

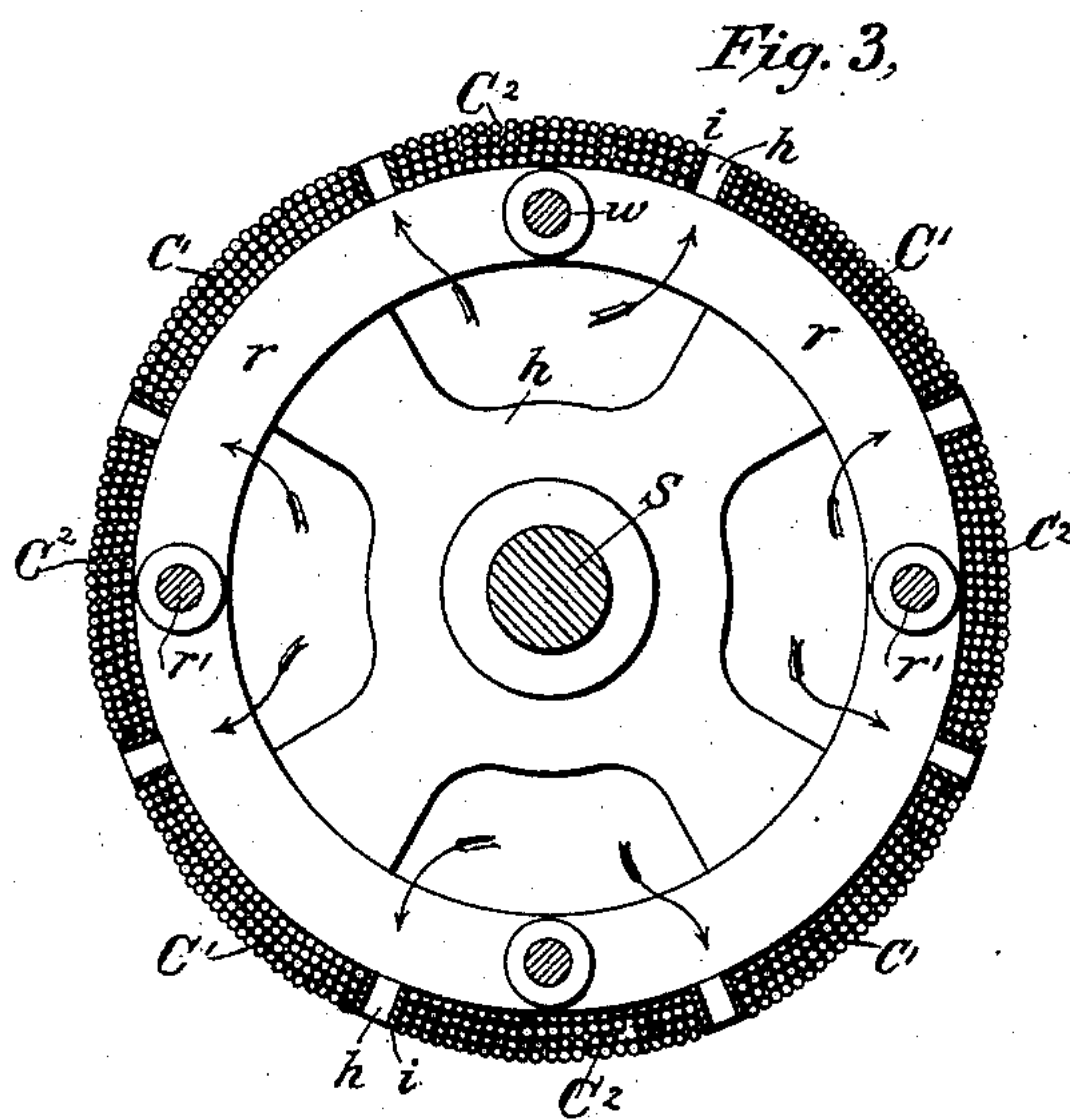
