(No Model.) 2 Sheets—Sheet 1.

F. G. MAYER.

DYNAMO ELECTRIC MACHINE.

No. 561,803. Patented June 9, 1896.

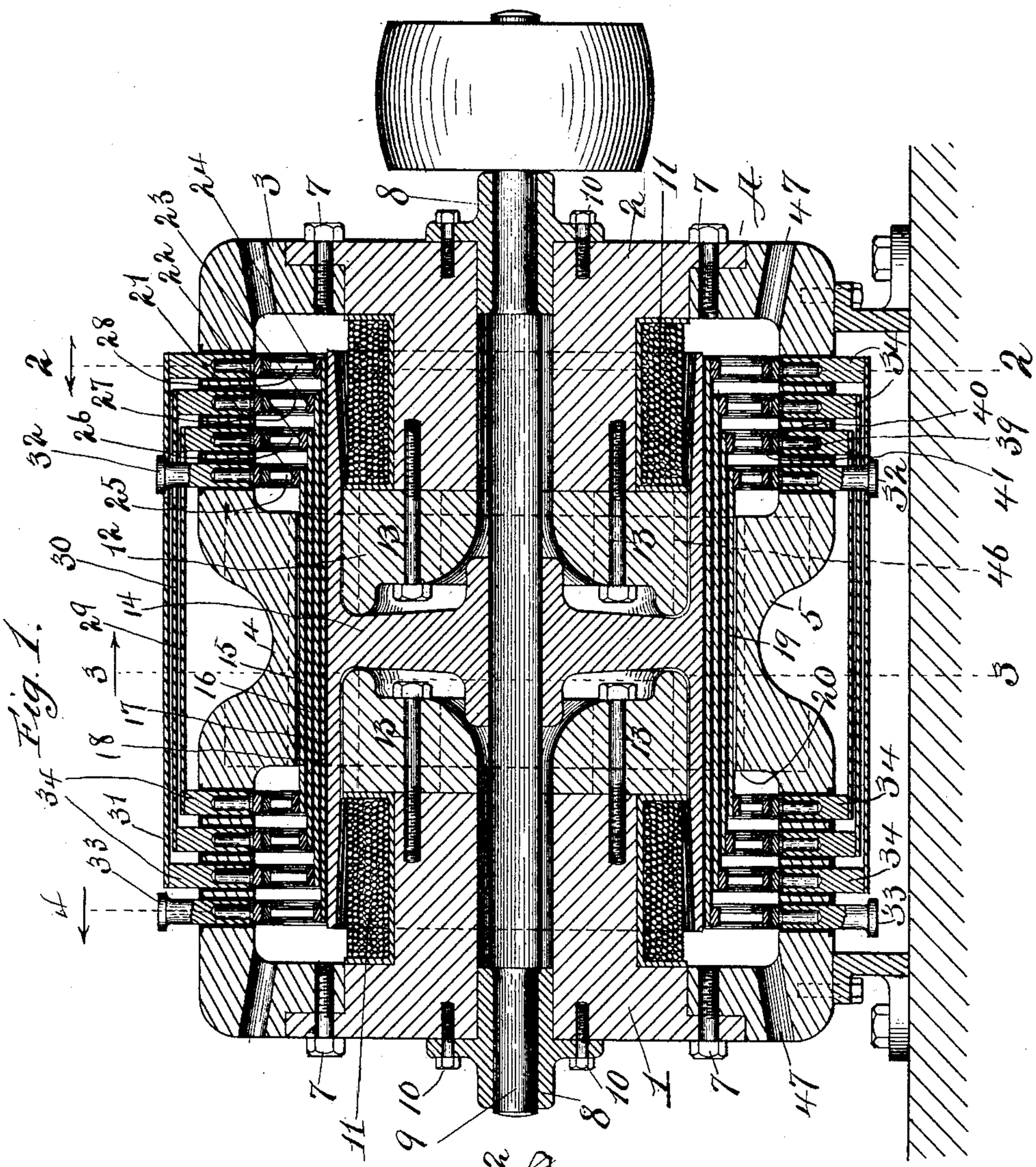

Fig. 1.

