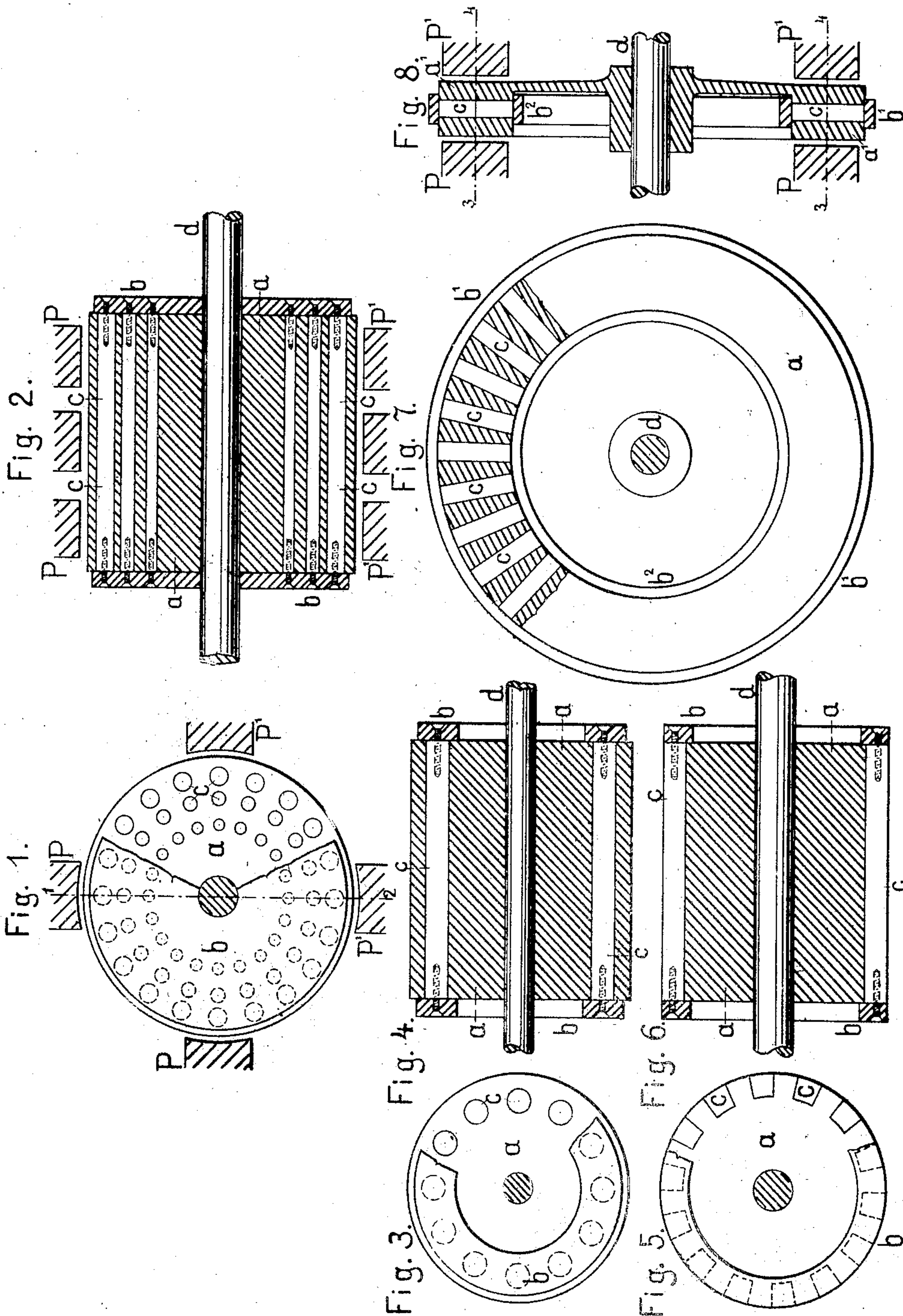


(No Model.)

M. VON DOLIVO-DOBROWOLSKY.  
ALTERNATING CURRENT MOTOR.

No. 427,978.

Patented May 13, 1890.



Witnesses:  
A. Wellen  
William H. Shipley,

Inventor:  
M. von Dolivo-Dobrowolsky  
by Marcelus Bailey  
his attorney.



# UNITED STATES PATENT OFFICE.

MICHAEL VON DOLIVO-DOBROWOLSKY, OF BERLIN, GERMANY, ASSIGNOR TO  
THE COMPANY ALLGEMEINE ELEKTRICITÄTS-GESELLSCHAFT, OF SAME  
PLACE.

## ALTERNATING-CURRENT MOTOR.

**SPECIFICATION** forming part of Letters Patent No. 427,978, dated May 13, 1890.

Application filed November 13, 1889. Serial No. 330,159. (No model.) Patented in Germany March 8, 1889, No. 51,083; in France June 24, 1889, No. 199,154; in Belgium July 1, 1889, No. 86,818; in Luxemburg July 2, 1889, No. 1,153; in Italy July 4, 1889, L. 456, and in Switzerland October 26, 1889, No. 1,532.

