

T. J. SLOAN.
 Improvement in Hand-Drilling Machines.
 No. 128,430. Patented June 25, 1872.

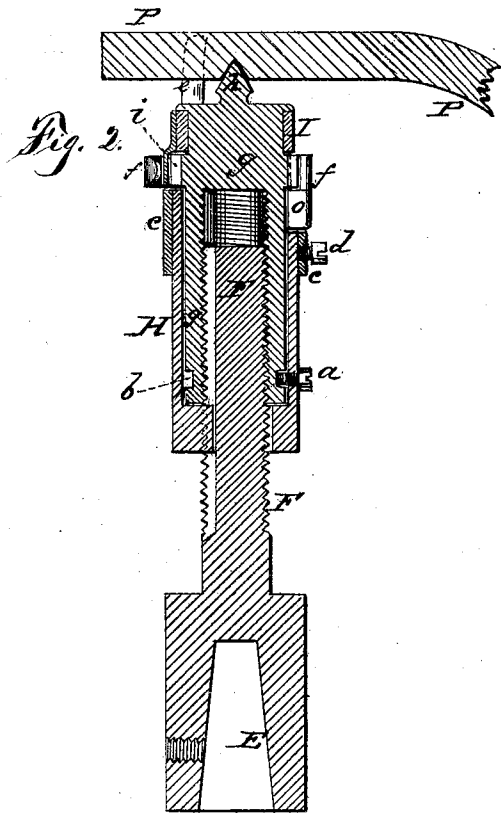
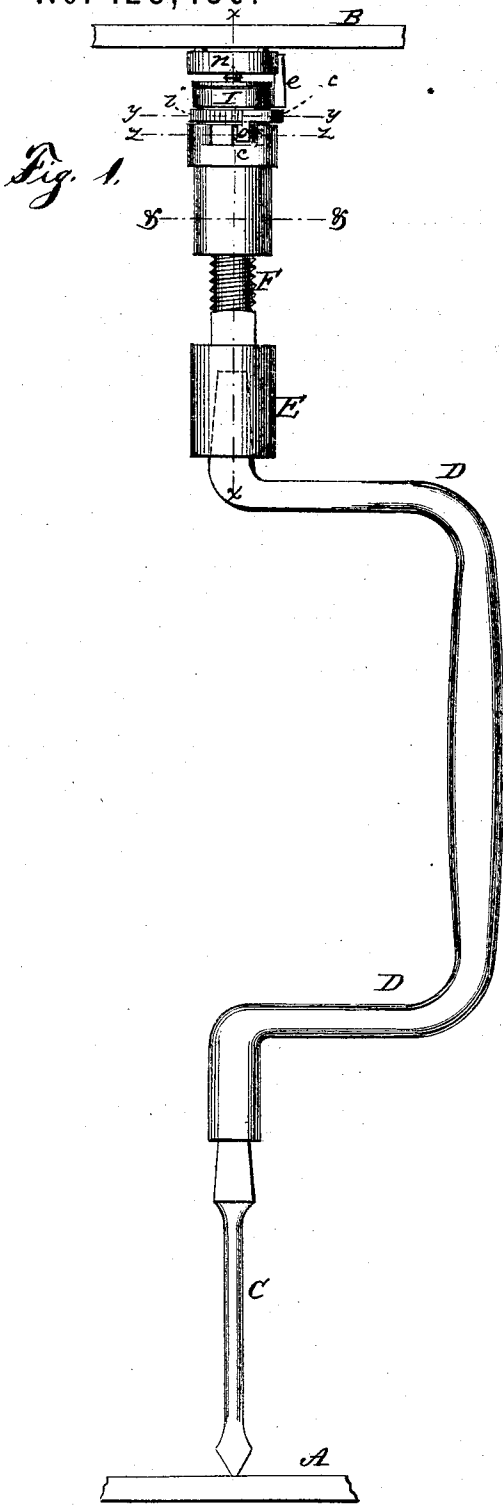


Fig. 3.

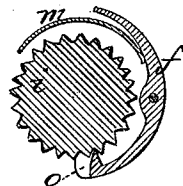


Fig. 4.

