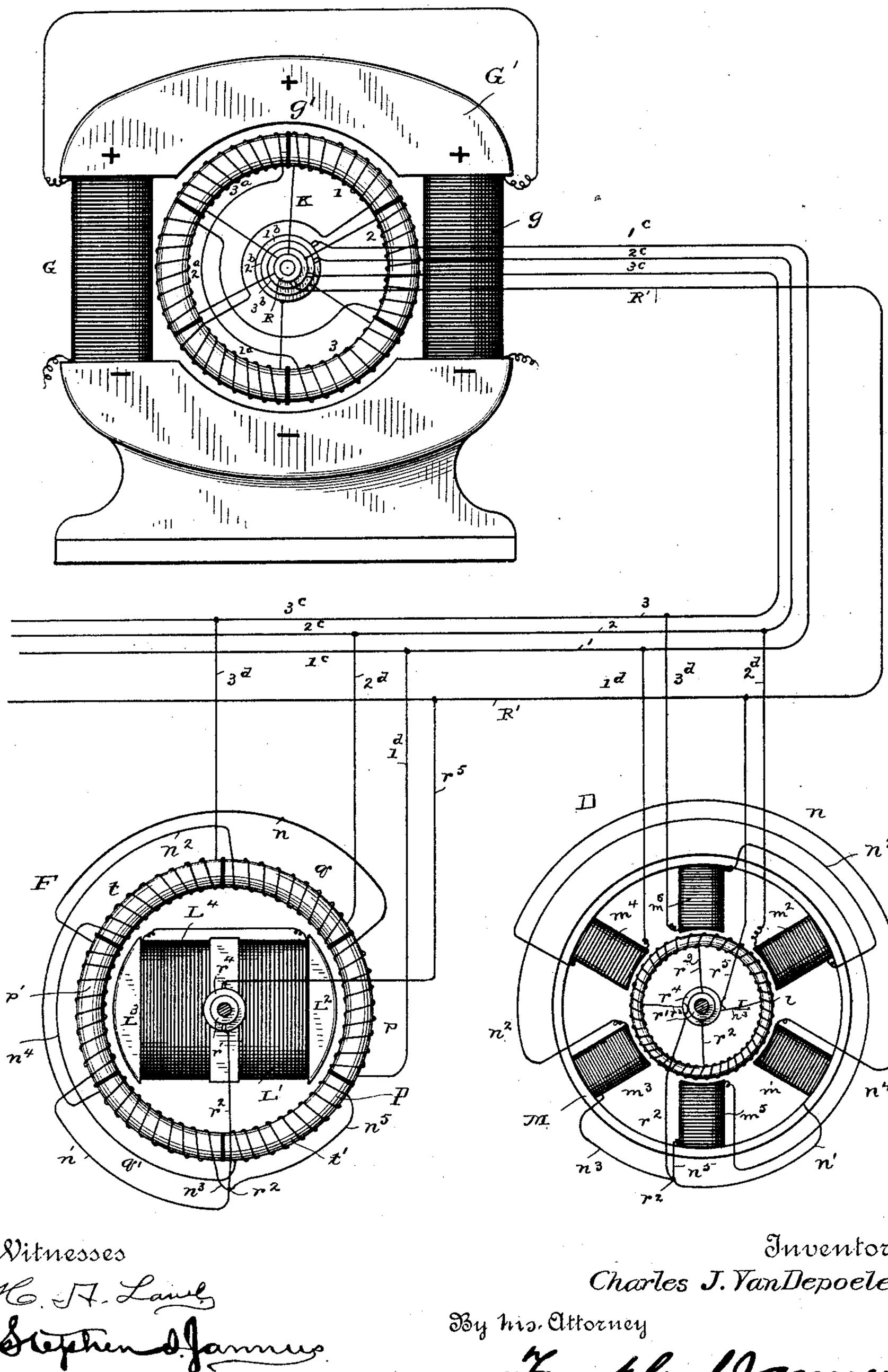
(No Model.)

C. J. VAN DEPOELE.

MULTIPLE CIRCUIT ELECTRIC MOTOR.

No. 434,816. Patented Aug. 19, 1890.



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UNITED STATES PATENT OFFICE.

CHARLES J. VAN DEPOELE, OF LYNN, MASSACHUSETTS.

