(No Model.)

# H. N. MARVIN.

## GENERATOR FOR ELECTRICALLY RECIPROCATED TOOLS.

No. 429,732. Patented June 10, 1890.

*Fig. 1*

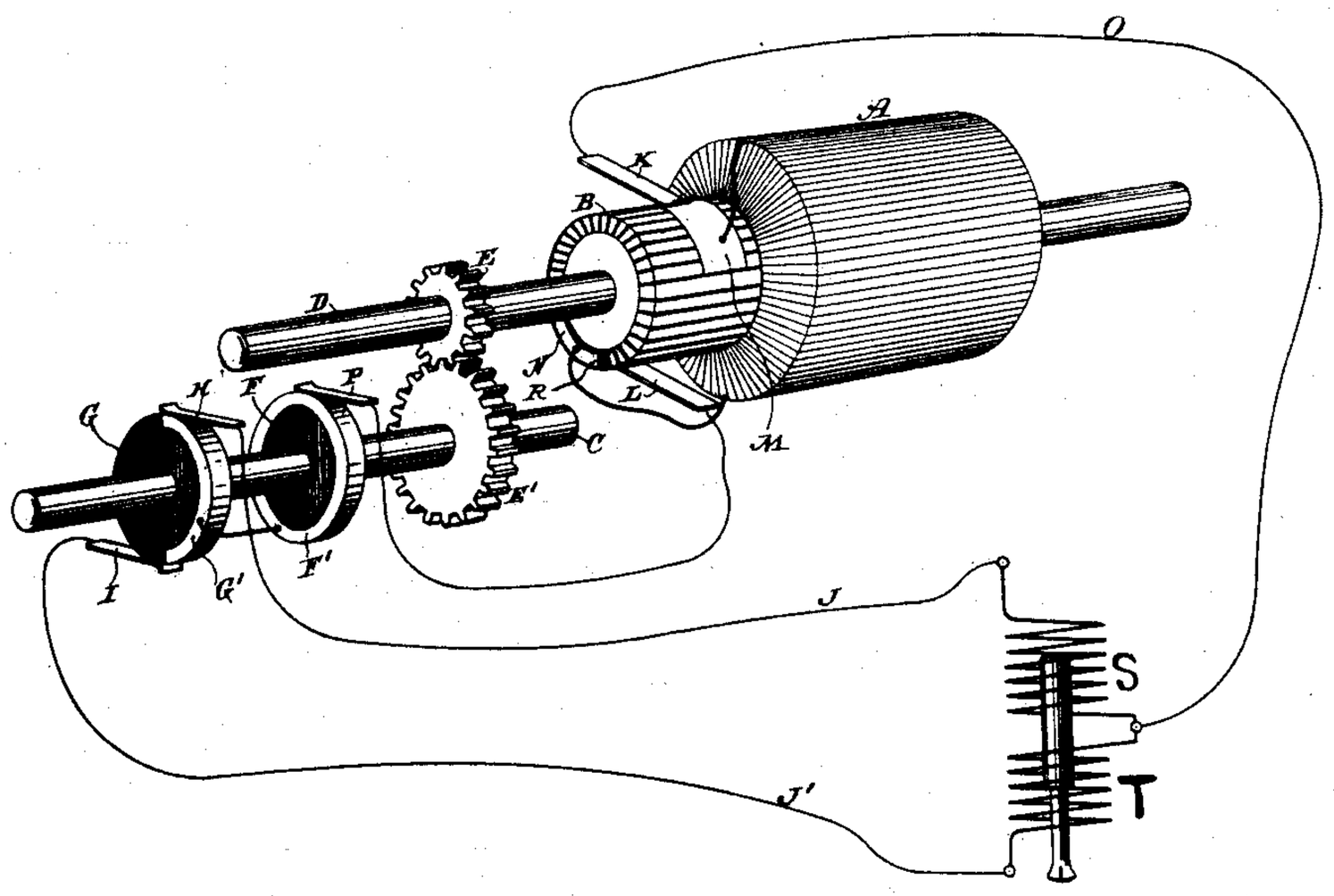



*Fig. 2*

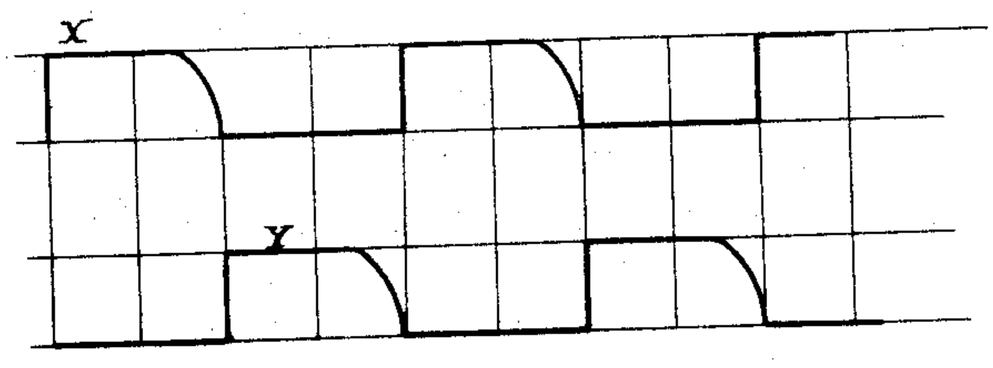
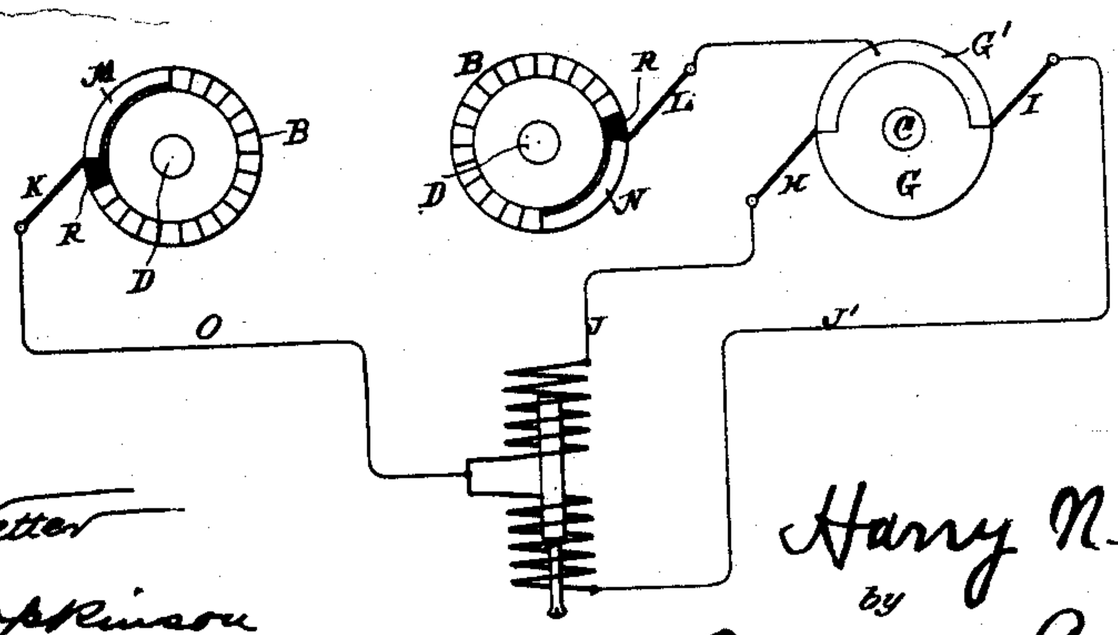



*Fig. 3*

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# UNITED STATES PATENT OFFICE.

HARRY N. MARVIN, OF SYRACUSE, NEW YORK.

## GENERATOR FOR ELECTRICALLY-RECIPROCATED TOOLS.

SPECIFICATION forming part of Letters Patent No. 429,732, dated June 10, 1890.

Application filed March 19, 1890. Serial No. 344,483. (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 Generators for Electrically-Reciprocated Tools, of which the following is a specification, reference being had to the drawings accompanying and forming a part of the same.

This invention relates to systems for operating percussion-drills in which two line or working circuits are employed, and which include, respectively, the coils of a drill or drills that produce the reciprocation of a magnetic core or plunger that carries the drilling or other tool.

The subject of the invention is an improvement in the apparatus or means for generating the necessary current impulses and supplying or delivering the same to the two working circuits or coils of the drill.

My objects in this invention are, mainly, to provide means for operating the drills at a lower rate of speed relatively to that of the generator than has heretofore been done, to produce or provide for the delivery to the respective drill-coils of current impulses of a character better adapted to perform the work required of them, and generally to afford a more efficient and practicable system than those heretofore used or proposed. To this end I employ a form of commutator or current-distributer rotating in unison with the armature of the generator, but at a lower rate of speed, and electrical connections so arranged that at the end at least of each impulse delivered by the distributer, and at or about the moment when a shifting of contacts takes place, the impressed electro-motive force will be at a minimum. I also construct or arrange the means for supplying the currents in such manner that each impulse will start with the maximum impressed electro-motive force, which will be maintained through the greater part of the period of such impulse and then gradually fall off until at its termination it becomes minimum.

A detailed explanation of the means by which I accomplish these results will serve to better explain the nature and principle of the invention.

Referring, therefore, to the accompanying drawings, Figure 1 is a view in perspective, partly diagrammatic, of a system containing my invention. Fig. 2 is a diagram of the curves of the impressed electro-motive force produced by the generator. Fig. 3 is a diagrammatic illustration of the relative arrangement of current collecting and distributing devices.

