No. 676,043. Patented June 11, 1901.

J. C. LINCOLN.

ELECTRIC DRILL.

(Application filed Nov. 22, 1899.)

(No Model.)

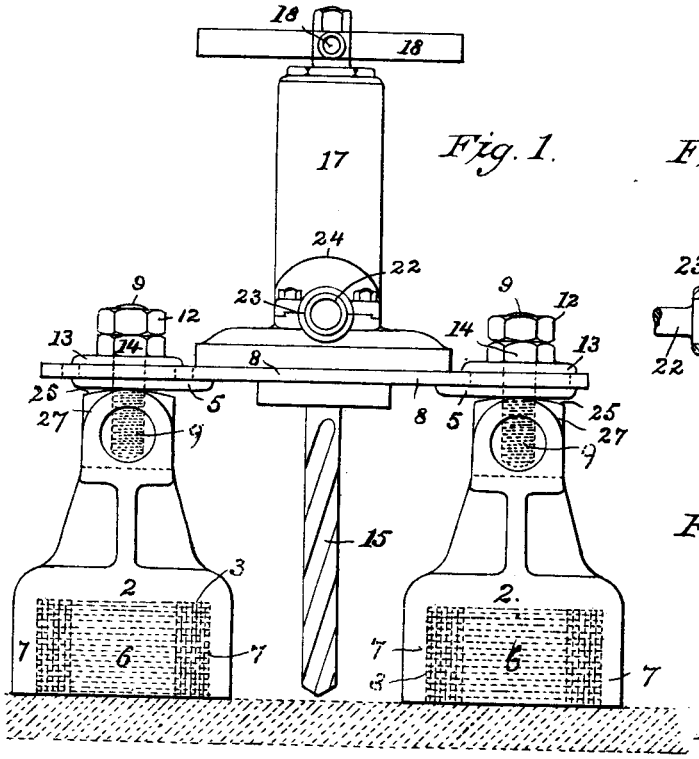

Fig. 1.

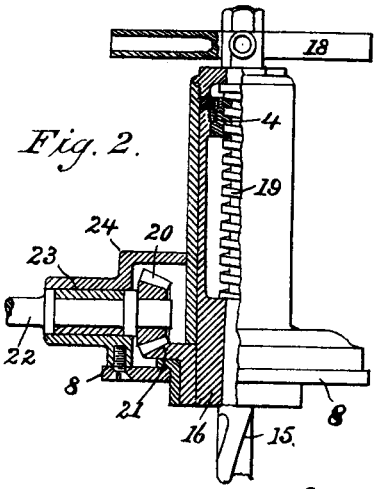

Fig. 2.

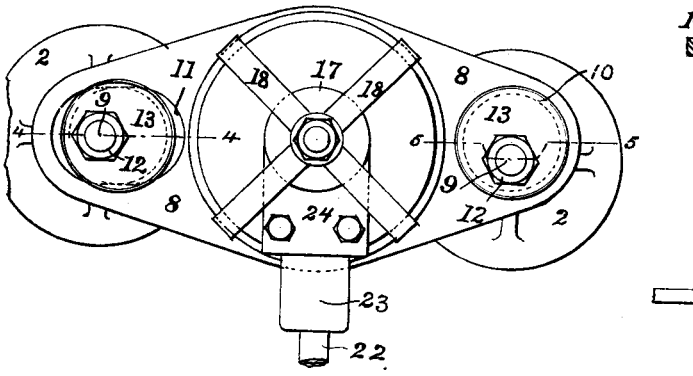

Fig. 3.

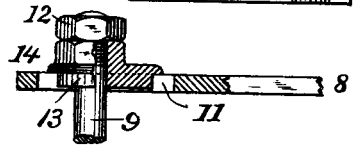

Fig. 4.

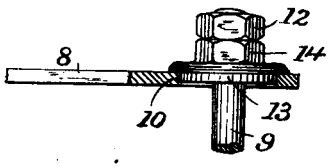

Fig. 5.

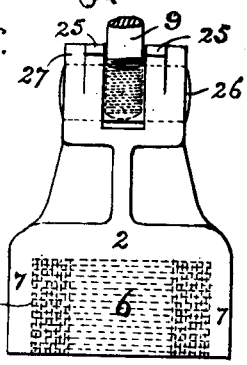

Fig. 6.

WITNESSES:

Wm. A. Skinkle

C. A. Henderson.

INVENTOR.

John C. Lincoln

BY

Am Austin

ATTORNEY.

UNITED STATES PATENT OFFICE.

JOHN C. LINCOLN, OF CLEVELAND, OHIO.

ELECTRIC DRILL.

SPECIFICATION forming part of Letters Patent No. 676,043, dated June 11, 1901.

Application filed November 22, 1899. Serial No. 737,907. (No model.)

To all whom it may concern:

Be it known that I, JOHN C. LINCOLN, a citizen of the United States of America, residing at Cleveland, Cuyahoga county, Ohio, have invented certain new and useful Improvements in Electric Drills, of which the following is a specification.

