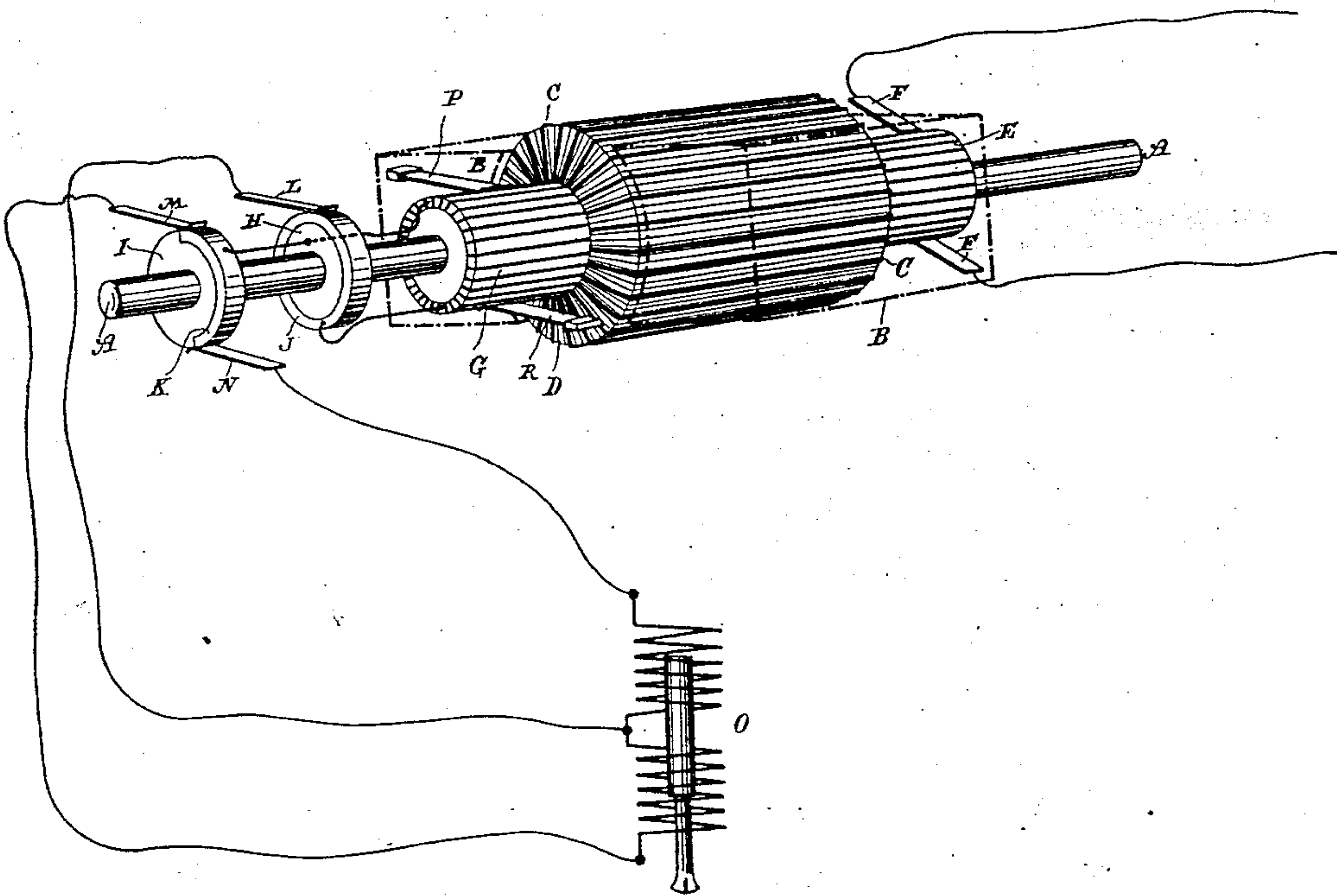


(No Model.)

H. N. MARVIN. BEST AVAILABLE COPY  
ELECTRIC DRILL SYSTEM.

No. 429,731.

Patented June 10, 1890.



Witnesses:

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## UNITED STATES PATENT OFFICE.

HARRY N. MARVIN, OF SYRACUSE, NEW YORK.

## ELECTRIC DRILL SYSTEM.

SPECIFICATION forming part of Letters Patent No. 429,731, dated June 10, 1890.

Application filed March 19, 1890. Serial No. 344,482. (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 Transformers for Electrical 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 is an improvement applicable to a system or plan of operating percussion or reciprocating drills and similar tools, in which pulsations or impulses of current are directed in alternation from a suitable generator or source of current through oppositely-acting coils, which effect the reciprocation of a magnetic core to which the drilling-tool is connected. Such devices or tools are used in mines, quarries, and the like, and frequently at a considerable distance from the generator or source of current. Under such circumstances it is often desirable to use a line-current of higher potential than that used in the drills, and under other circumstances it is often desirable to convert a continuous current into one that is better adapted to effect the operation of the drills.

