

(No Model.)

4 Sheets—Sheet 1.

E. T. GILLILAND.
DYNAMO ELECTRIC MACHINE.

No. 461,240.

Patented Oct. 13, 1891.

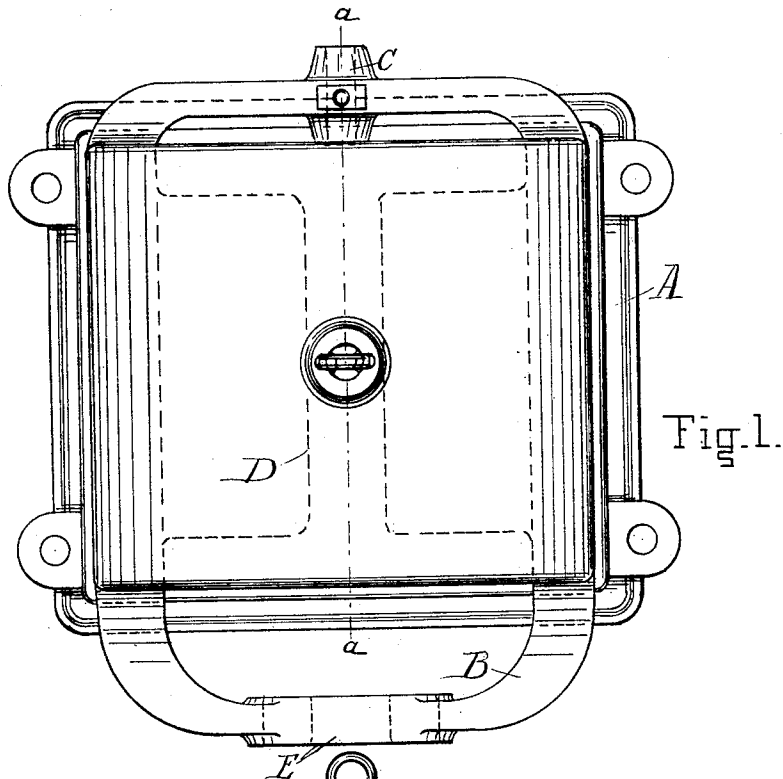


Fig. 1.

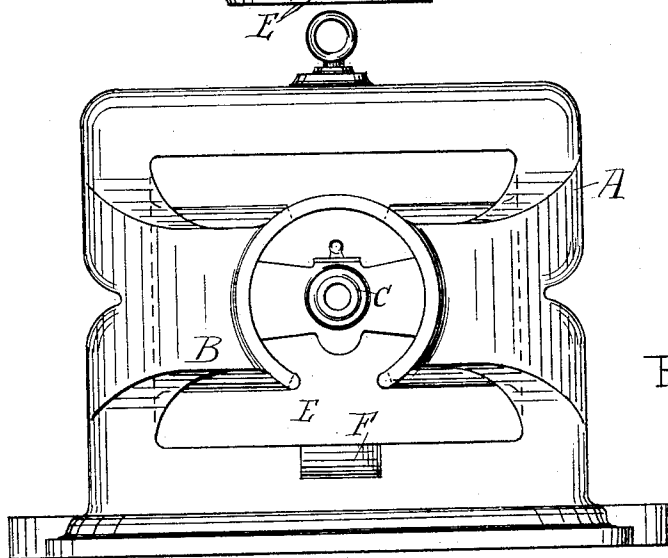


Fig. 2.

