(No Model.)

E. KOLBEN.

RING ARMATURE.

No. 480,728. Patented Aug. 16, 1892.

Fig. 1.

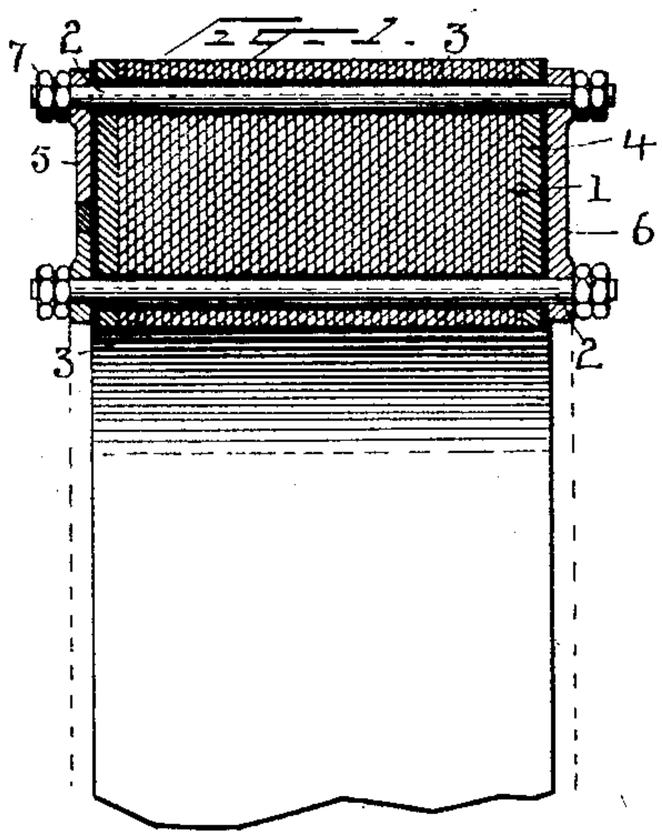


Fig. 2.

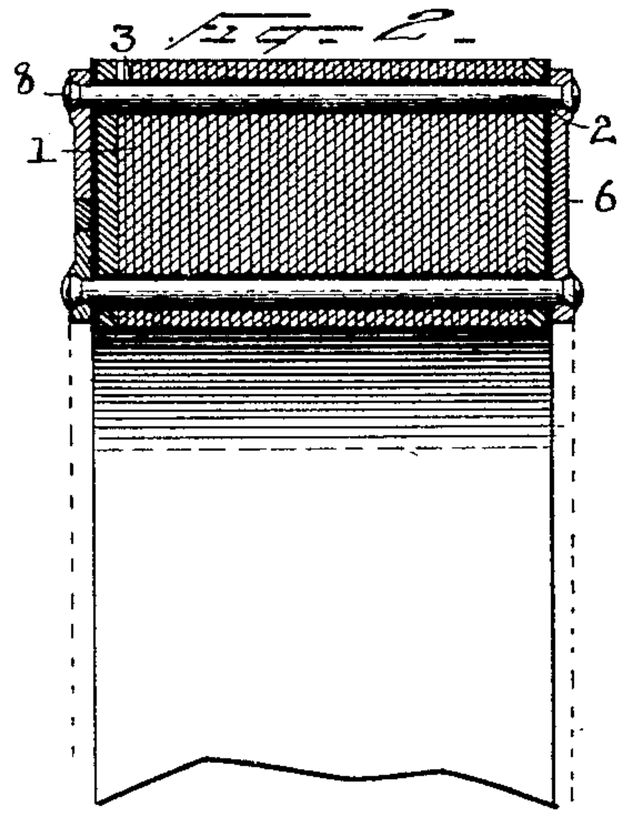


Fig. 3.

