M. LOVE.

Metal-Drilling Machines.

No. 146,923. Patented Jan. 27, 1874.

Fig. 1.

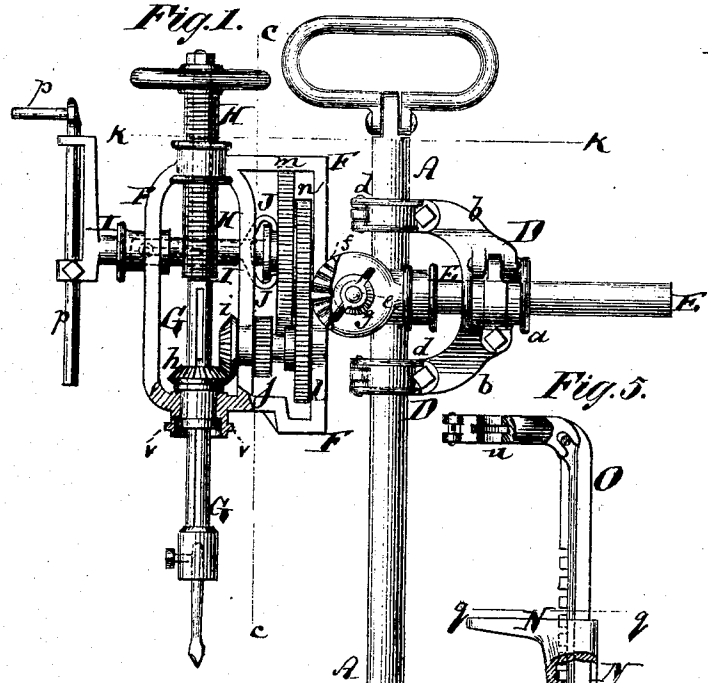


Fig. 2.

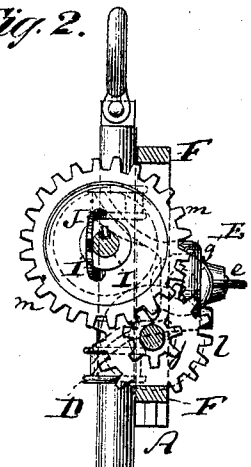


Fig. 5.

Fig. 6.

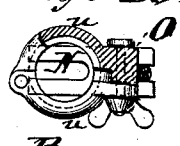


Fig. 7.

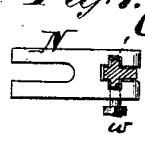
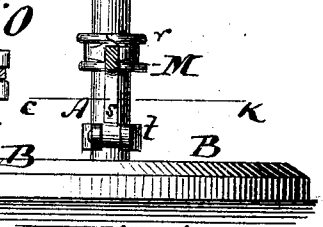
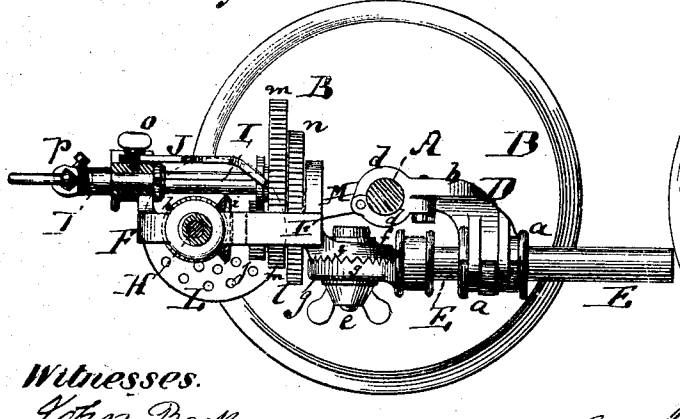
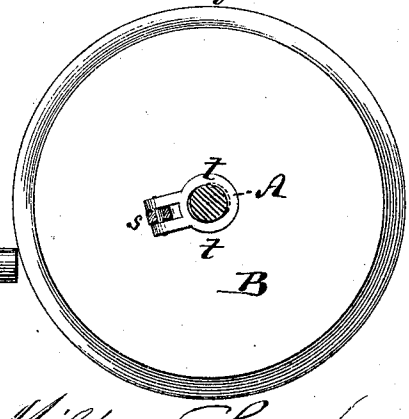


Fig. 3.

