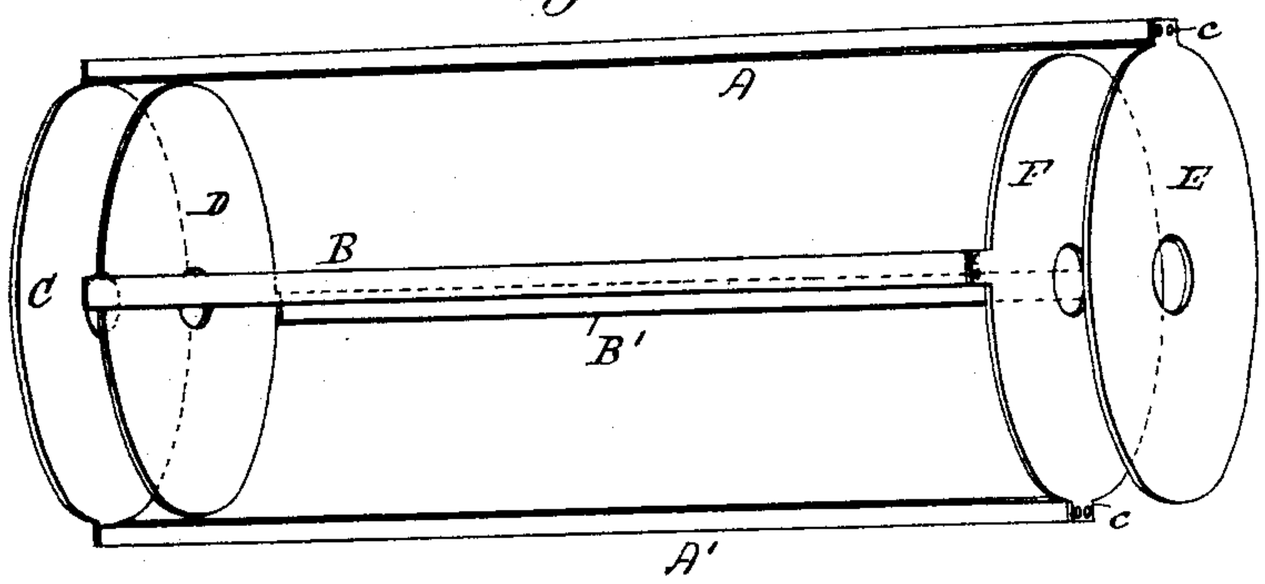
(No Model.) 2 Sheets—Sheet 1.

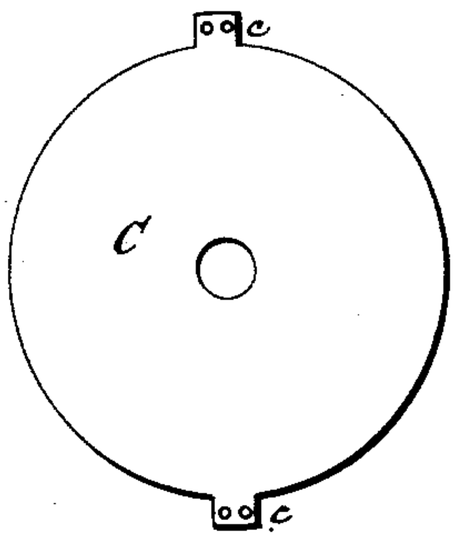
E. WESTON.

DYNAMO OR MAGNETO ELECTRIC MACHINE.

No. 401,317. Patented Apr. 9, 1889

Fig. 1.





