(No Model.) 2 Sheets—Sheet 1.

E. KOLBEN.

ARMATURE AND MEANS FOR SUPPORTING THE SAME.

No. 491,568. Patented Feb. 14, 1893.

Fig. 1.

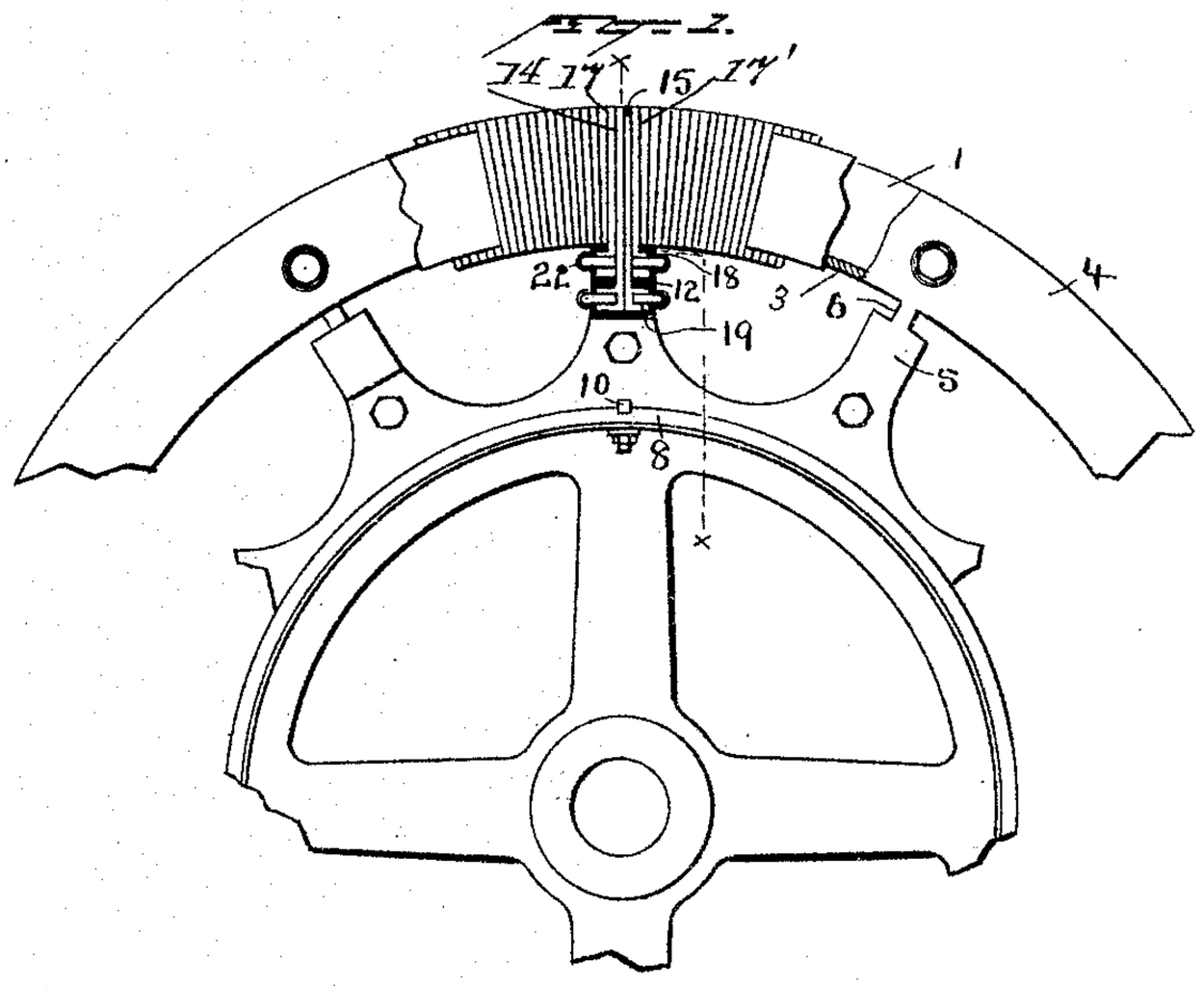
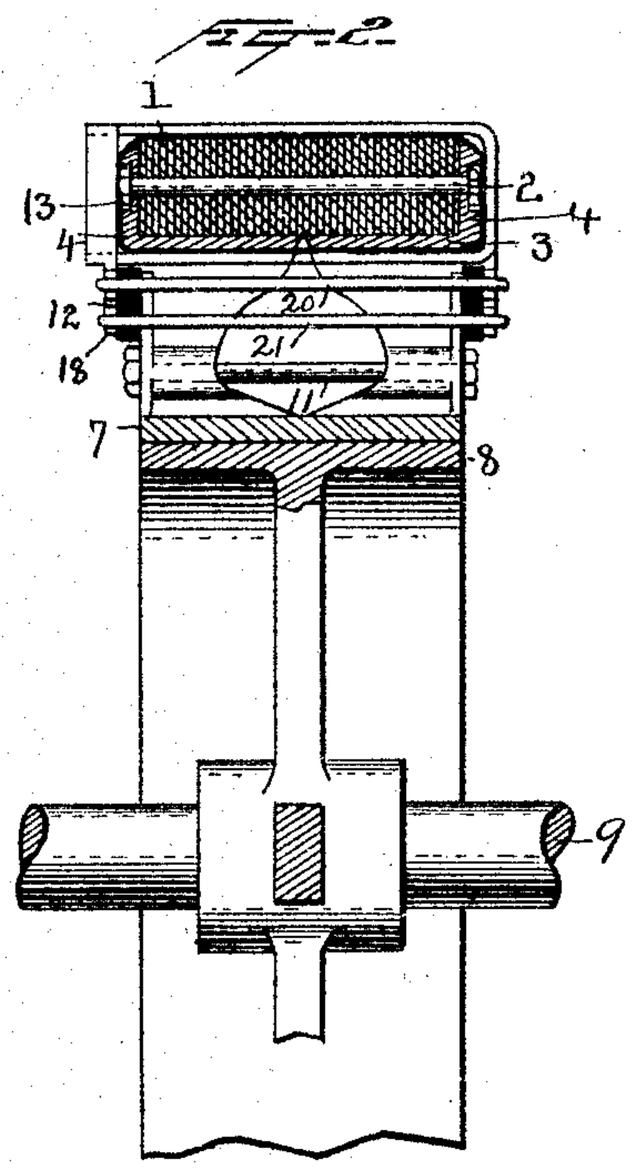