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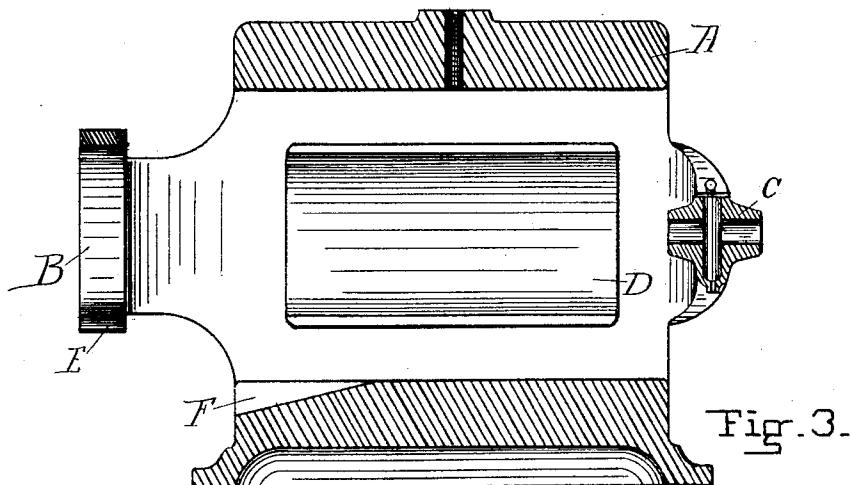
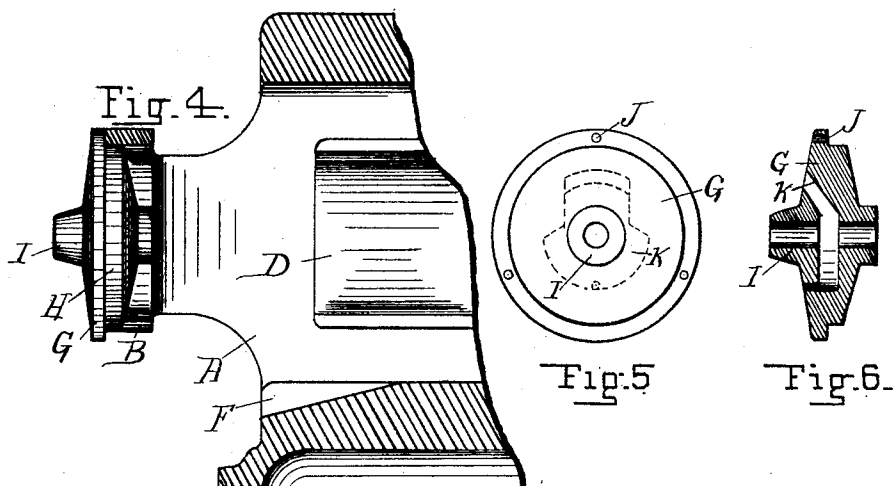
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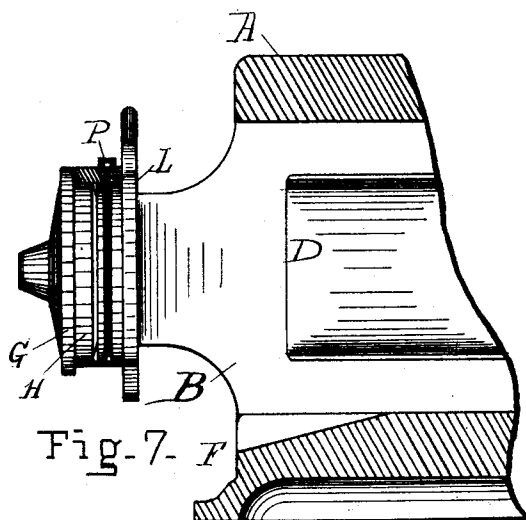


Fig-7. F

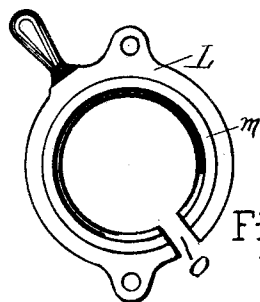


Fig-8.



Fig-9.

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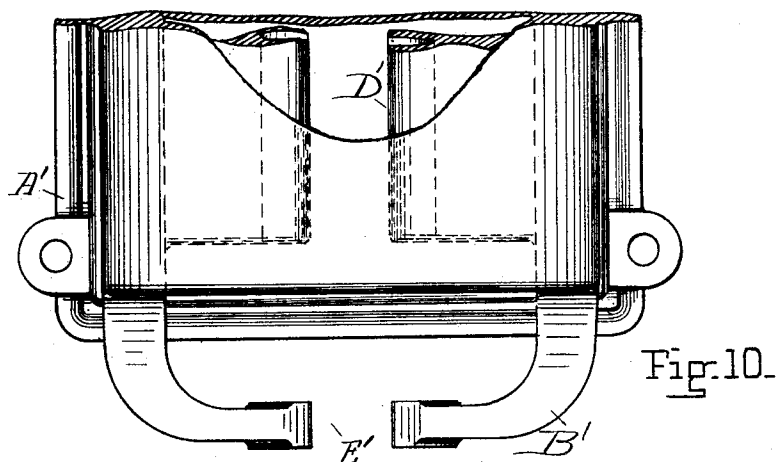


Fig. 10.

