No. 645,943. Patented Mar. 27, 1900.

G. DALÉN & A. HULTQVIST.

DYNAMO ELECTRIC MACHINE.

(Application filed Oct. 5, 1899.)

(No Model.)

Fig. 3.

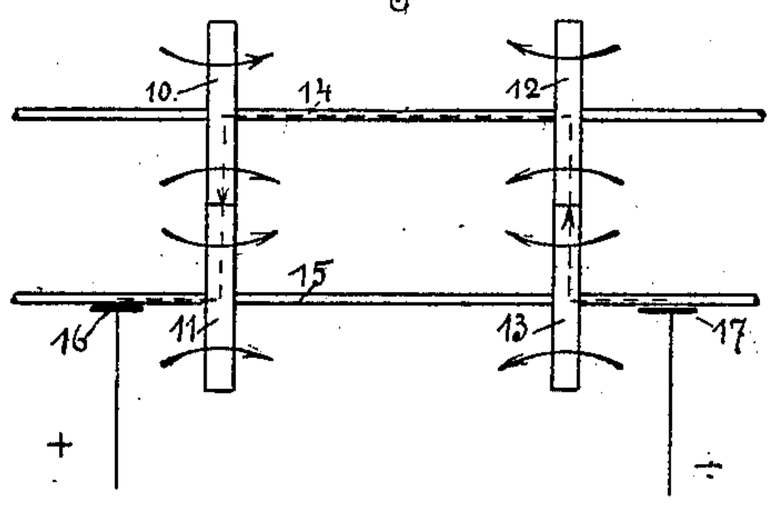


Fig. 1.

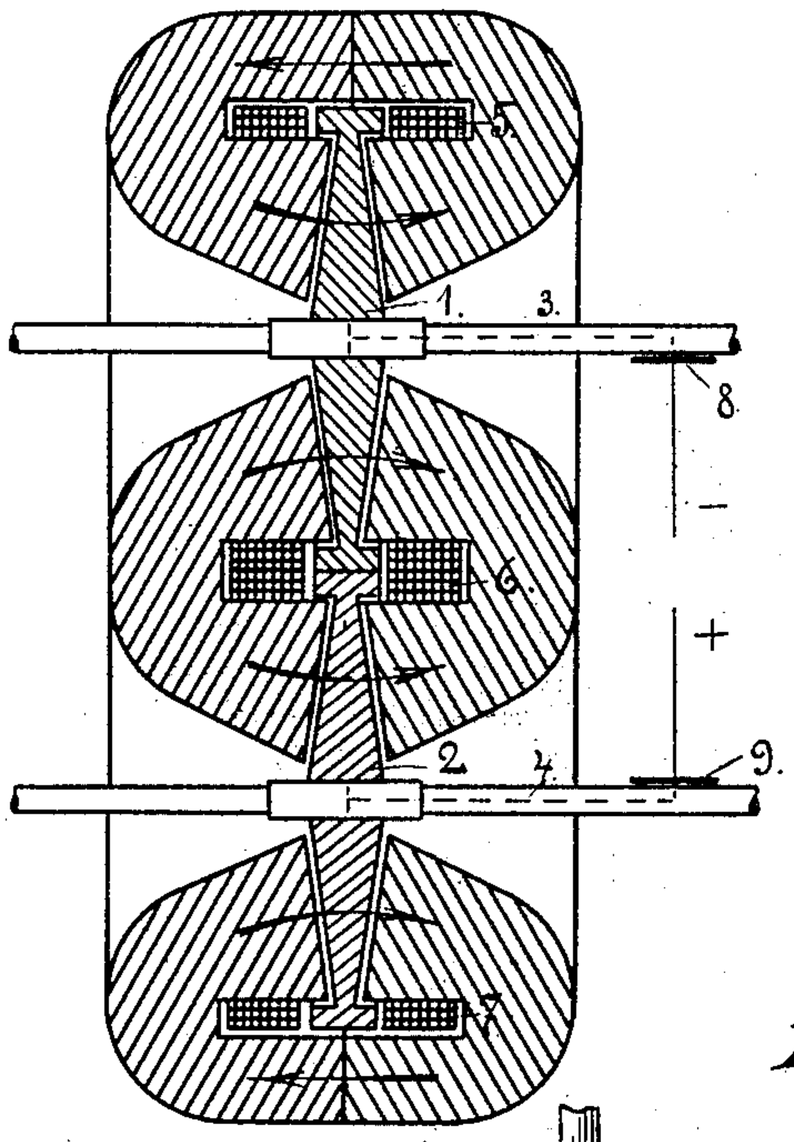


Fig. 2.

