

No. 854,321.

PATENTED MAY 21, 1907.

J. A. WILLIAMS.  
DYNAMO ELECTRIC MACHINE.

APPLICATION FILED FEB. 28, 1906.

2 SHEETS—SHEET 1.

Fig. 1.

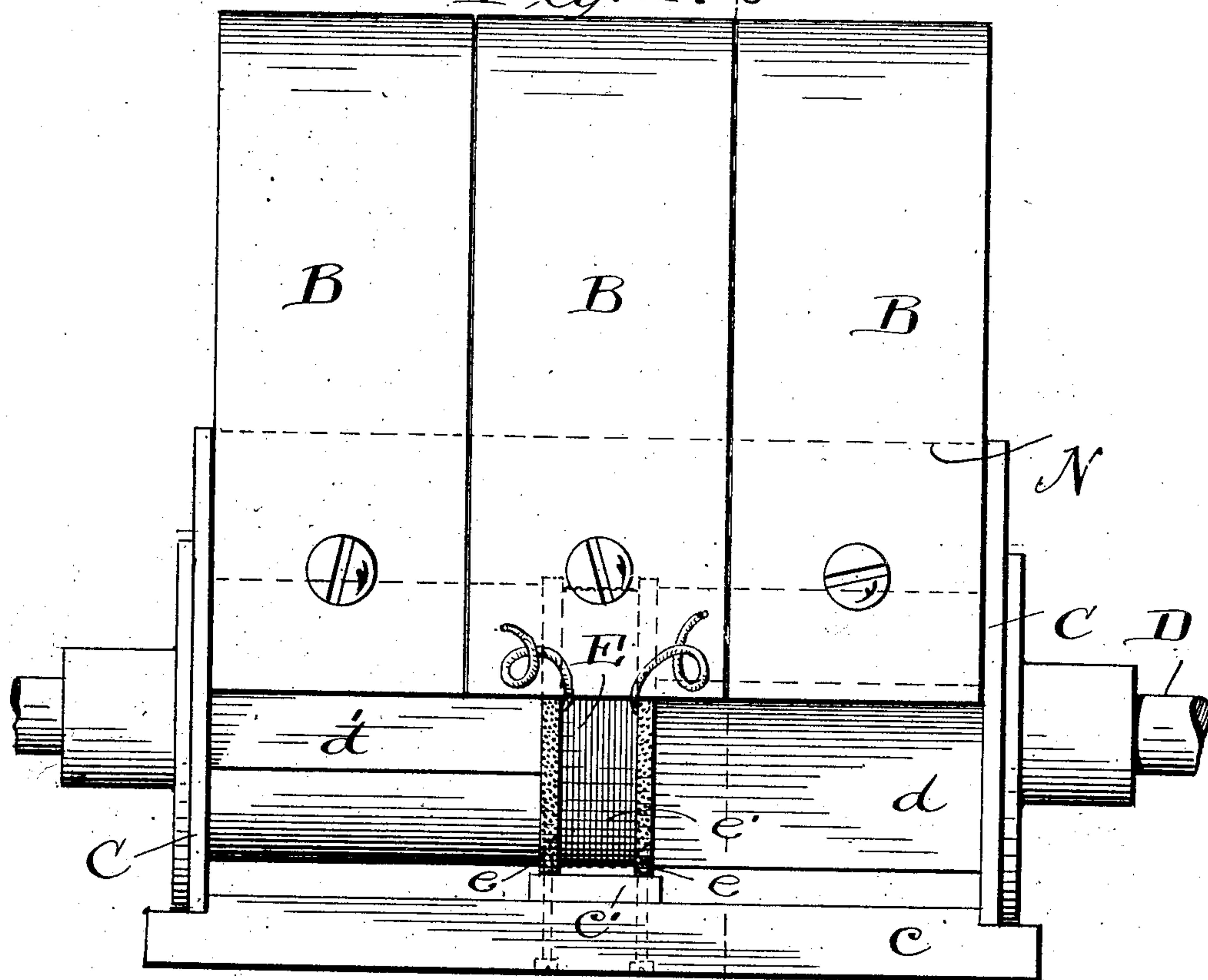
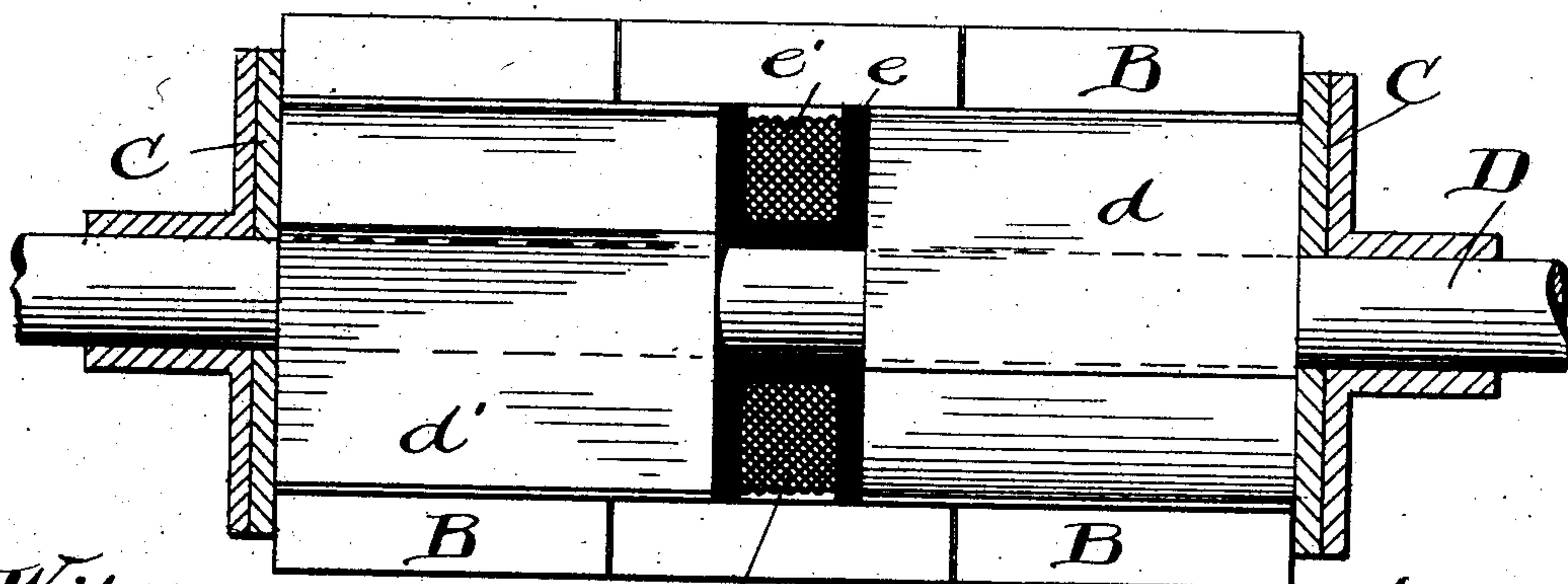