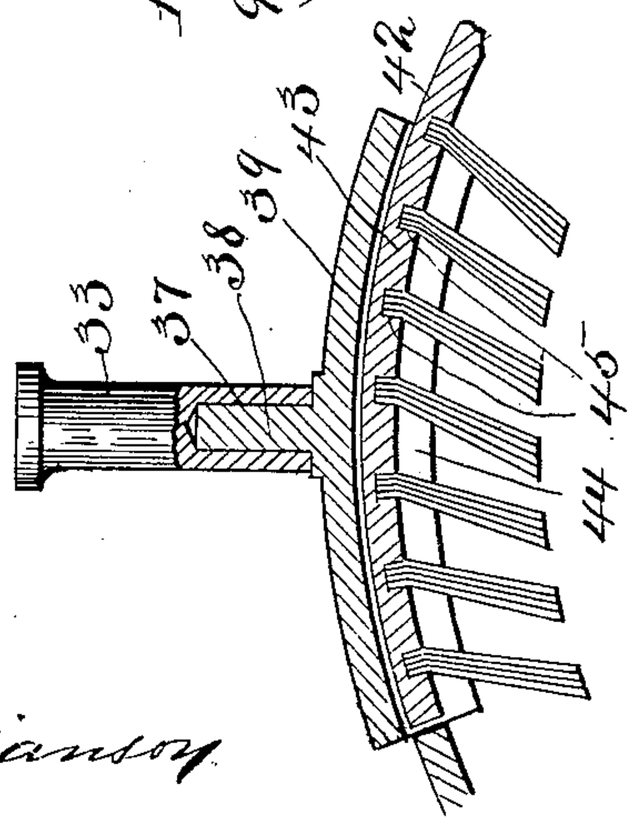

Fig. 4.

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Jno. A. Christianson

Inventor:
Fritz G. Mayer
By Rudolph Kuhn Lotz
Atty.

(No Model.)

2 Sheets—Sheet 2.

F. G. MAYER.

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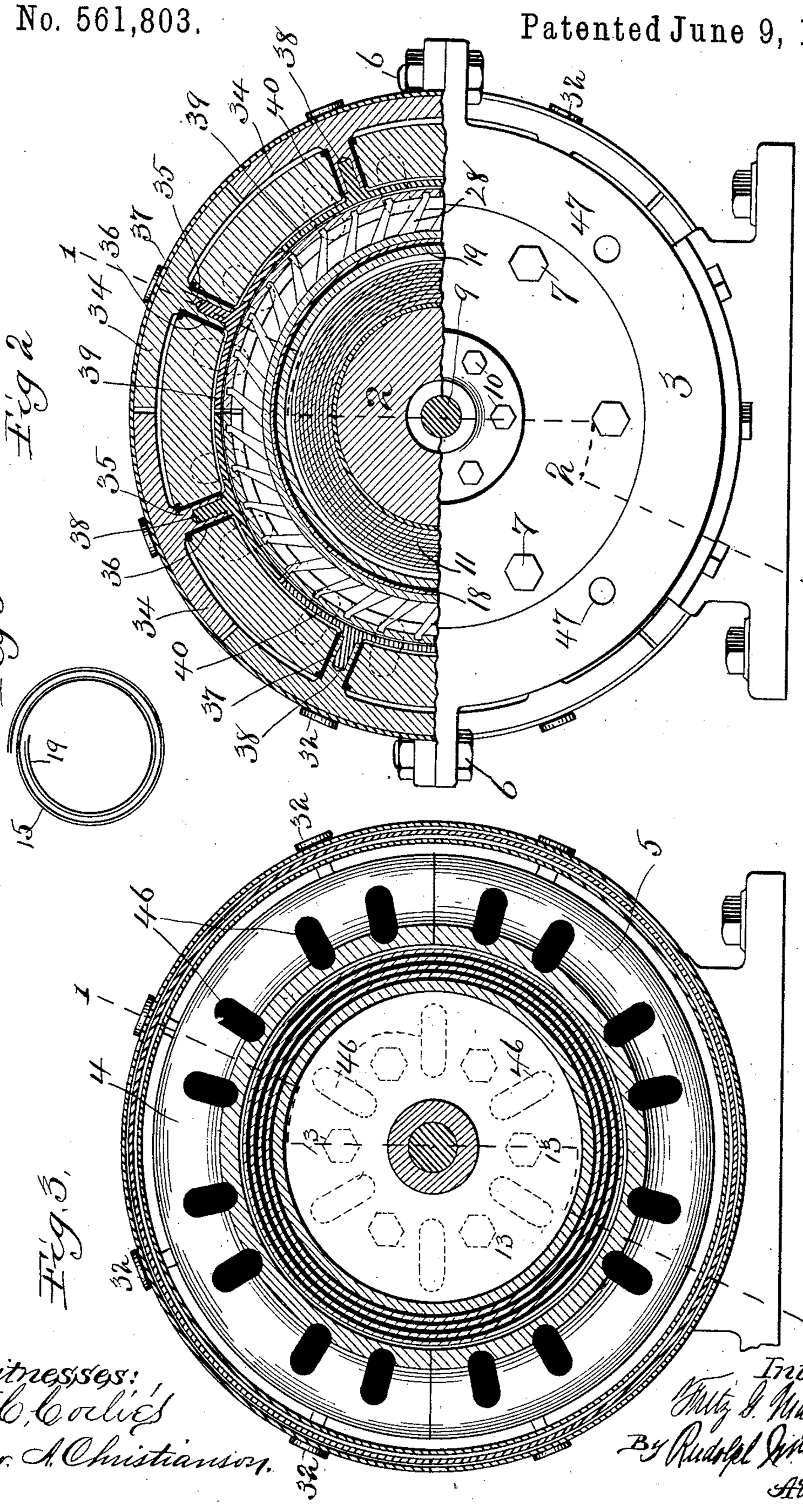

