UNITED STATES PATENT OFFICE.

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ELECTRIC DRILL, &c.

SPECIFICATION forming part of Letters Patent No. 644,591, dated March 6, 1900.
Application filed April 8, 1899. Serial No. 713,248. (No model.)

To all whom it may concern:

Be it known that I, WARREN P. FREEMAN, a citizen of the United States, and a resident of New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Electric Drills and Analogous Machinery, of which the following is a specification, reference being had to the accompanying drawings, forming part of the same, in which—

Figure 1 represents in side elevation a drill embodying my invention. Fig. 2 represents the same device, but with the gears brought into engagement; and Fig. 3 is a central vertical sectional view of the motor I prefer to employ.

My purpose has been to produce a convenient drill which could be easily manipulated and yet be effective.

S is the standard, which may be of any suitable form and is here shown as an upright post with a broad supporting-base. Extending from a sleeve s on said post is a table T for supporting the work. This table is held in position by a set-screw l', to which is attached a lever l, and a stop e is provided. Then when it is desired to shift the table upward the operator seizes the lever l and swings it upward, thus loosening the set-screw. As it continues to turn the projection p on the lever strikes the stop e, and the further application of force will raise the table, thus enabling the attendant to perform that operation with one hand. Gravity will lower it upon the set-screw being loosed, provided the attendant permits the descent.

Above the location of the table-sleeve I locate two arms A A', one above the other, to support and guide the drill stock or rod D. I prefer to mount these arms on sleeves s s', surrounding the post S and rigidly secured thereto, but sleeves are not absolutely necessary. The arms are provided with guide-ways through which the drill-stock D extends.

Between arms A A' upon the drill-stock D I place a friction-drum F, secured to the drill-stock, so as to rotate with it, by a spline or feather f on the drill-stock working in a slot in the drum, said slot being enough longer than the feather to permit the drill-stock to be raised and lowered at pleasure. A washer w is preferably placed between the bottom of the drum and the upper face of arm A.

A jointed handle-bar h h' is mounted on arm A', the upright portion h being secured by a set-screw l' to h. The horizontal part or handle h' is jointed, and a supplemental arm a extends outward and downward from arm h' to a point registering with stock D. Arm a is bifurcated, and the tines of its fork take 60 into a groove g in the upper part of the drill-stock. The handle h' is also provided with a pointed pivot-bearing b, which takes into a slight depression in the upper end of drill-stock D, so that by seizing the handle the attendant may put such pressure as he pleases upon the drill-stock or may depress it to cause the drill to bear upon the work or raise it to free the work from engagement with the drill. A weight may be hung on the handle to continue the pressure of the drill upon the work should the attendant wish to leave it unattended.

M is the motor supported on arms A A', sleeved upon standard S. A collar C and set-screw c and a set-screw e sustain the motor in position and yet permit a variation in its vertical or radial location. Wires W W' extend from the binding-posts B B' of the motor to a suitable power-supply. The axle a of the motor-armature a is provided with a friction-wheel F', beveled to gear with drum F and normally supported with the armature by a spring S' in the position shown in Fig. 3. This position, as will be noticed in Fig. 3, is somewhat different from that of the armatures of ordinary motors. The armature, instead of being so supported as to extend an even distance in each direction from the horizontally-central line of the field-magnets m m, is held somewhat above such a position.

The operation is as follows: The attendant, having prepared his work, placed it in a suitable position upon the table, and there secured h, loosens set-screw e, (supposing the parts of the drill to be in the positions shown in Fig. 1,) swings the motor and its friction-wheel around until the wheel F' bears upon friction-drum F, and then secures it in place. He then seizes handle h', brings the drill to bear upon the work, and turns the switch v,
(or he may turn the button first and then bring the drill down upon the work.) Immediately the motor will begin to rotate its armature and wheel F also, and that in turn will rotate drum F and the drill-stock and drill, and the work will proceed. Not only so, but as soon as the field-magnets are energized the draft of their electric power will tend to draw down the armature a' against the stress of spring S', and thereby increase the friction between wheel F' and drum F, this tending to draw down the armature and increase the friction, and the consequent power of the machine will be opposed by the resistance of one incline to the other and will adjust itself more nicely than would be practicable for the attendant to do anything approaching the rapidity and nicety with which it will be automatically done by the means described. To decrease the speed, it is only necessary to loosen set-screw $\theta$, lower collar C, then loosen set-screw $\phi$, lower the motor-wheel F' and the motor to engagement with a larger diameter of drum F, and this may be done without entirely stopping the movement of the drill, and, as is manifest, raising wheel F' to a higher plane would increase the speed of the drill.

Performance of work may be stopped either by raising the drill, by disengaging the friction-surfaces, or cutting off the current, as may be desirable.

I have shown and described friction-wheels; but other forms of engaging devices to transmit the power may be readily substituted therefor. Indeed, many variations in the devices will readily suggest themselves to any competent mechanic, and I do not intend to limit myself to a Chinese copy of any particular feature.

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

1. The combination of a standard, a support extending therefrom, a drill-stock rotatably mounted in said support, a friction-gear, secured to said drill-stock so as to rotate with it, a motor swiveled to the standard, a friction-gear mounted on the shaft of the motor-armature and means substantially as set forth for bringing the two friction-gears into engagement one with the other.

2. The combination of a standard, a support extending thereupon, a vertically-adjustable drill-stock rotatably mounted in said support, a friction-gear of horizontally-fixed position, secured to said drill-stock so as to rotate with it; a motor swiveled to the standard, a friction-gear mounted on the shaft of the motor-armature and means substantially as set forth for bringing the two friction-gears into engagement one with the other.

3. The combination of a standard a support extending therefrom, a drill-stock rotatably mounted in said support, a friction-gear secured to said drill-stock so as to rotate with it, a motor swiveled to the standard and provided with an armature which, except when energized, is supported a little out of the position to which the draft of the field would naturally tend to bring it, a friction-gear secured to the shaft of said armature and means substantially as set forth for bringing the two friction-gears into contact, one with the other.

Signed at New York, in the county of New York and State of New York, this 7th day of March, A. D. 1899.

WARREN P. FREEMAN.

Witnesses:

SPENCER C. CARY,
A. G. N. VERMILY.