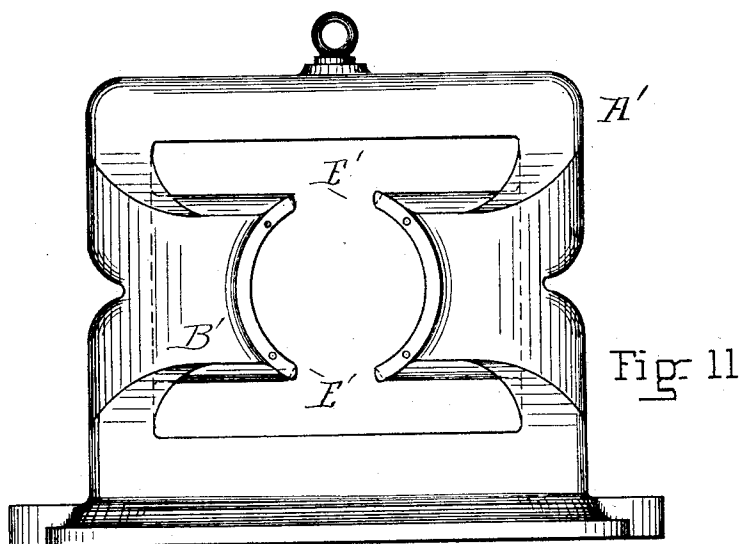


Fig. 11

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UNITED STATES PATENT OFFICE.

EZRA T. GILLILAND, OF NEW YORK, N. Y.

DYNAMO-ELECTRIC MACHINE.

SPECIFICATION forming part of Letters Patent No. 461,240, dated October 13, 1891.

Application filed January 31, 1891. Serial No. 379,850. (No model.)

To all whom it may concern:

Be it known that I, EZRA T. GILLILAND, a citizen of the United States of America, residing at the city of New York, county of New York, State of New York, have invented certain new and useful Improvements in Dynamo-Electric Machines, of which the following is a specification.

My invention consists in an improved frame of a dynamo-electric machine and in an improved provision for assembling the parts within the frame.

In constructing dynamos and motors great difficulty is encountered in centering the journal-bearings for the armature upon the axis of the polar cavity or cylindrical space between the faces of the pole-pieces, within which the armature is revolved. In machines in which the supports for the journal-bearings are mounted upon the base of the machine and fastened to it by bolts a slight imperfection—*e. g.*, in the bolt or its thread—will destroy the centering of the journal-bearing, either by moving the support aside or by turning it upon its base. To avoid this, dowel-pins are commonly inserted in the supports and base; but, however it may be accomplished, it is always a difficult matter to center supports erected upon the base, and they are liable to disarrangement, and this is true of any support the centering of which depends upon the set of a screw in its bed.

It is the object of my invention to simplify and cheapen the manufacture of dynamos and other machines of the same general class by removing this difficulty, and at the same time I secure other advantages hereinafter pointed out. I accomplish this by casting the field-magnets and the supporting-arms for the journal-bearings for the armature all in one piece of iron and in such manner as to permit the boring necessary to finish the machine ready for assembling to be done at one operation, and also to provide for the insertion of the armature and the coils of the field-magnets into position in the frame. Having cast the field-magnets and the supports for the journal-bearings as a single piece, or having cast the whole frame, including these parts, as a single piece, I bore at one operation, by well-known methods, the supports and the faces of the field-magnets upon a common

center, by which is meant that the centers of the orifices in the arms and of the curved faces of the field-pieces all lie along a common axis, which is the axis of rotation of the armature, as described below, reference being had to the accompanying drawings, in which—

Figure 1 is a top view of the frame. Fig. 2 is a view from the end through which the coils and armature are introduced into position. Fig. 3 is a longitudinal section on the line *a a* of Fig. 1. Fig. 4 is partly a longitudinal section and partly an elevation of the end shown in Fig. 2. Figs. 5 and 6 are details of the cylinder-head; Figs. 7, 8, and 9, the rocker-arm, which supports the commutator-brushes; Figs. 10 and 11, a modification.

