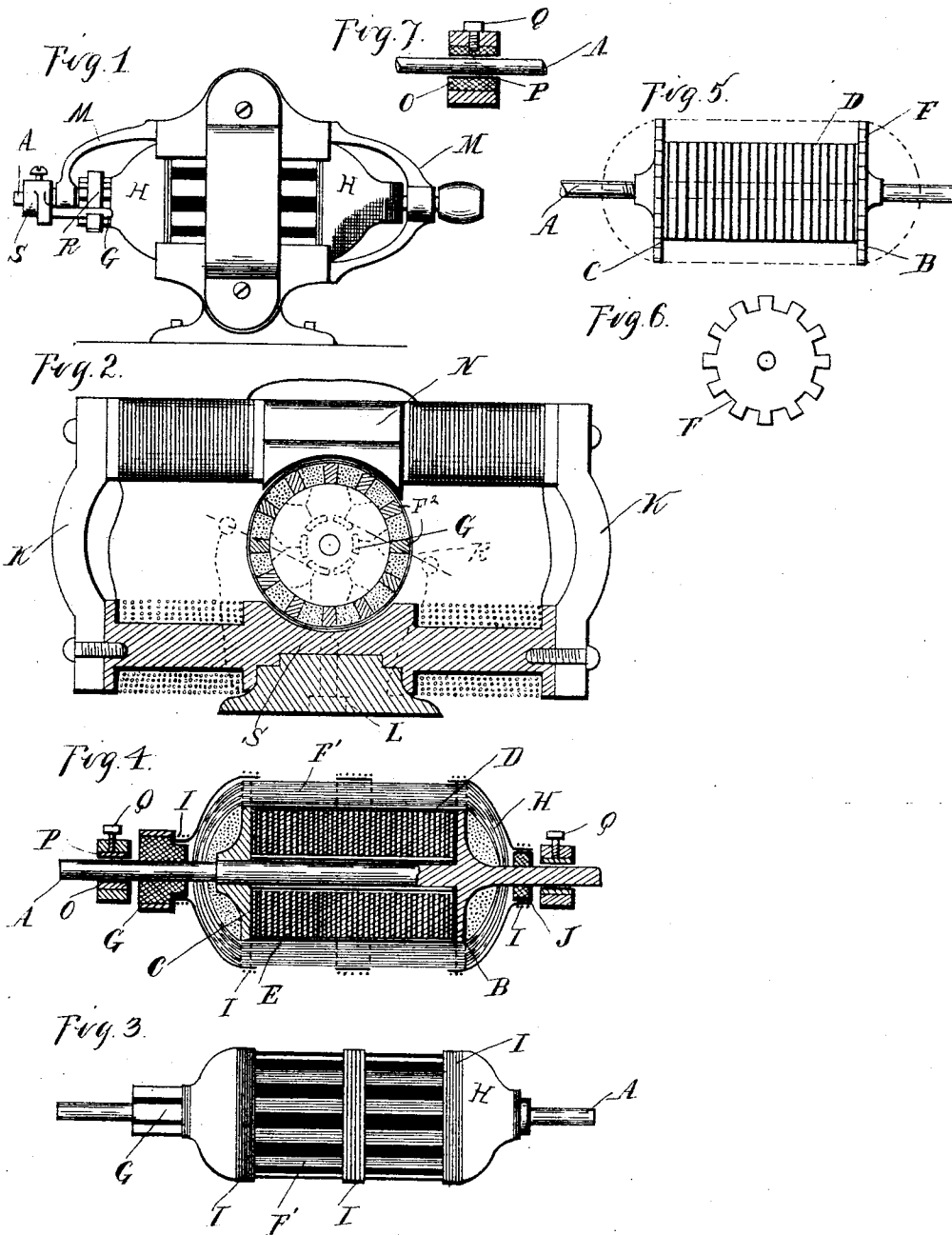


(No Model.)

H. A. FLORIAN.
ELECTRIC MOTOR.

No. 464,299.

Patented Dec. 1, 1891.



Witnesses
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UNITED STATES PATENT OFFICE.

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ELECTRIC MOTOR.

SPECIFICATION forming part of Letters Patent No. 464,299, dated December 1, 1891.

Application filed January 6, 1891. Serial No. 376,925. (No model.)

To all whom it may concern:

Be it known that I, HERMAN A. FLORIAN, a citizen of the United States, residing at Detroit, in the county of Wayne and State of Michigan, have invented certain new and useful Improvements in Electric Motors, of which the following is a specification, reference being had therein to the accompanying drawings.