Fig. 4.







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UNITED STATES PATENT OFFICE.

MILTON LOVE, OF CORRY, PENNSYLVANIA.

IMPROVEMENT IN METAL-DRILLING MACHINES.

Specification forming part of Letters Patent No. **146,923**, dated January 27, 1874; application filed December 9, 1873.

To all whom it may concern:

Be it known that I, MILTON LOVE, of Corry, in the county of Erie and State of Pennsylvania, have invented an Improved Hand-Drilling Machine, of which the following is a specification:

Figure 1 is a front elevation, partly in section, of my improved hand-drilling machine. Fig. 2 is a vertical section thereof on the line *c c*, Fig. 1; Fig. 3, a horizontal section on the line *k k*, Fig. 1; Fig. 4, a horizontal section on the line *c k*, Fig. 2; Fig. 5, a side view, partly in section, of the false rest and support for my improved hand-drilling machine; Fig. 6, a top view, partly in section, of such false rest and support; Fig. 7, a detail horizontal section of the latter on the line *q q*, Fig. 5.

Similar letters of reference indicate corresponding parts.

This invention relates to an improved drilling apparatus, which can be adjusted in such a manner that the drill may be worked with suitable speed or power, and set in any desired direction to work either vertically downward, or horizontally or upward, or at any suitable angle of inclination, so that the apparatus may be applied in places where other drilling apparatus could not conveniently be used. The invention consists in the novel arrangements of the several parts constituting the frame and mechanism of my drilling apparatus, all tending toward the realization of the objects specified, as will be hereinafter more fully described.

In the accompanying drawing, the letter A represents a post secured upon a suitable base, B, to stand firmly wherever placed. On this post is fitted an up-and-down adjustable slide, D, in which the horizontal shank E of the drill-holder has its bearings. The slide D is composed of a central box, *a*, that embraces the bar E, of two arms, *b b*, projecting from such box toward the post A, above and below the bar or tube E, and of two hinged clamps, *d d*, that embrace the post A above and below the bar or tube E, respectively, all as clearly shown in Fig. 1. The hinged clamps *d d* can be tightened by suitable set-screws, which are indicated in the drawing, so as to bind the slide at suitable height to the post A; and thus, by loosening the said screws, I will be enabled to move the slide up or down, and to turn it and adjust it on the post at any desired height. The box *a*, that embraces the horizontal bar or tube E, is also made in the form of a hinged clamp, as indicated in Figs. 1 and 3, and can also be tightened on the said bar or tube E by a suitable set-screw, so that when it is loosened the bar or tube may be turned on its own axis within such box to allow the inclination of the drill—that is to say, to permit the rotation of the drill on the axis of the tube or cylindrical bar E. After the desired position has been obtained, the set-screw of the box *a* is fastened, and the drill secured. F is the frame, in which the drill stem or spindle G has its bearings. This frame F connects with the bar or tube E by means of a pivot or screw, *e*. This screw passes through two circular plates, *f* and *g*, of which one, *f*, projects from the frame F, and the other, *g*, from the end of the bar or tube E. These two plates *f* and *g*, being of equal size, are placed with their faces in contact, the pin or screw *e* passing through both, as indicated in Fig. 3, the screw or a nut finally binding the two plates together. The contiguous faces of the plates *f* and *g* are toothed with radiating teeth, indicated in Figs. 1 and 3, so that the teeth of one of the plates enter the notches between the teeth of the other plate, and thus, after the screw *e* has been drawn tight, will prevent the two plates from vibrating on each other on the axis of the said screw *e*. By this arrangement, the frame F can be adjusted and brought into the vertical position shown in Fig. 1, or inclined on the axis *e* in any suitable degree. It will thus be seen that, by means of the adjustable slide D, and by the facility of turning the bar or tube E in the box *a*, and adjusting the frame F on the axis *e*, the drill can be brought into any desired position as to height and inclination. The drill-stem G has its upper end swiveled into a screw, H, that enters the upper end of the frame F, so that, by means of said screw H, the drill-stem can be set higher or lower in the frame F—that is to say, the drill can be fed in the desired manner by hand, a hand-wheel or handle being applied to the upper end of the screw H for that purpose, while, during operation, the drill-stem turns loose in the screw H, and does not affect the position