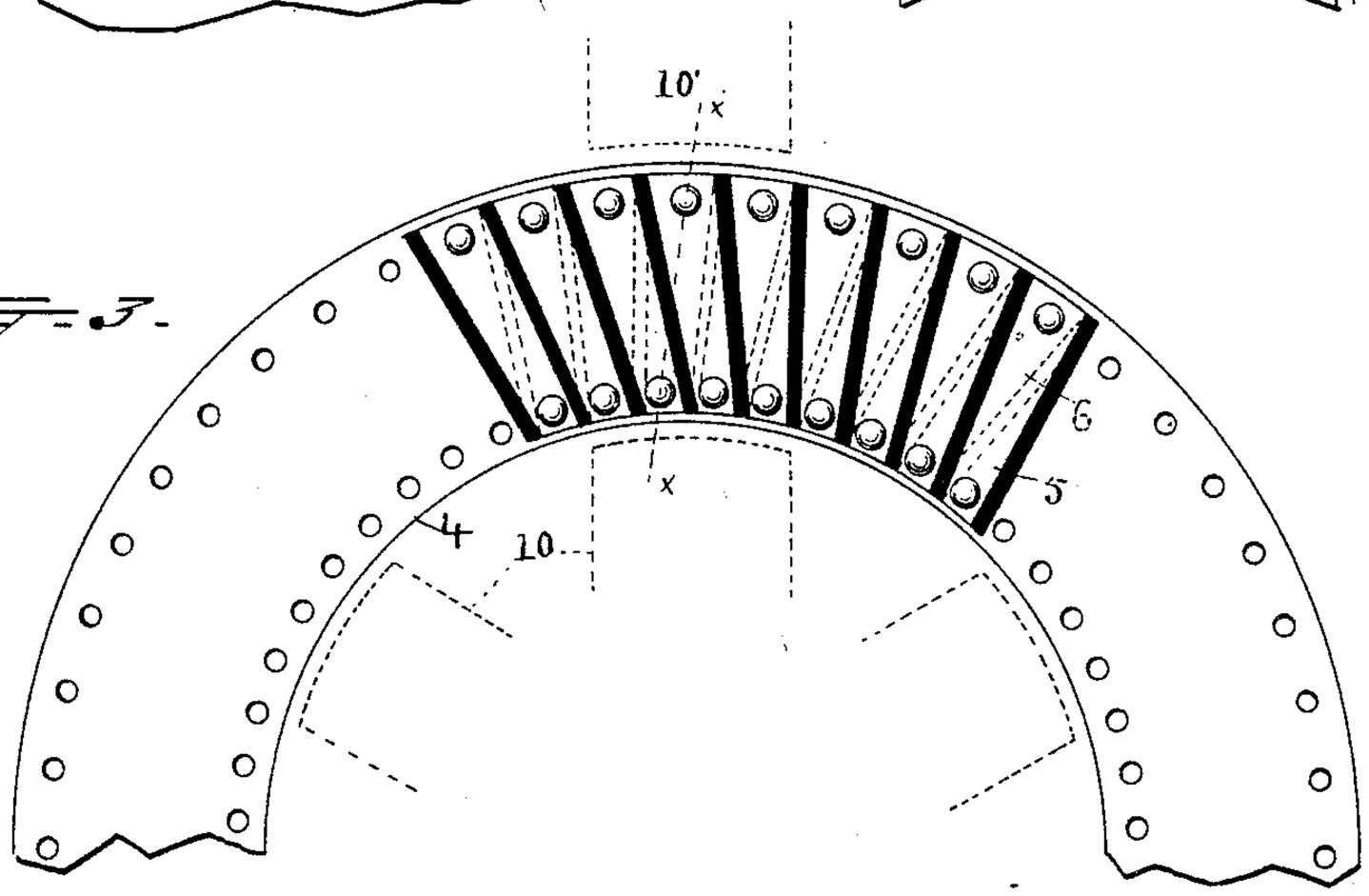
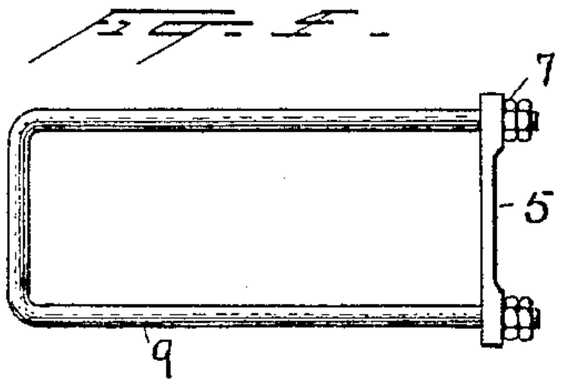


Fig. 4.



Witnesses
Norris S. Clark
N. F. Oberlé.

Inventor
E. Kolben
By his Attorneys
Dyer & Seely.

UNITED STATES PATENT OFFICE.

EMIL KOLBEN, OF SCHENECTADY, ASSIGNOR TO THE EDISON GENERAL ELECTRIC COMPANY, OF NEW YORK, N. Y.

RING-ARMATURE.

SPECIFICATION forming part of Letters Patent No. 480,728, dated August 16, 1892.

Application filed February 8, 1892. Serial No. 420,786. (No model.)

To all whom it may concern:

Be it known that I, EMIL KOLBEN, a subject of the Emperor of Austria-Hungary, residing at Schenectady, in the county of Schenectady and State of New York, have invented a certain new and useful Improvement in Ring-Armatures, of which the following is a specification.

The present invention relates to ring-armatures, and especially, though not necessarily, to large armatures adapted for use in connection with multipolar field-magnets. In machines of this class the conductors are generally large and there are a comparatively few turns or convolutions in the armature-coil. In the present case each coil which is connected to a commutator-segment is composed of a single convolution.

The invention consists in the armature-conductor hereinafter described, in the combination thereof with the armature-core in a particular manner, and in certain features of construction to be specified and pointed out in the claims.

