(No Model.)

R. LUNDELL.

ARMATURE FOR DYNAMO ELECTRIC MACHINES OR MOTORS.

No. 459,366. Patented Sept. 8, 1891.

Fig. 2.

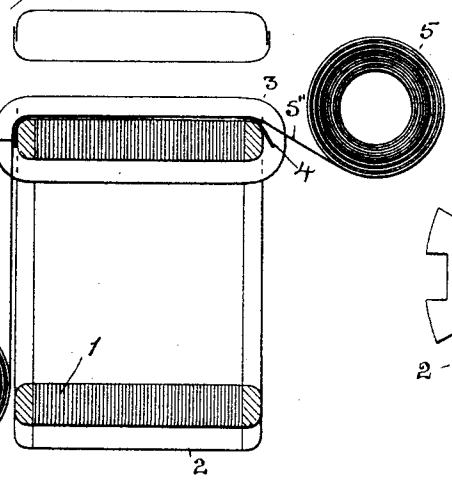


Fig. 3.

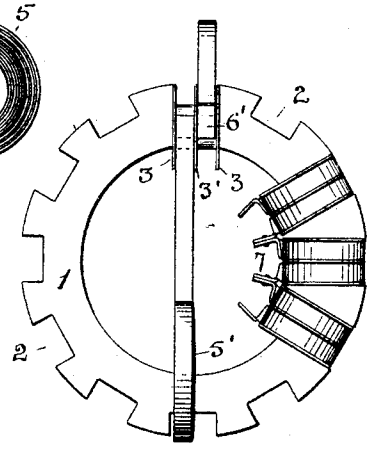


Fig. 1.

Fig. 4.

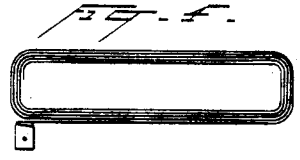


Fig. 5.

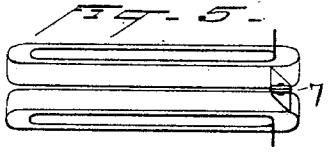


Fig. 9.

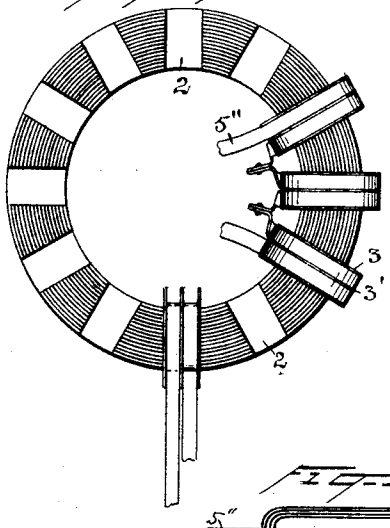


Fig. 10.

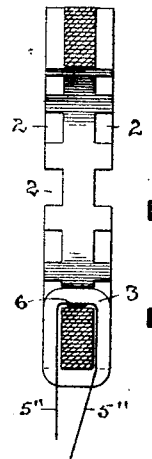


Fig. 6.

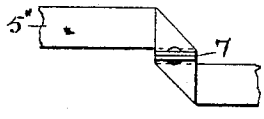


Fig. 7.

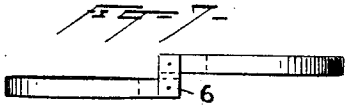


Fig. 8.

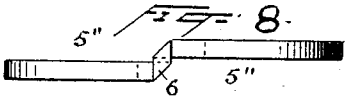
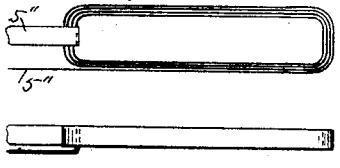


Fig. 11.



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UNITED STATES PATENT OFFICE.

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ARMATURE FOR DYNAMO-ELECTRIC MACHINES OR MOTORS.

SPECIFICATION forming part of Letters Patent No. 459,366, dated September 8, 1891.

Application filed November 24, 1890. Serial No. 372,400. (No model.)

To all whom it may concern:

Be it known that I, ROBERT LUNDELL, a citizen of the United States, residing at Brooklyn, county of Kings, and State of New York, have invented a certain new and useful Improvement in Armatures for Dynamo-Electric Machines or Motors, of which the following is a specification.

The present invention consists in a novel winding of the armature-coils, in an improved mode of insulating and protecting the coils, and in certain features of construction hereinafter set forth.

