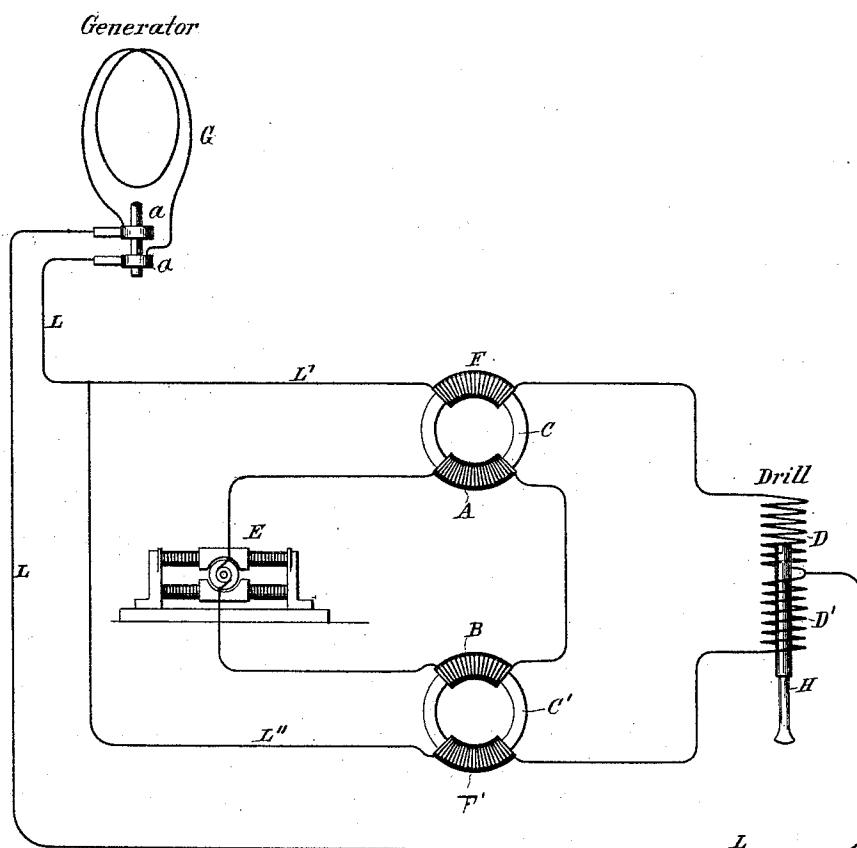


(No Model.)

H. N. MARVIN.
ELECTRIC DRILL SYSTEM.

No. 467,509.

Patented Jan. 26, 1892.



Witnesses:

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UNITED STATES PATENT OFFICE.

HARRY N. MARVIN, OF SYRACUSE, NEW YORK, ASSIGNOR TO THE MARVIN ELECTRIC DRILL COMPANY, OF SAME PLACE.

ELECTRIC-DRILL SYSTEM.

SPECIFICATION forming part of Letters Patent No. 467,509, dated January 26, 1892.

Application filed August 15, 1891. Serial No. 402,719. (No model.)

To all whom it may concern:

Be it known that I, HARRY N. MARVIN, a citizen of the United States, residing at Syracuse, in the county of Onondaga and State of New York, have invented certain new and useful Improvements in Electric-Drill Systems, of which the following is a specification, reference being had to the drawing accompanying and forming a part of the same.

This invention relates to systems or combinations of apparatus for operating by electrical agency electro-magnetic reciprocating drills or other similar tools. These systems involve a generator of electric currents, a drilling-tool provided with a reciprocating core or plunger and coils or solenoids acting on said plunger, and means for directing the current or current impulses alternately through the said coils to produce the necessary movements of the core and the cutting-tool attached thereto.

The improvements which form the subject of my present application consist in a novel means for effecting the transference of the current from one coil to the other, the object of such improvements being mainly to avoid the use of commutating devices or shifting contacts, such as have heretofore been generally employed.