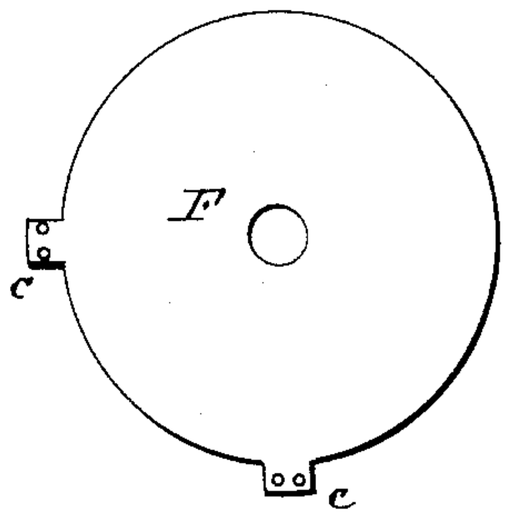
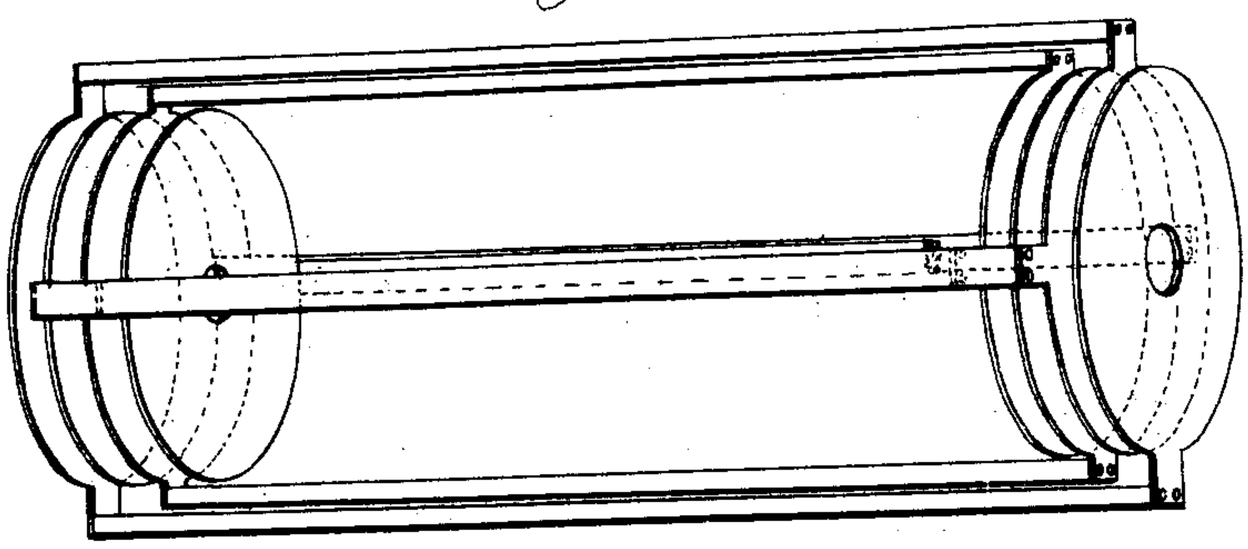


Fig. 2.



Witnesses.
Robert Ewatt.
Parker W. Page.

Inventor.
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By M. S. Bailey
Atty.

(No Model.) 2 Sheets—Sheet 2.

E. WESTON.

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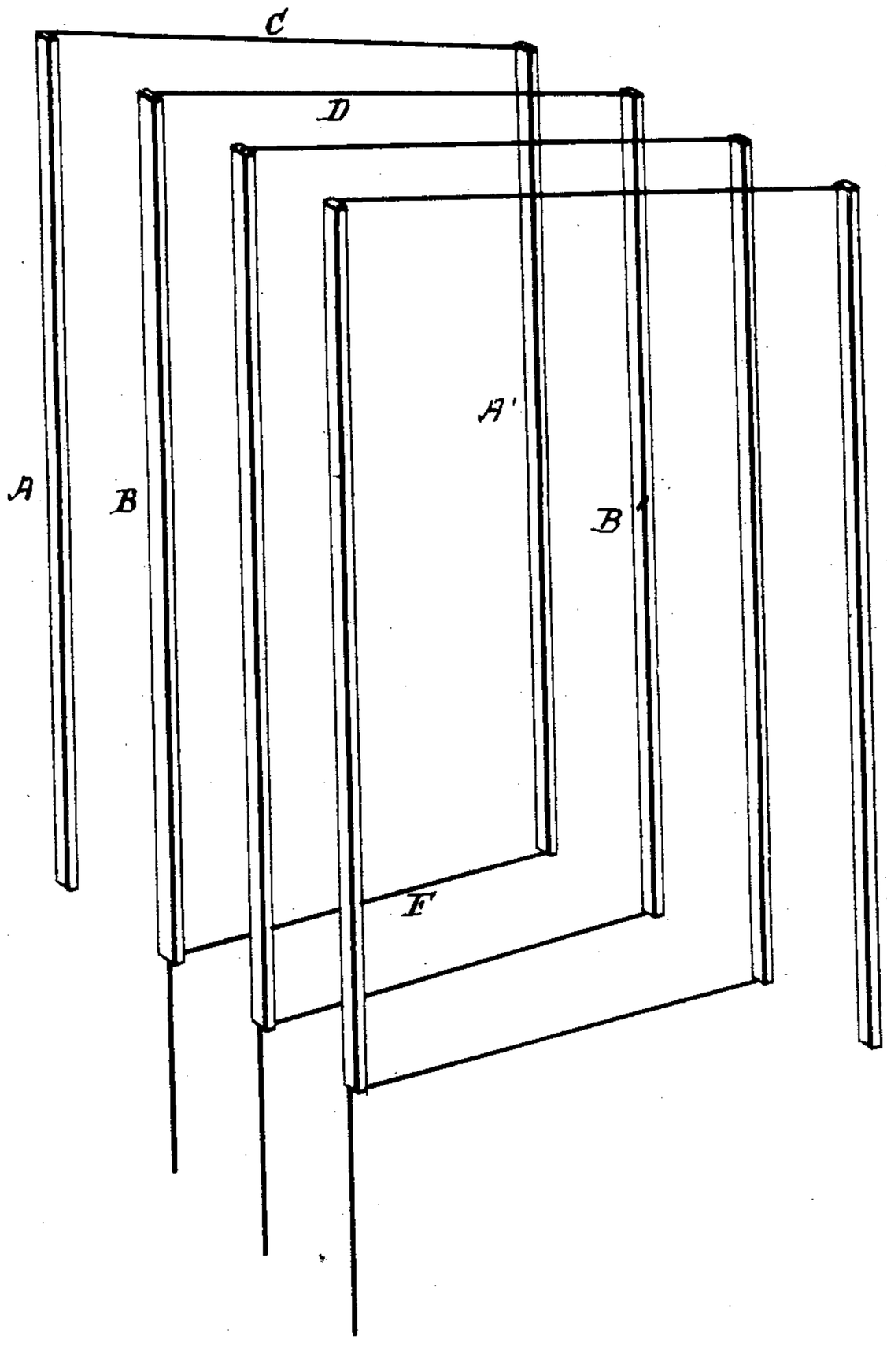
Fig. 3.



