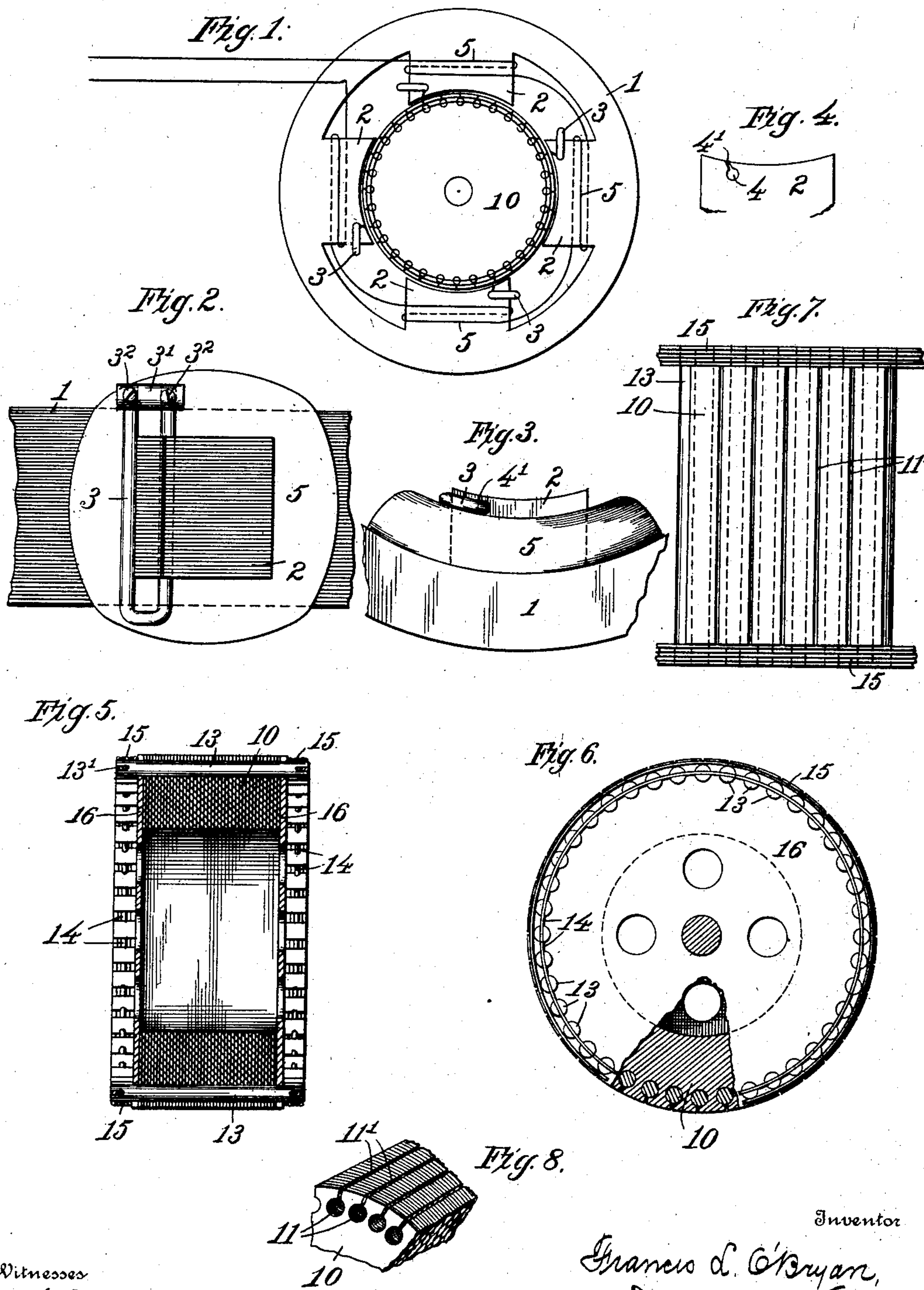


F. L. O'BRYAN.
ALTERNATING CURRENT MOTOR.

APPLICATION FILED DEC. 20, 1902.

NO MODEL.



Witnesses
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UNITED STATES PATENT OFFICE.

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ALTERNATING-CURRENT MOTOR.

SPECIFICATION forming part of Letters Patent No. 736,292, dated August 11, 1903.

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To all whom it may concern:

Be it known that I, FRANCIS L. O'BRYAN, a citizen of the United States, residing at Winston-Salem, in the county of Forsyth and State of North Carolina, have invented certain new and useful Improvements in Alternating-Current Motors, of which the following is a specification.

My invention relates to electric motors which are operated by alternating currents, and more particularly to induction-motors in which the propelling-current is applied to one of the motor members, and has for its object to provide an induction-motor for use in both single and multiphase circuits that is self-starting and possesses certain structural features that enables the various parts to be readily assembled or disassociated for purposes of adjustment or repair and also insures a maximum efficiency of the motor under varying conditions of operation.

In the accompanying drawings is shown the embodiment of a preferred form of my invention, Figure 1 thereof being a diagram of a single-phase alternating-current motor including my improvements. Fig. 2 is an enlarged detail plan view of a pole-piece provided with a removable energizing-coil and a secondary starting-coil in accordance with my invention. Fig. 3 is an elevation corresponding to Fig. 2. Fig. 4 is a detail of a pole-piece, showing the slot for retaining the starting-coil. Fig. 5 is a sectional elevation of the armature or rotor. Fig. 6 is an elevation, partly in section, of the same. Fig. 7 is a fragmentary plan view of the armature, and Fig. 8 is a perspective view of a section of the armature.

