(No Model.)

A. G. KETCHUM.

DYNAMO ELECTRIC MACHINE.

No. 343,129. Patented June 1, 1886.

Fig. 1.

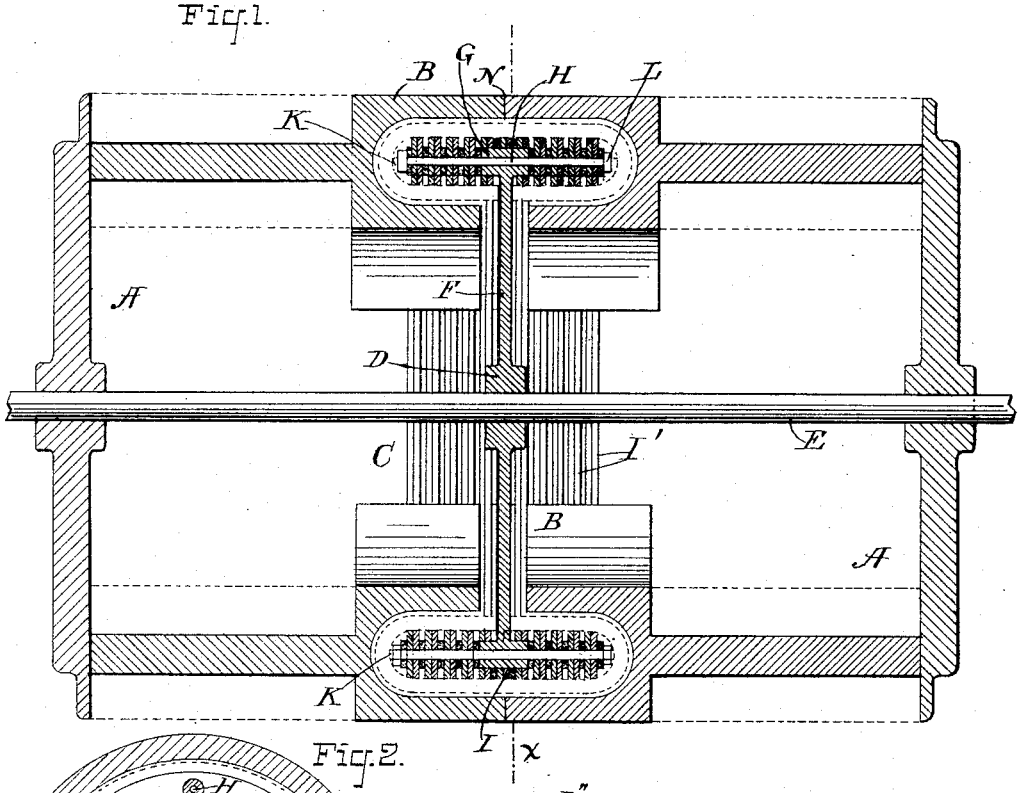
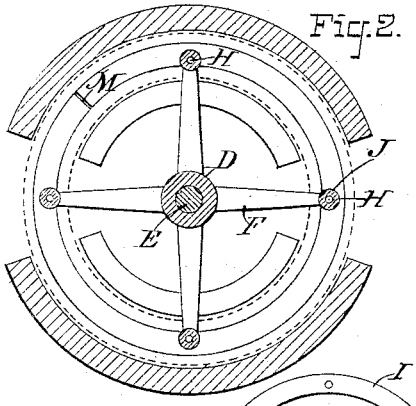
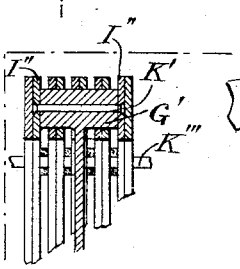


Fig. 2.





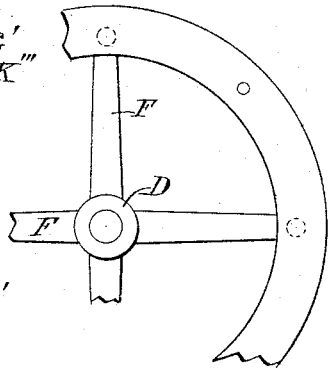


Fig. 3.

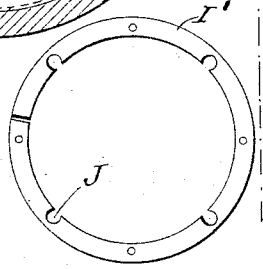
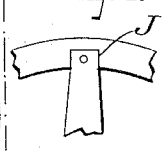


Fig. 4.



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ARTHUR G. KETCHUM, OF WINCHENDON, MASSACHUSETTS.

DYNAMO-ELECTRIC MACHINE.

SPECIFICATION forming part of Letters Patent No. 343,129, dated June 1, 1886.

Application filed February 10, 1886. Serial No. 191,446. (No model.)

To all whom it may concern:

Be it known that I, ARTHUR G. KETCHUM, a citizen of the United States, and a resident of Winchendon, in the county of Worcester and State of Massachusetts, have invented certain new and useful Improvements in Dynamo-Electric Machines, of which the following is a complete, clear, and exact description, setting forth in general and in detail my invention.

