(No Model.)

C. J. VAN DEPOELE.

INDUCTIONAL ELECTRIC MOTOR.

No. 408,642. Patented Aug. 6, 1889.

Fig. 1.

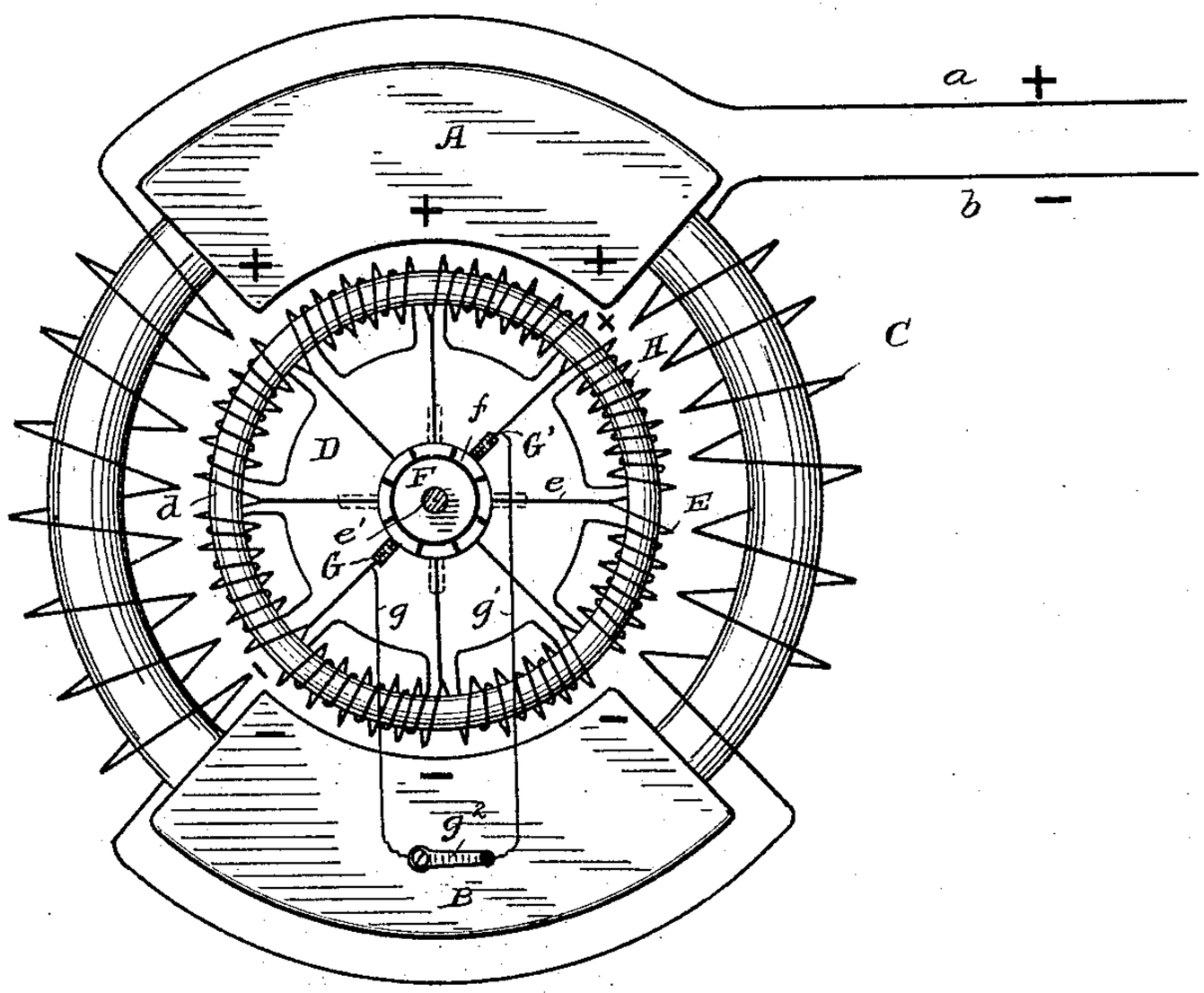
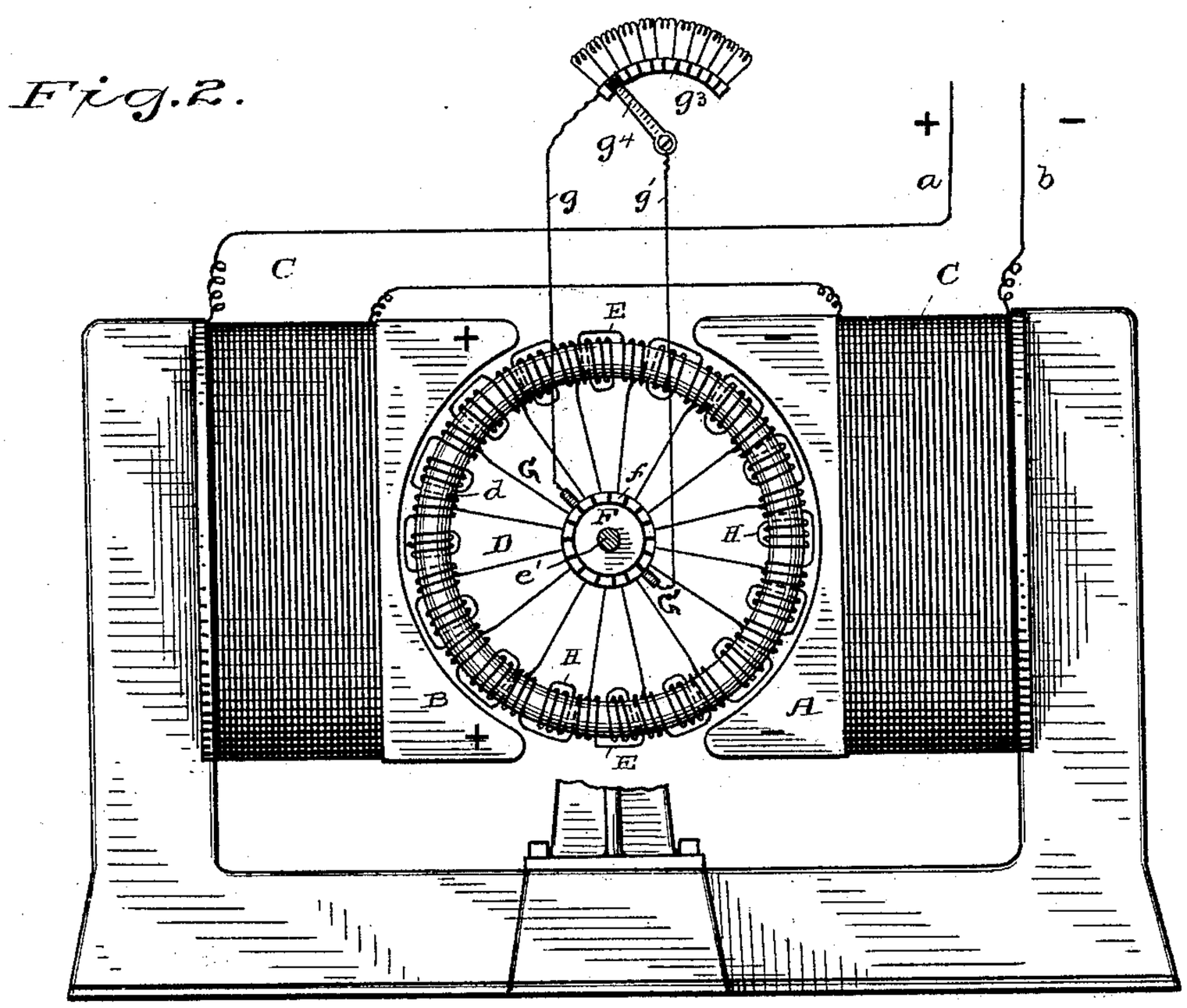