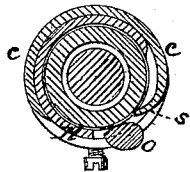
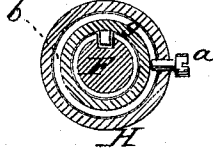


Fig. 5.



Witnesses:
Wm. A. DeLacy

Inventor:
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UNITED STATES PATENT OFFICE.

THOMAS J. SLOAN, OF NEW YORK, N. Y.

IMPROVEMENT IN HAND DRILLING-MACHINES.

Specification forming part of Letters Patent No. 128,430, dated June 25, 1872.

SPECIFICATION.

To all whom it may concern:

Be it known that I, THOMAS J. SLOAN, of New York city, of the county of New York, in the State of New York, have invented certain new and useful Improvements in Hand-Drills; and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawing making part of this application.

Previous to my invention it has been customary to provide the various kinds of drilling-machines and boring-bars with some sort of automatic feeding mechanism, by means of which the drill has been fed into its work during the operation of the machine; but in the use of what is known as a hand (ratchet or brace) drill, and which is almost or quite universally used for boring in metals, in putting up machinery of a heavy character, iron buildings, &c., it has been and is now customary to feed the drill by hand. In the use of this simple hand-drill the apparatus is generally clamped and held to the work by a sort of U-shaped bar of iron or dog, and this bar is generally provided with a screw bearing on the end of the said drill apparatus, and which is turned, at intervals, by hand to force the drill into the work, (the yielding of the dog or bar serving as a spring to keep the drill up to its work until the feed-screw is again turned.) This generally-practiced mode of using a hand-drill embodies the objections of an irregular hand-feed, beside the time and consequent expense of performing such hand-feed.

My invention has for its object to provide the ordinary hand-drill with a simple means for automatically feeding the drill as it is rotated with a uniform feed, and one which can be regulated at pleasure, according to the nature of the work being done; and to this end my invention consists in providing one end of an ordinary hand-drill with a male thread or screw and nut, which are caused to work the one within the other, at intervals, by means of a holder or detent, which is held by contact with the dog or any stationary point, and is alternately coupled to and disconnected automatically from said nut or screw, as will be hereinafter more fully explained; and my invention further consists in providing the nut or screw with a device by which the station-

ary or non-rotative detent may be made to effect a greater or less turning of the nut each time it takes hold, and thus effect a faster or slower feed to the drill, as the nature of the work may require.

To enable those skilled in the art to make and use my invention, I will proceed to describe the construction and operation of my automatic-feed hand-drill, referring by letters to the accompanying drawing, in which—

Figure 1 is an elevation of a hand-drill made according to my invention. Fig. 2 is a vertical section at $x x$, Fig. 1. Fig. 3 is a cross-section at $y y$; and Figs. 4 and 5 are similar sections at $z z$ and at $\& \&$. Figs. 2, 3, 4, and 5 are drawn double the scale of Fig. 1 so as to more clearly show the details.

In the several figures the same part is designated by the same letters of reference.

A represents the surface or stock which the drill is to operate in or bore, and B a fixed surface, (the dog or any other suitable stationary surface,) against which a bearing or fulcrum is secured. C is an ordinary drill, the shank of which is placed in the socket of a common brace, D, or brace-bar; and the upper end (or that opposite to the one in which the drill is placed) of this brace D is fitted with a square shank into the socket E of the screw-bar or arbor F. On the screw F works a long nut or threaded sleeve, g , which is provided with a pointed teat, h , that is intended to bear against the dog or other stationary surface that serves as a bearing or purchase for the drill-stock. On the nut g is a ratchet-wheel or toothed portion at i , and around said nut, extending downward from said ratchet-wheel i , and surrounding, at its lower end, the screw F, is a tube or thimble, H. This thimble H is fitted to the screw F with a spline and feather, so that the two must turn together, though they are free to move longitudinally on each other; and said thimble is held in a reverse manner on the nut g by means of a set-screw, a , which projects into an annular spline or groove, b , on the nut g in such a manner as to prevent the thimble H and nut g moving on each other longitudinally, while they are free to rotate the one around the other. A portion of the upper end of thimble H is cut away so as to leave the exterior of the nut g just below its ratchet i exposed, and over this exposed portion, and

