(No Model.) 2 Sheets—Sheet 1.

J. HODUIT.

DYNAMO ELECTRIC GENERATOR OR MOTOR.

No. 459,508. Patented Sept. 15, 1891.

Fig. 1.

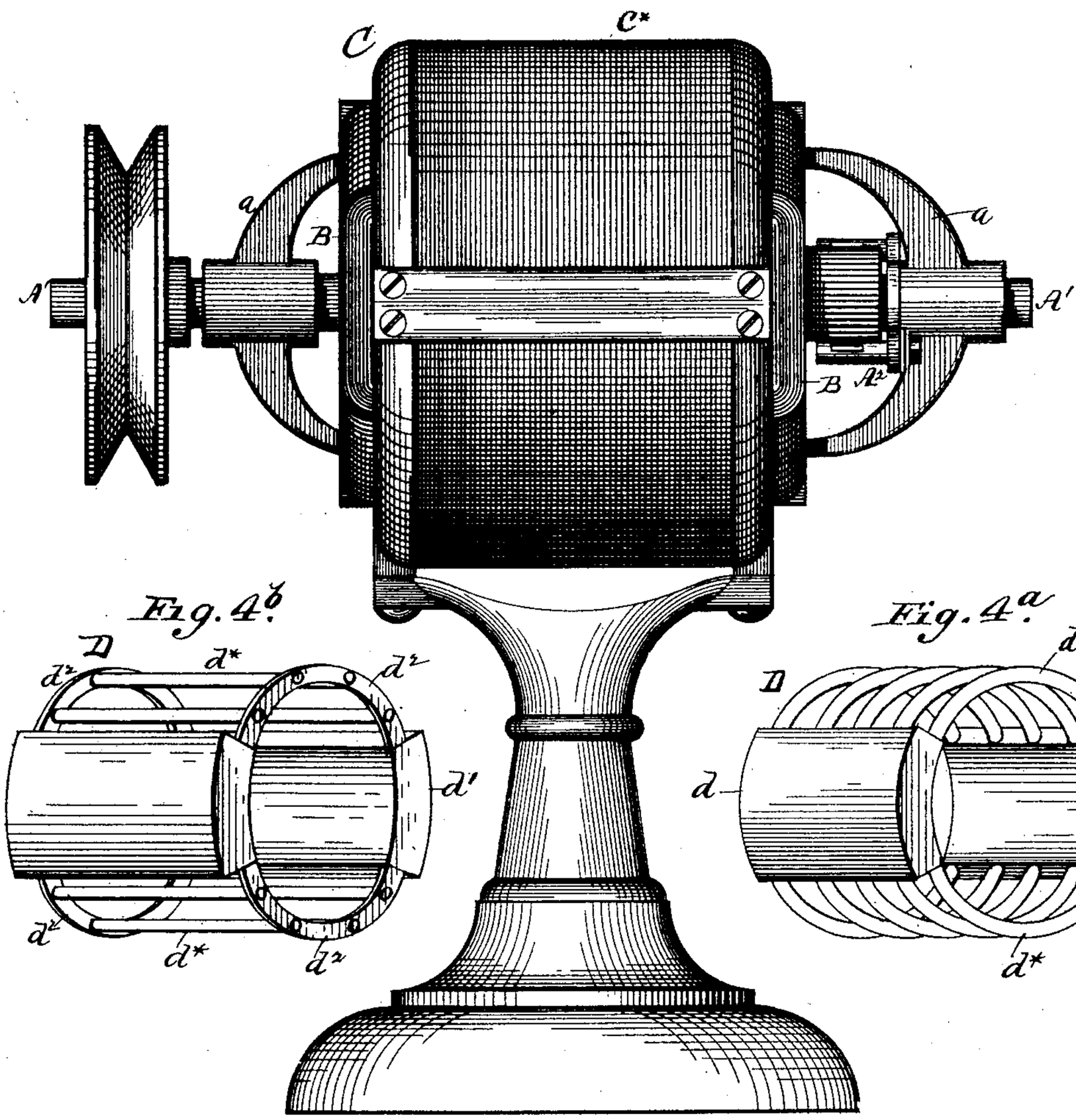
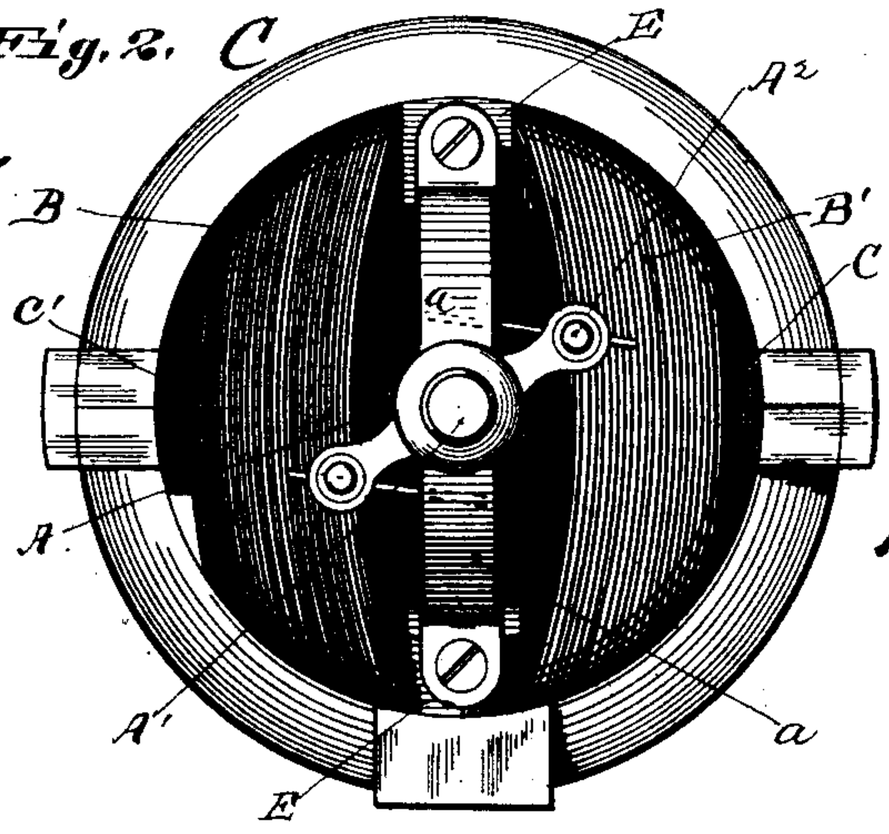