Fig. 2.



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CHARLES J. VAN DEPOELE, OF LYNN, MASSACHUSETTS.

INDUCTIONAL ELECTRIC MOTOR.

SPECIFICATION forming part of Letters Patent No. 408,642, dated August 6, 1889.

Original application filed April 23, 1889, Serial No. 308,241. Divided and this application filed July 13, 1889. Serial No. 317,432.

(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 Inductional Electric Motors, of which the following is a description, reference being had to the accompanying drawings, and to the letters and figures of reference marked thereon.

This application is a division of case filed April 23, 1889, Serial No. 308,241.

My invention relates to improvements in electro-dynamic motors of the class adapted to be operated by currents of alternating polarity, or currents having a defined rise and fall, whether of alternating or constant polarity; and the present invention is a development of the invention shown and described in Letters Patent No. 300,535, granted to me June 17, 1884.

Broadly, the invention consists in applying alternating or intermittent electric currents to the field-magnet coils of an electro-dynamic motor for creating a field of force therein, the iron portions of said field-magnet being suitably subdivided to secure the desired rapidity of magnetization and demagnetization, the said field of force acting inductively upon a closed circuited winding upon the annular core of the armature. An armature of the Gramme type may be employed, the desired results being attained by electrically connecting the commutator-brushes in order to afford a defined path for the flow of the secondary currents generated in the armature-coils by the inductive action of the reversals of polarity in the field of force. This method of operation is fully set forth in my said prior patent in connection with continuous currents. As there set forth, I may also, for the better government and control of the machine, close the commutator-brushes through an exterior circuit including an adjustable resistance. The effect upon the core of the armature is increased by additional windings connected in separate closed sections, and also caused to produce secondary currents by induction. The separate independent closed-circuit coils may be arranged as intermediate sections placed between the coils connected to the commutator, or the wire may be wound in separate layers, all the sections of one layer being connected to the commutator and the remainder connected as separate closed circuits each including any desired number of coils. By employing the closed circuits in addition to the regular winding a limited quantity of wire is connected to the commutator, and the tendency to sparking is thereby diminished and greater durability of both commutator and brushes secured.