A represents the armature of an ordinary continuous-current dynamo-electric machine, which, as will be well understood, may be excited from an external source from a current derived from its armature or otherwise.

B is a commutator, the insulated segments or plates of which are connected to the several sections of the armature-coil.

C is a counter-shaft geared to or driven by the armature-shaft D in any suitable manner, but so as to revolve at a slower speed—say one-half as fast—the connection in the present case being shown as made by gears E E′.

On the shaft C are fixed two insulating-disks, one, as F, carrying a metal ring F′ and the other G a half-ring G′. Brushes H I bear upon diametrically-opposite points of the disk G, and these brushes are connected with the two drill circuits or coils J J′, respectively.

Two brushes K L bear upon the periphery of the commutator B at opposite ends of the same, and in the paths of these brushes, respectively, are placed blocks or plates M N, each extending over ninety degrees of the circumference of the commutator. These plates or blocks are electrically connected with diametrically-opposite commutator-segments and extend backward from the same, the segments which they overlap being cut away and an insulating substance being interposed between them and the plates.

To one of the brushes, as K, is connected a conductor O, which forms the common return-wire for the two drill-coils. The other brush, as L, is connected with a brush P, that bears upon the metal ring F′, which is connected electrically with the half-ring G′. An insulating-division of mica or other refractory material (marked R) is inserted in the commutator between the end of each plate M N and the adjacent commutator-segment.

By reason of this plan of connections and the proper relative disposition of the parts described the operation of the system is as follows: In the position of the parts shown the brushes K L have just left the two plates or blocks M N and are passing over the mica segments R, which should be slightly wider than those portions of the brushes that bear upon the commutator. The brushes then come in contact with the segments of the commutator proper, and an electro-motive force is impressed upon the circuit of the brushes of maximum value. Such circuit is run from brush K to the junction of the drill-coils, thence through coil S to brush H, and then to the continuous ring F′ and brush P, back to the commutator. As the armature revolves, this maximum electro-motive force is maintained during the next three-fourths of a revolution; but when at the beginning of the last quarter of a revolution of the commutator the brushes K L come onto the plates or blocks M N the electro-motive force begins to fall as the coils of the armature to which these blocks are connected move around into the position of maximum induction. When the revolution is completed, the potential between the brushes K L falls to zero. Up to this time the shaft C has made a half-revolution and the segment or half-ring G′ shifts from the brush H to the brush I. The next revolution of the armature and commutator B sends a current of like character into the coil T of the drill, and so on.

The character of the impressed electro-motive force supplied to each drill-coil in succession is indicated by the curves X and Y, and it will be observed that for three-fourths of a revolution of the armature the impressed electro-motive force is at a maximum, and that it then falls off to minimum during the last quarter.

It will be understood that the actual current in each coil is modified to some extent by the self-induction and the counter electro-motive force of the coils, and will not correspond exactly with the impressed electro-motive force; but for practical purposes only the latter may be considered.

The relative lengths or positions of the plates M N and the half-ring G′ will determine whether the sparking, when such occurs, be entirely confined to the commutator or the half-ring G′, or will be divided between the two.

The advantages of the construction are that the generator may be run at double the speed of the drill, or, in other words, make two complete revolutions for each to-and-fro movement of the drill-plunger, and, furthermore, that the impressed electro-motive force may be maintained at its maximum during the intervals of time of each impulse that the maximum work is required. A drill may be operated much more effectively in this way than by the arrangements heretofore used or proposed.

What I claim in this application, disclaiming for the purposes of this case all the patentable features not specifically set forth in the claims, is as follows:

1. The combination, with a continuous-current dynamo-electric machine, of two external circuits and a current-distributer rotating in unison with the machine, but at a lower rate of speed, connections between the commutator and the contacts of said distributer, and brushes for connecting said contacts with the external circuits alternately, as set forth.

2. The combination of a generator provided with a continuously-wound armature-coil, a commutator connected with said coil and brushes bearing thereon, two external or working circuits, a distributer for connecting the brushes alternately with the said circuits, and means for rotating the distributer at a lower rate of speed than the generator, as set forth.

3. The combination of a generator provided with a continuously-wound armature-coil, a commutator the segments of which are connected with said coil and formed with two bearing-plates connected with and extended backward from two diametrically-opposite segments, brushes in the path of said plates, two external circuits, and means for connecting the commutator-brushes alternately therewith during the periods of complete revolution of the commutator, as set forth.

4. The combination, with the two drill-circuits, of a continuous-current machine consisting of field-magnets, an armature and a commutator, the latter provided with the bearing-plates connected with and extended backward from diametrically-opposite segments, a counter-shaft driven by the armature-shaft at half the speed of the latter, and a contact-plate or distributer electrically connected with one of the commutator-brushes and carried by the counter-shaft and adapted to be brought into connection with the drill-circuits alternately, as set forth.

HARRY N. MARVIN.

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