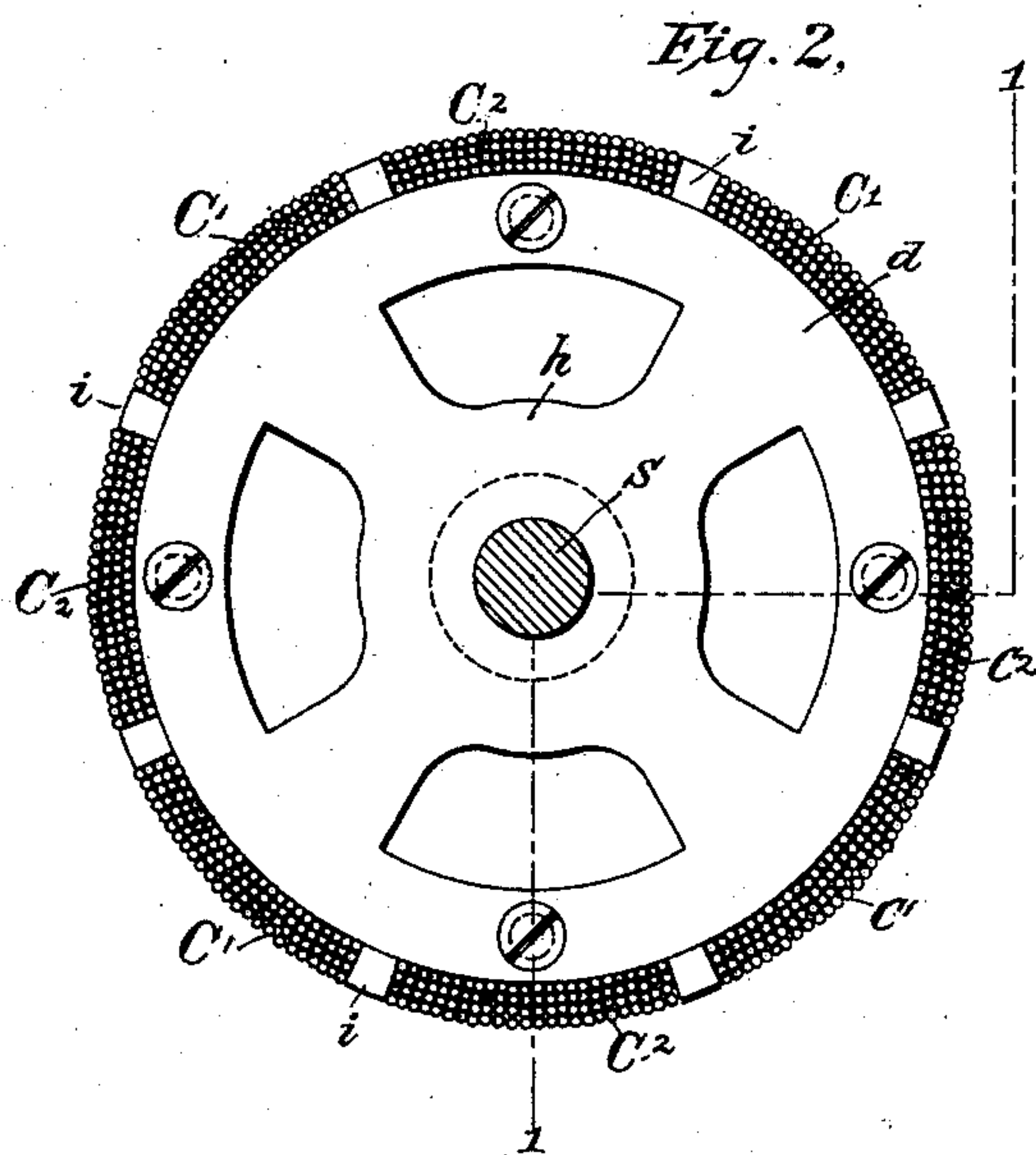
