(Model.)

A. WIRSCHING.

DYNAMO ELECTRIC MACHINE.

No. 249,716. Patented Nov. 15, 1881.

Fig: 1.

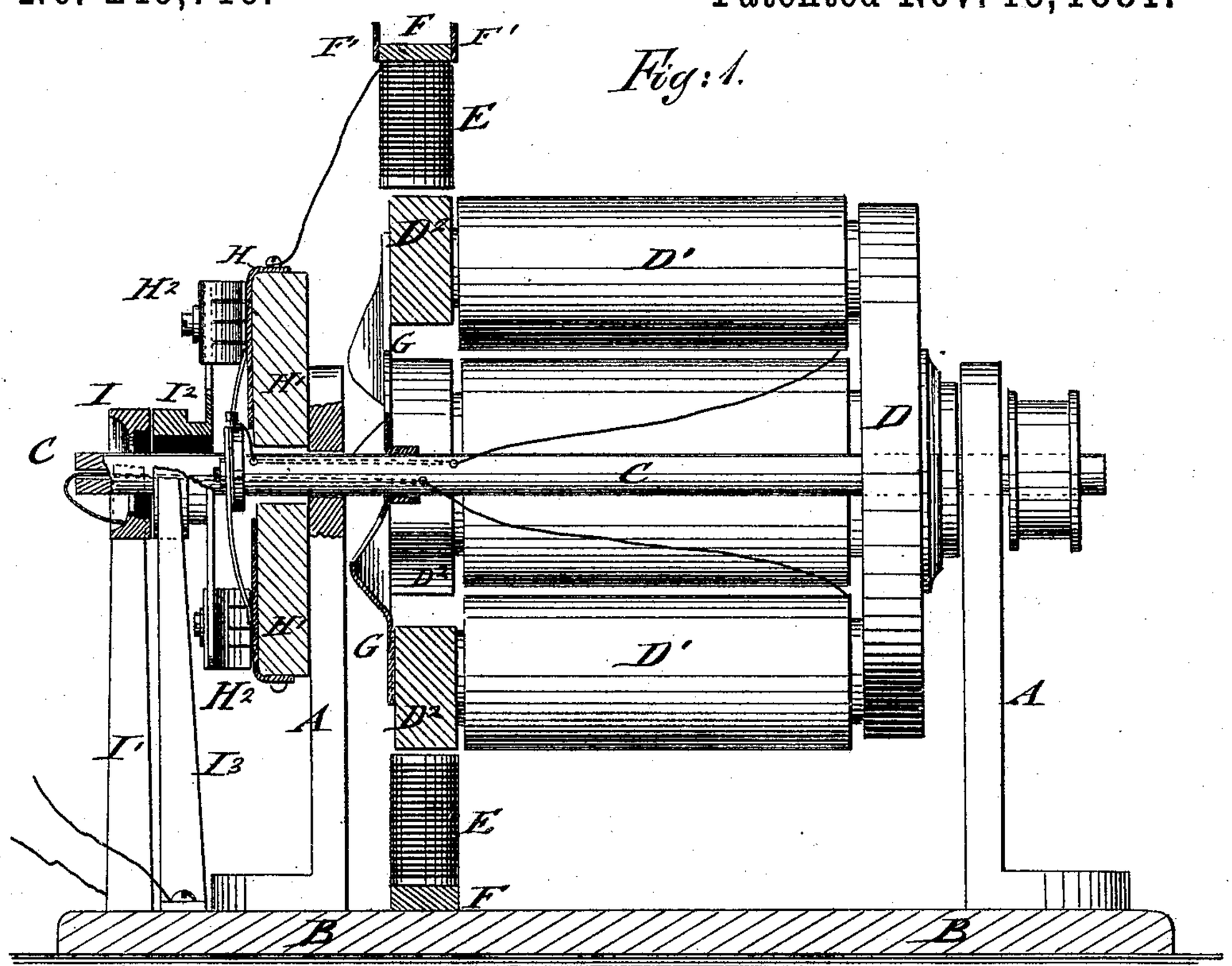


Fig: 3.