Referring to the drawings, 1 represents the field-magnet, inducing member, or stator, which is formed of a series of sheet-iron stampings built up to form a laminated structure, which may be secured in rigid ultimate form by the usual cheek-pieces and cross rods or bolts. Projecting from the field-magnet ring are a series of pole-pieces 2, in this instance four in number. Near one edge each pole-piece is pierced with a transverse perforation 4, which is continued in a reduced inclined slot 4', terminating in and dividing the pole-piece transversely. Upon each pole-

piece is removably mounted an energizing-coil 5, which is built up of successive layers or convolutions of wire in such form as to closely embrace the pole-piece and conform to the contour of the inner periphery of the magnet-ring 1. The several coils 5 are connected in series with the external circuit, as indicated. Mounted in the transverse perforation 4 of each pole-piece is a secondary or starting coil 3, which consists of a stout rod or bar, preferably of copper, bent to U shape, having one leg threaded through and snugly fitting the perforation 4 and the other lying adjacent to the lateral face of the pole-piece, thereby constituting a guard or keeper to hold the coil 5 in place on the pole-piece. The circuit of said coil is closed upon itself by a yoke or bridge-piece 3', which is perforated to receive the ends of the coil, to which it is secured by set-screws 3².

The armature, inductor, or rotor 10 consists of a ring or drum built up of sheet-iron stampings to form a laminated structure, faced on each side by the usual cheek-pieces 16, of brass or other metal, which also constitute the spider or mounting for the shaft upon which the armature is mounted. Near its outer periphery the armature is provided with a series of longitudinal perforations 11, which are preferably continued to the surface of the armature in narrow slots 11', thereby dividing the outer portion of the armature into a series of T-shaped teeth. Fitted within the perforations 11 is a series of stout copper bars or plugs 13, which project at each end beyond the lateral face of the armature and are provided with kerfs or notches 13' in their respective ends, into which copper rings or bands 14 are secured by soldering, brazing, or any other suitable means. Around the projecting ends of the circular series of bars 13 close coils of wire 15 are wound, and preferably the several convolutions are secured to each other and to the bars 13 by solder or other means, thereby binding and strengthening the armature structure and forming with the rings 14 a short circuit for the several bars, having a resistance that is practically *nil*. It is to be noted that the slots 13' and the rings 14 may be dispensed with if the wire wrappings 15 are made of

sufficiently low resistance to provide a "dead" short circuit for the bars 13.

My improved motor as thus described possesses the material advantages of simplicity in construction, efficiency in operation, and ready adaptability to adjustment and repair. The narrow slot 4' in each pole-piece insures a sufficient localization of the lines of force within the area of the coil 3 to produce a sufficient distortion or shifting of the field of force to effect a ready starting torque; but said slot is so small in area as to offer practically no impediment to an even distribution of the lines of force throughout the pole-face when the motor has acquired its normal speed. The heavy coil 3 affords a path of very low resistance to the induced currents at starting and by reason of its ready removability permits the separate energizing-coil 5, which it normally holds securely in place on the pole-piece, to be detached from the machine for purposes of inspection and repair. The application of the binder-coils 15 to the ends of the armature-bars 13 produces a solid practically integral structure for the armature-coils thus formed, possessing a signally low resistance.

Having thus described my invention, what I claim is—

30 1. In an alternating-current motor, a secondary or starting coil, comprising a bar bent upon itself and connected at its ends by a yoke or bridge-piece.

2. In an alternating-current motor, a secondary or starting coil, comprising a U-shaped bar and a removable yoke or bridge-piece connecting the ends thereof.

3. In an alternating-current motor, a removable primary coil and a secondary or starting coil, also removable, securing and retaining said primary coil in position on the pole-piece.

4. In an alternating-current motor having

a series of pole-pieces each provided with a perforation near one edge, a removable primary coil mounted on each pole-piece, and a series of secondary or starting coils each comprising a bar bent upon itself and connected at its ends by a removable yoke, said bar having one section occupying the perforation in the pole-piece, whereby the corresponding primary coil is secured in position on the pole-piece.

5. In an alternating-current motor having a series of pole-pieces each provided with a transverse perforation near one edge, a secondary or starting coil on each pole-piece comprising a U-shaped bar and a detachable yoke connecting the ends thereof, said coil passing through the perforation in the pole-piece and embracing the section of said pole-piece adjacent to said perforation.

6. In an alternating-current motor having a series of pole-pieces each provided with a transverse perforation near one edge thereof and a narrow groove opening between the pole-piece and the perforation, a primary coil on each pole-piece, a secondary or starting coil on each pole-piece, comprising a U-shaped bar and a yoke connecting the ends thereof, said bar occupying the transverse perforation in said pole-piece and thereby securing the primary coil in position on the pole-piece.

7. In an alternating-current motor provided with an armature of the squirrel-cage type, a series of conductor-bars projecting beyond the lateral faces of the armature and a coil of wire surrounding and connecting the series of rod ends on each side of the armature.

In testimony whereof I have hereunto subscribed my name.

FRANCIS L. O'BRYAN.

Witnesses:

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W. A. MABRY.