around the thimble H, is fitted a ring, *c*, which is adjusted circumferentially on the thimble, and is secured in place by a set-screw, *d*. This ring *c* is cut away to correspond with the cut-away portion of thimble H, and, by adjustment on said thimble, varies the extent of the exposed portion of nut *g* for purposes to be presently explained. *I* is a collar, which is located between the ratchet-wheel and upper end of nut *g*, and turns freely on the latter. It is provided with a projecting arm, *e*, which acts as a stop against the dog or any fixed point, for purposes to be presently explained, and also has attached to it a pawl or detent-bar, *f*, one end of which engages with the ratchet *i*, and is provided with projecting portion *o*, which works in the cut-away portions of ring *c* and thimble H, as and for the purposes which will be presently explained. *m* is a spring, one end of which is fast to collar *I*, the other acting on the pawl or detent *f* to throw, and holds its end in engagement with the ratchet-wheel. At Fig. 1 I have shown the lug *e* held by a notched button or piece *n*, which is confined by pressing between the drill and the fixed surface B by points of friction; but, in lieu thereof, the said stop or lug *e* may operate against the dog or any other stationary point or surface, as seen in dotted lines at Fig. 2, where P illustrates part of the dog or iron clamping-bar that holds the drill, or against which the bearing or purchase is obtained, and where the piece *n* is dispensed with.

The operation of all the parts already alluded to may be thus briefly explained: The apparatus being clamped to the work by a dog, or in any suitable manner, so that the drill-point is on the spot to be perforated, and the opposite end of the apparatus having a bearing against some fixed or stationary surface, and the lug *e* being interlocked or in contact with any fixed surface to prevent it from turning around, the operator simply turns the brace D in the usual manner in the proper direction to rotate the drill *c*. As the brace D is turned the socket E and screw-arbor F, with all the accompanying parts, turn with it (except the collar *I* and its pawl *f*) until the cut-away portions of the thimble H and ring *c* come opposite to the portion *o* of the pawl, when said portion is forced inward by the spring *m* toward the nut *g*, and the pawl or detent *f* engages with the ratchet *i*. The ratchet *i* and pawl *f* being now engaged, the former, and consequently the nut *g*, is held still, while the screw F, thimble H, and ring *c* continue to rotate. This rotation of the screw while the nut *g* is held still, of course, causes the screw F to be fed down by the nut, and thus the drill is fed

into its work; but this feeding down of said screw continues for only a short time, because as the ring *c* rotates the beveled edge of the cut-away portion *s* (see Figs. 1 and 4) of said ring passes under the portion *o* of pawl *f* and lifts the latter out of engagement with the ratchet *i*, so that the nut again rotates or travels with the screw. Each time a rotation of the drill and brace is made this holding still of the nut for a brief period is effected, and the consequent progression of the drill into the work results.

To vary the feed it is only necessary to turn the ring *c* in different positions, securing it in any one by the set-screw *d*, so as to increase or diminish the length or extent circumferentially of the open or cut-away space into which the prong *o* of pawl *f* passes, and thus increase or diminish the time (compared with the time of one revolution of the drill) during which the nut *g* will be held still to effect the feed.

It will be understood that by means of this variable feed device, operating on the feeding-nut or screw-thread, the distance that the screw is fed at each revolution may be regulated, so that the most delicate and, at the same time, uniform and almost continuous feed may be effected.

It will be understood that in lieu of holding a nut on the continuously-rotating screw-shaft the inverse of this arrangement may be adopted with substantially the same feed mechanism and a similar result.

The projecting lug *e* of the pawl-collar, which must be held still or kept from turning, may, of course, be of any size and shape, and only needs to have a bearing against any fixed point or surface, which purchase or bearing may be obtained in any manner most convenient and obvious to the workman.

I am aware that drilling-machines have been made with automatic feed mechanisms, and do not wish to be understood as claiming an automatic feed mechanism in combination with a drilling mechanism; but

What I do claim as new, and desire to secure by Letters Patent, is—

The combination of the thimble H and its adjustable ring *c*, collar *I* provided with projection *e*, and ratchet and pawl *i f* with the nut *g* and screw-shank F, all arranged for operation, substantially as specified.

In testimony whereof I have hereunto set my hand and seal this 16th day of August, 1870.

THOS. J. SLOAN. [L. S.]

In the presence of—
J. N. McINTIRE,
C. E. WARREN.