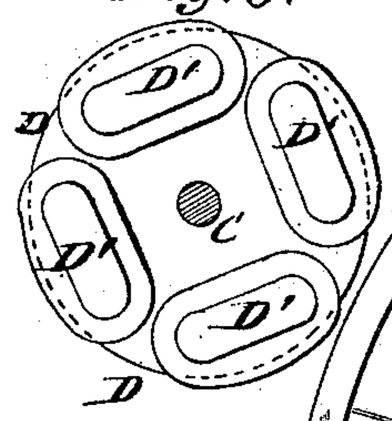


Fig: 2.

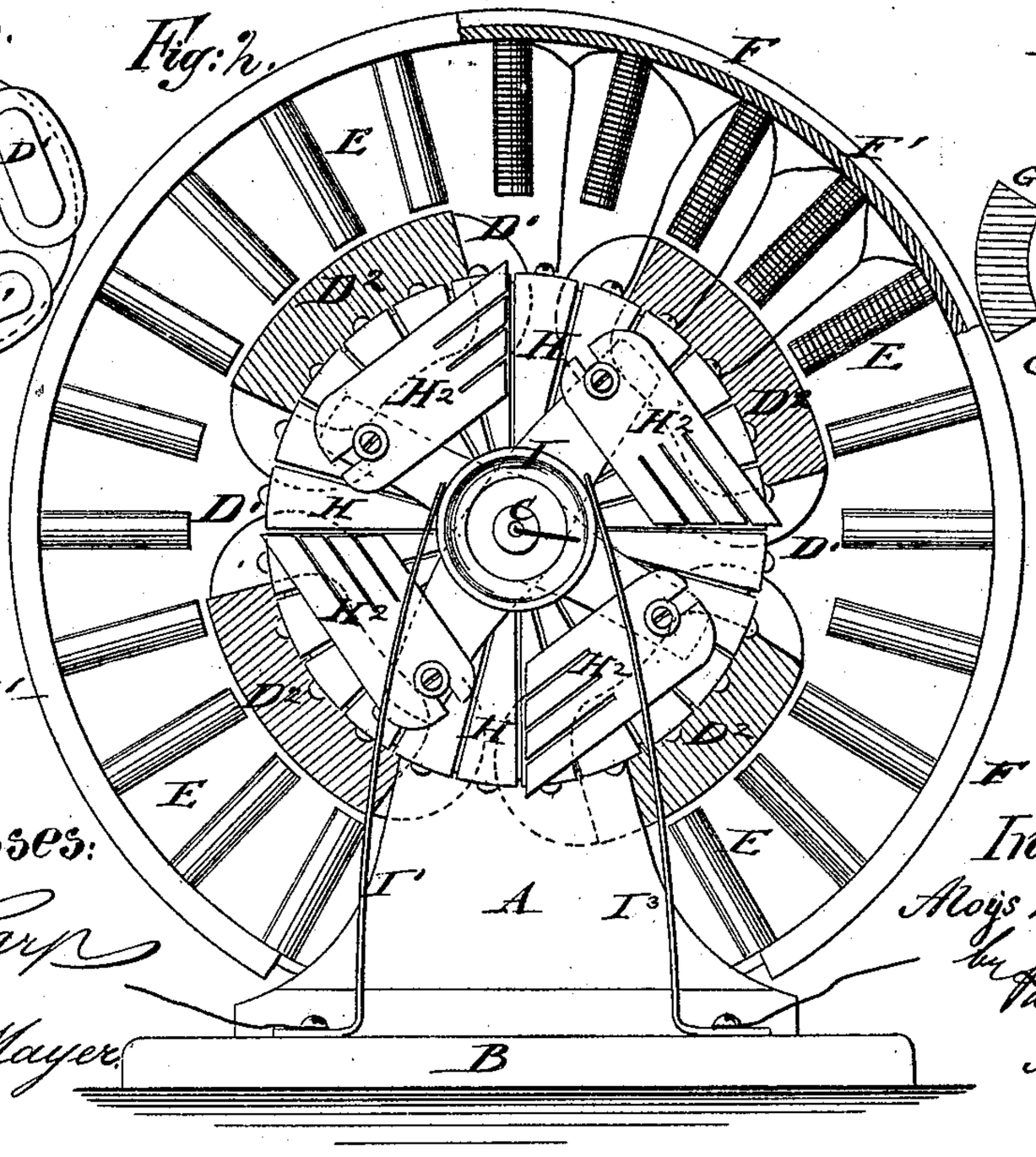
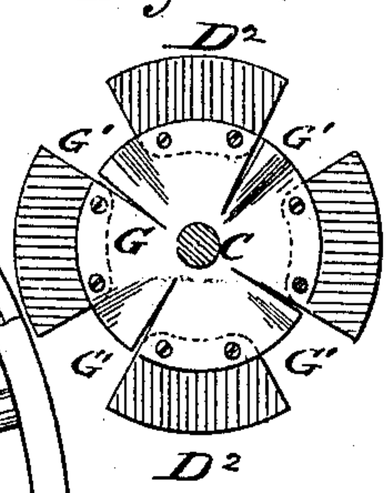