Fig. 2.



Witnesses
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W. F. Clarke.

Inventor
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(No Model.) 2 Sheets—Sheet 2.

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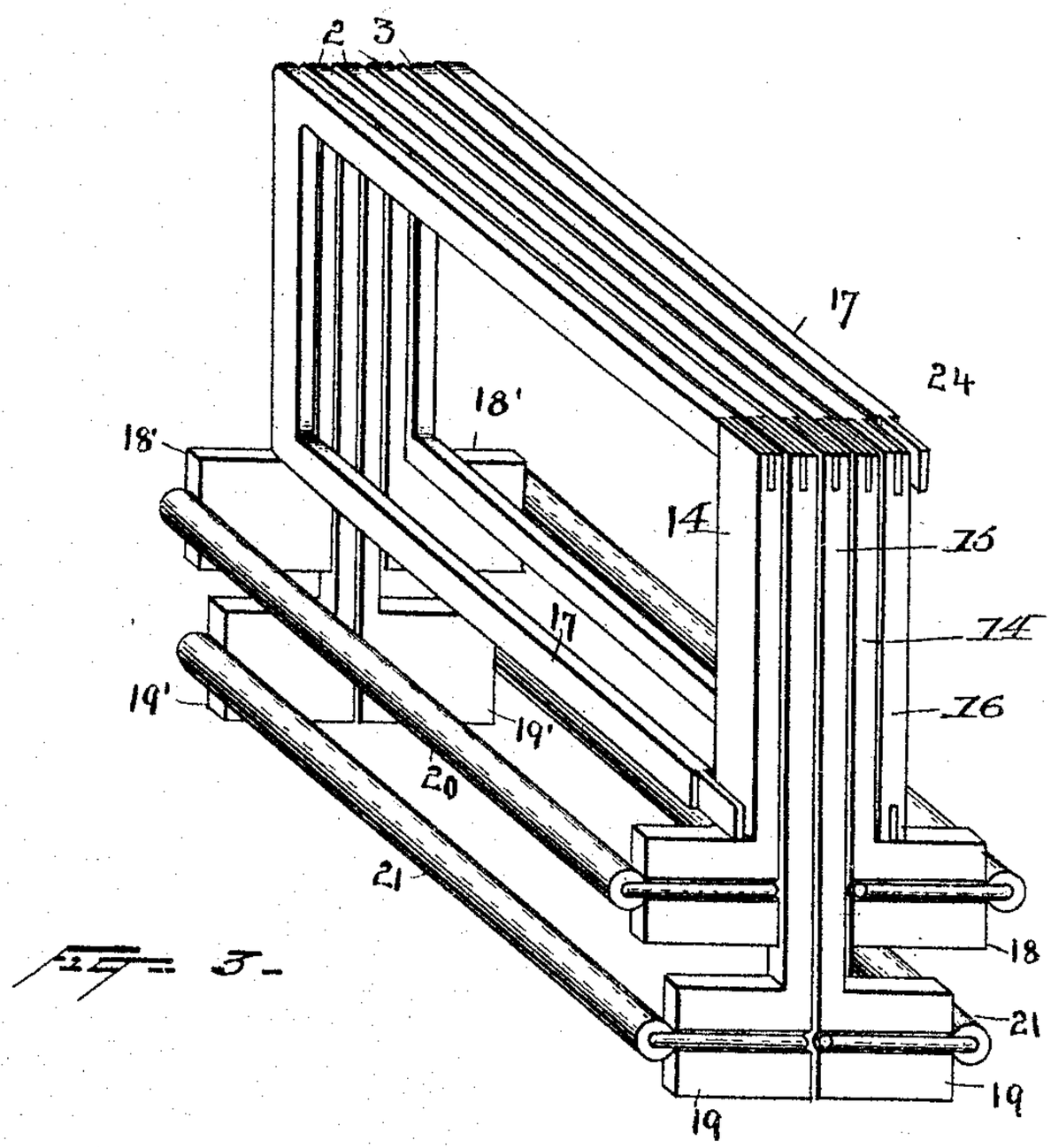