In carrying out my invention I employ an ordinary alternating-current generator of slow period, using for this purpose any such form of generator as has been heretofore employed with these drills, and which under the most efficient conditions of speed delivers impulses of current at the rate best adapted for the operation of the drill. One of the terminals of such generator is connected to a conductor common to both of the drill-coils. The other terminal is connected with a conductor that is divided at any desired point between the generator and the drill into two branches which connect, respectively, with the two drill-coils and which include some form of device capable of setting up in the respective branches a counter electro-motive force opposite in direction to that of the other, whereby currents or current impulses of one direction will be opposed or retarded in one branch and facilitated in the other, and conversely.

The invention may be carried out by the aid of various devices, but in practice I pro-

pose to establish two fields of force of opposite character through which the respective branches are carried, and by the inductive effect of which currents of one direction are opposed or impeded, while currents in an opposite direction are met by practically no other opposition than that due to the ohmic resistance of the conductor.

The specific details of this invention I have illustrated in the accompanying drawing, which is a diagram of the entire system, in which the various elements are illustrated by the usual conventional representations.

G represents a generator of alternating currents similar in construction to those now in use for a similar purpose, and provided with an armature-coil terminating in collecting-rings *a a*. From brushes or springs bearing on these rings the line-wires L L run to the drill or drills, one of which only is shown in the diagram.

The drill is composed, essentially, of a reciprocating core or plunger, carrying the cutting-tool H and working in a solenoidal coil, divided into two parts or sections D D'. One of the line-conductors is carried direct to the center of this coil, to which it is electrically connected. The other conductor is branched or divided at any point in its course, and the two branches are connected, respectively, to the free terminals of the drill-coils D D'. In one of the branches, as L', is an induction device such as a magnetic ring C, wound with two coils A F. In the other branch L'' is a similar device, the ring C' on which is wound with two coils B F'. A galvanic battery, a continuous-current dynamo, or any other similar source of current includes in its circuit the two coils A and B and imparts to the rings C C' constant magnetism, maintaining the rings at or near the point of saturation. The two coils F F' are wound in such direction with reference to the coils A B on the respective rings that a current impulse of given direction, which tends to divide between the two branches L' L'', acts to increase the saturation of one of the rings, or, in other words, to magnetize it more strongly, but to demagnetize the other. In consequence of this the currents meet with a strong opposition in the latter branch, but with little opposition in the other. Hence practically the whole cur-

rent impulse will follow the path of less resistance passing through the branch that tends to increase the saturation of the iron ring. A current of opposite direction obviously has the opposite effect and passes through the other coil of the drill. In this way the drill-coils or sections of coil receive currents in alternation and a reciprocation of the plunger results.

10 What I claim as my invention is—

1. The combination, with an alternating-current generator and a reciprocating drill having two energizing-coils, of a divided conductor from one generator-terminal to the two coils, respectively, and a device in each branch of said conductor for producing a counter electro-motive force or electrical resistance to currents of a given direction, but not to those in an opposite direction, as set forth.

20 2. The combination, with an alternating-current generator and a reciprocating tool having two energizing-coils or coil-sections, of a divided conductor from one generator-terminal to the two coils, respectively, and a magnetically-saturated induction device included in each branch, adapted to oppose current impulses of opposite directions, respectively, as set forth.

3. The combination, with an alternating-current generator and a reciprocating tool consisting, essentially, of a magnetic core or plunger and two energizing-coils, of a conductor connecting one terminal of the generator to one terminal of each drill-coil, a conductor from the other terminal of the generator, divided into two branches connected to the outer ends of the two drill-coils, and devices for producing a counter electro-motive force or electrical resistance of opposite effect included in or connected with the said two branches, respectively, as herein set forth.

4. The combination, with an alternating-current generator and a reciprocating tool having two energizing-coils, a divided conductor from one generator-terminal to the two coils, respectively, magnetic cores C C, energizing-coils A B thereon and in circuit with a source of continuous currents, and coils F F', also wound on said cores and included in the branches L' L'', respectively, as herein set forth.

HARRY N. MARVIN.

Witnesses:

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