the standard, for limiting the upward movement of the rack-bar, substantially as herein described.

8. In a drill feed mechanism, the rack-bar L, to which the drill-spindle is coupled, in combination with the means for feeding the rack-bar down, consisting of the shaft D, the ratchet-wheel E, and clutch F, for throwing said wheel into and out of connection with the shaft, the pawl H, operated from the main driving-shaft, and gearing between shaft D and said rack-bar, and the means for returning the rack-bar, consisting of the spring P, for lifting it, substantially as herein described.

9. In a drill, the standard or pillar A, having bracket B, with head b, and the driving-shaft J, having a cam, j, in combination with the bracket C, mounted on the head b, the shaft D in the bracket, the ratchet-wheel E on the shaft, the lever G, pivoted to the bracket, the bent arm I on the lever, against which the cam of the driving-shaft operates, the actuating-pawl H on said lever, the retaining-pawl K, the vertically-reciprocating rack-bar L, mount-

ed in the bracket, and to which the drill-spindle is coupled, the counter-shaft N, having a pinion, *n*, and the gear *n'* and pinion *d'* between the shafts, all arranged and adapted to operate substantially as herein described.

10. In a drill, the rack-bar L, to which the drill-spindle is coupled, the ratchet-wheel E, and power-transmitting mechanism between said wheel and the rack-bar, in combination with the pivoted lever G, having a bent arm, I, on its lower end, and operated by the driving-shaft, as described, the pawl H on the upper end of the lever, for operating the ratchet-wheel, and the pivoted lever Q, having cam-head *q*, bearing against the lever G, whereby the work of the pawl H is regulated, substantially as herein described.

In witness whereof I have hereunto set my hand.

MARTIN SCHWÄRZLER.

Witnesses:
S. H. NOURSE,
H. C. LEE.