Referring to Figs. 1 to 9, A is the frame of the machine. B is the arm or support for a journal-bearing through which the field-magnet coils and the armature are introduced into position. C is the arm or support for a journal-bearing at the other end of the machine. D is the pole and pole-piece of one of the field-magnets.

In constructing the machine the arm C is bored of proper size to receive a journal-bearing. The arm B is bored with an opening or orifice larger than the external diameter of the armature or otherwise shaped to admit the armature into the polar cavity. In practice the orifice is made circular and of equal diameter with the polar cavity. To permit the introduction of the coils of the field-magnets, which are wound upon bobbins, a section of the rim about this orifice is cut away either at the top or the bottom, or both, (see Fig. 11,) thus forming an opening through the arm, and the base, or if desired, the top of the frame is cut away, as shown at F.

When the machine is to be assembled, the coils of the field-magnets are inserted through the end B and slipped onto the cores. The armature is then inserted through the circular orifice in B. One end of its axis is supported in the bearing in the arm C. The other end is supported in a plate or other support, which can be fitted into the orifice as the journal-bearing in the cylinder-head G. (Illustrated in Figs. 4, 5, and 6.) Both the journal-bearings of the armature-axis are of non-magnetic material. On the cylinder-head is cut a flange H, which fits accurately

within the orifice in B. This cylinder-head is bored, turned off, and faced at one operation, and is thereby accurately centered and aligned. The head is fastened to the arm by bolts inserted through the holes J. As the rim of the cylinder-head fits snugly against the outer face of the arm B, no defect in the screws can effect more than a slight rotation of the cylinder-head, and since the journal-bearing is at the center of the cylinder-head the centering or alignment is not destroyed thereby. Thus the centering of the journal-bearing is secured by the abutment of its support—namely, the flanged cylinder-head—against the inner walls and outer face of the arm B. Within the cylinder-head is the oil well and feed K. (Shown in Figs. 5 and 6.)

The rocker-arm L of the commutator (illustrated in Figs. 8 and 9) has a flange *m*, similar to H, and which is inserted into the same orifice, but from the rear of the arm B. This rocker-arm is cut away at O to slip over the axis of the armature. In the flange *m* is a notch or groove *n*, extending around the whole or a part of its circumference, in which plays a set-screw P. This screw prevents lateral movement of the rocker-arm while it is being rotated and locks the arm in any desired position.

By extending the supports for the armature from the field-magnet, instead of resting them upon the base, it becomes possible to reduce the size of the base, and hence the weight of the frame, and these supports help to hold the pole-piece of the field-magnets against the enormous attraction tending to draw them together. Moreover, since the supports connect the pole-pieces through the cores of the field-magnets they are in the magnetic circuit.

In the modification shown in Figs. 10 and 11, in which the arm B is cut in two by the openings E E', it is necessary, in order to secure the full advantage of introducing the supports into the magnetic circuit, to make the cylinder-head of magnetic material. The head used with either form is ordinarily made of cast-iron. The cut in the base of the frame (shown at F) is not necessary in this modification.

It is obvious that each of the arms B and C may be bored with an orifice large enough to admit the armature. Both journal-bearings may in that case be supported in cylinder-heads. Where in the claims I specify that one arm is bored to admit the armature-bearing I do not limit myself to so boring one of the arms only. It is also obvious that my invention is applicable to motors as well as dynamos, and the claims are intended to cover its application to the general class of dynamo-electric machinery.

What I claim, and desire to secure by Letters Patent, is—

1. In a dynamo, the field-magnets and supports for the armature-axis bored upon a common center, the boring in one support being

a circular opening to admit the armature into the polar cavity, in combination with a support fitting into the opening and having at its center a bearing for the axis of the armature, substantially as described.

2. In a dynamo, the field-magnets and supports for the armature-axis made in one piece and bored upon a common center, the boring in one support being a circular opening to admit the armature into the polar cavity, in combination with a support fitting into the opening and having at its center a bearing for the axis of the armature, substantially as described.