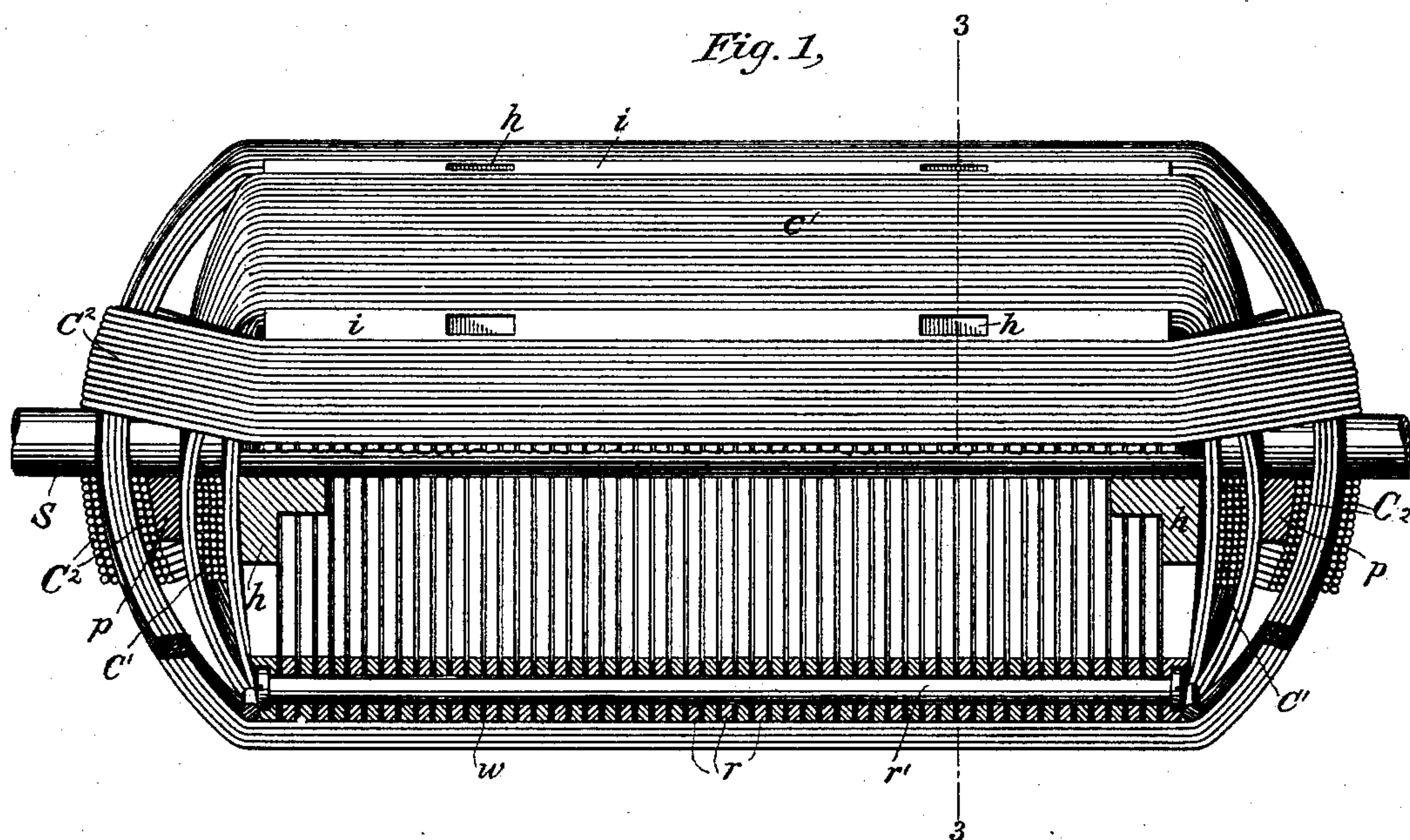
(No Model.)

