

(No Model.)

D. P. THOMSON & A. R. GORANSON.
COMMUTATOR.

No. 558,120.

Patented Apr. 14, 1896.

FIG-1-

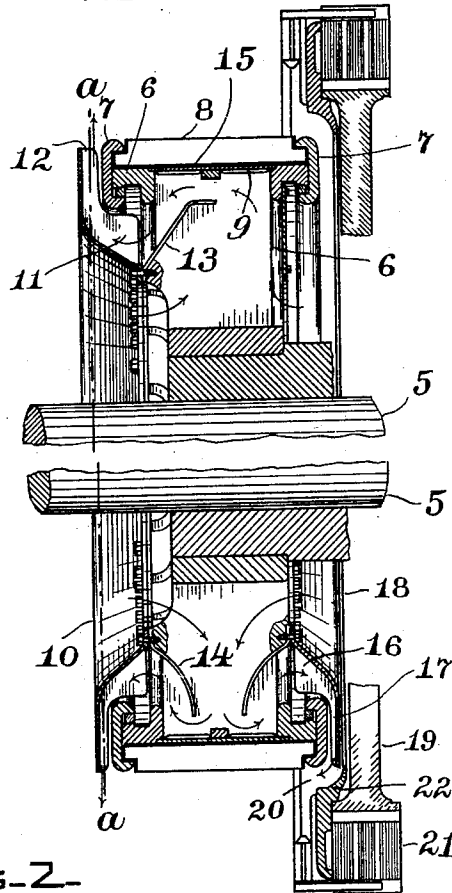
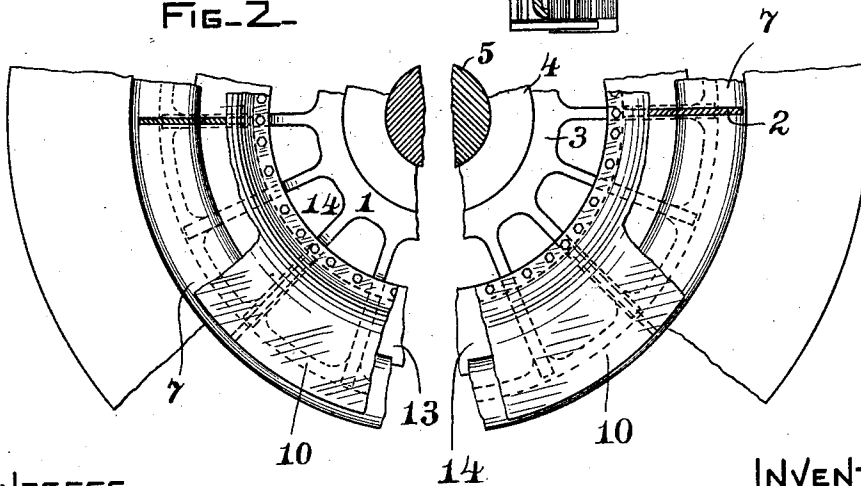


FIG-2-



WITNESSES-

R. D. Hill

A. Macdonald.

INVENTORS-

David P. Thomson
Alvin R. Goranson
By *Wm. R. Macdonald*
Att'y.

UNITED STATES PATENT OFFICE.

DAVID P. THOMSON AND ALEXIS R. GORANSON, OF SCHENECTADY, NEW YORK, ASSIGNORS TO THE GENERAL ELECTRIC COMPANY, OF NEW YORK.

COMMUTATOR.

SPECIFICATION forming part of Letters Patent No. 558,120, dated April 14, 1896.

Application filed December 19, 1895. Serial No. 572,654. (No model.)

To all whom it may concern:

Be it known that we, DAVID P. THOMSON, a citizen of the United States, and ALEXIS R. GORANSON, a subject of the King of Sweden and Norway, residing at Schenectady, in the county of Schenectady, State of New York, have invented certain new and useful Improvements in Commutators, (Case No. 298,) of which the following is a specification.

