

(No Model.)

2 Sheets—Sheet 1.

V. F. PRENTICE.
DRILLING MACHINE.

No. 547,588.

Patented Oct. 8, 1895.

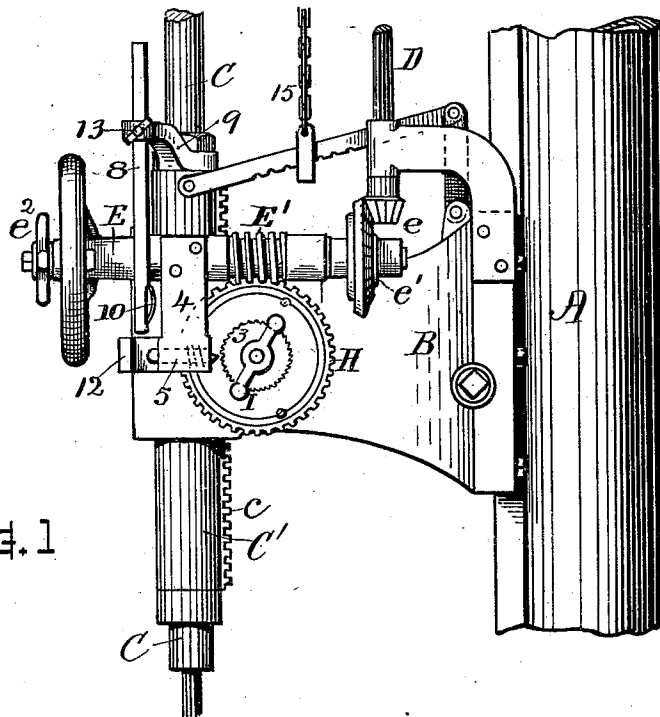


FIG. 1

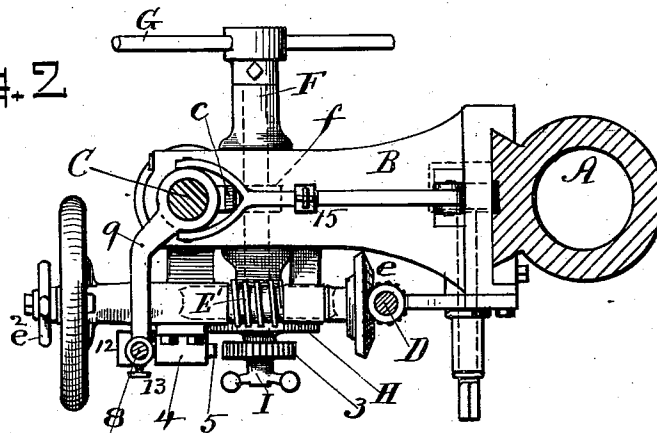


FIG. 2

Witnesses.

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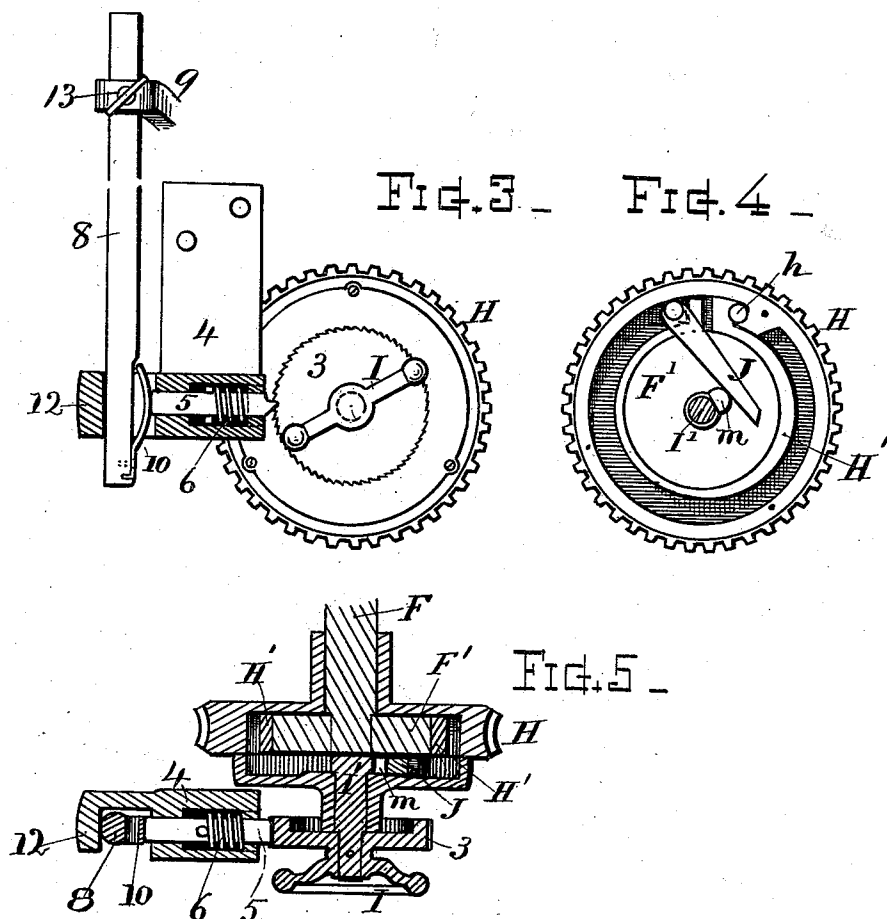
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UNITED STATES PATENT OFFICE.

