

No. 769,090.

PATENTED AUG. 30, 1904.

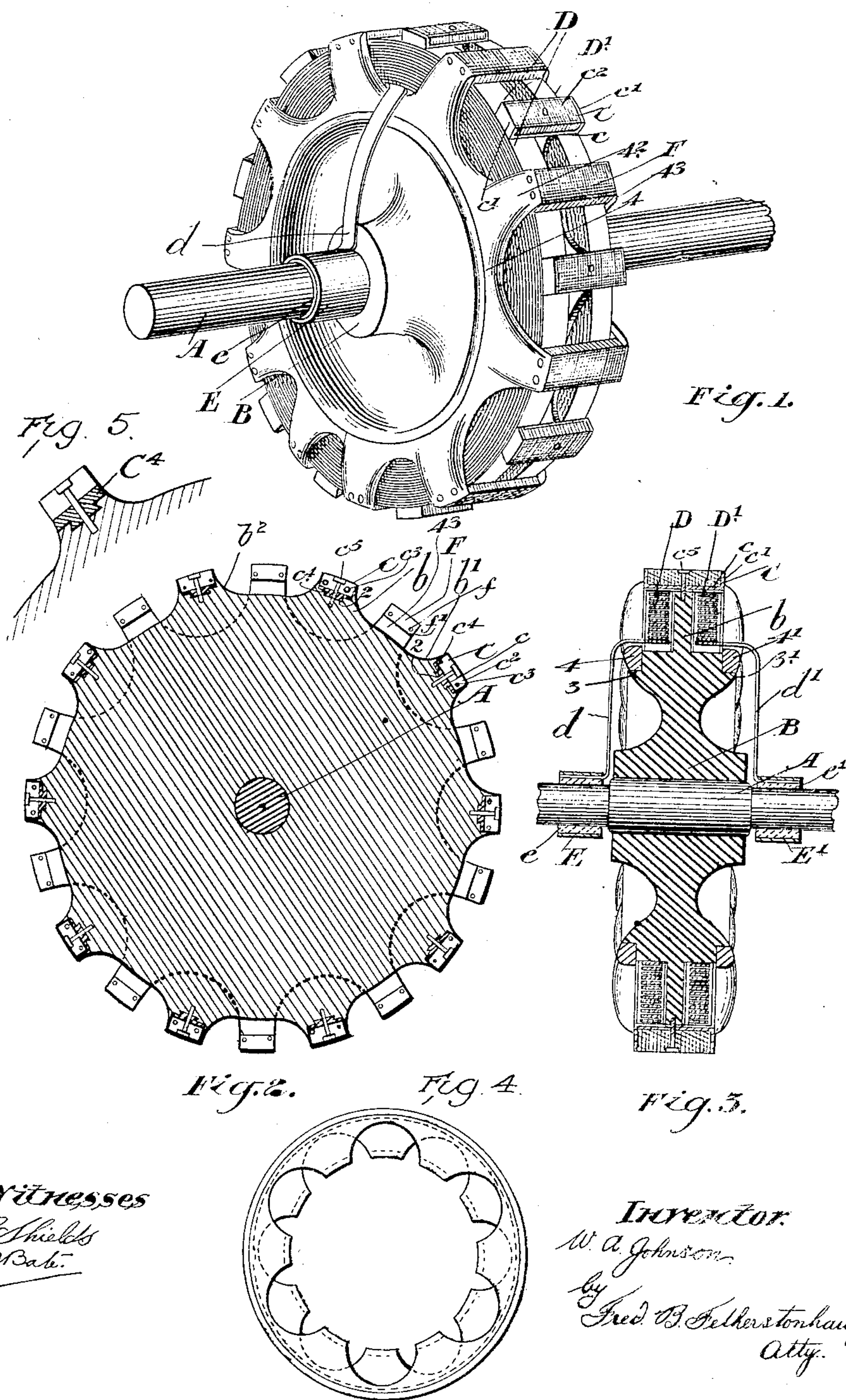
W. A. JOHNSON.

REVOLVING FIELD FOR ELECTRIC GENERATORS OR MOTORS.

APPLICATION FILED MAR. 5, 1903.

NO MODEL.

2 SHEETS—SHEET 1.



Witnesses

R. Shields
J. B. Bate.

Inventor:

W. A. Johnson.

By Fred. B. Felkerstonhaugh
Atty.