Fig: 4.



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UNITED STATES PATENT OFFICE.

ALOYS WIRSCHING, OF BROOKLYN, ASSIGNOR TO THE AMERICAN ELECTRIC LIGHT COMPANY, OF NEW YORK, N. Y.

DYNAMO-ELECTRIC MACHINE.

SPECIFICATION forming part of Letters Patent No. 249,716, dated November 15, 1881.

Application filed September 28, 1881. (Model.)

To all whom it may concern:

Be it known that I, ALOYS WIRSCHING, of the city of Brooklyn, county of Kings, and State of New York, have invented certain new and useful Improvements in Dynamo-Electric Machines, of which the following is a specification.

In the accompanying drawings, Figure 1 represents a side elevation, partly in section, of my improved dynamo-electric machine; Fig. 2, a sectional end elevation of the same; and Figs. 3 and 4 are detail views, showing, respectively, the arrangement of the revolving electro-magnets and the enlarged pole ends and cooling-fan of the same.

Similar letters of reference indicate corresponding parts.

This invention has reference to such improvements in dynamo-electric machines that an increased quantity of induced currents may be obtained, and the heating of the electro-magnets, as well as of the induction-coils, prevented in a reliable manner. The machine may be used with or without a commutator, so as to furnish either a continuous current or alternate currents, according to the purposes for which the same is required.

The invention consists of a number of horizontal permanent or electro magnets, which are attached to a common disk that is keyed to the revolving shaft of the machine. The pole ends of the magnets are enlarged in outward and sidewise direction, so as to form sector-shaped pole-pieces. A disk-shaped plate with wings is attached to the shaft and pole-pieces to keep the latter cool by throwing air thereon. The circle formed by the enlarged pole-pieces is surrouuded by a fixed ring, from which a series of short induction-coils extend radially inward close up to the faces of the armatures. The induced currents generated in the induction-coils are conducted to a commutator of suitable construction, whose brushes revolve with the shaft, but are insulated therefrom. The brushes supply the currents to the electro-magnets, and increase by their action the strength of the induction-currents, which are finally transferred in the customary manner to the lights or other objects placed in the circuit by means of the insulated disks of the shaft and contact-springs. The exterior ring is made hollow or arranged with flanges, so as to form a tube or trough for keeping the ring and coils cool by running water.

Referring to the drawings, A A represent two supporting-standards, which are rigidly secured to the base-plate B of my improved dynamo-electric machine. The driving-shaft C of the machine turns in bearings of the standards A A, being revolved by belt-and-pulley transmission from any suitable prime motor. To the shaft is keyed at one end a disk, D, of iron or other metal, to which the soft cores of one or more pairs or sets of permanent or electro magnets, D′, are secured, the magnets being supported parallel to the shaft and revolved therewith. The electro-magnets D′ are arranged so as to have alternating polarity, their pole ends D^2 being enlarged in outward direction, so as to form sector-shaped pole-pieces D^2. The circle formed by the faces of the pole-pieces is of about the same or of somewhat larger diameter than that of the cylinder, formed by the rotation of the electro-magnets. These pole-pieces D^2 are also enlarged sidewise, so that the space between two adjoining pole ends is reduced as much as possible. The enlarged pole-pieces D^2 are encircled by a number of radial induction-coils, E, whose cores are attached to a ring, F, that is firmly secured to the base-plate concentric to the shaft and to the faces of the pole-pieces D^2. The faces of the pole-pieces D^2 are close to the ends of the cores of the coils E, and impart to them positive or negative polarity, according as the negative or positive poles of the magnets pass the same. A large number of induction-coils, E, may thus be arranged around the magnets, which number increases with the number and size of the revolving magnets, so that in a comparatively small space a large number of coils may be arranged, and consequently a larger quantity of induced currents and a more powerful line-current may be obtained. The soft-metal cores of the coils E are wound in one direction, so as to furnish uniform currents of alternating polarities by the successive action of the magnets thereon. The pole-pieces D^2 are

