

F. E. HIRT.
COMMUTATOR CONSTRUCTION.
APPLICATION FILED JAN. 30, 1909.

953,832.

Patented Apr. 5, 1910.

Fig. 1

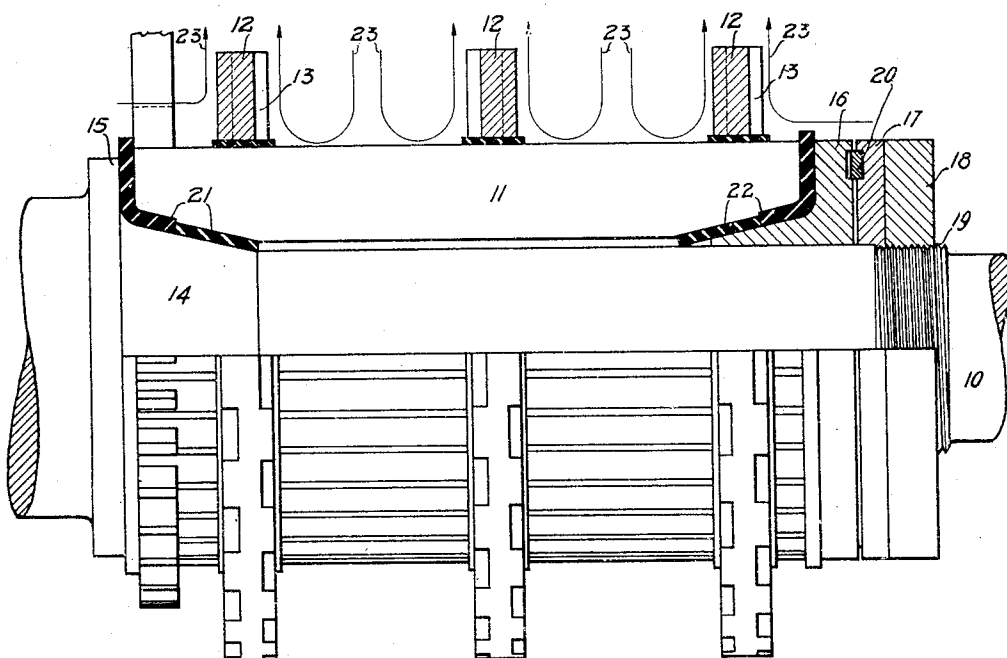
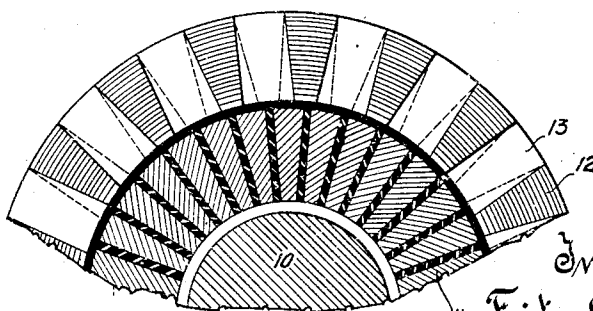


Fig. 2



Witnesses:

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UNITED STATES PATENT OFFICE.

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COMMUTATOR CONSTRUCTION.

953,832.

Specification of Letters Patent.

Patented Apr. 5, 1910.

Application filed January 30, 1909. Serial No. 475,227.

To all whom it may concern:

Be it known that I, FRITZ E. HIRT, a citizen of Switzerland, residing at Milwaukee, in the county of Milwaukee and State of Wisconsin, have invented certain new and useful Improvements in Commutator Construction, of which the following is a full, clear, and exact specification.

My invention relates to commutators of dynamo-electric machines and more particularly to means for reinforcing and cooling them.

In high speed dynamo-electric machines, the centrifugal forces developed are very large, and means for reinforcing the various rotating parts must generally be used. Thus it has been proposed to hold high speed commutators together by means of shrink rings. But when these machines are in action, there is also a very pronounced tendency to heat.

The main object of my invention is to provide means for cooling commutators of dynamo-electric machines, and this without the use of any additional parts and without interfering with the reinforcing action of the shrink-rings above referred to.