Fig. 2.



Witnesses

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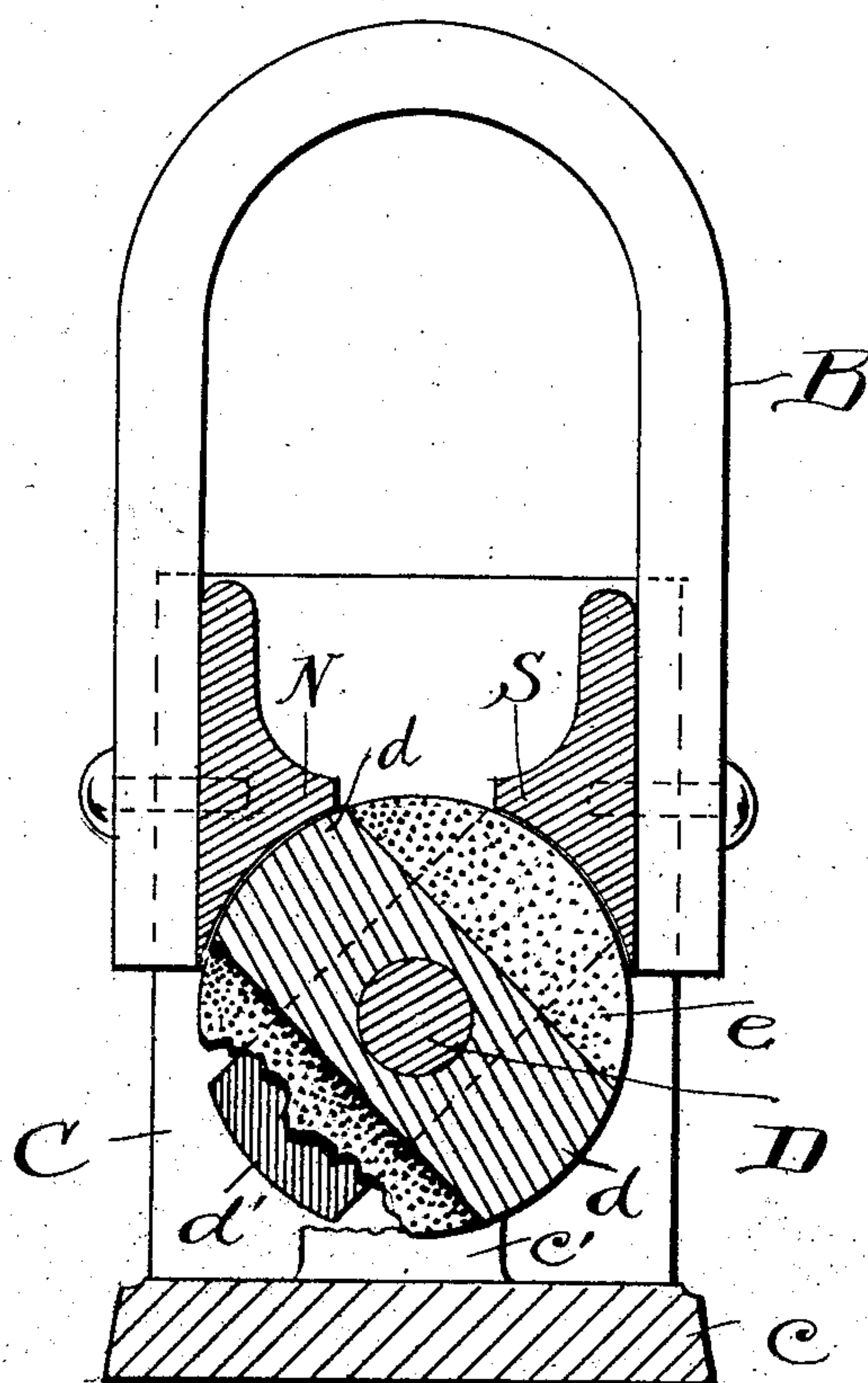
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2 SHEETS—SHEET 2.

*Fig. 3.*



*Witnesses.*

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# UNITED STATES PATENT OFFICE.

JOSEPH A. WILLIAMS, OF CLEVELAND, OHIO.

## DYNAMO-ELECTRIC MACHINE

No. 854,321.

Specification of Letters Patent.

Patented May 21, 1907.

Application filed February 28, 1906. Serial No. 303,328.

*To all whom it may concern:*

Be it known that I, JOSEPH A. WILLIAMS, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented a certain new and useful Improvement in Dynamo-Electric Machines, of which the following is a full, clear, and exact description.

The invention, as shown in the drawing, is embodied in a generator of simple form intended principally for use in connection with explosion engines to produce igniting sparks; although it is clear that the invention is not restricted to this particular embodiment or use.

The object of the invention is to provide an electric generator which, in addition to being very simple, in construction and, consequently, very cheap, may be made to produce many alternations of the flow of the magnetic lines of force for each revolution and, consequently, many alternations of the induced current in the armature windings.

The invention resides, particularly, in the construction of the armature, which, broadly speaking, comprises the windings, and a rotatable member made of magnetic material mounted to rotate about an axis which is substantially coincident with the axis of the windings.

The invention also consists in the combination with the pole pieces and their magnets of an armature consisting of windings and a core, made of magnetic material, passing through said windings and mounted so as to rotate upon an axis which is substantially coincident with the axis of the windings,—said core being provided with a plurality of wings which are arranged one-half on one side and the other half on the opposite side of the armature windings and are so disposed that when any wing on one side of said windings is in juxtaposition with one pole, a wing on the other side of said windings is in juxtaposition with the other pole.

It also consists in an electric generator having the characteristics last above referred to when the armature windings are upon a non-rotatable spool. And it also consists in such other details of construction as are shown in the drawing and hereinafter described and definitely pointed out in the claims.