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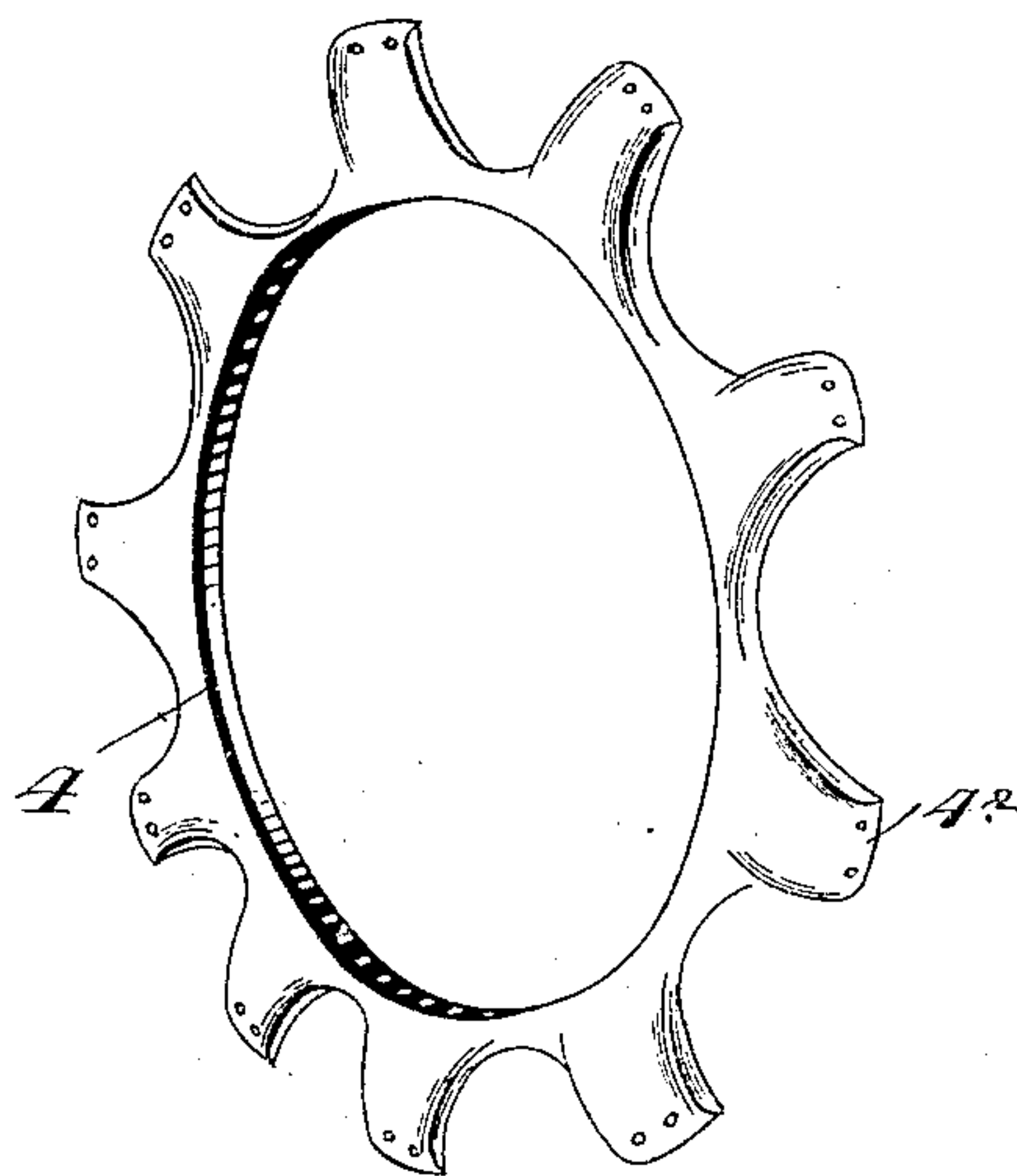


Fig. 6.

