(No Model.) 2 Sheets—Sheet 1.

L. A. McCARTHY.

ARMATURE FOR DYNAMO ELECTRIC MACHINES.

No. 458,236. Patented Aug. 25, 1891.

Fig. 3,

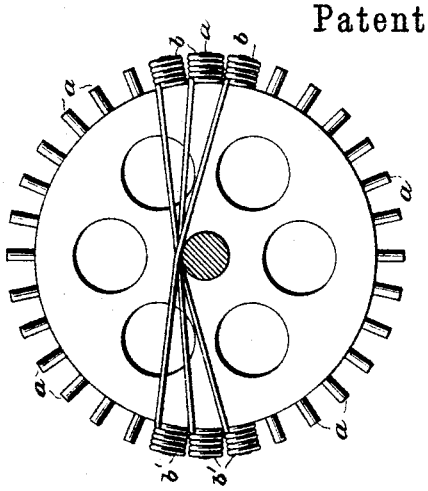


Fig. 4,

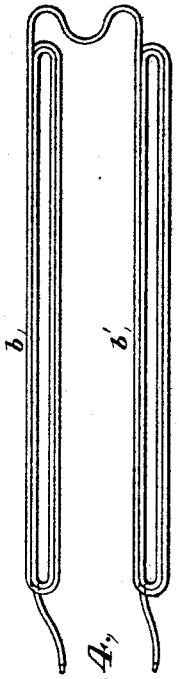


Fig. 2,

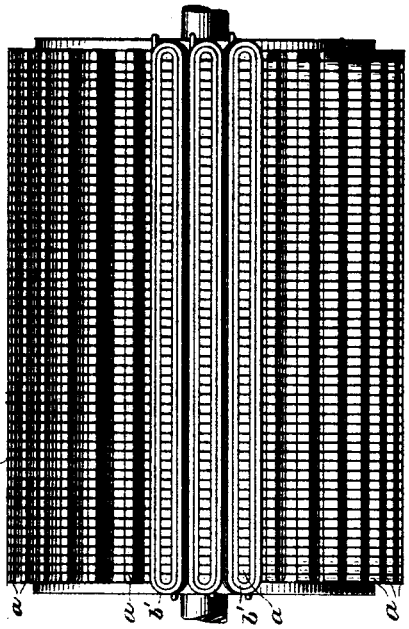


Fig. 5,

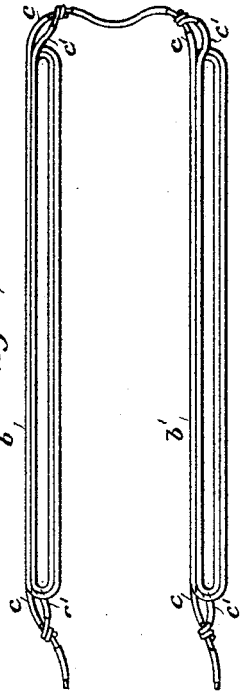
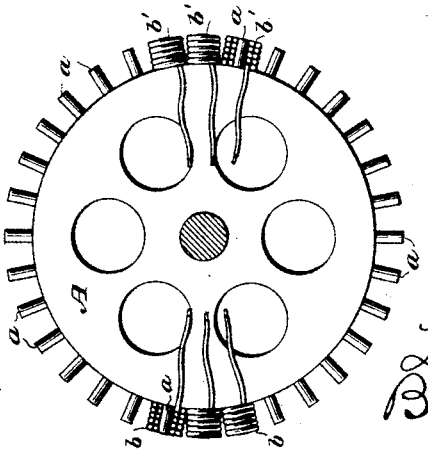


Fig. 1,



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(No Model.) 2 Sheets—Sheet 2.

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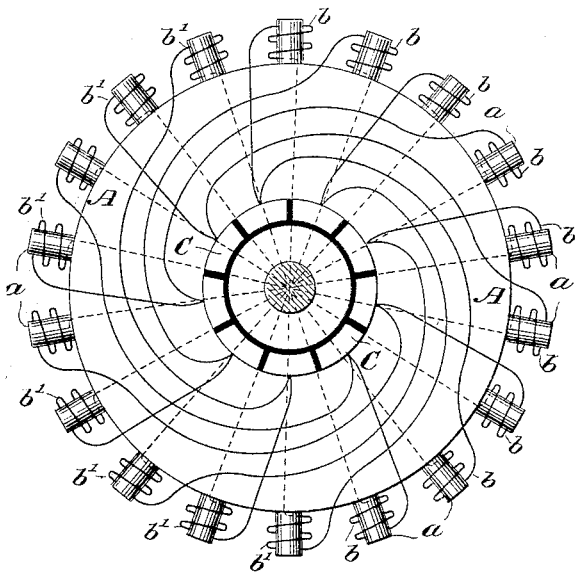
ARMATURE FOR DYNAMO ELECTRIC MACHINES.

No. 458,236. Patented Aug. 25, 1891.

Fig. 6.



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UNITED STATES PATENT OFFICE.

LAURENCE A. McCARTHY, OF BROOKLYN, NEW YORK.

ARMATURE FOR DYNAMO-ELECTRIC MACHINES.

SPECIFICATION forming part of Letters Patent No. 458,236, dated August 25, 1891.

Application filed February 18, 1891. Serial No. 381,975. (No model.)