My invention relates particularly to improvements in dynamo-electric machines having reference to the armature and the rings composing said armature, and to the proportional dimensions of the superficial area of the armature directly exposed to the pole-pieces of the field-magnets, and to the portion of the same indirectly exposed.

The object of my invention is to provide a form of armature readily put together, adapted to abstain from warping, and at the same time to expose a maximum area of the armature to the action of the magnetic field.

The invention consists of certain elements organized, essentially as described, in conformity to the accompanying drawings and claims, adapted to operate as hereinafter stated, including all modifications as to their form, combination, or disposition applicable to any purpose mentioned or not mentioned, but especially applicable to the uses alluded to, and different, when considered in entirety, from any combination ever before made known to the public as far as the records are able to prove.

The machine embodying my invention consists, essentially, of the combination of an armature, field-magnets, and pole-pieces to said magnets, the frame of said armature consisting of a combination of a central hub having radial spokes all lying approximately in the same plane, enlarged cylindrical heads upon the outer ends of said spokes, a first set of flat incomplete metallic rings, notches in said rings fitting upon said heads, holes in said heads parallel to the axis of said hub, a second set of flat incomplete metallic rings, holes in said rings in line with the holes in said heads, insulating material between said rings, and bolts passing through all of said holes.

In order to illustrate the practical manner of carrying out the invention, drawings are hereunto annexed and described, in which similar letters of reference represent corresponding elements, and in which each part referred to is designated by a single letter.

Figure 1 shows a general longitudinal cross-sectional view of the machine. Fig. 2 shows a cross-sectional view at the line *x*. Fig. 3 shows a single incomplete ring and notches J therein. Fig. 4, including the portion of the drawing within the line *y* made up of long and short marks, shows a somewhat equivalent construction as that shown in the other figures.

The machine consists of the combination of field-magnets A, having pole-pieces B and armature C. The armature-frame is composed of a central hub, D, secured to the main shaft E of the machine, radial spokes F to said hub, enlarged heads G at the outer ends of said spokes, holes H in said heads and parallel to said shaft, incomplete flat metallic rings I, having notches J to fit over said heads, other similar rings, I′, having no notches, holes in all the rings and in line with the holes in said heads, bolts K, passing through said holes, and nuts L upon the ends of said bolts, for the purpose of securing the rings to each other and to said heads.

Some of the more important details of construction and disposition are as follows: The notches J serve a useful purpose. If they were not present several rings midway between the ends of the armature would have to be omitted. This omission would destroy the symmetry of the armature and diminish the strength and quantity of iron in the armature. Each ring is preferably split at M, or incomplete. It is found by this construction that the expansion and contraction due to heat take place in the plane of the ring, thereby preventing warping, while the pole-pieces are so grooved as to embrace the whole superficial area of such an armature, except the spokes and hub, the pole-pieces touching and being secured to each other at N on the outside and separated on the inside approximately only by the thickness of the spokes F.

The invention is not limited to the precise construction hereinbefore described, as it is

evident that many modifications may be made therein without departing from the spirit of the invention.

In Fig. 4 several rings are fitted upon the enlarged heads and prevented from sliding off by means of bolts K′ passing through said heads and through one ring, I″, upon each side of the heads, the remaining rings being secured to each other and to the former mentioned rings by bolts K‴ passing through holes in all the rings. Only one of the heads in this modification is shown, as they are all alike. In this case I prefer to make the notches rectangular, as shown at J′, instead of circular, as shown at J in Fig. 3.

Having now stated the title, object, and nature of the said invention, having described its practical realization by reference to the accompanying drawings, and having particularly ascertained the manner in which the same operates to accomplish the said object, what I consider to be novel and original, and therefore claim as my invention, is—

1. In a dynamo-electric machine, an armature-frame consisting, essentially, of a central hub having radial spokes all lying in approximately the same plane, enlarged cylindrical heads upon the outer ends of said spokes, holes in said heads, a first set of incomplete rings having notches which fit upon said heads and secured to said heads, and a second set of incomplete flat metallic rings secured to said first set, substantially as and for the purpose set forth.

2. In a dynamo-electric machine, an armature-frame consisting of a central hub having spokes, enlarged heads at the outer ends of said spokes, a first set of rings secured to said heads and provided with notches which fit upon said heads, and a second set of rings secured to said first set of rings, all in combination, substantially as described.

3. In a dynamo-electric machine, an armature-frame consisting, substantially, of a central hub, and radial spokes to said hub, enlarged ends to the outer ends of said spokes, rings of sheet metal containing slots which fit upon said heads, additional rings, also of sheet metal, upon each side of said first-mentioned rings, holes in all of said rings and in said heads, and bolts passing through said holes, in combination with field-magnets and pole-pieces thereto, said pole-pieces each having branches, one branch of each extending within the armature to the said spokes and the other of each extending outside the armature and secured to a similar branch of an opposite pole-piece, essentially as and for the purpose set forth.

In testimony whereof I have hereunto signed my name, in the presence of two subscribing witnesses, this 1st day of February, 1886.

ARTHUR G. KETCHUM.

Witnesses:
FRANK B. SPALTER,
S. A. GREENWOOD.