In carrying out my invention I provide slotted shrink-rings which act as fan vanes producing strong currents of air for cooling the commutator.

In the accompanying drawing, Figure 1 is a partial longitudinal sectional view of a commutator embodying my invention; and Fig. 2 is a transverse sectional view of the same commutator showing the relative positions of the slots in the shrink-rings.

A shaft 10 carries a commutator 11. The bars of the commutator 11 rest at one end on insulation 21 mounted on an inclined portion 14 of the shaft and against a flange 15. The other ends of the bars rest on insulation 22 mounted on an inclined or cone shaped seat 16 which is free to move, within small limits, longitudinally on the shaft. This seat, which supports one end of the commutator and centers the latter relatively to the shaft, is held in place by a collar 17 and nut 18, the latter of which engages the threaded portion 19 of the shaft. Interposed between the seat 16 and the collar 17 and seated in grooves therein, is a yielding split ring 20. The bars are surrounded by slotted or grooved shrink-rings 12, prefer-

ably made of some strong durable material such as nickel steel. Three rings which are well insulated from the bars are employed in this particular case, although a greater or less number may be used.

When the commutator rotates, the slotted shrink-rings act as fan vanes, causing a circulation of air currents adjacent the slotted rings outward through the slots and away from the commutator. These currents of air have a very material effect in keeping the commutator cool and this cooling effect increases with the speed. The directions of the currents of air are indicated by the arrows 23 in Fig. 1.

The slots 13, which extend across the sides of the shrink-rings and are preferably radial, are located at points circumferentially spaced alternately on opposite sides of the shrink-rings around the latter. With this arrangement of slots the strength of the shrink-rings is not materially decreased. It is further to be noted that the slots in adjacent sides of adjacent shrink-rings occur in pairs. Chief among the advantages of this latter arrangement is the directness of action, there being no tendency for the currents of air to eddy, which might occur if the corresponding slots were otherwise relatively located.

Many modifications may be made in the arrangement specifically shown and described, and I aim in the appended claims to cover all modifications of this invention which do not involve a departure from the spirit and scope of the same.

What I claim as new is:—

1. In the rotary member of a dynamo-electric machine, the combination of a commutator, and rings mounted on and insulated from said commutator, said rings being provided with slots or grooves.

2. In the rotary member of a dynamo-electric machine, the combination of a commutator, and shrink-rings mounted on and insulated from said commutator, said rings being provided with radial slots or grooves.

3. In the rotary member of a dynamo-electric machine, the combination of a commutator, and shrink-rings mounted on and insulated from said commutator, said rings being provided with slots or grooves located at points circumferentially spaced alternately on opposite sides of said rings.

4. In the rotary member of a dynamo-electric machine, the combination of a commutator, and shrink-rings mounted on and insulated from said commutator, said rings
5 being provided with pairs of slots or grooves occurring in adjacent sides of said rings.

5. In the rotary member of a dynamo-electric machine, the combination of a commutator, and slotted or grooved shrink-rings mounted on and insulated therefrom,
10 the slots or grooves of said shrink-rings being transverse and so arranged that a circulation of air over the commutator is caused.

15 6. In the rotary member of a dynamo-electric machine, the combination of a commutator, and steel shrink-rings mounted on and insulated therefrom, said rings being provided with radial slots or grooves.

20 7. In the rotary member of a dynamo-electric machine, the combination of a commutator, and shrink-rings mounted on and

insulated therefrom, said rings being provided with radial slots or grooves on one or both sides.

25 8. In the rotary member of a dynamo-electric machine, the combination of a commutator, and slotted or grooved shrink-rings surrounding said commutator and insulated therefrom, said slots or grooves extending across the sides of said shrink-rings.
30

9. In the rotary member of a dynamo-electric machine, the combination of a commutator, and rings with integrally formed fan-vanes in the sides of said rings mounted
35 on and insulated from said commutator.

Milwaukee, Wis., Jan. 20, 1909.

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

FRITZ E. HIRT.

Witnesses:

H. C. CASE,

CHAS. L. BYRON.