The annexed drawings and the following description set forth in detail one mechanical form embodying the invention, such detailed construction being but one of various mechanical forms in which the principle of the invention may be used.

In the accompanying drawings, Figure I represents a side elevation of my improved drill. Fig. II is a side elevation, partly in section, of the bit feeding and rotating mechanism. Fig. III is a plan view of the drill. Fig. IV represents a cross-section on the line 4 4 of Fig. III. Fig. V is a similar section on the line 5 5 of Fig. III. Fig. VI is an end view of the magnets, showing means for attaching the platen.

The drill is secured to the metal plate 1 or the material to be operated upon by means of two electromagnets 2, each of which is provided with an annular recess 3, containing coils 6. The outer annular wall 7, that forms one of the poles of each magnet, is preferably thinner than the plate to which the drill is secured. The magnets are provided with upwardly-projecting ears or lugs that have their bearing-faces 25 suitably rounded or inclined and provide bearings for swivel-pins 26, journaled therein. The platen 8 is secured to the magnets by bolts 9, tapped into the swivel-pins and which pass through perforations 10 and 11 provided in the platen and are threaded at their upper ends to receive nuts 12. One of said perforations is circular and the other perforation is oval or elliptical in outline. Circular disks 13 seat in these perforations and are mounted eccentrically upon the bolts 9. Each disk is provided with a flange that projects over the perforation and with a perforated nut or boss 14, preferably formed integral therewith, through which the bolt passes. Each disk is also provided, preferably, with a flange or enlargement 5 beneath the platen, which rests upon the bearing-faces of the magnet and holds the platen from contacting directly therewith.

The bit 15 is held by a chuck 16, that is longitudinally and rotatably movable in the casing 17. The chuck is fed by a handle 18 upon a screw-threaded rod 19, which engages a nut secured in the upper end of the chuck and is rotated by a beveled pinion 20, meshing with a beveled gear 21, secured to the chuck in any well-known manner, as by a feather and groove, that will permit longitudinal movement of the chuck through the hub of the beveled wheel, while compelling them to rotate together. The pinion is keyed upon a shaft 22, journaled in bearings 23, provided by a housing 24, that is secured to the casing and the platen. Said shaft may be either flexible or rigid and is preferably actuated by a motor that may be operated by the same current that excites the magnets.

The drill is secured to the metal platen by the magnets, so that the bit is over or nearly over the point to be drilled, and the bit is then adjusted by rotating the eccentric disks. Rotation of the disk seated in the circular perforation moves the platen to the right or left, as seen in the drawings, approximately in the plane of the magnets, and rotation of the disk in the oval perforation moves same in a direction approximately at right angles thereto in an arc having the circular perforation as its center. In case the drill is to be operated upon an uneven or curved surface the swivel-pins permit the platen to be moved upon curved bearing-faces of the magnets until it is in a horizontal plane. After the bit has been adjusted the platen is secured in position by tightening the nuts upon the bolts. By means of this construction the drill can be adjusted with the utmost precision upon either a plane or curved surface without moving the magnets, provided they are placed with reasonable care. The constant switching on and off of the electrical current and changing the magnets in order to adjust the drill is thus avoided. Not only is the labor required of the operator decreased, but the adjustment can be made more rapidly and accurately than when the magnets require to be moved. The mechanism for ro-

tating the bit permits the drill and motive power to be constructed separately, whereby the weight of the drill is reduced to a minimum and its construction is correspondingly simplified.

I claim as my invention—

1. In an electric drill, the combination with two magnets and a platen having a bearing on said magnets, of means upon each magnet engaging the platen to move same in different directions in the same plane, substantially as described.

2. In an electric drill, the combination of two magnets, a platen arranged between the magnets, means upon one of the magnets for moving the platen in one direction, and means upon the other magnet for moving the platen in a different direction, substantially as described.

3. The combination with two magnets and a platen arranged between and supported by said magnets, of means upon one of said magnets for moving the platen in a plane transverse of the axis of the drill, and means upon the other magnet for moving one end of the platen in a direction approximately at right angles to the direction of said first movement, substantially as described.

4. The combination with two magnets and a platen arranged between and supported by said magnets, said platen being provided at one end with a circular perforation and at its other end with an oval perforation, of a circular disk in each of said perforations, said disks being eccentrically rotatable upon means securing the platen to the magnets, substantially as described.

5. In an electric drill, the combination of two magnets, a platen between said magnets, a bit supported by the platen and arranged between the magnets, means upon the platen for feeding and rotating the bit, and means upon each magnet engaging the platen to move same and the bit in different directions in the same plane.

6. In an electric drill, the combination of two magnets, each provided with upwardly-extending lugs having curved bearing-faces, and a swivel-pin journaled in said lugs, a platen between the magnets and movably secured thereto by bolts tapped into the swivel-pins, and means upon said bolts for adjusting the platen, substantially as described.

In testimony whereof I sign this application, in the presence of two witnesses, this 17th day of November, 1899.

JOHN C. LINCOLN.

Witnesses:

C. I. HENDERSON,

G. H. FOSTER.