O. URBAN & M. J. WIGHTMAN.

DYNAMO ELECTRIC MACHINE.

No. 379,037.

Patented Mar. 6, 1888.



Witnesses
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UNITED STATES PATENT OFFICE.

OSCAR URBAN AND MERLE J. WIGHTMAN, OF HARTFORD, CONNECTICUT;
SAID URBAN ASSIGNOR TO THE SCHUYLER ELECTRIC COMPANY, OF
MIDDLETOWN, CONNECTICUT.

DYNAMO-ELECTRIC MACHINE.

SPECIFICATION forming part of Letters Patent No. 379,037, dated March 6, 1888.

Application filed August 27, 1886. Serial No. 212,002. (No model.)

To all whom it may concern:

Be it known that we, OSCAR URBAN and MERLE J. WIGHTMAN, citizens of the United States, residing at Hartford, in the county of Hartford and State of Connecticut, have invented certain new and useful Improvements in Armatures for Magneto-Electric Machines, of which the following is such a full, clear, and exact description as will enable any one skilled in the art to which it appertains to make and use the same.

Our invention relates to means for more effectually ventilating the coils of armatures of electrical machines.

In another application, filed August 19, 1886, Serial No. 211,254, we have shown and described means for insulating and ventilating the coils at the ends of the armature. The present invention is an improvement on the invention set forth in said application.

The object of the present invention is to produce a cooling effect throughout the armature, as well as to insulate and ventilate the coils at the ends of the armature.

It consists in providing the core of the armature, which may be made up of ring-sections, with open end sections, so as to afford communication between longitudinal air-spaces left between the coils at the ends of the armatures and the hollow interior of the core. The armature may or may not be provided with slots or air-spaces around and about its periphery which communicate with the interior of the core, thus affording a free circulation of air between the ends of the armature through the hollow interior of the core and the air-spaces along the periphery as the armature rotates.

In the drawings accompanying and forming part of this specification the same letters of reference indicate the same parts.

Figure 1 represents a side view of the armature on the plane 1 1 of Fig. 2, showing half of the armature in section. Fig. 2 shows an end view of the armature with the coils in section, and Fig. 3 shows a section of the armature on the plane 3 3 of Fig. 1.

S represents the shaft upon which the core and coils are mounted, and which serve to rotate the armature. The core is made up of ring-

sections r , which are insulated from each other by washers w . Through these washers and rings pass rods r' , of wood, bolted by means of countersunk screws to disks d , which form the end sections. The end sections are cut away, as shown in Figs. 2 and 3, forming air-passages from the ends of the coils to the interior of the core. The disks d are provided with hubs h , which are keyed to the shaft S and support the core and coils wound thereupon. By this construction the core may be provided with a spacious hollow interior, allowing a great volume of air to remain within the armature and thereby cooling it effectually.

We have shown the armature as having two systems of coils thereupon, with two independent coils in each system.

The coils of the first system are represented by the letter C' , and are wound first upon the core at right angles to each other, as shown in Figs. 2 and 3. Half of the first coil of the first system is wound first, then all of the second coil of that system, and then the remaining half of the first coil, so as to make the length of wire of the two coils in the system exactly equal to each other.

After the completion of the first system of coils, a plate, p , is slipped over the shaft S . This plate may be of any insulating material, such as hard rubber or vulcanized fiber. The plate p and the means for supporting the outer coils—*i. e.*, the coils of the second system—are described in detail in the aforesaid application.

The coils of the second system (represented by C'') are now wound upon the core and over the plate p at right angles to each other and between the spaces left by the coils of the first system. Previous to their winding, however, sticks of wood or insulating material, i , are placed between the two systems and rest upon the core. The coils of the second or outer system are wound precisely similar to the coils of the first or inner system—that is to say, the first half of the first coil of the second system is wound over the plate p , then all of the second coil, and then the latter half of the first coil, so as to make the length of wire in the two coils in this system the same. The length

of wire in each of the systems, however, may be different. This mode of winding forms no part of our invention, and we do not wish to limit our invention to any particular way of winding the armature-coils, as it may be applied to any form of armature-winding. The plate *p* separates the coils from one another at the ends, making longitudinal air-spaces between the coils at the ends for ventilating and insulating purposes.