In the drawings, Figure 1 is a diagrammatic view showing a motor having both commutated and uncommutated coils upon its armature. Fig. 2 is a view in elevation, partly in diagram, the armature of which is provided with commutated and uncommutated coils and an adjustable resistance in circuit with the commutator-brushes.

As indicated in said drawings, A B represent the polar extensions of the field-magnets, which said field-magnets may be of any desired or convenient type.

C is the field-magnet winding, the coils of said winding being placed upon suitably-laminated cores connecting or attached to the said pole-pieces. The pole-pieces A B should also be of subdivided iron to secure ready resistance to the reversals or phases of the supply-current, which current may be of alternating polarity or intermittent or pulsating in character, and is supplied to the field-magnet circuit through conductors *a b*.

D is the armature, which, as indicated, is of the Gramme type, having an annular core *b*, provided with a continuous winding of suitable-sized insulated copper conductor E. The winding E is connected at suitable intervals by conductors *e* with the sections *f* of the commutator F. The armature and commutator are mounted upon a suitable shaft *e'*, and are thereby sustained in rotative relation to the field-magnet extensions A B.

G G′ are adjustable commutator-brushes suitably sustained in operative relation to the surface of the commutator F.

As indicated in Fig. 1, the commutator-brushes G G′ are merely connected by conductors *g g'*, which may be electrically united through switch g^3, it being understood, however, that the switch may be dispensed with

and a single wire used to connect the commutator-brushes. The circuit uniting the commutator-brushes may be extended and include current-controlling devices of any desired nature, whereby the flow of current in the armature can be controlled.

As shown in said Fig. 2, conductors g g' are connected, respectively, to a rheostat g^3 and a switch-lever g^4, whereby more or less artificial resistance can be introduced into the armature-circuit at will. It will be apparent that by adjusting the positions of the commutator-brushes the armature-poles can be located and maintained wherever desired, and the direction or speed of rotation of the said armature can be governed accordingly.

In the apparatus forming the subject of the present application an additional winding or windings is provided upon the armature in the form of what I have called "uncommutated coils" H. The uncommutated coils are closed upon themselves, and consequently have no connection with the comutator or circuit devices of the machine, and with each phase of current in the field-magnets secondary currents will be generated in said uncommutated coils, which, being in the same direction as the currents generated in the continuous coils of the armature, will coact to establish poles in the armature-core, and the polarizing effect of said secondary currents will be concentrated on opposite sides of the core in line with the commutator-brushes.

By the employment of uncommutated closed circuits H, in addition to the ordinary winding E, greater magnetizing-currents can be employed with less heating, wear, and destruction of commutator and brushes than if all the wire upon the armature were wound in a single commutated circuit.

It is of course immaterial how the commutated and uncommutated coils are arranged upon the commutator so long as the desired results follow. The said windings may be in separate layers, as indicated in Fig. 1, or in sections, as in Fig. 2.

While I have described the invention as applied to an armature of the Gramme type, it will be understood that an armature of any other continuous-current type may be employed; also, that the form and style of the field-magnets may differ from those herein shown, and it will also be apparent that the current-regulating devices placed in circuit with the commutator-brushes in Fig. 2 may be of any form or nature calculated to produce the best results.

Any matters herein shown and described but not claimed continue to form part of the parent application.

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

1. An electro-dynamic motor comprising a suitable field-magnet system energized by alternating or intermittent currents, and an armature rotatively mounted within the field of force and having a plurality of windings upon its core, a sectional commutator and connections between the sections of said commutator and a portion of the armature-coils, and a suitable circuit spanning the commutator-brushes, the remaining armature-coils forming a circuit or circuits closed upon themselves, substantially as described.

2. An electro-dynamic motor comprising field-magnets energized by alternating or intermittent currents, and an armature rotatively mounted within the field of force and having two windings upon its core, the alternate coils being connected to a sectional commutator provided with contact-brushes spanned by a suitable conductor, the remaining coils forming local circuits closed upon themselves, substantially as described.

3. An electro-dynamic motor comprising suitable field-magnets energized by alternating or intermittent currents, an armature rotatively mounted within the field of force of said magnets and provided with conductors upon its core, a portion thereof being connected to a sectional commutator provided with contact-brushes connected in closed circuit, the remaining conductors upon the armature-core being arranged and connected to form a plurality of separate closed circuits therefor, substantially as described.

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

CHARLES J. VAN DEPOELE.

Witnesses:
JOHN W. GIBBONEY,
CHARLES L. OECHSNER.