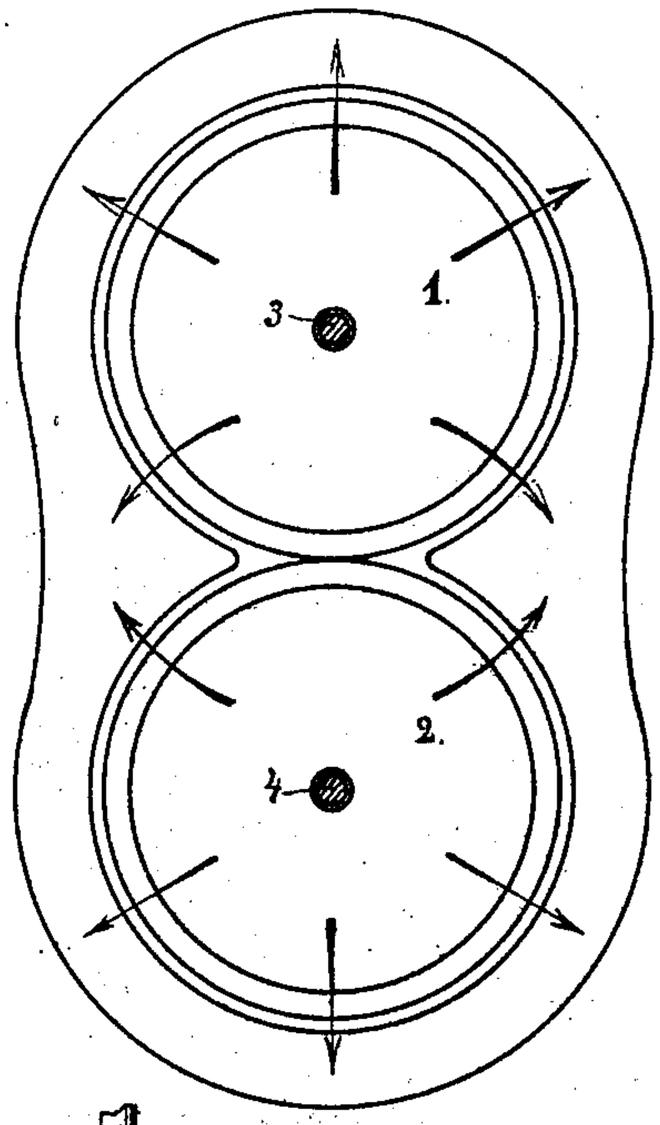


Fig. 5.

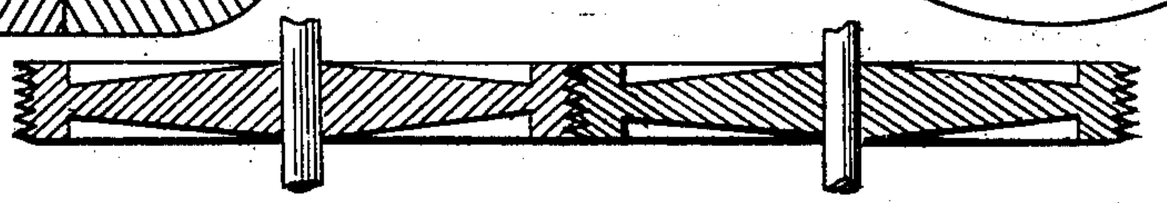
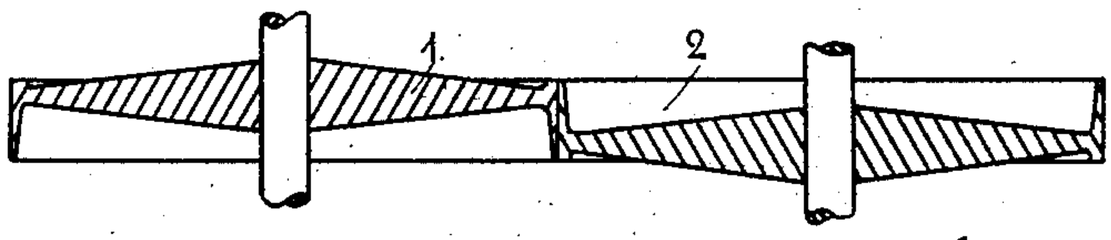


Fig. 4.



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UNITED STATES PATENT OFFICE.

GUSTAF DALÉN AND ARTHUR HULTQVIST, OF STOCKHOLM, SWEDEN.

DYNAMO-ELECTRIC MACHINE.

SPECIFICATION forming part of Letters Patent No. 645,943, dated March 27, 1900.

Application filed October 5, 1899. Serial No. 732,692. (No model.)

To all whom it may concern:

Be it known that we, GUSTAF DALÉN and ARTHUR HULTQVIST, engineers, residing at Stockholm, Sweden, have invented certain Improvements in Dynamo-Electric Machines, of which the following is a specification.

It has been proposed to construct one-poled dynamo-electric machines by means of two rotating disks of steel, copper, or other suitable material, which disks have been placed within magnetic fields in such a manner that electromotive force is generated in the direction from the center of one disk to the center of the other disk. In order to conduct this electromotive force from one disk to the other disk, a belt or band of a suitable flexible and conducting material has been used, which belt or band was laid around the two rotating disks.

Hitherto dynamo-electric machines of that kind have had only a limited employment on account of the large dimensions which they receive when constructed for a high voltage, as it was not possible to give the said disks a rotation greater than that determined by the strength of the belt or band.