Fig. 4b.

Fig. 4a.

Fig. 2.



Attest:

D. B. Bahuman

F. T. Johnson

Inventor:

John Hoduit

By J. N. Kalb

His Attorney

(No Model.) 2 Sheets—Sheet 2.

J. HODUIT.

DYNAMO ELECTRIC GENERATOR OR MOTOR.

No. 459,508. Patented Sept. 15, 1891.

Fig. 3.

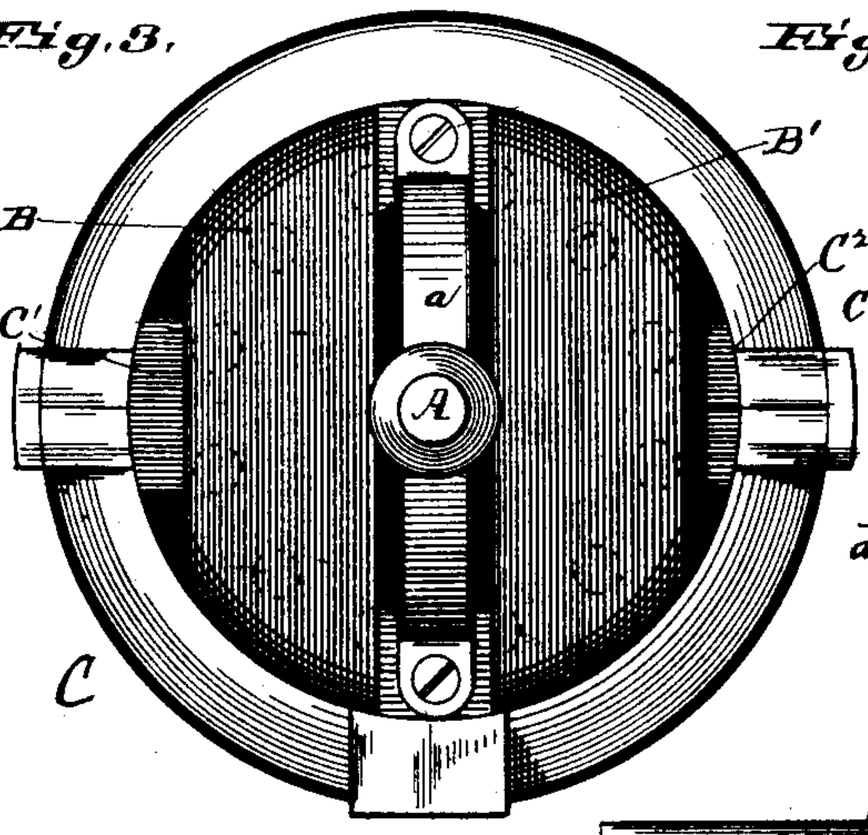


Fig. 4.

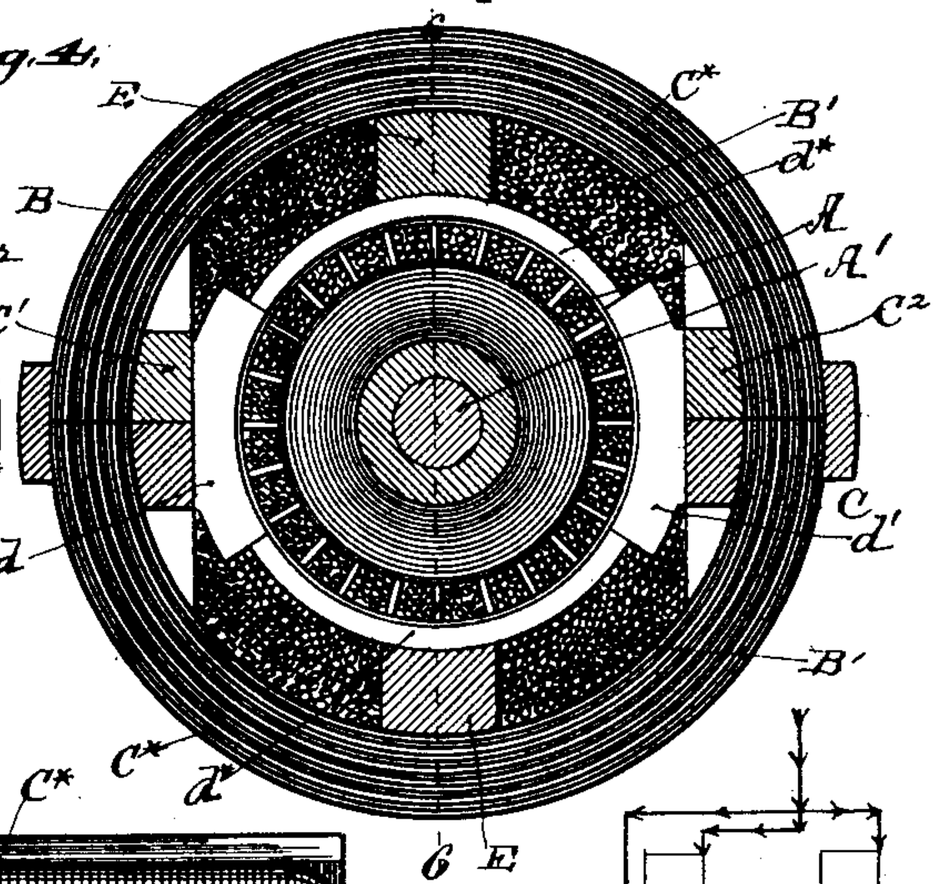


Fig. 5.