VERNON F. PRENTICE, OF WORCESTER, MASSACHUSETTS.

DRILLING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 547,588, dated October 8, 1895.

Application filed February 4, 1895. Serial No. 537,233. (No model.)

To all whom it may concern:

Be it known that I, VERNON F. PRENTICE, a citizen of the United States, residing at Worcester, in the county of Worcester and State of Massachusetts, have invented a new and useful Improvement in Drilling-Machines, of which the following, together with the accompanying drawings, is a specification sufficiently full, clear, and exact to enable persons skilled in the art to which this invention appertains to make and use the same.

The object of my present invention is to provide in a power-operated drilling-machine an efficient and desirable means for automatically stopping the feed of the drill when the drilling-tool has reached any given position in its downward movement, and for simultaneously releasing the drill-spindle and its carrying-quill from the feed-operating mechanism, so that the quill and drill-spindle may be readily elevated, either by the quick-return lever or automatically, as soon as its downward feed ceases.

Another object is to provide an automatic stop mechanism that can be practically applied to and conveniently operated upon large or heavy upright drilling-machines.

These objects I attain by the mechanism illustrated in the drawings, wherein—

Figure 1 is a side view of the movable head and such parts of an upright drilling-machine as will show the nature of my invention. Fig. 2 is a plan view of the same. Fig. 3 is a vertical section of the stop mechanism. Fig. 4 is a vertical section of the gear-clutch, and Fig. 5 is a horizontal section of the stop mechanism and clutch devices.

Such parts of the drilling-machine as are not herein shown may be of any well known or suitable construction.

Referring to parts, A indicates the main frame or upright post; B, the movable head; C, the drill-spindle; C', the quill and rack carrying said drill-spindle; D, the feed-operating shaft; E, the worm-shaft mounted in bearings on the head and connected with shaft D by bevel-gears *e* and friction-clutch *e'*, which latter is operated by the star or handle *e*² in usual manner.

F indicates the cross-shaft carrying the pinion *f* that engages the quill-rack *c*, said shaft having the quick-return lever or hand-bar G

at one end, and the worm-wheel H that meshes with the worm E', mounted to run loose upon its other end, the worm-gear being provided with the friction or clutch, and means for controlling or operating said clutch for connecting the worm-gear and shaft for rotation together. The above-named parts are disposed in the usual operative arrangement. The friction-hub F' within the worm-wheel (see Fig. 4) is fixed on the cross-shaft F, while the worm-wheel turns loose on said shaft, its toothed periphery meshing with and being actuated by the worm E' and operating-shaft D in usual manner. A band or open-sided ring H' surrounds the hub F', one end of said ring being connected with the wheel H at *h*, and its other end sustained against a lever J that is operated for locking and unlocking the clutch by the button *m* on the head of the clutch-axle I', by turning which the ring is caused to hold or release the surface of the hub accordingly as the button is turned against or away from said lever. A grip piece or handle I is provided on the outer end of the clutch-axle for working the clutch by hand.