To all whom it may concern:

Be it known that I, LAURENCE A. McCARTHY, a citizen of the United States, and a resident of Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Armatures for Electric Machines, of which the following is a specification.

My invention relates to the construction of armatures for dynamo-electric machines.

The object of this invention is (by combining the principles of the Siemens H armature and the drum-armature of Alteneck) to provide an armature for direct-current motors of low resistance having as little useless wire as possible, and which, while being electrically efficient, will be simple in construction and can be repaired readily by removing faulty coils and replacing them with others previously prepared.

It is a well-known fact that the nearer the face of the armature can be placed to the poles of the field-magnets the stronger is the attractive and repulsive effect obtained, and by making the radial teeth on the face or circumference of the armature narrow a large number of wires can be wound across it and the greatest possible number of lines of force cut in each revolution. Another advantage gained by using a large number of radiating teeth or magnetic poles and coils of wire on the face of the armature, is the more gradual and even change of polarity in the armature as it rotates.

The invention consists, broadly, in constructing an armature-core (preferably laminated) with a large number of teeth radiating from the circumference of the armature-core. Around said teeth are wound or placed coils of wire arranged in pairs, one coil of each pair on the opposite side of the armature from the other, each pair of said coils being connected together at the back end of the armature by a piece of heavy well-insulated wire, thereby having very little resistance to be overcome outside of the active or useful wires in the coils. The other or free ends of each pair of coils are shown as ready to be connected to sections of a commutator.

In the accompanying drawings similar letters indicate similar parts.

Figure 1 shows an end view of an armature with one pair of coils in section and with the ends of the wires from the coils hanging loose. Fig. 2 gives a side view of the armature, showing the shape and position of the coils and radiating teeth and their relation to each other. Fig. 3 gives another end view showing coils on the opposite sides of the armature connected together. Fig. 4 shows a pair of coils before they are placed on the armature. Fig. 5 illustrates a modification of the coils shown in Fig. 4, showing double coils or a coil wound in multiple and connected together before being connected to the coil on the opposite side of the armature. Fig. 6 shows the coils *b b'*, connected to the sections of commutator G.

Again referring to Fig. 1, which is intended to represent the front or commutator end of an armature, and in which A represents the magnetic body of an armature having narrow radiating teeth *a a*, around which the coils of wire *b b'* are placed, the teeth *a a* are a part or prolongation of the magnetic disks A. Now, while the free ends of the coils *b b'* are shown as hanging loose in this figure it can readily be understood that by connecting the free ends of one pair of said coils to bars of a commutator, so as to be able to send a current through said pair of coils, they will cause the armature to indicate a positive polarity on one side and a negative polarity on the other or opposite side of said armature, and by connecting the free ends of each pair of coils to the commutator, as shown in Fig. 6, so that the current will flow in the same direction through them, the poles on the armature will not only be strengthened, but will be charged from point to point as the armature revolves.

Fig. 2 not only shows the shape of the coils of wire placed around the teeth or prolongations *a a* on the face of the armature, but shows that the teeth do not extend the whole length of the armature, enough space being left at each end to support the wire where it passes around the ends of the teeth, thus preventing overhanging ends that might work loose and cause trouble. The coils are also shown as being wound as compactly as possible and fitting snugly around the teeth without further compression, thus reducing useless wire to a minimum. Fig. 2 also shows a

laminated core built up of disks of magnetic metal. The disks are preferably plated with some non-magnetic metal, as well as separated by a non-conductor, flying particles of metal being thus less liable to adhere to the teeth and cause trouble. While, for the sake of clearness, in the drawings I show no means of holding the coils in place on the armature, any of the well-known means may be employed; but I prefer to use a wire wrapped circumferentially around the armature.

Fig. 3 shows each pair of coils *b* and *b'* connected together across the end of the armature by a single wire, preferably of a diameter to cause little or no resistance. This will be found very convenient in making repairs to injured armatures, as all that it will be necessary to do will be to cut off the faulty coil where it is attached to the connecting-wire and replace it by a good one.

Fig. 4 shows a pair of coils *b* and *b'* ready to be placed on the armature, as shown in Fig. 3.

Fig. 5 shows a modification of the coils *b* *b'* of Fig. 4, in which independent coils of wire *c* and *c'* are shown, one wrapped around the outside of the other and their free ends connected together before being carried across to the coil on the opposite side of the armature. I am by this means enabled to very materially reduce the resistance of the armature without increasing the size of the wire used.

Now, having described the different parts and their connection to each other, what I claim as my invention is—

1. In an armature for dynamo-electric machines, the combination of a magnetic core having narrow projecting teeth with coils of wire connected together in pairs, one coil of each pair wound around the tooth on the opposite side of the core from the other coil of the pair, all substantially as set forth.

2. In an armature for dynamo-electric machines, the combination of coils of insulated wire connected together in pairs by a single conductor with a laminated core having an even number of narrow radiating teeth, said coils arranged around said teeth and on opposite sides of said core, all substantially as set forth.

3. In an armature for electric machines, the combination of a laminated core having narrow radiating teeth with coils of wire in multiple around each tooth, said coils connected in pairs, one member of each pair arranged on the opposite side of the core from the other member of the pair, all substantially as shown.

Signed at New York, in the county of New York and State of New York, this 14th day of February, A. D. 1891.

LAURENCE A. McCATRHY.

Witnesses:
J. B. SABINE,
ALBERT SHIFFER.