The present invention has for its object to avoid said inconvenience; and it consists therein that the electromotive force is conducted from one disk to the other disk by means of direct contact established between the disks, which for this purpose are pressed toward each other at or near the circumference. Owing to this contact between the disks they may be driven with a considerably-high speed, the ratio of speed being limited only by the strength of the disks. When constructed according to this invention, the machines will be cheap to manufacture and will receive small dimensions, on delivering a current with a desired voltage.

The accompanying drawings show the improved dynamo-electric machine.

Figure 1 is a vertical section of the machine. Fig. 2 is a side view of the same. Fig. 3 shows, schematically, the arrangement of two sets of rotating disks. Fig. 4 shows on a larger scale a modified construction of the outer rings of the disks in order to assure a good contact between the disks. Fig. 5 is a detail view showing the rifled rings.

1 and 2 indicate the rotating disks, mounted on the shafts 3 and 4 and pressed toward each other at the circumference. The disks rotate in opposite directions and are situated in magnetic fields 5 6, 6 7. Said magnetic fields are arranged in such a manner that the magnetic lines of force pass from the left to the right through the disk 1 as well as through the disk 2, as indicated by the arrows, and pass through the armature from the right to the left. Thus an electromotive force is generated in the disk 1 in the direction from the center of the disk to the circumference, while in the disk 2 the electromotive force has the direction from the circumference of the disk to its center. The electromotive force is conducted from the one disk to the other at the circumferential point of contact between the two disks, and thus a total electromotive force is generated in the direction from the center of the disk 1 to the center of the disk 2. By means of sliding contacts 8 and 9 upon the shafts 3 and 4 the electric current may be gathered and conducted to the places for its employment.

Fig. 4 shows a construction of the outer rings of the disks 1 and 2 in order to obtain a constant pressure between the disks. For this purpose the outer ring projects sidewise and the center lines of the disks are displaced sidewise in such a manner that the rings are brought into contact with each other along their whole length. Thus a yielding contact is established, which is necessary, especially at high speeds, for assuring a good contact. The outer rings of the disks may also be made yielding in other ways than shown in the drawings. They may, if desired, be rifled in order to provide a larger surface of contact between the disks. For the purpose of opposing less resistance at the point of contact between the two disks the rings of the disks may be coated with a good conductor—for instance, copper—if the disks are not themselves made of a good conducting material.

Instead of using only two rotating disks, as shown, three or more disks may be employed, which are in contact with each other at or near the circumference. The magnetic fields in which said disks rotate are in this case arranged in such a manner that electromotive force is transmitted at the point of contact between two disks from one disk to the other

disk. This disposition may be clear without any further description or drawings. Several sets of rotating disks may also be employed and the magnetic field within said sets arranged in such a manner that the electromotive forces generated in each set of disks are added. Fig. 3 shows, schematically, a dynamo-electric machine in which two sets of rotating disks are employed. 10 11 indicate the disks in the one set, 12 13 the disks in the second set. The disks 10 and 12 are mounted upon the shaft 14 and the disks 11 and 13 upon the shaft 15. Within the set 10 11 the magnetic fields are arranged in such a manner that electromotive force is generated in the direction from the center of the disk 10 to the center of the disk 11. Within the set 12 13 the direction of the electromotive force is from the center of the disk 13 to the center of the disk 12. Using one of the shafts—for instance, 14—as conductor between the two groups a total electromotive force is generated in the direction from the center of the disk 13 to the center of the disk 11, and by means of sliding contacts 16 17 on the shaft 15 the generated electric current may be conducted to the places for its consumption. It may be observed that the part of the shaft 15 situated between the outer sets of disks must be insulated from the disks. It will be understood that instead of using the shaft 14 as conductor between the sets any suitable conductor which rotates with the disks may be employed.

Having now particularly described and ascertained the nature of the said invention and in what manner the same is to be performed, we declare that what we claim is—

1. In a dynamo-electric machine, the combination of two or more rotating disks, which are in contact with one another at or near the periphery, and magnetic fields, in which said disks rotate, so arranged that electromotive force is generated in the direction from the center of one disk to the center of another disk, substantially as described and for the purpose set forth.

2. In a dynamo-electric machine, the combination of two or more rotating disks, which are in contact with one another by means of their outer yielding rings, and magnetic fields, in which said disks rotate, so arranged, that electromotive force is generated in the direction from the center of one disk to the center of another disk, substantially as described and for the purpose set forth.

3. In a dynamo-electric machine the combination of two or more rotating disks, which are in contact with one another by means of their outer rifled rings, and magnetic fields, in which the disks rotate, so arranged, that electromotive force is generated in the direction from the center of one disk to the center of another disk, substantially as described and for the purpose set forth.

4. In a dynamo-electric machine the combination of two or more sets of rotating disks, which are in contact with one another at or near the periphery, magnetic fields, in which said disks rotate, so arranged, that the electromotive forces, generated within the several sets, are added, and a conductor between the sets of disks, rotating with the disks substantially as described and for the purpose set forth.

In testimony that we claim the foregoing as our invention we have signed our names in presence of two subscribing witnesses.

GUSTAF DALÉN.
ARTHUR HULTQVIST.

Witnesses:
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