The insulation *i* may or may not be slotted at *h* at various places along and about the periphery of the armature. Inasmuch as the ring-sections upon which the sticks *i* rest are separated from each other by washers when this insulation is slotted, a circulation of air will take place between the ends of the armature through the interior of the core and holes *h*, as clearly shown by the arrows in Fig. 3. The insulating-plate *p* and air-spaces formed about the ends afford complete insulation between the coils of the different systems, between which there should be, in practice, the greatest difference of potential, the difference of potential between the coils of the same system being but slight at any time during the operation of the apparatus.

The forces imparted to the air as the armature rotates will put it in motion and afford an effective way of cooling the armature, as before stated.

What we now desire to claim and secure by Letters Patent is—

1. A cylindrical armature for electric apparatus, having a cord made up of ring-sections, insulating-washers separating the same from each other, cut-away or open disks forming the last sections, hubs carried by the latter, a shaft carrying said hubs, coils wound upon said core, and longitudinal air-spaces between the coils at the ends of the core.

2. A cylindrical rotary armature for electrical apparatus, having a core made up of ring-sections, insulating-washers separating the same from each other, insulating-rods carrying said rings and bolted to cut-away or open disks forming the end sections of said core, hubs upon said end sections, a shaft keyed thereto, and coils wound upon said core, having longitudinal air-spaces at the ends for ventilating and insulating purposes and communicating with the hollow interior of said core through the passages afforded by said open sections.

3. A cylindrical rotary armature for an electrical apparatus, having a core made up of ring-sections, insulating-rods carrying said rings and bolted to cut-away or open disks forming the end sections of the core, hubs upon said end sections, a shaft keyed thereto, and coils wound upon said core, having radial air-spaces at the ends communicating with the hollow interior of said core through the passages afforded by said open sections, and longitudinal air-spaces about the periphery of the armature, also communicating with said hollow interior.

4. A rotary armature of cylindrical or other shape having open ends and longitudinal air-spaces between the coils at the ends, for the purpose set forth.

5. A rotary cylindrical armature for electrical apparatus, having a core composed of ring-sections secured together and to open end sections keyed to the armature-shaft, making a hollow interior, means for separating and insulating the ring-sections from one another, coils wound thereupon, and air-spaces between the coils along the periphery and between the coils at the ends of the armature, affording a circulation of air between the hollow interior of the core and the external air at the ends and along the periphery of the armature for ventilating and insulating purposes, substantially as set forth.

6. A rotary armature for electrical apparatus, having coils wound thereupon with air-spaces between the coils along and about the periphery communicating with its interior and communicating longitudinal air-spaces at the ends of the armature for cooling the same by the forces imparted to the air by the rotation of said armature.

7. The combination, in a rotary armature forelectrical apparatus, of two systems of coils, as *C'* and *C''*, wound upon a hollow open end core, means for separating them from one another at the ends of the armature for ventilating and insulating purposes, and means also for separating and insulating them from one another along the periphery of the armature, and slots in the insulation along the face of the armature communicating with the hollow interior of said core, whereby the forces imparted to the air by the rotation of the armature serve to ventilate it at the ends and throughout the armature.

8. The combination, in a rotary armature for an electrical apparatus, of two systems of coils, as *C'* and *C''*, wound longitudinally thereupon, a core made up of ring-sections suitably insulated from each other and having open end sections to which the shaft is keyed, means for separating said systems of coils from one another at the ends of the armature for ventilating and insulating purposes, and means also for separating and insulating said systems from one another along the periphery of the armature, which latter means is slotted, so as to provide air-passages from the hollow interior of said core, whereby the forces imparted to the air by the rotation of the armature serve to ventilate it at the ends and throughout the armature.

In testimony whereof we have hereunto set our hands and seals, this 23d day of August, 1886, in the presence of the two subscribing witnesses.

OSCAR URBAN. [L. S.]
MERLE J. WIGHTMAN. [L. S.]

Witnesses:

HERMANN LEMP,
ALFRED S. BELDEN.