3. In a dynamo, the field-magnets and supports for the armature-axis, which connect the pole-pieces magnetically through their cores, all bored upon a common center, the boring in one support being a circular opening to admit the armature into the polar cavity, in combination with a support fitting into the opening and having at its center a bearing for the axis of the armature, substantially as described.

4. In a dynamo, the field-magnets and supports for the armature-axis, which connect the pole-pieces magnetically through their cores, made all in one piece and bored upon a common center, the boring in one support being a circular opening to admit the armature into the polar cavity, in combination with a support fitting into the opening and having at its center a bearing for the axis of the armature, substantially as described.

5. In a dynamo, the field-magnets and supports for the armature-axis bored upon a common center, the boring in one support being a circular opening to admit the armature into the polar cavity, in combination with a flanged cylinder-head fitting into the opening and against the face of the support and having at its center a bearing for the axis of the armature, substantially as described.

6. In a dynamo, the field-magnets and supports for the armature-axis made in one piece and bored upon a common center, the boring in one support being a circular opening to admit the armature into the polar cavity, in combination with a flanged cylinder-head fitting into the opening and against the face of the support and having at its center a bearing for the axis of the armature, substantially as described.

7. In a dynamo, the field-magnets and supports for the armature-axis, which connect the pole-pieces magnetically through their cores, all bored upon a common center, the boring in one support being a circular opening to admit the armature into the polar cavity, in combination with a flanged cylinder-head fitting into the opening and against the face of the support and having at its center a bearing for the axis of the armature, substantially as described.

8. In a dynamo, the field-magnets and supports for the armature-axis, which connect the pole-pieces magnetically through their cores,

made all in one piece and bored upon a common center, the boring in one support being a circular opening to admit the armature into the polar cavity, in combination with a flanged cylinder-head fitting into the opening and against the face of the support and having at its center a bearing for the axis of the armature, substantially as described.

9. In a dynamo, the field-magnets and supports for the armature bored upon a common center, the boring in one support being a circular opening to admit the armature into the polar cavity and having the rim cut away, as shown at E, to provide for assembling the parts of the machine, in combination with a support fitting into the opening and having at its center a bearing for the axis of the armature, substantially as described.

10. In a dynamo, the field-magnets and supports for the armature bored upon a common center, one support being cut in two to provide for assembling the parts of the machine and having faces that form arcs of a common circle, in combination with a support abutting against the faces and having at its middle point a bearing for the axis of the armature, sustained at the common center by the abutment of the support against the faces, substantially as described.

11. In a dynamo, the field-magnets and supports for the armature, which connect the pole-pieces magnetically through their cores, all bored upon a common center, one support being cut in two to provide for assembling the parts of the machine and having faces that form the arcs of a common circle, in combination with a support of magnetic material abutting against the faces and having at its middle point a bearing for the axis of the armature, sustained at the common center by

the abutment of the support against the faces, substantially as described.

12. In a dynamo, the field-magnets and supports for the armature, one support having an opening large enough to admit the armature into the polar cavity, in combination with a rocker-arm carrying the commutator-brushes sustained by said support, and a support for a journal-bearing fitting into said opening, substantially as described.

13. In a dynamo, the field-magnets and supports for the armature, one support having an opening large enough to admit the armature into the polar cavity, in combination with a support for a journal-bearing, and a rocker-arm carrying commutator-brushes, both fitting into said opening, substantially as described.

14. In a dynamo, the field-magnets and supports for the armature, one support having an opening large enough to admit the armature into the polar cavity, in combination with a support for a journal-bearing, and a flanged rocker-arm carrying commutator-brushes, both fitting into the opening, and a set-screw to fasten the rocker-arm, substantially as described.

15. In a dynamo, the field-magnets and supports for the armature, one support having an opening large enough to admit the armature into the polar cavity, in combination with a support for a journal-bearing, and a flanged rocker-arm carrying commutator-brushes, both fitting into the opening, the flange of the rocker-arm having a groove in which plays a set-screw, substantially as described.

EZRA T. GILLILAND.

Witnesses:

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EMMA L. WYMAN.