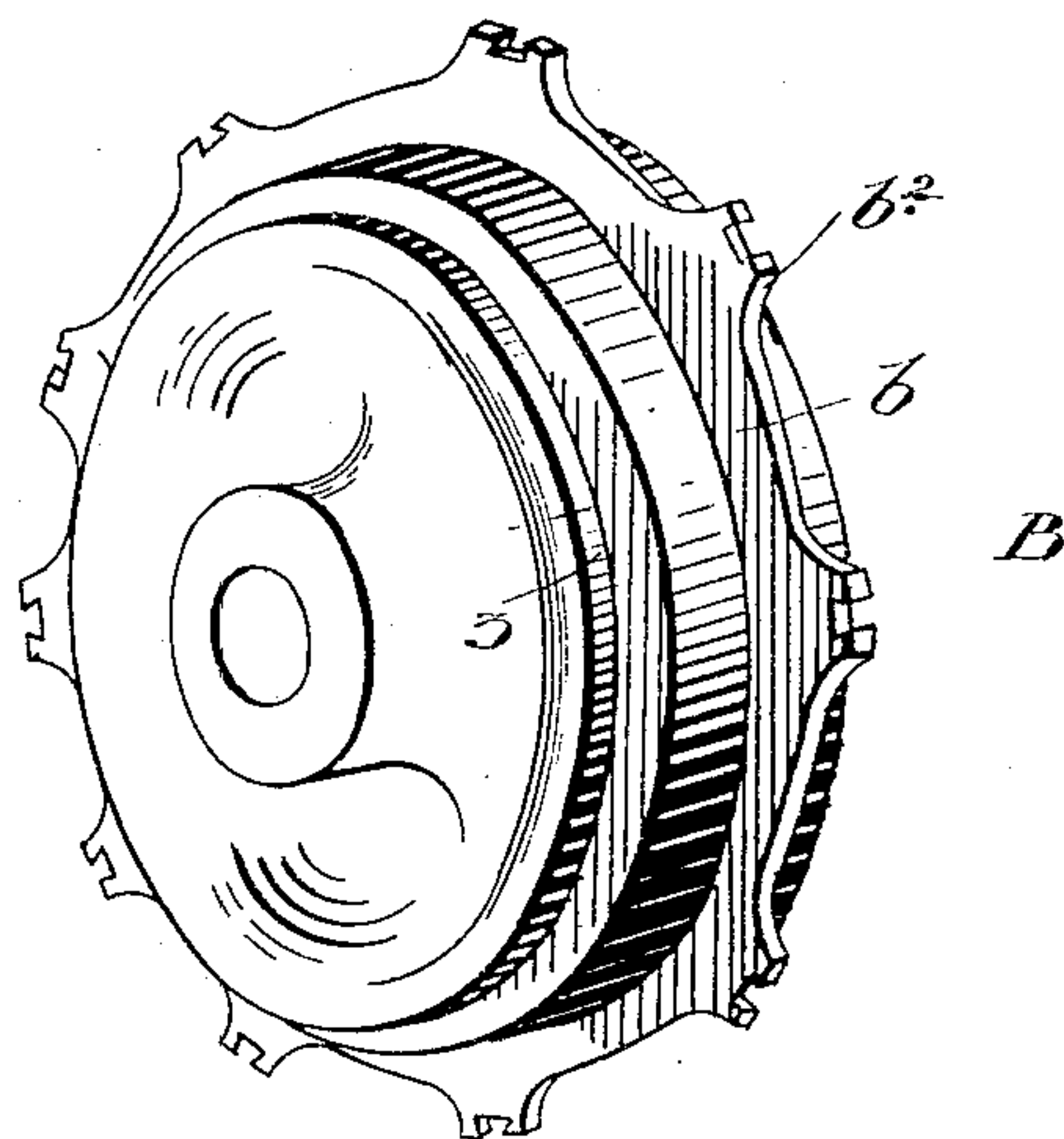


Fig. 7.

Witnesses-

C. H. Bate

W. H. Smith

Inventor:

W. A. Johnson

by

Ed. B. Hetherington
Atty.

UNITED STATES PATENT OFFICE.

WILLIAM ASAHIEL JOHNSON, OF TORONTO, CANADA.

REVOLVING FIELD FOR ELECTRIC GENERATORS OR MOTORS.

SPECIFICATION forming part of Letters Patent No. 769,090, dated August 30, 1904.

Application filed March 5, 1903. Serial No. 146,337. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM ASAHIEL JOHNSON, electrician, of the city of Toronto, in the county of York, in the Province of Ontario, Canada, have invented certain new and useful Improvements in Revolving Fields for Electric Generators or Motors, of which the following is a specification.

My invention relates to improvements in revolving fields for electric generators or motors, synchronous and otherwise; and the object of the invention is to devise a simple and compact construction of revolving field whereby a maximum of inherent regulation with a minimum of magnetic heat in all the parts may be secured; and it consists, essentially, of a field having the peripheral pole-pieces thereof so arranged that every alternate pole-piece is centrally mounted upon the central flange of the hub or drum and each of the remaining pole-pieces is carried by a flange or support at each end of the pole-piece in such a manner as to form an annular recess on each side of the central pole-piece support, which extends out centrally from the drum, and two exciting-coils arranged one on each side of the central supports for the alternate pole-pieces and within the end supports of the remaining pole-pieces, the parts being otherwise arranged and constructed in detail, as and for a purpose which will be explained hereinafter.