MULTIPLE-CIRCUIT ELECTRIC MOTOR.

SPECIFICATION forming part of Letters Patent No. 434,816, dated August 19, 1890.

Original Application filed August 12, 1889, Serial No. 320,456. Divided and this application filed October 28, 1889. Serial No. 328,395. (No model.)

To all whom it may concern:

Be it known that I, CHARLES J. VAN DEPOELE, a citizen of the United States, residing at Lynn, in the county of Essex and State of Massachusetts, have invented certain new and useful Improvements in Multiple-Circuit Electric Motors, of which the following is a description, reference being had to the accompanying drawing, and to the letters and figures of reference marked thereon.

This application is a division of a prior case filed August 12, 1889, Serial No. 320,456, and relates to an improved form of electric motor, together with means for supplying currents thereto. An organization embodying my invention will be hereinafter described, and referred to in the appended claims.

The accompanying drawing is a diagrammatic view partly in elevation, showing the circuits, connections, and arrangements of a source of current, together with two forms of motor, both embodying the invention.

In said drawing, G indicates the generator or source which, as described in the application of which this case is a division, is operated as a motor-generator, such arrangement forming a part of the system therein set forth; but so far as the present application is concerned it is entirely immaterial how the generator-armature be driven, the only essential features being those which relate to the supply of current to the working-circuits of the motors according to the invention and so as to produce the desired results.

The armature K is wound in three divisions, comprising six coils 1 1^a 2 2^a 3 3^a, and the said six coils are connected by their outer terminals to three insulated annular contact surfaces or rings 1^b 2^b 3^b. All the inner terminals of said coils are connected to a central ring R, constituting the common return. Suitable contact-brushes are placed upon the contact-rings and connected to separate insulated line-conductors 1^c 2^c 3^c, through which three separate successive current impulses will be transmitted in one direction and three in the other at each complete revolution of the said armature.

It will be understood that, although a specified number of circuits, connections, and generative coils are shown and described in this application, the invention is not limited to the employment of any particular number of electrical divisions or subdivisions, since the arrangement shown and described may be multiplied, as desired, without in any way departing from the invention.

Two slightly-different forms of motor, both suitable for use with my improved system, are illustrated, said motors, as here shown, comprising six-pole field-magnets and two or four pole armatures. The six poles of the said field-magnets are so connected with the three circuit-wires extending from the generator-armature that they will be energized oppositely in pairs and in succession—that is to say, that the motor will have three sets of poles on opposite sides of the armature, which will be energized consecutively. This is effected by carrying the conductors 1^c 2^c 3^c, extending from the rings 1^b 2^b 3^b of the generator-armature and connecting the same by suitable branch conductors 1^d 2^d 3^d, leading therefrom, to opposite pairs of field-magnet coils, the inner ends of said branch conductors being all connected through brushes to collector-rings r' upon the armature-shafts of the motors D F. The rings r' thus constitute one side of the common return-circuit between the multiple circuits of the generator and the coils of the field-magnets of the motor which correspond thereto. The armature L of the motor D is provided with a continuous winding l, which is joined at opposite equidistant points by conductors r^2 r^2 r^3 r^3. The conductors r^2 are connected to ring r', and the return current from each pair of the field-magnet coils passes therethrough in succession. The currents entering the armatures L L′ through conductors r^2 divide and flow through the armature-conductor 1 in multiple arc, issuing by conductors r^3 and passing thence to ring r^4, and from there by branch r^5 into the main common return R′, connected to the ring R, representing all the inner terminals of the generator-armature.

The motor D is provided with six field-magnet cores sustained by an exterior magnetic shell or support M. The magnetic cores referred to project radially inward into opera-

tive relation to the periphery of the armature L, and the said cores are wound with suitable magnetizing-conductors connected in pairs with the several supply-conductors. Current flows from conductor 1^c through branch 1^d to magnet m^4, thence by conductor n to magnet m', thence by conductor n' to the common return r^2. The second pair of magnets receive their current from main conductor 2^c through branch 2^d to magnet m^2, flowing thence by conductor n^2 to magnet m^3, and thence by conductor n^3 to the common return r^2. The third pair of magnets is similarly energized by the currents flowing in the conductor 3^c, currents flowing thence by conductor 3^d to magnet m^6, thence by conductor n^4 to magnet m^5, and thence by conductor n^5 to the common return r^2.