Fig. 3.

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UNITED STATES PATENT OFFICE.

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

ARMATURE AND MEANS FOR SUPPORTING THE SAME.

SPECIFICATION forming part of Letters Patent No. 491,568, dated February 14, 1893.

Application filed February 8, 1892. Serial No. 420,787. (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 Armatures and Means for Supporting the Same, of which the following is a specification.

The present invention relates to armatures, and more especially to those used in large multipolar generators.

The main objects of the invention are to provide strong, simple and efficient means for connecting the supporting and driving spider or pulley to the armature ring, and for connecting the armature coils around the spider; and the invention consists in the several features and combinations designed to accomplish these objects as hereinafter fully described and set forth.

In the accompanying drawings, Figure 1 is a side elevation of one-half of an armature ring, the conductors forming the coil thereof being shown on a short section of the core only; Fig. 2 is a section on line *x*—*x* of Fig. 1; and Fig. 3 is a section of coil detached from the armature and showing the manner of passing the spider arms.

In applications of even date herewith Serial Nos. 420,784 and 420,785 I have described armatures in which the conducting coil is built up from U-shaped conductors on the armature core, the ends being connected by cross bars to complete the spiral, the outer edges of these cross bars being finished off to form the commutator surface, and I prefer to use that form of conductor in connection with the present improvements.

The armature ring or core 1 is built up of wrought iron washers or rings placed side by side, as shown in Fig. 2. Through said rings are holes for the reception of bolts 2, which may be insulated in any suitable manner. Extending around each side of the inner periphery of the armature core is a ring 3, having a flange 4 which covers, or partially covers, a side of the core, as clearly shown in said Fig. 2 and as shown also in Fig. 1. The bolts 2 also pass through these flanges 4 and hold the two rings 3 firmly in place. Over the core and the flanged rings is placed an insulating coating 13 against which the coil conductors rest. Said rings 3 have projecting from their inner sides several spider arms 5, preferably formed integral therewith. As the power of the driving engine is expended in turning the armature in the magnetic field by means of these arms, it is necessary that they should have a strong and rigid mechanical connection with the armature, but any such mechanical driving arrangement will require some portion of the armature surface. Such connection, in occupying a portion of the inner periphery and in breaking the regularity of the surface, presents a difficulty to overcome when winding so as to make a symmetrical and well balanced armature and an even commutator surface. To obviate this difficulty I provide spiders having arms of special shape arranged so that although the necessary cross-section of metal is provided on the inside periphery of the armature to insure sufficient mechanical strength, the metal is arranged to occupy as narrow a space as possible on said periphery by placing the mass of the metal of the spider arms in lines parallel to the axis of the armature. I find it convenient to have each arm occupy a space equivalent to that required for two or more armature bars.