The subject of my present invention is an apparatus by the use of which either of these results may be accomplished.

Generally stated, it consists in a transformer adapted to convert direct or continuous currents of a given potential into pulsating currents of the same or another potential, which is to be connected at any desired point in an electric circuit, and which may be used to operate one or any desired number of reciprocating drills.

The general plan of construction of this device is an armature, preferably of cylindrical or annular form, mounted to turn between proper field-magnets and provided with two windings. One of these windings, which may be regarded as the primary, inasmuch as it is to be connected to the line or generator circuit, is provided with a commutator and brushes by means of which the line-current imparts rotation to said armature. The other winding is connected to any suitable form of current distributor or commutator by means of which current impulses, pulsations, or al-

ternations are or may be directed through suitable brushes alternately into the two circuits, including the coils of a drill or drills.

The primary and secondary circuits or windings of the transformer may be so proportioned as to length, quantity of copper, and other well-known understood conditions as to alter the relative potential of the currents induced, as will be well understood, the pulsations of current being induced by the rotation of the secondary winding in the magnetic field produced by the primary current.

The details of this invention will be understood by reference to the accompanying drawing, which is a view, partly diagrammatic and in perspective, of an apparatus constructed in accordance with the invention.

What I designate as the "transformer" in this case comprises practically a motor and a generator, the former being adapted to be operated by a current from a suitable source and the latter being constructed to supply defined impulses or pulsations of current. Such a device may be constructed in various ways; but that which I prefer is constructed as follows:

A is an armature-shaft, on which is mounted a suitable armature-core that is capable of revolving in the field produced by magnets. (Represented by B.) The core is wound with two independent coils or sets of coils. (Designated by the letters C and D, respectively.) At one end of the core is an ordinary segmental commutator E, with the plates of which the coils or loops from the coils C are connected. Brushes F bear on this commutator and are adapted to be connected with the line-wires from any suitable source of continuous currents. I have omitted to show any of the ordinary provisions for exciting the field-magnets from the main line, as this is a matter well understood. There is a second commutator G at the opposite end of the core, and to the plates of said commutator the secondary coil or coils D are connected in the usual manner.

In addition to the commutator G there are secured to the shaft A two disks H I. One of these disks, as H, is provided with a metal ring J, connected with a segment or plate of the commutator, and the other, as I, carries a half-ring K, connected with the diametric-



ally-opposite commutator-segment. A single brush L bears on the continuous ring J, and two brushes M N bear upon opposite sides of the edge of the disk I.

5 The drill is represented by O, and its two coils are shown as connected by one of their terminals to the brushes M N, respectively, while the other terminals are joined by a common return-wire to the brush L.

10 It is apparent from the character of this construction that a continuous current directed through the coils C will impart rotation to the armature, and that in consequence current will be developed in the coil or coils  
15 D, and that this current will be delivered in impulses of rising and falling potential alternately into the two circuits of the drill. At the same time a secondary continuous current may be taken off from the commutator  
20 G by brushes P R bearing thereon.

The commutator G may be dispensed with and the coil D connected directly to a suitable form of distributor for delivering current-impulses alternately to the drill-coils, or any  
25 other form of distributor suitable for this purpose may be used in conjunction with the commutator. I do not describe in detail any of the various forms of distributor that may be used in this way, as I have shown several  
30 of such devices in my Patent No. 420,816, dated February 4, 1890, and elsewhere, and they are now well understood.

With this plant all the advantages of a converter system may be secured, while a

ready and practicable means is provided for 35 operating my drills from any continuous-current circuit.

The invention claimed in this application is limited to combinations involving the use of a transformer, and the broad principle of 40 operating drills by pulsating or alternating currents is not claimed herein.

What I claim is—

1. A transformer for electrically-reciprocated drill systems, comprising, in combination, motor-coils and generator-coils mounted to rotate in the same field of force, a commutator connected with the motor-coils, and a distributor connected to the generator-coils and adapted to connect said coils alternately 50 with the drill circuits or coils, as herein set forth.

2. The combination, with field-magnets, of an armature-core mounted to rotate within the field of force produced thereby, primary 55 and secondary coils wound on said core, a commutator connected with the primary coils, a distributor composed of a continuous and a half ring connected, respectively, to opposite points or parts of the secondary coil, and 60 brushes forming the terminals of two independent circuits bearing upon the said rings in the manner described.

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