With multiple cross-connections, as just described, the armature becomes self-starting, while with a single set of connections, as seen in armature L′ of motor F, the action is synchronic. The motor F differs slightly from that just described in having an annular field-magnet divided into six sections instead of the six separate field-magnets connected in pairs, as shown in connection with motor D. The armature is also of a different type, being what is known as a "Siemens H." The connections, however, are to the same effect as in the motor D. The motor F is illustrated principally to show that the invention is not limited to a single form of motor, and it will be understood that any device capable of operation in connection with the system herein described may be used in connection therewith.

In the motor F the armature L′ is provided with opposite polar-extensions L^2 L^3, the intervening iron core being wound with suitable conductor L^4. Contact-rings r' r^4 are provided, as in the armature L, and the opposite ends of the coils L^4 are connected by suitable conductor, whereby the armature-coils form a single circuit, producing poles of opposite name at the opposite extremities of said armature. The armature L′ is rotatively mounted within an annular field-magnet, comprising a core P, wound with a magnetizing-conductor divided into six sections p p' q q' t t', said sections being energized by magnetizing-conductors wound thereon, said conductors being connected, substantially as described, with reference to the motor D—to wit, from main conductor 1^c through branch 1^d to section p, thence by conductor n to section p', thence by conductor n' to the return r^2, the second set being connected by conductor 2^d with the main conductor 2^c, said conductor 2^d extending to section q, thence by conductor n^2 to section q', thence by conductor n^3 to the return r^2. The third set of field-magnet coils is connected to the main supply-conductor 3^c by conductor 3^d, current passing from section t by conductor n^4 to section t', thence by conductor n^5 to the return r^2. Thus it will be seen that the multiple currents flowing in the conductors 1^c 2^c 3^c energize the armatures L L′ with a polarity corresponding to that of their field-magnet poles, and that the field-magnet poles are successively energized to coact to establish and maintain continuous rotary movement of the armature in a direction depending upon the direction of rotation of the generator-armature, and consequently the order in which the currents flow in the motor-circuits.

While I have described the motor-armature as of the drum type, it will be understood that any type of armature can be used with good results, and it will be apparent that any number of poles may be provided, either in the armature or in the field-magnets, or in both, provided they are so disposed that their action will be successive and progressive. The invention therefore is not limited to the exact details of construction shown and described, but may be varied in many ways without departing from the invention.

Having described my invention, what I claim, and desire to secure by Letters Patent, is—

1. An electric motor having multiple field-magnet poles and multiple circuits therefor energized successively, and an armature energized by the common return of all the independent circuits.

2. An electric-motor system comprising a multiple-current generator and corresponding circuits between the motor and generator, a single return for all the independent currents, the field-magnet poles of the motors being energized in succession, and their currents returned successively through the armature-circuit.

3. An electric-motor system comprising a source of successive independent currents energizing successive and independent field-magnet poles of the motor or motors, and a common return for the independent field-circuits, said return-circuit including the armature-conductor, substantially as described.

4. An electric motor having a plurality of field-magnet poles energized in succession by independent currents, and a common return for the independent currents through the armature-conductor and back to the generator, substantially as described.

5. An electric-motor system comprising a current-generator giving successive impulses in successive circuits around the motor field-magnets, and a single return from the successive circuits through the armature-conductor and back to the generator in closed circuit, substantially as described.

6. An electro-dynamic motor comprising a plurality of oppositely-placed field-magnets, a wire-wound armature mounted rotatively between all of the field-magnets, a separate supply-circuit for each set of field-magnets, and a return-conductor common to all of the field-magnets, and connections between the said return-conductor and the armature-circuit, whereby currents passing successively

through the field-magnets will all be conveyed through the armature-conductor for magnetizing the core thereof, substantially as described.

7. An electro-dynamic motor comprising a plurality of sets of field-magnets, a wire-wound armature rotatively mounted within the field of force of all of said magnets and provided with connections for establishing the line of polarization therein, circuits supplying currents successively to the field-magnets, a common return for all of said magnets, and connections between said return and one side of the armature-circuit connections between the other side of said armature-circuit and the continuation of the return-conductor, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

CHARLES J. VAN DEPOELE.

Witnesses:
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