In the accompanying drawings, which illustrate the invention, Figure 1 is a cross-section of an armature-ring and shows the mode of winding the conductors on the ring. Fig. 2 indicates the position of the insulating-strips used to separate the convolutions of the coils. Fig. 3 is a side view of an armature-ring on which three coils have been wound and connected together, and on which one coil is just started. Fig. 4 is a cross-section of a completed coil, the insulated strips between the convolutions being omitted to prevent confusion in the lines. Figs. 5 and 6 indicate one method by which the outer ends of the conducting-strips may be bent and connected together. Fig. 5 is a view of two connected coils, looking from the center of the ring. Figs. 7 and 8 indicate two ways in which the inner ends of the conducting-strips may be connected together. Fig. 9 is a side view of a different form of armature-ring, and Fig. 10 is a cross-section thereof. Fig. 11 shows a side and an edge of a coil composed of a single conducting-strip.

The armature-core which I prefer to use is made up of a number of sheet-metal rings placed side by side, as indicated at 1 in Fig. 1, and suitably held together. The ring is provided with grooves 2 at regular intervals around its periphery, and around the ring at these points the coils are placed, preferably, in the following manner: Mica, asbestus, or other fire-proof insulating-washers 3 are placed in the groove to be wound adjacent to each side of the groove, and a similar washer 3′ is placed at the center of the groove. A strip 4 of the insulating material is then laid over the ring between the washers, as indicated in Fig. 1. Two rolls 5 5′, of copper or other conducting ribbon 5″, are taken and the free ends of the two ribbons placed side by side, as indicated in Fig. 7, and connected by a cross-piece 6 by the use of silver or other solder; or a single strip can be used by giving it a double bend, as shown in Fig. 8, in which case the cross-piece 6 is a part of the strip itself. The united ends are then placed in the groove, as indicated at 6′, Fig. 3. One of the rolls—for example, 5—is passed repeatedly around the core, whereby the conductor is formed into a coil thereon. As or just before the roll is passed across one face of the ring, a thin strip 4, of mica or other fire-proof insulating material, is laid over the preceding convolution of the conductor. The position occupied by these insulating-strips is shown in Fig. 2, the short insulating-strips being put in place, one after another and end to end, but preferably slightly overlapping. Longer insulating-strips may be used, if desired, and of different material than those named—for example, oiled paper—if the armature is to be used where there is little danger of burning out. This is found to constitute an economical and simple method of making up armature-coils, since the conductors need not be iusulated before being wound and since the insulating-strips and the conducting-ribbons may be very thin, allowing a long conductor to be wound in a small space on the ring. The conductor being flat or rectangular in cross-section is readily held in place in the groove. If desirable, the ends of the insu lating-strips may be cemented together. The mica is treated with an acid, then washed and dried before use in order to remove any iron which is contained in it and which would reduce its insulating properties. After the first roll has been wound onto the ring the second roll 5′ is carried around the ring in an opposite direction beside the first coil, as is clearly shown. After several coils have been wound on the ring their ends are united, as shown at 7.

Instead of having the ring grooved on its outer periphery, it may be grooved on its side faces, as shown at 2 in Figs. 9 and 10. In this case the winding is effected in the same manner as above described.

While I prefer to wind two strips side by

side in making up each coil this is not essential, but one strip may be used, as indicated in Fig. 11. This strip would be bare, as in the first case, but its several convolutions would be separated by thin layers of mica or other fire-proof material; but to avoid confusion these layers are not shown.

Having thus described the invention, what I claim is—

1. The combination, in an armature, of a ring or core and several coils thereon, said coils consisting of flat conductors, the convolutions of which are separated by fire-proof material, and fire-proof washers at the sides of said coils, whereby said bare conductors are surrounded on all sides when wound into coils by fire-proof material, substantially as described.

2. The combination, in an armature, of a grooved ring, a coil in each groove consisting of conducting-strips, the convolutions of the coil being separated by fire-proof material, and fire-proof washers insulating the coil from the ring, whereby the strips are surrounded on all sides when wound into coils by fire-proof material, substantially as described.

3. An armature-coil consisting of two conducting-strips wound side by side, the convolutions of the coils being separated by fire-proof strips, and insulating-washers separating the two sections of the coil and separating the coil from the ring, substantially as described.

4. An armature-coil composed of two conducting-strips wound side by side in a single groove and having their ends connected, the convolutions and the sections of the coil being separated by insulation, substantially as described.

5. An armature-coil composed of two bare conducting-strips wound side by side in a single groove and having their ends connected, the convolutions of the coil being separated by fire-proof insulating material, substantially as described.

6. An armature-coil consisting of a flat conducting-strip, the convolutions of which are separated by insulation composed of insulating-strips placed in succession one after another, substantially as described.

7. An armature-coil consisting of a conducting strip, the convolutions of which are separated by overlapping fire-proof strips, substantially as described.

This specification signed and witnessed this 21st day of November, 1890.

ROBT. LUNDELL.

Witnesses:
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