Witnesses.
Robert Ewett.
Parker W. Page.

Inventor:
Edward Weston
By M. R. Bailey
Atty.

UNITED STATES PATENT OFFICE.

EDWARD WESTON, OF NEWARK, NEW JERSEY, ASSIGNOR TO THE UNITED STATES ELECTRIC LIGHTING COMPANY, OF NEW YORK, N. Y.

DYNAMO OR MAGNETO ELECTRIC MACHINE.

SPECIFICATION forming part of Letters Patent No. 401,317, dated April 9, 1889.

Application filed May 31, 1881. Serial No. 34,506. (No model.)

To all whom it may concern:

Be it known that I, EDWARD WESTON, of Newark, Essex county, State of New Jersey, have invented certain new and useful Improvements in Dynamo or Magneto Electric Machines, of which the following is a specification.

My invention relates to dynamo or magneto electric machines, and more especially concerns those machines in which a cylindrical armature wound longitudinally with a continuous coil of insulated wire, substantially in the manner indicated in my Letters Patent No. 209,532, is revolved in the fields of permanent or electro magnets in such manner that the wires are caused to cut the lines of force of the said field-magnets at right angles. In the winding of this class of armatures the conductors, which are of insulated copper wire, are carried around and over the ends of the core, the connections with the commutator-segments being effected by taking out loops at points where the wire is brought out to be carried over from one section of the armature to the next. The character of the current generated by such machines depends, as is well known, directly upon the size and length of the wire employed in the coil—a current of intensity requiring a comparatively large number of convolutions of small or fine wire, and on the other hand a current of great quantity and low electro-motive force necessitating for its production a smaller number of convolutions of wire of greatly-increased area in cross-section. Such a change as that last named in the character of the conductors results, when methods of winding similar to that shown in my Letters Patent No. 209,532 are followed, in a great increase in the bulk of the armature, and from the difficulty of bending wires of large diameter around the ends of the core these are carried out to such an extent that in machines of medium size the total length of the armature will be nearly double that of the core. To overcome these objections and to reduce the amount of inefficient wire, or that portion of the wire which is carried beyond the core, is mainly the object of my invention. To this end I substitute for the wire coil in each division of the armature diametrically oppositely-placed insulated conducting bars or strips of considerable area in cross-section, combined with insulated conducting disks or plates at the ends of the core, which serve to connect the bars, the bars and disks or plates with which the armature is thus provided being connected one to the other, substantially in the manner hereinafter described, so as to constitute a connected unbroken series from which at proper points connections may be taken off to the commutator-segments, just as loops are taken off in the case of a continuous coil. This arrangement obviates the objections hereinbefore referred to, and it also possesses the further advantage of permitting enough metal to be put into the conductor at the ends of the armature to very materially reduce the resistance of the inefficient portion of the conductor without appreciably increasing the bulk or length of the armature.

The nature of my invention and the manner in which the same is or may be carried into effect will be understood by reference to the accompanying drawings, in which—

Figure 1 is a perspective view of a series of parallel conducting bars or strips and cross connecting disks or plates embodying my invention. Fig. 2 is a like view of a similar arrangement in which two adjacent conductors are employed. Fig. 3 is a theoretical exposition of the manner of connecting the conductors with one another and with the commutator-segments.