In the accompanying drawings, illustrating the improvements, Figures 1 and 2 are cross-sections of two slightly-different forms of armatures on lines corresponding to $x\,x$ of Fig. 3. Fig. 3 is a side view of part of a ring-armature with conductors connected according to this invention, and Fig. 4 is a modified form of conductor.

The armature-core 1 is preferably built up of wrought-iron rings placed side by side, as shown in Figs. 1 and 2. Through said core, in a direction parallel with its axis, I drill or punch two series of holes near the inner and outer peripheries, respectively, said holes being sufficiently large to receive the armature-conductors 2 and their surrounding insulation 3. The holes in the two series should be equal in number, and evidently those in the outer series will be farther apart than those of the inner series.

When the armature is designed, it should be so arranged that the total cross-section of iron between the conducting-bars at the outside periphery of the armature-core lying immediately under a pole is at least equal to, if not greater than, the cross-section of the iron in the armature-body, and in order to reduce the total cross-section of iron between the bars at the inside periphery and which lie immediately under a pole to as small an amount as practicable the holes should be made quite near to the inside periphery, so that the cross-section of the armature-core left between the holes and the inside periphery will allow but a very small percentage of the total magnetic flux to pass from pole to pole on the inside periphery, so that only an extremely small opposition electro-motive force is set up in these interior bars. On each side of the core is placed an insulating-ring 4, having holes registering with those in the core, and the insulating tube or covering around the conductors extends through said holes in the insulating-rings, thus more perfectly insulating the conductors. The ends of the conductors are connected by flat strips or bars 5 6. Each strip connects a rod in one of the upper holes with a corresponding rod in the lower hole, the connection being such, as indicated in Fig. 3, that a continuous spiral will be formed. The cross-bars 5 6 may be secured to the conductors in several different ways—for example, by nuts 7, as indicated in Fig. 1, by riveting, as shown at 8, Fig. 2, or by an ordinary solder joint or otherwise.

When the armature has been built up as described, the two faces formed by the cross-bars 5 6 are finished off and are then adapted to serve as commutator-surfaces. It will be evident that either of said surfaces may be left unfinished, if desired. The armature being perfectly symmetrical, when one of these surfaces becomes unduly worn by the commutator-brushes the other side may be used without affecting the operation of the machine, since the armature can be reversed to bring the opposite side into position to cooperate with the commutator-brushes.

Instead of having the conductors connected by the cross-bars at both ends, I may use U-shaped conductors 9, as shown in Fig. 4, with a cross-bar 5 at one end only. In this case the bars 5 may serve as commutator-bars or the cross-conductors formed by the U-conductors themselves.

With the armature described it is proposed to employ an external field-magnet, the poles being diagrammatically indicated at 10′, Fig.

3, although it is evident that the same may be used with internal poles, as indicated at 10.

By mounting the conductors as described I provide a symmetrical armature without unnecessary bulk and in which the several parts are securely and rigidly held in place and one in which the electrical connections are exceedingly simple, so that they can be made by an ordinary workman.

What I claim is—

1. The combination, in a ring-armature, of an iron core having two series of holes through it near the inner and outer peripheries, respectively, and in the direction of its axis, and insulated conductors in said holes, the ends of the several conductors being connected to form the armature-coil, substantially as described.

2. The combination, in a ring-armature, of an iron core having two series of holes through it near the inner and outer peripheries, respectively, and in the direction of its axis, and insulated conductors in said holes, the ends of the several conductors being connected to form the armature-coil by cross bars or plates forming or adapted to form commutator-segments, substantially as described.

3. The combination, in an armature, of an iron core and insulating-washers at both sides thereof, the core and washers having two series of holes through them near their inner and outer peripheries, respectively, and in the direction of the axis of the armature, conductors in said holes, and insulation between the conductors and the core, the ends of the several conductors being connected across the faces of the core to form the armature-coil, substantially as described.

4. The combination, in an armature, of an iron core and insulating-washers at both sides thereof, the core and washers having two series of holes through them near their inner and outer peripheries, respectively, and in the direction of the axis of the armature, conductors in said holes, the ends of the several conductors being connected to form the armature-coil, and insulating-tubes on the conductors and extending into the washers, substantially as described.

5. The combination, in a ring-armature, of a core, transverse conductors, and cross or connecting conductors at both sides of the armature, said cross-conductors at both sides being finished or adapted to be finished to form commutator-surfaces, substantially as described.

6. An armature having the conductor comprising its coil bare on two opposite sides of the armature, whereby either side may be employed as a commutator-surface, substantially as described.

7. A symmetrical reversible armature having the conductor comprising its coil bare on two opposite sides of the armature, said sides forming or adapted to form commutator-surfaces, whereby when the conductors at one side become worn the armature may be reversed, so that the commutator-brushes will bear on the opposite side, substantially as described.

This specification signed and witnessed this 22d day of January, 1892.

EMIL KOLBEN.

Witnesses:
FREDERICK BATHURST,
GEORGE H. RUPLEY.