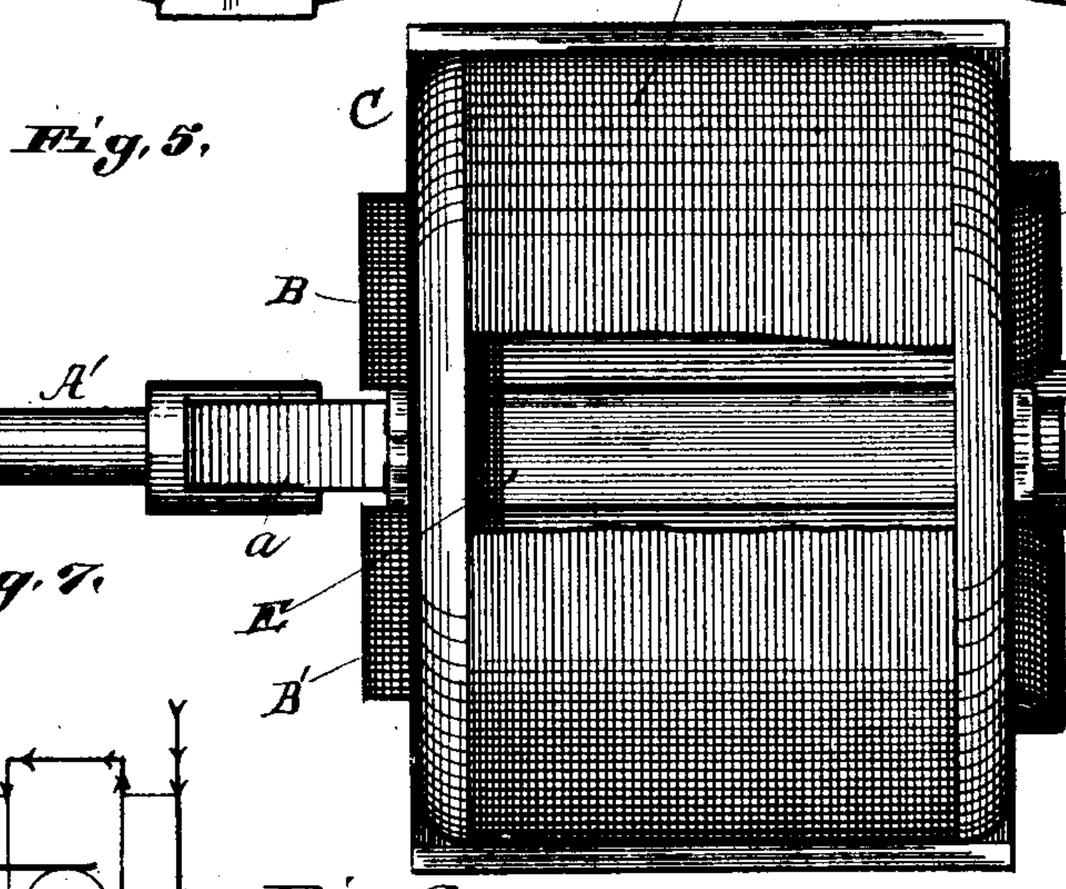


Fig. 9.

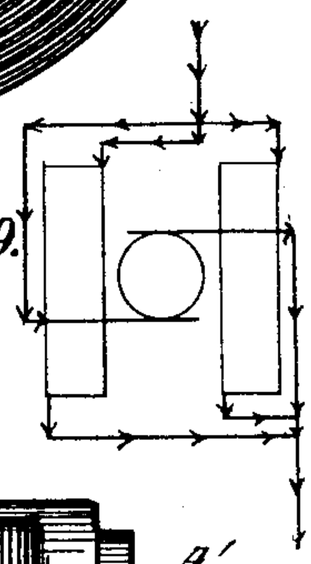


Fig. 7.

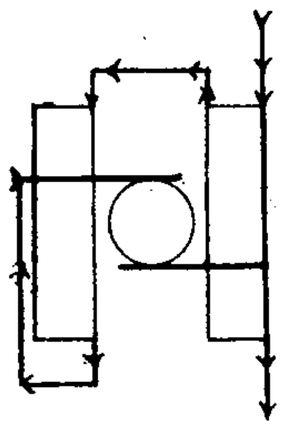


Fig. 8.