*To all whom it may concern:*

Be it known that I, MICHAEL VON DOLIVO-DOBROWOLSKY, a subject of the Emperor of Russia, residing at Berlin, Prussia, Germany,  
5 have invented new and useful Improvements in Alternating-Current Motors, (for which Letters Patent have been granted in France June 24, 1889, No. 199,154; Belgium July 1, 1889, No. 86,818; Luxemburg July 2, 1889, No. 1,153;  
10 Italy July 4, 1889, No. 456, Vol. 50; Switzerland October 26, 1889, No. 1,532, and Germany March 8, 1889, No. 51,083,) whereof the following is a specification.

My invention relates to the method of producing rotative motion by means of alternating electric currents proposed by Professor Ferraris in Turin. According to this method two or more magnetizing-coils or groups of coils placed at an angle to each other are so  
20 connected that on one hand they are traversed by alternating currents of different phases, (such as are produced by an alternating-current dynamo in which the armature-coils are shifted in respect to each other,) and that, on  
25 the other hand, the resulting magnetic field of the said coils travels in a determined direction of rotation. If in this rotating magnetic field is placed a conductive body capable of rotating—for instance, a cylinder of  
30 copper or iron—it will be caused to rotate by the reciprocal action of the magnetic field and the Foucault currents induced in the conducting-body. An alternating-current motor of this system having a copper cylinder will,  
35 however, not produce a high degree of useful effect, although there is a well-conductive path for the Foucault currents, because the intensity of the magnetic field is but small. If an iron cylinder is employed, a strong mag-  
40 netic field is obtained; but then the inconvenience arises that the electric currents are conducted much less than by copper, and that therefore too great a resistance is presented to the said currents. In order to obviate these  
45 disadvantages, the body in which the Foucault currents are induced, and which constitutes the armature of the motor, is constructed

of iron and copper combined, the iron forming a body of rotation, such as a solid or hollow cylinder or a ring, while the copper is  
50 employed in the shape of bars or veins traversing or embedded into the surface of the iron and connected together at both ends by conductors of copper. The said bars are arranged in such position as to be transverse  
55 to the direction of motion of the rotating part of the motor, (which may be the armature or the magnetizing-coils,) and also transverse to the lines of force of the magnetic field. The iron, instead of forming one solid body, may  
60 in certain cases be composed with advantage of a plurality of plates or pieces of other form, and these may be insulated from each other or not. Likewise the copper bars may be replaced by bundles of strips or wires of copper.  
65 The copper does not require to be insulated from the iron, because the object of the improvement is only to present to the Foucault currents, in addition to the iron, a path which is more conductive than the latter, and thereby  
70 to increase the magnetic inertia of the armature.

In the annexed drawings are shown in end views and in longitudinal sections different arrangements of armatures carried out according to my invention.

According to Figures 1 and 2 the armature consists in an iron cylinder *a*, fixed on a shaft *d* and provided with three rows of perforations parallel to its axis. Into the said perforations the copper bars *c* are inserted, and these bars are conductively connected together at both ends by the copper disks *b*. If an armature of this description is placed in the rotating magnetic field, such as may be  
85 produced by the poles *P P'*, it will be perceived that the bars *c* are transverse to their direction of motion and also transverse to the line 1 2, representing the direction of the lines of force of the said field in a given moment.

The armature shown by Figs. 3 and 4 differs from the foregoing only in this, that there is but one row of bars *c*, connected together by flat rings *b*.



Figs. 5 and 6 represent an armature in which the copper bars *c* are embedded in grooves cut into the periphery of the cylinder *a*, the conductors whereby the bars are connected together at their ends having in this arrangement also the form of flat rings.

Figs. 7 and 8 are sectional views of a ring armature *a'*, arranged to rotate between poles *P* and *P'*, which are opposite to the sides or end surfaces of the ring. The bars *c* are in this case placed radially on account of the magnetic lines of force 3 4 being parallel to the shaft *d*, and they are connected together by the copper rings *b'* *b''* being, respectively, outside and inside of the armature-ring.

With an armature of the described construction, the strength of the magnetic field is increased by the mass of iron of the armature, while in the veins of copper powerful Foucault currents can circulate, which in-

crease the magnetic inertia of the armature, and thus promote its propulsion.

I claim as my invention—

In an alternating-current motor, the combination, with a field-magnet, of an armature composed of an iron body of rotation, bars, strips, or wires of copper arranged transversely to the direction of rotation of the motor, and also transversely to the lines of force of the magnetic field, and copper conductors, whereby the said bars, strips, or wires are connected together at both ends, substantially as described.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

MICHAEL VON DOLIVO-DORROWOLSKY.

Witnesses:

F. VON VERNIN,  
GEO. H. MURPHY.