UNITED STATES PATENT OFFICE.

FRITZ G. MAYER, OF CHICAGO, ILLINOIS.

DYNAMO-ELECTRIC MACHINE.

SPECIFICATION forming part of Letters Patent No. 561,803, dated June 9, 1896.

Application filed October 18, 1895. Serial No. 566,163. (No model.)

To all whom it may concern:

Be it known that I, FRITZ G. MAYER, a subject of the Emperor of Germany, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Dynamo-Electric Machines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to a novel construction in a dynamo-electric machine of the so-called "unipolar" type, the object being to provide a machine of this kind which will provide a current of low tension but of high amperage; and it consists in the features of construction and combinations of parts hereinafter fully described and claimed.

In the accompanying drawings, illustrating my invention, Figure 1 is a vertical longitudinal section of a dynamo-electric machine constructed in accordance with my invention, taken on the lines 1 1 of Figs. 2 and 3. Fig. 2 is a transverse vertical section, partly in elevation, taken on the line 2 2 of Fig. 1. Fig. 3 is a transverse vertical section taken on the line 3 3 of Fig. 1. Fig. 4 is a detail sectional view on the line 4 4 of Fig. 1. Fig. 5 is a detail view showing the construction of the metallic cylinders on the armature.

Referring now to said drawings, A indicates the casing of a dynamo-electric machine constructed in accordance with my invention, which consists, preferably, of two end or core pieces 1 and 2, to which the outer cylindrical casing 3 is secured. Said outer cylindrical casing 3 consists of two halves 4 and 5, which are bolted together by bolts 6 and are secured to said core-pieces 1 and 2 by means of bolts 7. Said core-pieces 1 and 2 are provided with central openings, in which bearings 8, adapted to receive the shaft 9, are secured by bolts 10 in an obvious manner. Said core-pieces 1 and 2 are provided with magnet-coils 11 and shoes 12, which are secured to the inner ends of said core-pieces by bolts 13. Said shoes 12 are larger in diameter than said core-pieces and serve to keep said magnet-coils in place. An armature 14 is mounted upon said shaft 9 and consists of an iron pulley, upon the rim of which a series of cylinders 15, 16, 17, and 18, of copper, are mounted, said cylinders being insulated from each other and from said pulley by layers 19 of insulating material. As shown in Fig. 5, each of said cylinders consists, preferably, of a thin sheet of copper or fine wire-cloth rolled spirally, with a layer of insulating material interposed. This is preferably done by taking a long sheet of thin metal or wire-cloth and laying a sheet of insulating material of the same size over it and rolling them up together. Each so constructed cylinder is then mounted upon the armature-core, one surrounding the other and insulated therefrom and from the armature-core. Said outer cylindrical casing 3 is reduced in size at its central portion to form an annular inwardly-extending shoe or projection 20. Said shoes 12 extend inwardly underneath the rim of said pulley and close to the spokes or disk of same. In this manner and by means of my manner of electrically connecting said magnet-coils the magnetic lines of force will distribute themselves equally and pass outwardly from said shoes through said armature and complete the circuit through said outer cylindrical casing 3, the lines generated in the core-piece 1 passing through its shoe and thence outwardly through the armature and into the casing 3, and thence to the left back to said core-piece, while the lines generated in said core-piece 2 will pass to the right through said casing back to the core 2. Said cylinders 15, 16, 17, and 18 are provided at their ends with contact-rings 21, 22, 23, and 24, respectively, and to