connected to the shaft C by a disk-shaped plate, G, which is attached to the shaft by means of a sleeve, and to the pole-pieces by means of screws. The plate G serves not only for steadying the pole ends, but mainly by means of angularly bent-up wings G′ as a fan, by which a continuous current of air is thrown on the pole-pieces, so as to keep them cool and prevent them from undue heating. The wings G′ are arranged somewhat in front of the pole-pieces, as many wings being provided as there are electro-magnets.

The induction-coils are connected by wires to a commutator consisting of radial plates H, which are insulated from each other by a ring-shaped support, H′, that is supported on that standard A nearest to the stationary ring F. One or more pairs of revolving brushes, H², that are placed at the proper angle toward each other, according to the position of the electro-magnets, take up the induced currents of opposite polarities. The brushes are keyed by an insulated sleeve or ring to the shaft, one set of brushes taking up the currents induced by the north poles, the other set of brushes the currents induced by the south poles. One set of brushes collecting currents of one polarity is connected by means of a wire, which is passed through a longitudinal hole of the shaft to the helices of the electro-magnets, so as to excite thereby the magnets when the machine is started, which then generate the induced currents in the induction-coils E until a current of maximum strength is obtained. The wire, after being wound around the magnets, passes in similar manner from the helices through a hole of the shaft, and out at the end of the same, being there connected with an insulated disk, I, from which the current is taken up and transmitted by a contact-spring, I′, to the line-circuit. The contact-spring I′ is secured by a binding-post to the base-plate. A similar disk, I², and contact-spring I³ take up the currents of opposite polarity collected by the other set of brushes, and throw them in the same direction into the main circuit, so as to strengthen the current thereby.

By connecting the binding-posts of the contact-springs with the circuit-wires the continuous current produced may be employed for lighting, electroplating, or other purposes, as required. The exterior ring of the induction-coils is made either hollow or arranged with bent-up side flanges, F′, as shown in Figs. 1 and 2, so that a stream of running water may be allowed to pass around the ring F, and thereby the ring and cores kept cool.

If desired, the working of the machine may be reversed by making the electro-magnets and brushes stationary and rotating the ring together with the induction-coils and the commutating-disk. The large number of induction-coils that may be arranged around the arc-shaped pole-pieces of the magnets in connection with the direct action of the pole-pieces of the electro-magnets on the cores of the induction-coils furnish thereby currents of considerable strength and intensity, while the large number of small induction-coils facilitates the tearing off of the electro-magnets and their passage from one coil to the other. The easier motion of the magnets from one coil to the other, together with the compact arrangement of the magnets close to the shaft and at the inside of the induction-coils, requires less power, and consequently less expense for running the machine.

I do not claim an armature, provided with wings or vanes revolving therewith, for the purpose of affording a circulation of air through the armature to prevent heating.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. The combination of horizontal revolving inducing-magnets, having enlarged sector-shaped pole-pieces extending at right angles in outward direction therefrom, with a series of inwardly-radiating induced magnets arranged in a circle around the pole-pieces, substantially as and for the purpose described.

2. In dynamo-electric machines, the combination, with revolving permanent or electro magnets having enlarged armatures, of a disk-shaped plate with radial wings, attached to shaft, and pole-pieces of the revolving magnets, for throwing a current of air on the armatures, substantially as specified.

3. The combination of horizontal revolving inducing-magnets, having enlarged sector-shaped poles and radial cooling-wings, with a stationary ring, having a series of radial inwardly-extending induction-coils, said ring being either hollow or flanged to admit circulation of water around the same, as described.

In testimony that I claim the foregoing as my invention I have signed my name, in presence of two witnesses, this 30th day of January, 1879.

ALOYS WIRSCHING.

Witnesses:
PAUL GOEPEL,
CARL KARP.