In the several figures similar letters refer to corresponding parts.

A A′ B B′ designate conductors composed, in this case, of bars of copper insulated from the armature-core, which latter, for the better illustration of my invention, has been omitted from the drawings. The bars are laid longitudinally along the core, which may be of any suitable construction—such, for instance, as described in my Letters Patent hereinbefore referred to—and are placed diametrically opposite to one another in pairs, A A′ forming one pair, B B′ another, and so on for as many sets or pairs as may be desired.

C D E F are the cross connecting-plates, formed, preferably, of disks of copper properly insulated from the shaft of the armature

which passes through them, and having a cross-sectional area equal to or greater than that of the bars. The ends of the bars are provided with screw-holes, and are united with ears *c* on the disks by screws which pass through the ears into the bars, as indicated, the joints, for better security, being completed by solder. The several disks are insulated from each other by paper or silk and are of the same size.

The armature-core may, as before said, be of any suitable known construction, care being taken to insulate it from the bars and their connecting disks or plates.

I remark here that in lieu of using ears and screws as a means of uniting the bars and disks said parts may be united in any other convenient way. I also remark that I have, for the sake of clearness, represented in the several figures of the drawings the ears as strips projecting from the periphery of the disks. In practice, however, they should of course be of such size and dimensions as not to offer increased or undue resistance to the passage of the current. The method of connecting the bars together and to the segments of the commutator will be understood readily by reference to the diagrammatic Fig. 3, in which the arrangement of the parts shown in Fig. 1 is carried out to illustrate the connections in an armature of double the number of pairs of bars. By this figure it will be seen that at one end of the armature the disks (represented by simple lines) serve to connect the opposite bars of a set, while at the other end the disks are utilized as the connections between the terminal bar of one set and the initial bar of the next adjacent set, and from each of these latter disks a connection is made by a rod or wire with one segment of the commutator. The bars are thus seen to be connected up in regular series, forming the equivalent of a continuous coil, the commutator-connections being the same as though wire were used. In this respect the plan pursued is the same as that set forth in my hereinbefore-named Letters Patent. The number of sets in this manner increases until each section of the armature is provided with its bar, and connections are made from each of the front disks to the commutator.

In Fig. 2 is shown the method of connecting up when two series of bars are employed, the one superposed on the other. In this case a similar winding is adopted, the bars and disks of each series being connected up and transmitting the currents generated by them to the commutator by means of connecting rods or wires leading from the disks to the commutator-segments, in the same manner as described with reference to Fig. 3, the order of connection being substantially the same as that described for the superposed wire coils in my Letters Patent No. 209,532.

The size of the conductors on and leading from an armature of the kind just described is such as to necessitate a considerable enlargement of the journal-bearings should the conductors be carried through the bushings of the shaft from the armature to the commutator, as is usually done. It will therefore be advisable to fix the commutator to the shaft inside of the bearing and to attach the wires directly thereto.

From the foregoing it will be perceived that the armature in which my invention resides is substantially the same in principle and general characteristics as that set forth in my Letters Patent above named, the difference between the two being mainly, if not entirely, in the construction of the parts which compose the coil or coils. By combining conducting-bars with cross connecting disks or plates in the manner hereinbefore described I obtain an armature which furnishes currents of low electro-motive force and great quantity, without increasing the bulk or length of the armature and without enhanced cost of manufacture. The disks or plates, while forming efficient connections, can lie close to one another, thus occupying but little space, while at the same time a sufficient amount of metal may be put into them to render them of very low resistance.

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

1. In an armature whose core is longitudinally wound with a continuous conducting coil or coils, substantially in the manner stated, a coil composed of longitudinal conducting-bars, combined with cross connecting disks or plates, substantially as hereinbefore set forth.

2. An armature-coil composed of longitudinal bars or strips, combined with cross connecting disks which at one end of the armature connect the two bars of one set and at the other end of the armature connect the terminal bar of one set with the initial bar of the next succeeding set, the latter disks being connected up with the commutator, substantially as hereinbefore set forth.

3. In a revolving armature, a conducting-coil whose longitudinal portions are united at the end or ends of the armature by a disk or plate connection, substantially as and for the purposes hereinbefore set forth.

4. The combination, in a revolving armature, of longitudinal conductors with end connecting-disks, substantially as hereinbefore set forth.

In testimony whereof I have hereunto set my hand this 30th day of May, 1881.

EDWARD WESTON.

Witnesses:
E. A. DICK,
PARKER W. PAGE.