In the drawing, Figure 1 is a front elevation of a machine embodying the invention in a simple form. Fig. 2 is a bottom plan

view thereof with the base plate *c* removed; and Fig. 3 is a sectional side elevation in the plane of line 3—3 of Fig. 1.

Referring to the parts by letters N and S represent respectively the north and south pole pieces of the magnets B, which magnets may be permanent magnets or electro magnets, as desired. The faces of said pole pieces are curved about the axis of the core D, and the centers of said pole faces are substantially 90° apart.

D represents the armature core, and E the armature windings, said windings consisting of an insulating spool *e* and wire coils *e'* wound thereon. The armature core is rotatably mounted between the curved faces of the pole pieces and upon an axis which is coincident with the axis of curvature of the faces of said pole pieces; and said core passes through the armature windings—that is to say, through the spool *e* and the wire coils thereon, in such direction that its axis of rotation is substantially coincident with the axis of said windings. C, C represent the bearings in which said armature core is mounted. In the construction shown the windings—that is to say, the spool and the coils thereon are stationary,—the spool being fixed to a suitable support *c'*. It is not, however, of the essence of the broad invention that these windings shall be non-rotatable, although it is a desirable feature of construction, making for simplicity and decreased cost.

The core which must be made of magnetic material, preferably soft iron, is provided with four radiating wings *d—d'*, two of said wings, viz., the wings *d*, being at one end of the spool *e*, and the other two of said wings, viz., the wings *d'*, being at the other end thereof. The wings *d—d'* extend in opposite directions in the same diametrical plane; and the same is true of the wings *d'—d'*; but the two diametrical planes in which said wings lie are at right angles to each other. The pole pieces and wings being arranged as described, it is evident that when one of the wings *d* is in juxtaposition to the face of one pole piece, the end of one of the wings *d'* will be in juxtaposition to the face of the other pole piece.

The magnetic lines of force flowing from the north pole piece enter one wing, *d* for example, and flow along the core and through the windings E and out of one of the wings *d'* to the south pole piece, thereby inducing a



current flow in one direction through the wire  $e'$  of the coils. As the core continues to rotate it next brings one of the wings  $d'$  in juxtaposition to north pole piece and one of the wings  $d$  in juxtaposition to the south pole piece, whereupon the magnetic line of force from the north pole piece enters said wing  $d'$  and flows along the core and thence along the wing  $d$  to the south pole piece, thereby going through the windings E in the opposite direction and inducing in the wire  $e'$  of the windings a current flow in a direction which is opposite to that first referred to. The device shown has, therefore, a great advantage over other magneto-electric machines, used for this purpose, especially on automobiles, because such other device do not become sufficiently active to produce the desired result until they come into rapid rotation, and therefore it is usually necessary to provide an auxiliary device of some sort, as a dry battery, to produce the igniting sparks necessary to put the engine into operation.

Having described my invention, I claim:

1. In a magneto-electric machine, the combination of a non-rotatable spool on which are armature windings and a rotatable core passed axially through said spool and having, at one end of the spool, two diametrically opposed projecting wings, and having, at the other end of said spool two opposed projecting wings lying in a diametrical plane at right angles to that in which the other two wings lie, with magnets having pole pieces whose faces are concentric with the axis of

said core,—the distance between the centers of said pole faces being substantially  $90^\circ$ .

2. In a machine of the character described, a non-rotatable armature winding, a rotatable inductor core passed axially through said winding and having on one side of the winding diametrically opposed wings and having on the other side of the winding diametrically opposed wings lying in a plane at right angles to that of the first named wings, with magnetic pole pieces on opposite sides of the winding and having faces concentric with the said core, the centers of said pole faces being substantially  $90^\circ$  apart.

3. In a machine of the character described, a non-rotatable armature winding, a rotatable inductor core passed axially through said winding and having on one side of the winding diametrically opposed wings and having on the other side of said winding diametrically opposed wings lying in a plane at right angles to that of the first named wings, magnetic pole pieces on opposite sides of the winding, there being two pieces of opposite polarity on each side of the winding, the pieces on each side of the winding being in the same axial plane with pieces having the same polarity on the opposite side of the winding.

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

JOSEPH A. WILLIAMS.

Witnesses:

E. B. GILCHRIST,  
E. L. THURSTON.