thereof. In the lower part of the frame F is swiveled a miter-wheel, *h*, which embraces the stem G, and connects therewith by feather and groove, so that the rotation imparted to the miter-wheel will be transmitted to the stem G and to the drill attached thereto, while at the same time the said stem will be permitted to be adjusted lengthwise without affecting the position of said miter-wheel. The miter-wheel *h* meshes into the teeth of another miter-wheel, *i*, whose arbor is hung horizontally in the frame F, and upon which there are mounted two pinions, *j* and *l*, the pinion *j* being smaller than *l*, as shown in Fig. 1. A horizontal driving-shaft, I, has its bearings in the upper part of the frame F, and carries two toothed wheels, *m* and *n*, which connect with said shaft I by groove and feather, and also with a clutch, J, whereby they can be slid on the shaft. When, by means of said clutch, the wheels *m* and *n* are brought into the position shown in Fig. 1, the wheel *n* will be in gear with *l*, while *m* and *j* will be out of gear. Thus the smaller wheel on the driving-shaft will be in gear with the larger wheel on the arbor of the miter-wheel *i*, and greater power, with less speed, will be the consequence. But when, by means of the clutch J, the wheel *m* is drawn into gear with *j*, and *n* out of gear, the larger wheel on the driving-shaft will be in gear with the smaller wheel on the arbor, and greater speed with less power will be obtained. Thus, by means of the clutch J, the drill may be adjusted either to increased speed or power, as may be desired. The clutch is slotted and can be secured, by a set-screw, *o*, in either of its two positions onto the frame F. The handle *p* of the driving-shaft *g* is also adjustable therein in the manner indicated in Fig. 1—that is to say, fitted through projecting lips or cranks of said shaft and secured by a set-screw, so that the adjustment of such handle may also be used to increase the power of the machine. A pulley or band-wheel may be used in place of the handle *p*. L is the rest of the drill, being a plate of circular or other form, perforated in the usual style and swiveled in a horizontal arm, M, that projects from the post A. A hinged clamp, *r*, at the inner end of the arm M, embraces the post A and enables the operator to secure the arm M at suitable height on said post in conformity to the thickness of the work to be drilled, and the position of the drill and frame F on the post. The arm M has a downwardly-projecting brace, *s*, which is pivoted to a sleeve, *t*, that loosely embraces the shaft A. The sleeve *t* serves not only, by its connection with the brace *s*, to hold the arm M horizontally and to remove the strain therefrom, but also to prevent the dropping of the arm M on the post A while the set-screw of the hinged clamp *r* is being loosened, a slight inclination of the arm M and rest L tending them to bind the sleeve *t* onto the post A and to retain the rest in position until the same is intentionally lowered or raised into a different position. In some cases, especially when the drill is not used in the vertical position, the rest L will be useless, and, nevertheless, it will be desirable to have a rest even for the inclined drill. For this purpose I have applied a false rest, N, which can be used when the drill is inclined, or, in fact, whenever the rest L is not to be used. This false rest slides on a bar, O, which has a hinged clamp, *u*, at its upper end. By this hinged clamp the rod O is connected with the lower end of the frame F, where there is a projecting bead, *v*, concentrically around the stem G. When this clamp *u* of the bar O is placed around this bead *v* and secured the arm O will be parallel about with the stem G, and will be swiveled to the frame F, so that it can be turned therein to bring the rest N into any suitable position. The rest N can slide on the bar O and be fastened, by a set-screw, *w*, at the desired height, to such bar O, the latter being, by preference, toothed, as shown in Fig. 5, to permit the rest to be firmly secured in the desired position as to height, the rest having one or more teeth which enter the notches of the bar O.

Of course the false rest L, with its appendages, is or may be removed, when the rest L can be used. This false rest may be applied to other drills with the same results as on this drill, and used in the same manner.

I claim—

1. The slide D, containing the hinged clamps *d d* and box *a*, and combined with the post A and with the horizontal cylindrical shank E of the drill-frame, substantially as and for the purpose herein specified.

2. The combination, in the frame F, of the clutch J, wheels *m n j l h*, and drill-stem G, as and for the purpose set forth.

3. The false rest N, fitted adjustably upon the bar O, which has the hinged clamp *u* for application to the frame F, substantially as set forth.

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Witnesses:
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