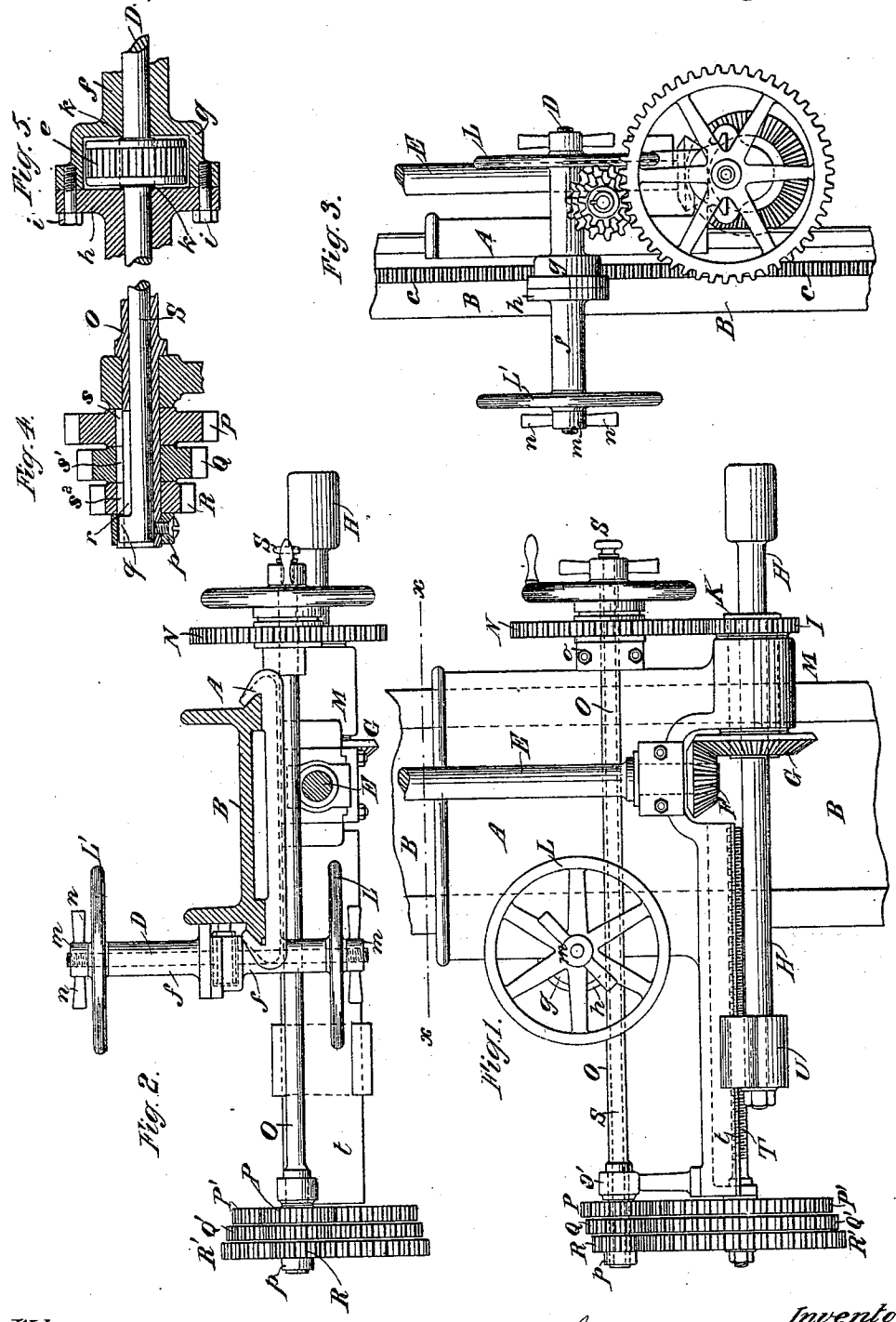
(No Model.)

J. MILLER.

DRILLING MACHINE.

No. 282,750. Patented Aug. 7, 1883.



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UNITED STATES PATENT OFFICE.

JAMES MILLER, OF NEW YORK, N. Y., ASSIGNOR OF ONE-HALF TO CORNELIUS H. DELAMATER AND GEORGE H. ROBINSON, OF SAME PLACE.

DRILLING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 282,750, dated August 7, 1883.

Application filed December 29, 1882. (No model.)

To all whom it may concern:

Be it known that I, JAMES MILLER, of the city, county, and State of New York, have invented a new and useful Improvement in Drilling-Machines, of which the following is a specification.

My invention consists in a certain improvement in drilling-machines, the main features of which are the convenient and simple mechanism by which the operator is enabled readily to adjust the feed from the drill end of the machine without having to walk around the machine, and to adjust the perpendicularly-adjustable carriage or slide from either the front or back of the machine.

Figure 1 is a front elevation of my invention. Fig. 2 is a horizontal section through the line *x x* on Fig. 1. Fig. 3 is a side elevation of the left-hand side of the machine. Fig. 4 is a sectional detail, enlarged, of the feed-shaft, rod, and feed-gears. Fig. 5 is a sectional detail, enlarged, of the pinion-box, pinion, and pinion-shaft for adjusting the drill-carriage higher or lower.

A is the perpendicularly-adjustable carriage or slide, which supports the drilling mechanism.