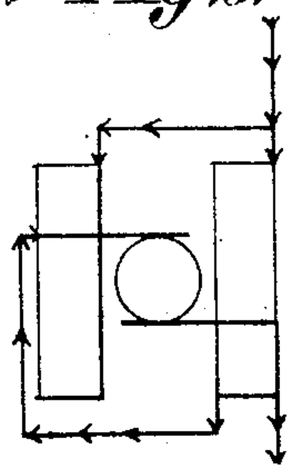


Fig. 6.

Attest:

A. G. Buhmann

F. T. F. Johnson

Inventor:

John Hoduit

By I. N. Kalb

His atty.

UNITED STATES PATENT OFFICE.

JOHN HODUIT, OF ST. LOUIS, MISSOURI, ASSIGNOR OF ONE-HALF TO CARL RUETER, OF SAME PLACE.

DYNAMO-ELECTRIC GENERATOR OR MOTOR.

SPECIFICATION forming part of Letters Patent No. 459,508, dated September 15, 1891.

Application filed May 25, 1891. Serial No. 393,927. (No model.)

To all whom it may concern:

Be it known that I, JOHN HODUIT, a citizen of the United States, residing at St. Louis, in the State of Missouri, have invented certain new and useful Improvements in Electric Motors; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

My invention relates to improvements in electric motors, and has for its object the provision of an effective motor operating either with alternating or continuous currents with equal facility and effect, and wherein the induction or Foucault currents are to a great degree prevented, thereby increasing the power of the motor.

The invention consists in certain novel constructions and combinations of parts hereinafter described, and pointed out in the claims.

The accompanying drawings illustrate what I consider the best method of carrying my invention into practice.

Figure 1 is a side elevation of the motor set up for use. Fig. 2 is an end elevation of the same, taken from the commutator end at the right hand of Fig. 1. Fig. 3 is an elevation of the opposite end. Fig. 4 is a transverse section of the motor on the line 4 4, Fig. 6, showing the frame-bars running circularly. Fig. 4^a is a detail of the field-coil frame in perspective. Fig. 4^b is a perspective view of a modified form of the field-coil frame, wherein the bars are longitudinal. Fig. 5 is a plan view of the motor with the field broken away to show one of the strips of non-conducting material, which affords attachment for the yokes in which the arbor of the armature finds bearings. Fig. 6 is a central longitudinal section of the motor, taken on line 6 6, Fig. 4, but with the armature in elevation. Fig. 7 is a diagram showing connection for the device in series. Fig. 8 is a diagram showing the field-coils connected in multiple. Fig. 9 shows the two field-coils and the armature connected in multiple.

Similar letters of reference indicate corresponding parts in all the figures where they occur.

A is the armature, of any desired or suitable construction, preferably of the ordinary variety known as the "drum" armature.

A′ is the arbor of the armature, which is supported in the yokes *a a* at each end of the motor. At one end the armature is equipped with the ordinary commutator A^2.

B B′ are the field-coils composed of insulated copper wire, and C the inclosing frame or cylindrical shell, which in the motor consists of suitable supporting parts and insulated wire or iron plates laminated at right angles to the direction to which the field-coils are wound, as shown at C* and pole-points C′ C^2, which are located on the sides of the field opposite to each other and approach the armature. The pole-points coincide with the horizontal points of division of the inclosing frame or shell, which division is provided to facilitate the removal of the coils and to take out the armature. Equidistant between the pole-points are non-conducting strips or bars E, to which the yokes *a a* are attached.

When the machine is to be used as a dynamo, the lamination of the inclosing frame or shell is not necessary or desirable, and is preferably omitted.

The portions C* are electrically insulated from the field-coils. When the inclosing frame or shell is formed of insulated wire, this insulation will be effected without further provision; but in case of laminated plates their inner edges must be covered with insulated material to prevent their damaging the insulation of the field-coils.