10 This invention relates to new and useful improvements in dynamo-electric machines; and the invention consists in the construction, arrangement, and operation of different parts.

The object of my invention is principally 15 to construct a standard electric motor which is compact, durable, and efficient, and not liable to get continually out of order when subjected to the various incidents of wear and tear connected with the commercial use of 20 such motors, and which as at present constructed are insufficiently protected or insufficiently insulated or liable to have their insulation destroyed by heating or lack of protection.

25 In the drawings, Figure 1 is a side elevation of my improved machine. Fig. 2 is a vertical central cross-section thereof. Fig. 3 is a detached elevation of the armature. Fig. 4 is a longitudinal section of the armature. Fig. 30 5 is a detached elevation of the armature-body. Fig. 6 is a detached elevation of one of the heads of the armature-body. Fig. 7 is a detail section of one of the bearings.

A is the armature-shaft, preferably made 35 of brass, integral with the head B, a similar head C being screw-threaded upon the shaft. Between the two heads are clamped a series of iron disks D, insulated from each other and from the heads by paper disks or other 40 insulating material, and also insulated from the shaft by paper or other suitable material E, wound upon the shaft, the heads B and C projecting beyond the face of the disks D and provided with a series of rectangular 45 notches F. This body is wound lengthwise with a series of helices F' in diametrically-separate divisions engaging into the notches of the heads with the spaces between the helices on the face of the disks left open. The 50 terminals of two adjacent divisions are looped together and connected to commutator-plates

of a suitable commutator G, placed upon one end of the shaft of the armature. Preferably I place before winding an insulating-covering of strips of mica between the helices and 55 the iron disks to prevent any possibility of short-circuiting from defective insulation of the helices. The ends of the helices are provided with a covering H, of canvas, leather, or other insulating material, and these cover- 60 ings are secured in place upon the armature by binding-wires I, wrapped over the inner and outer edges of said covering, the latter being at the outer end tied upon the insulating-rings J, secured upon the armature or 65 formed integral with the commutator-body, on the end on which the commutator is placed. The covering H is preferably additionally coated with shellac, and this material is also used with the paper insulation between the 70 disks D. In the open spaces between the helices I place, preferably, in the center short filling-blocks of wood F², as shown in Fig. 2, and then place a wrapping of paper or other insulating material centrally around the 75 armature over these fillers, using binding-wire to hold it in place.

The field of force consists of the two pole-pieces N and S, the concave faces of which in- 80 close the armature on top and bottom, respectively, each pole-piece being provided with two electro-magnets, the cores of which are integral with the pole-pieces and connected at the outer end by iron cross-bars K, which 85 unite the electro-magnets and pole-pieces into a vertical rectangular frame at right angles to the axis of the armature, and a cast-iron base L is secured in a recess formed in the under side of the lower pole-piece.

The bearings for the armature-shaft are 90 formed in the lower ends of the brackets M, which brackets are secured to the front and rear faces of the pole-pieces, respectively. These bearings are preferably formed of tubular sleeves O of fiber, lined with a metal sleeve 95 P, and detachably held in place by a set-screw Q.

The brushes R are secured to a suitable brush-holder S, which in turn is adjustably 100 secured to the bracket M.

What I claim as my invention is—

1. The combination, with a revolving arma-

ture, of a field-of-force magnet composed of four electro-magnets arranged in pairs on opposite sides of said armature and having their inner ends united by pole-pieces extending
5 above and below the top and bottom of said armature, respectively, and having their outer ends united by cross-bars to form a rectangular frame at right angles to the axis of the armature, a base secured in the recess formed
10 in the under side of the lower pole-piece, and brackets secured to the pole-pieces and provided with insulated bearings for the armature-shaft, substantially as described.

2. In a dynamo-electric machine, an armature consisting of the armature-shaft A and
15 clamped heads B and C, made of non-magnetic material, the iron disks D, clamped between said heads and insulated therefrom and each other and from the armature-shaft,

the helices F', wound endwise upon the armature in diametrically-opposite divisions, forming air-spaces between the same, the insulating material placed between said helices and the iron disks on the armature-shaft, the insulating-covering II, secured over the exposed
25 ends of the armature-helices, the insulating-rings J on the armature-shaft to which said covering is secured, the binding-wires for securing said covering, and the spacing-blocks centrally secured between the helices, substantially as described.

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

HERMAN A. FLORIAN.

Witnesses:

M. B. O'DOGHERTY,
P. M. HULBERT.