In the drawings, the narrow part 6 of each spider arm has substantially the width of four of the cross conductors hereinafter described which serve for commutator bars. The U-shaped conductors 17 and cross conductors 16 cover the core up to the lines 17′. The spider arms are provided with flanges which gradually broaden out and strengthen said arms and the ring 7 on which they are supported. Said ring is adapted to receive a second ring 8 carried on any suitable hub 9.

10 is a spline causing said parts to move together.

11 are cross bolts for connecting together the rings 3.

On the spider arms are mounted insulating blocks 12, the outer faces of which are preferably in the same plane as the outer face of the insulation 13, which surrounds the armature core and the flanged rings 3, already described. Cross special conductors 14, 15, lying between the lines 17′, and of the L shape

indicated in the several figures of the drawings, are bolted or otherwise secured to these insulating blocks. The main bodies of these conductors are of the same width and thickness and of the same shape as the cross conductors 16, which connect the ends of the U-shaped conductors 17 to form the spiral, in the manner set forth in my applications already referred to and as indicated in Fig. 3. At the inner end each of these special conductors is provided with enlarged or laterally extending heads 18, 19, in which are formed holes through which bolts or screws may pass to secure the same to the insulating blocks. The faces of said heads are also preferably provided with grooves, into which the ends of cross conductors 20, 21 may be laid as indicated most clearly in Fig. 2, the conductors being secured by solder or otherwise. These conductors 20, 21 are preferably provided with insulating coatings 22, except at their extreme ends and may be of larger cross section than the conductors 23 to compensate for the extra resistance due to the greater length. As shown, these conductors extend around the edges of the spider arms and across the armature ring, but at some little distance from the inner periphery thereof, and at the opposite ends are connected to similar heads 18′, 19′, and these heads form the lower ends of L-shaped conductors 23, the ends 24 of which are provided with tongues of the same form as those at the ends of the U-shaped conductors 17. By reference to Fig. 3 the connection of the conductors where they pass the spider can be traced. In this figure the conductors are separated slightly and all insulation is omitted to avoid confusion. Starting at the lower arm of the conductor 17, following said arm to the first special conductor 14 at the left, to conductor 20, to the head 18′ of the first L-shaped conductor 23, to the left head 19, to conductor 21, to the second L-shaped conductor 23, thence to the head 19 at the right, to its conductor 21, and so on around until the next U-shaped conductor 17 is reached. In this way the cross connections are made in a symmetrical manner and the side faces of the armature are maintained even.

What I claim is,

1. The combination of an armature ring or core, spider arms supporting the same, an armature conductor or coil surrounding the core, special conductors crossing the sides of the core at the spider arms, said special conductors being connected across the inner surface of the armature by suitable conductors passing around or by the arms, substantially as described.

2. The combination of an armature core, flanged rings secured thereto, spider arms extending from the inner periphery of the rings, and an armature conductor or coil surrounding the core and said rings but insulated therefrom, the conductors crossing the inner surface of the armature at the spider arms being at a distance from said surface, substantially as described.

3. The combination of an armature core, spider arms supporting it, an armature coil surrounding said core and a side of which is adapted to form a commutator surface, and special conducting sections interposed in said coil at each spider arm for continuing said coil by the arms, the portions of said special conductors crossing the commutator surface of the armature corresponding in shape to the main conductors of the coil crossing said face, substantially as described.

4. The combination of an armature core, arms extending from the inner periphery thereof for supporting it, conductors or coils surrounding the core and passing across its inner periphery, said arms being comparatively thin adjacent to said inner periphery whereby only a few regular cross conductors need be omitted, and conductors extending around said arms and across the armature at a distance from the inner periphery, substantially as described.

5. The combination of an armature core, wide spider arms having thin portions adjacent to the inner periphery of said core, means for connecting the arms to the core, armature coils covering the inner periphery of the core except in the space occupied by the arms, conductors supported by the arms and connected across the armature to complete the coil, substantially as described.

6. The combination of an armature core, spider arms extending from its inner periphery, insulating blocks on the arms, conductors extending across the sides of the armature and forming part of the armature coil supported by said insulating blocks, and conductors also forming parts of the armature coil connected to the conductors on the insulating blocks and extending across the armature at the sides of the arms, substantially as described.

7. The combination of a core, conductors surrounding the core on all sides, arms extending from the inner periphery of the core for supporting the same, insulating blocks on the arms, conductors thereon extending across sides of the armature and connected at their upper ends to conductors extending across the outer periphery of the core, substantially as described.

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

EMIL KOLBEN.

Witnesses:

FREDERICK BATHURST,

GEORGE H. RUPLEY.