B is the stationary dovetailed standard or support, upon which the carriage A and its mechanism are adapted to move vertically. This support B is provided with a rack, *c*, upon which a pinion, *e*, is permitted to work perpendicularly. The horizontal shaft D, which supports the pinion, is itself supported by a sleeve, *f*, which is carried by the carriage A. This sleeve is enlarged into an open box near its center, and is there divided into two parts, *g* and *h*, which are held together by screws *i*. This box contains the pinion *e*, but allows it to have enough play for the same to revolve. The pinion *e* is secured upon an enlarged portion of the shaft D, which presents shoulders *k* on each side, as shown in Fig. 5. The shaft D is revolved, and with it the pinion, for the purpose of adjusting the height of the drill-shaft by means of either hand-wheels L L′ from the front or back of the machine, which hand-wheels are secured to the shaft D by means of feathers and grooves. The shaft D is also provided at each end outside of the wheels L L′ with screw-threads, which are covered by nuts *m*, having handles *n* for the convenience of the operator, whether he be in front or at back of the machine. These nuts are used for the purpose of locking the carriage A at any height by drawing and clamping either side of the pinion *e* or either shoulder *k* against its respective side of the box *g h*, according to which nut *m* is screwed up.

E is the driving-shaft, which is itself driven from above in any appropriate manner through gears or otherwise. Upon the lower end of the shaft E is affixed a bevel-gear, F, which engages with another bevel-gear, G, upon the drill-spindle H. This gear G and the gear I are not permanently fastened to the shaft H, but they are connected by a sleeve, K, which turns in the box M on the carriage A, and through which the drill-spindle H slides freely, while it is compelled to turn therewith by a feather and groove. The shaft or drill-spindle H has the box M and the sleeve K for one of its bearings, the bevel-gear G being on one side and the spur-gear I on the other. The spur-gear I engages with another spur-gear, N, fastened to the hollow horizontal feed-shaft O. This shaft is supported in bearings *o o′*, and has at its opposite end three or more spur-gears, P Q R, of different diameter, which are adapted to revolve around the shaft O, and are retained in their positions longitudinally by the support *o′* and the collar *p*. A sliding rod, S, passes through the hollow feed-shaft O, from the front end of which it protrudes, and this rod S has a feather, *q*, at one end, which is adapted to slide in a longitudinal slot, *r*, in the shaft, and also into any one of the slots *s s′ s²* in the gears P Q R. The spur-gears P Q R engage with other spur-gears, P′ Q′ R′, of relatively different diameter, which are fastened to one end of the feed-screw T.

U is a carriage fastened to the opposite end of the drill-spindle H to that at which the drill is affixed. This carriage is adapted to slide along a horizontal guide, *t*, on the carriage A, and is provided with a female screw-thread, through which the feed-screw passes. When the feed-screw T revolves, the carriage U will slide along the horizontal rail *b*, traveling the length of the feed-screw T and feeding the drill to the article that is to be drilled. As before stated, the degree of feed is regulated

by means of the feather *q* entering the slot of one of the gears P Q R of different diameter. Of course when the feather engages with one wheel—say P—said wheel is caused to rotate with the feed-shaft O, and transmits motion through the wheel P′ to the feed-screw T, while the other loose wheels, Q R, are rotated by the wheels Q′ R′ independently of or idly upon the feed-shaft O. The gear P engages with its corresponding gear, P′, which will revolve the feed-screw T. If the small gear R is brought into action, the feed will be less than if either of the larger gears P or Q is brought into action. The degree of the feed varies with the diameter of the gear, which is immediately brought into action by the rod S. The larger the diameter of the gear the greater is the degree of feed given to the drill-spindle H. The rod S is disengaged from the gears P Q R by pushing it until its feather *q* enters a slot in the collar *p*, as shown in Fig. 4.

It may be understood by reference to the drawings that the rod S, being extended right through the front end of the shaft, and being furnished with a knob or handle on the protruding end, can be easily manipulated by the attendant without requiring him to leave the position in which he ordinarily stands while attending to the machine.

I do not broadly claim for working a feed-screw a hollow shaft furnished with two or more loose gears, either of which may be coupled with it by a feather and rod within the said shaft; but

What I claim as my invention, and desire to secure by Letters Patent, is—

1. The combination, with the drill-spindle and an independent feed-screw for feeding the spindle mounted in fixed bearings, of a slotted feed-shaft made hollow from end to end and geared with the drill-spindle, two or more gears fast on the feed-screw and two or more gears loose on the rear end of the feed-shaft, and each having a notch or groove in its bore, and a sliding rod extending entirely through the hollow feed-shaft, provided at the rear end with a feather adapted to engage with the notch or groove in any one of the said loose gears, and projecting from the front end of the feed-shaft, so that it may be grasped at the front of the machine and slid in or out to engage its feather with any one of said loose gears, or to disengage its feather from said gears, substantially as herein described.

2. The adjusting mechanism of the carriage A, composed of the stationary rack *c*, the adjusting-shaft D, furnished with a pinion, *e*, and inclosed within the sleeve *f* and box *g h*, and having at each end a hand-wheel or handle, L or L′, and a screw-thread and nut, *m*, providing for locking the carriage by the attendant either at the front or back of the machine, substantially as herein described.

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Witnesses:
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