this end I make said cylinders of varying widths to allow space at each end for said rings. Thus said cylinder 18 is preferably as wide as the rim of said pulley, while said cylinder 17 is of less width, so as to allow the ends of said cylinder 18 to project beyond the ends of said cylinder 17. Thus each cylinder is narrower than the one inwardly of it. In the drawings I have shown four of said cylinders, though it will of course be understood that this number can be increased or diminished according to the desired tension of the generated current. Brushes 25, 26, 27, and 28 engage said rings 21, 22, 23, and 24, respectively, to conduct the electric current from the same as it is generated. I prefer to use a large number of said brushes, as shown. Said brushes are

connected with outer cylinders 29, 30, and 31 and with contact-posts 32 and 33, which surround said outer casing, thus connecting said inner cylinder or armature with said outer cylinders, and it may be said that said outer cylinders form a portion of the armature-winding, as the current passes from binding-posts 32 through the brushes 25 into the cylinder 15, thence through the opposite brushes 25 through the cylinder 29, thence through brushes 26 through cylinder 16, thence through the opposite brushes 26 through cylinder 30, and so on and out at binding-posts 33. Said outer cylinders are connected at their ends to metallic contact-pieces 34, which extend about forty-five degrees around said outer casing 3, and are provided at their middle portions with pins 35, which extend through said outer cylindrical casing 3, from which they are insulated by layers 36 of insulating material around the same. Said pins 35 are provided with openings 37, which are adapted to receive lugs 38 on interior metallic contact-pieces 39. Said interior contact-pieces 39 consist of curved metallic pieces 40, extending about forty-five degrees around the inner circumference of said cylindrical casing 3, and are provided at each side with inwardly-extending annular flanges 41, between which the brush-holders 42 are held. Said brush-holders 42 consist of metallic arcs 43, about ninety degrees in extent, which are also provided with inwardly-extending annular flanges 44, by means of which a firm and even contact with said contact-pieces 39 is insured. Said metallic arcs 43 are further provided with openings 45, in which the ends of said brushes are secured.

It will be obvious that that portion of the outer cylindrical casing 3 situated between the above-described contact-pieces and the outer cylinders and armature will form a magnet-core on account of the passage of the current around the same, thus generating magnetic lines of force which will travel at an angle of ninety degrees to the magnetic lines of force generated in said core-pieces 1 and 2 and cut the same. I do not anticipate that these latter magnetic lines of force will be sufficient to break the first-named circuit; but to weaken and break the last-named magnetic circuit as far as possible I provide openings or air-spaces 46 in said outer cylindrical casing 3 and in said shoes 12 which the said last-named magnet-circuit must traverse, thus obviously eliminating the same to a great extent. To prevent an uneven magnetization in the rotating armature-core, the said openings extend only to points near the inner circumference of said annular projection or shoe of said outer circumference of said shoes 12, in order to allow an unbroken and equal distribution of the magnetic lines of force passing from said shoes into said outer cylindrical casing. For the same reasons the said openings in said casing and said shoes are preferably situated alternately opposite each other. For purposes of ventilation I provide openings 47 in the ends of said outer cylindrical casing 3.