Figure 1 is a perspective view of my improved revolving field. Fig. 2 is a cross-section parallel with the face of the field. Fig. 3 is a longitudinal section on a line with the axis of the shaft. Fig. 4 is a detail showing an alternative form of revolving field. Fig. 5 is a detail view. Figs. 6 and 7 are detail views.

In the drawings like characters of reference indicate corresponding parts in each figure.

A is the main shaft of the rotor.

B is the central hub or drum, which is provided with a central flange b , having arc-shaped recesses b' .

C represents a series of pole-pieces each of which is made up of a holding-plate c with flanged ends c' and several laminæ c^2 , arranged side by side and extending from flange

to flange. The laminæ are held in place by cross bolts or rivets c^3 , extending through the laminæ and end flanges c' , as indicated. The pole-piece itself is held in place by a dovetailed tongue c^4 , fitting into a correspondingly-formed groove 2 in the projecting portion b^2 of the flange b , and by a bolt c^5 , extending through the center of the pole-piece into the projecting portion b^2 . The bolt c^5 serves to prevent circumferential as well as lateral displacement, and the tongues c^4 serve to prevent circumferential displacement, and it will thus be understood that the pole-pieces C are securely held in place.

D and D' are the exciting-coils, which are arranged one on each side of the central flange b , being supported in recesses formed between the flange and the drum B. The terminals d and d' are held within the rings E and E', which are insulated from the shaft A by the insulating-rings e and e' .

The central hub or drum B is provided with angular annular recesses 3 and 3' on each side thereof, and in such recesses fit the rings 4 and 4', which are each provided with substantially outwardly extending radial projections 4² and 4³. Between these projections are fitted alternate pole-pieces F, which are held in place between the ends of the projections 4² and 4³ by the cross bolts or rivets f , which extend through the laminæ f' , forming the pole-pieces, such laminæ being placed side by side, as indicated.

Having now described the principal parts involved in my invention, I shall briefly describe the advantages arising from the construction thereof. I will suppose that the north pole-pieces are the pole-pieces C. Then the south poles will be formed at the center of the arc-shaped recesses b' throughout the periphery. The pole-pieces F would be the south pole-pieces and, it will be seen, are peripherally alternately arranged to the north pole-pieces, and the corresponding poles to pole-pieces F would be in the center of the arc-shaped recess F' between the arms 4² and 4³. The arrangement thus set forth is such that the center line drawn on a plane perpendicularly to the axis of the shaft divides or defines absolutely the neutral point or points

in the magnetic effect of the windings upon the surrounding parts and of the neutral point or points of the magnetic magnets themselves, including the carrying-drum, rotating
 5 flanges, and the pole-pieces themselves and their influence upon and in relation to the stationary armature, metallic laminated core, and the armature-windings in coil, as may be located thereon. In fact, the whole arrange-
 10 ment is electrically, mechanically, and magnetically more symmetrical than any construction of which I am aware. The advantages of such a construction are as follows: My revolving field is so designed that there is ample
 15 room for strong field exciting-coils, such as shown, and their proper insulation and rigid mechanical placing on the carrying-drum. There is far less tendency for such field-windings to counteract the magnetizing influence
 20 of the respective coils upon their neighboring cores, the pole-pieces, and thereby any tendency to detract from the useful energy intended to be effected in such coils is minimized. In fact, the detracting reaction, which always
 25 occurs more or less in moving magnets, is prevented to the greatest extent possible, as well as similar reactions from the armature-circuits in regard to their effect upon the revolving field and the consequent counter-re-
 30 action again of the revolving field against any armature, and so on in endless confusion, which now occurs and which is so detrimental to other constructions or devices.

A further advantage of my revolving field
 35 is the accessibility of the different parts for inspection, a thorough lamination and ventilation of every part, its adaptation for machine winding, and close inherent regulation under change of load.

40 In this specification I have not described the stationary armature, as the form of stationary armature may be of any suitable form designed to coact with my revolving field. I may also point out that in the form of my re-
 45 volving field the lightness of the pole-pieces themselves, due to their not carrying any of the exciting-coils, materially reduces the peripheral strain.