Upon the clutch-controlling handle or its axle I provide a disk or wheel 3 having a notched periphery or engaging-surface, and adjacent thereto, mounted in a bearing or bracket 4, fixed on the frame, I arrange a dog or stop-bolt 5 adapted to engage said disk and retain it against forward rotation. Said stop-bolt is preferably mounted to have endwise movement through its bearing, and a spring 6 is combined therewith for removably retaining the stop or dog out of engagement with the ratcheted disk, as indicated in Figs. 1 and 2. The ends of the stop-bolt are respectively fitted one for entering the notch on the disk and the other for receiving the pressure of the trip or actuator. This latter end is located adjacent to the path or line of movement of a trip device or rod 8, which is adjustably secured to an arm 9, carried upon or fixed to the top end of the quill and having upward and downward movement in unison with the quill, drill-spindle, and drilling-tool. The lower end of said rod 8 is furnished with a lug, incline, or projection that moves into contact with and forces the stop-bolt toward the wheel 3, with which it is thereby caused to engage. The lug 10 is

best made as a spring or bow, so that it can yield if the point of the stop-bolt should meet the point of the ratchet detent. The outer end 12 of the bearing is best formed to embrace and support the rod 8 as it descends to contact with the stop-bolt, said rod being thereby prevented from springing or yielding outward by the force required to overcome the resistance of the stop-bolt spring 6. The rod 8 can be adjusted up or down, as desired, in the arm 9 by aid of the thumb-screw 13, so that its time of actuating the stop will correspond to any required depth of drill-work.

15 The operation is as follows: The rod 8 being adjusted to such position as required, the clutch of the worm-gear is locked by turning the handle forward, so as to bring the button *m* beneath the lever J and the drill is started. 20 As the drill-spindle feeds downward, the lug or spring 10 on the rod strikes the dog or stop-bolt and moves it into engagement with the disk 3, thereby arresting the forward movement of said clutch-controlling disk and its axle, so that the further forward movement of the worm-wheel H carries the lever J off from the button, thereby effecting the automatic unlocking of the clutch and release of the cross-shaft from the worm-wheel. Then 30 the quill and drill-spindle are free to be raised by the quick-return lever G, turning backward the cross-shaft H; or, if desired, the counterbalance can be adjusted, so that the drill will be lifted automatically by the chain 15 as soon as the clutch is released. With this stop mechanism no disconnection of the feed-gearing is required before raising the drill, and no readjustment for continuing the operation of the machine other than to simply 40 turn the controlling-handle I to relock the clutch. Hence it affords a practical and convenient means for use on large and heavy drilling-machines, as the controlling parts can be easily manipulated.

45 I claim as of my invention and desire to secure by Letters Patent—

1. In a drilling machine, in combination with the quill carrying the drill-spindle, the

cross-shaft that transmits the feeding motion to said quill and drill-spindle, the worm-gear 50 by which said shaft is rotated, and the friction device or clutch connecting said worm-gear and shaft; a clutch-controller or grip adapted to lock the clutch by a forward rotation, and unlock by rotation in opposite di- 55 rection, the ratchet-faced wheel or disk fixed on the controller-axle, a stop-dog or bolt adapted for engaging therewith, means for normally retaining said dog out of engagement, and the stop-actuating rod connected 60 with the drill-spindle carrier for moving into contact with said dog-bolt, for the purpose set forth.

2. In combination with the worm-shaft, the cross-shaft, the worm-wheel, and the worm- 65 wheel clutch provided with means for controlling the same in clutching and unclutching the parts, the ratchet-faced wheel or disk arranged on the clutch controller, the stop-dog or endwise-reciprocating bolt adapted for en- 70 gaging and holding said controller disk, its retracting spring, the trip-rod adjustably secured to an arm connected with the quill carrying the drill-spindle and moving in unison with the drill-feed, the end of said rod pro- 75 vided with a lug or projection that contacts with the end of said dog-bolt to force said bolt into engagement with the disk, for the purpose set forth.

3. In a drilling-machine, the combination of 80 the worm-wheel clutch, clutch-operating grip or controller having the notched disk thereon, the reciprocating stop-bolt, the spring for retracting said stop-bolt, the bolt-guiding bearing provided with a back guard for sustain- 85 ing the trip or actuating rod, the adjustable actuating rod having a spring or yielding presser-lug thereon that acts against said stop-bolt, substantially as set forth.

Witness my hand this 1st day of February, 90 1895.

VERNON F. PRENTICE.

Witnesses:

CHAS. H. BURLEIGH,
ELLA P. BLENUÉ.