I do not of course wish to be limited to the exact construction herein shown and described, as I contemplate changing the same to suit various requirements without departing from the spirit of my invention.

I claim as my invention—

1. In a dynamo-electric machine, an outer casing and a core concentric therewith, and an armature mounted upon a shaft running in bearings in said core, said armature consisting of a core adapted to revolve between said outer casing and said concentric core and having a series of concentric metallic cylinders mounted thereon, said cylinders being insulated from each other and from said core, substantially as described.

2. In a dynamo-electric machine, a casing, a core within said casing, and an armature between said core and said casing, said armature consisting of a series of metallic cylinders mounted upon a cylindric core and upon each other and being insulated from said core and from each other, commutator-rings upon said cylinders, brushes secured to said casing and having contact with said commutator-rings, and metallic cylinders surrounding said outer casing and connected consecutively with said brushes whereby the circuit of the current generated by said armature is completed, substantially as described.

3. In a dynamo-electric machine, an outer casing and a core, metallic cylinders surrounding said outer casing and insulated therefrom, an armature adapted to revolve within said casing, and connection between said outer cylinders and said armature whereby the circuit of the current generated in said armature is completed through said outer cylinders, substantially as described.

4. In a dynamo-electric machine, an outer casing and a core, metallic cylinders surrounding said outer casing and insulated therefrom, an armature adapted to revolve within said outer casing and consisting of a core having a series of concentric cylinders mounted thereon and insulated from each other and from said core, and means for connecting said cylinders of said armature consecutively with said outer cylinders whereby the circuit is completed through said outer cylinders, substantially as described.

5. In a dynamo-electric machine, an outer casing, two cores within said casing concentric therewith, a shaft running in bearings within said cores, and an armature on said shaft having a core mounted upon spokes or a disk revolving between the ends of said cores, said iron core of said armature revolving between said cores and said casing and having a series of metallic cylinders mounted thereon and connected consecutively with binding-posts and cylinders on said outer casing, substantially as described.

6. In a dynamo-electric machine, an outer

casing, an armature revolving within the same and consisting of a series of metallic cylinders mounted upon a core, said cylinders being insulated from each other and from said core and carrying contact-rings at their ends, brushes mounted in said outer casing and having contact with said contact-rings, and metallic cylinders on said outer casing connected with said brushes whereby the current generated in said armature will complete the circuit through said outer cylinders, substantially as described.

7. In a dynamo-electric machine, an outer casing and a core, metallic cylinders surrounding said outer casing and insulated therefrom, an armature adapted to revolve within said casing and consisting of a core having a series of concentric cylinders mounted thereon and insulated therefrom and from each other, said cylinders on said armature exceeding said outer cylinders in number by one, and means for connecting said cylinders on said armature consecutively with binding-posts and with said outer cylinders whereby the circuit is completed through said outer cylinders, substantially as described.

8. In a dynamo-electric machine, an outer casing, an armature revolving within said casing consisting of a core having a series of concentric cylinders mounted thereon, contact-rings on the ends of said cylinders, and brushes adapted to connect said cylinders with outer cylinders mounted on said outer casing, by means of metallic arcs having pins 35 extending through said casing and insulated therefrom, openings 37 in said pins adapted to receive lugs 38 on interior metallic contact-pieces 39 having interiorly-extending flanges 41 between which brush-holders 42 are adapted to be held, said brush-holders 42 being provided with interiorly-extending flanges 44 adapted to fit between said flanges 41, and means for securing said brushes to said brush-holders, substantially as described.

9. In a dynamo-electric machine, an outer cylindrical casing and a core, an armature adapted to revolve between said casing and said core, and openings in said casing and core running lengthwise of said machine to break magnetic lines of force generated by said armature and running crosswise of the magnetic circuit generated in said core, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

FRITZ G. MAYER.

Witnesses:
RUDOLPH WM. LOTZ,
E. J. BOILEAU.