I of course as an alternative may make the
 50 form of revolving field such that the drum would be to the outside of the windings and the pole-pieces extending radially inwardly, as shown in Fig. 4, in which case of course the armature would be stationary and mount-
 55 ed on a suitable bed-plate, through which the main shaft carrying the revolving field would pass.

What I claim as my invention is—

1. A revolving field comprising a suitable
 60 drum mounted on a shaft, a series of pole-pieces of one polarity centrally arranged on such drum and a series of pole-pieces of opposite polarity alternately arranged to the
 65 aforesaid pole-pieces, so that a plane perpen-

the face of the field passing through the center of the poles divides or defines an absolutely neutral point or points in the magnetic effect of the windings and magnets as and for the purpose specified.

2. A revolving field comprising a suitable drum mounted on a shaft, a series of pole-pieces of one polarity centrally arranged on such drum and a series of pole-pieces of opposite polarity alternately arranged to the
 75 aforesaid pole-pieces, so that a plane perpendicular to the axis of rotation and parallel to the face of the field passing through the center of the poles divides or defines an absolutely neutral point or points in the magnetic
 80 effect of the windings and magnets, and two exciting-coils extending around the drum and disposed equidistant from the center of the pole-pieces as and for the purpose specified.

3. In a revolving field, the combination with
 85 the drum and central flange having arc-shaped recesses in the periphery thereof, of pole-pieces centrally held on the projections between the arc-shaped recesses as and for the purpose specified.

4. In a revolving field, the combination with the drum and central flange having arc-shaped recesses in the periphery thereof, of pole-pieces centrally held on the projections be-
 95 tween the arc-shaped recesses and two exciting-coils surrounding the drum and disposed one on each side of the central flange as and for the purpose specified.

5. In a revolving field, the combination with the drum, of rings fitting on each face there-
 100 of and each having a series of outwardly-extending projections, and pole-pieces held in between each pair of oppositely-disposed projections as and for the purpose specified.

6. In a revolving field, the combination with
 105 the drum, of rings fitting on each face thereof and each having a series of outwardly-extending projections and pole-pieces held in between each pair of oppositely-disposed pro-
 110 jections, and two exciting-coils disposed one toward each end of the poles and surrounding the drum as and for the purpose specified.

7. In a revolving field, the combination with the drum having a central flange and pole-
 115 pieces centrally supported thereon, of end rings having outwardly-extending projections arranged in pairs, and the pole-pieces held therebetween, such pole-pieces being of opposite polarity to the former pole-pieces as and
 120 for the purpose specified.

8. In a revolving field, the combination with the drum having a central flange and pole-
 125 pieces centrally supported thereon, of end rings having outwardly-extending projections arranged in pairs, and the pole-pieces held therebetween, such pole-pieces being of opposite polarity to the former pole-pieces, and two exciting-coils located one on each side of the central flange of the drum as and for the purpose specified.

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9. In a revolving field, the combination with the drum having a central flange provided with a series of arc-shaped recesses, and pole-pieces centrally supported upon the projections between the recesses, of end rings affixed to the drum and having outwardly-extending projections with arc-shaped spaces between them and arranged in pairs, and the pole-pieces held therebetween, such lateral pole-pieces being of opposite polarity to the former pole-pieces as and for the purpose specified.

10. In a revolving field, the combination with the drum having a central flange provided with a series of arc-shaped recesses, and pole-pieces centrally supported upon the projections between the recesses, of end rings affixed to the drum and having outwardly-extending projections with arc-shaped spaces between them and arranged in pairs, and the pole-pieces held therebetween, such latter pole-pieces being of opposite polarity to the former pole-pieces, and two exciting-coils located one on each side of the central flange of the drum as and for the purpose specified.

11. In a revolving field, the combination

with the drum and central flange provided with arc-shaped recesses, of the pole-pieces comprising a cross-plate provided with end flanges and having a dovetailed tongue fitting into a corresponding groove in the projection between the arc-shaped recesses, the laminæ fitting in between the end flanges of the plate, the cross bolts or rivets extending through the laminæ and end flanges, and the central bolt extending through the center of the laminæ into the projections of the flange as and for the purpose specified.

12. In a revolving field, the combination with the drum having the face peripheral recesses and the rings fitting in such recesses and provided with outwardly-extending projections having arc-shaped recesses between the projections, of the pole-pieces comprising the laminæ, and the bolts extending through the laminæ and the projections as and for the purpose specified.

WILLIAM ASAHUEL JOHNSON.

Witnesses:

M. McLAREN,
H. STRICKLAND.