Each of the field-coils B B′ is preferably composed of continuously-wound wire at right angles to the laminations of the inclosing frame or shell and extending endwise around a skeleton or frame D, which surrounds the armature and is attached to the inclosing frame or shell. This skeleton or frame D preferably consists, as shown in Fig. 4^a, of side plates *d d′* and circular bars *d**, which may be cast integral with the plates, thus completing a circular skeleton or frame on which the wire of the field-coils is wound in the manner hereinafter explained. The frame or skeleton may, however, be formed

of the side plates and circular end rings d^2, connecting the ends of the plates and having the bars d^* longitudinally supported in the rings, as seen in Fig. 4^b. The bars d^* in both cases are covered with fiber paper under the field-coils to insulate them therefrom, and one end of the longitudinal bars may be insulated in the supporting-ring to prevent induction. The side plates d d' of the frame D are secured to the pole-points C′ C^2 by means of screws or in any other convenient manner, no insulation being necessary at these neutral points, as no induction can take place here. The field-coils B and B′ are wound upon the frame D, the projecting edges of the plates d and d' affording a center on each side of the frame on which the wire of the coils is continuously wound lengthwise of the frame and parallel with the sides of the armature, thus bringing it at right angles to the laminations of the inclosing frame or shell, and also effecting a separation of the coils, between which in the center the arbor of the armature extends and between which at top and bottom the non-conducting strips E lie, thus producing two separate field-coils supported on the same frame or skeleton. The field-coils, as will be seen, encompass the entire length and ends of the armature on both sides of the arbor, and the armature is utilized as the field-core.

In the arrangement shown in Fig. 4 there will be two magnetic circuits from the field-coils, uniting and passing through the armature and dividing at the division of the inclosing frame or shell at the right side at poles C^2 and half passing through each side or half of the inclosing frame or shell and entering again on the opposite side of the motor at pole C′. The plates d and d', connected to the pole-pieces C′ C^2, cause the sides of the shell or frame to approach the armature at these points and shorten the air or jumping space of the magnetic current.

It will be noticed that the disposition of the bulk of the inclosing frame or shell is so made as to bring most of the iron at the pole-pieces on the sides and the least at top and bottom, where the field-coils cross the frame or shell laminations, thus rendering the shell easy to magnetize and demagnetize with an alternating current, while the bulk on the sides carries the current with certainty and the best effect.

In Figs. 7, 8, and 9, as already stated, are shown different ways of connecting. Fig. 7 shows the connections in series, the current passing through the first field-coil, the second field-coil, and then the armature. In Fig. 8 the field-coils are in multiple, each coil taking half of the current and the whole current passing through the armature. Fig. 9 shows two field-coils and the armature connected in multiple, the current dividing into three and uniting after passing through the machine. For high voltage the machine is worked in series, as shown in Fig. 7, and for low voltage all the parts are in multiple, as shown in Fig. 9.

Having thus described my invention, what I claim, and desire to secure by Letters Patent of the United States, is—

1. The combination of an armature, a frame surrounding the same, field-coils supported on said frame, and an inclosing frame or shell, substantially as and for the purpose set forth.

2. The combination of an inclosing frame or shell having the pole-points, as described, field-coils, and a supporting-frame therefor, having plates connected to the pole-points and lying in close relation to the armature for the purpose described, and an armature within said frame, as set forth.

3. The combination of a cylindrical shell divided horizontally, as described, and having pole-points coincident with the division-lines, longitudinal field-coils mounted within said shell, and an armature operating within the field-coils, as set forth.

4. The combination of a cylindrical shell divided horizontally, as described, and having pole-points coincident with the division-lines, longitudinal field-coils mounted on a frame secured to said pole-points, and an armature operating within the field-coils, as set forth.

5. In a device of the kind described, a field-coil frame composed of side plates for attachment to the inclosing frame or shell and also serving as centers on which the winding of the field is made, and supporting-bars, all substantially as and for the purpose set forth.

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

JOHN HODUIT.

Witnesses:
O. S. BACON,
JAMES H. MORRIS.