This invention broadly contemplates a commutator so constructed that it will by its revolution cause a circulation of air over the parts of the commutator which are apt to become heated and dissipate any warm air which may collect within the commutator.

In carrying out this invention the commutator is constructed with a radial fan-like arrangement and a circumferential air-chamber acting in conjunction with the preceding parts to maintain a forced circulation of air through the commutator.

Referring to the accompanying drawings, Figure 1 is an elevation in transverse section, with parts broken away, of a commutator constructed in accordance with this invention. Fig. 2 is a side view of a portion of a commutator constructed in accordance with this invention, with parts broken away, in vertical section on the line *a a* of Fig. 1.

The manner of carrying out this invention is set forth in the following-described structure. A radial fan-like structure 1 is provided, consisting of thin blades or fans 2, radiating from the ring 3, mounted on the block 4, secured to the shaft or axis 5. These fans 2 are located between the two circumferential rings 6, to which are clamped, by means of the clamping-rings 7, the commutator-bars 8. Mounted on the rings 6, between the commutator-bars 8 and said rings 6, is a circumferential strip of thin metal 9, riveted or otherwise secured to the fans 2. On one side of the commutator is located a circumferential air-chamber 10, communicating with the chambers formed between the fans 2 by means of air-passages 11 and with the outside of the commutator at a point in line with its periphery and at one side thereof by means of air-passages 12. In conjunction with the air-spaces formed between the fans 2 and the air-

passages 11 and 12 are employed deflectors 13, consisting of strips of sheet metal bent at a suitable angle and projecting at an angle into the chambers formed by the fans 2 and secured at one end between one of the rings 6 and the rear of the air-chamber 10.

In describing one form of construction of the commutator reference is had to the upper portion of Fig. 1, in which the deflectors 13, in conjunction with the air-passages 11 and 12, are used on the inside of the commutator. In further carrying out the construction it will be noticed that the structure forming the air-chamber 10 terminates at a little distance from the ring 3, leaving spaces 14, through which air is drawn into the chambers formed between the fans 2 from the outside. In the construction hitherto described as the commutator revolves the air is drawn into and through the chambers formed by the fans 2 from the outside, as indicated by the arrows, and is sucked or drawn out of said chambers over the deflectors 13 through the passages 11 and 12, the air-chamber serving, in conjunction with the fan, to maintain a forced circulation of air through the commutator and draw the air out, as above stated.

It will be seen that by means of the foregoing operation warm air tending to collect in the rear of and heat the commutator-bars will be dissipated and that the commutator-bars will be kept cool by the centrifugal action of the air caused by the revolution of the commutator. Ordinarily in the construction of a commutator a slight space is left between the circumferential strip of thin metal 9 and the commutator-bars 8. To avoid the collection of dust and oil in said space and to aid in dissipating any heat which may tend to be created on the inner surface of the commutator-bars, mica 15 or any other suitable insulating material is inserted between said strip 9 and the commutator-bars 8; but plate 9 and mica together may be omitted, if desired.

In another form of construction (shown in the lower portion of Fig. 1) curved deflectors 14 on both sides of the commutator are employed, projecting toward the periphery of the commutator, in conjunction with a second air-chamber 18 and air-passages 16 and 17 in said

second air-chamber 18. The air-chamber 18 is employed in conjunction with the air-chamber 10 and its air-passages 11 and 12. In this construction the air drawn out of the chambers between the fans 2 will be conducted on the inside of the commutator, or that side next to the arms 19 of the spider and adjacent to the leads 20, in proximity to the armature-winding 21, and over the leads 20, as indicated by the arrow, in a curved direction, by means of the curved deflecting portions 22, so that the air-currents will be carried across the top or outside portion of the commutator-bars 8 and cool the same.

It will thus be seen that in both instances warm air tending to collect in the chambers formed by the fans 2 would be dissipated and the inner portion or under side of the commutator-bars will be cooled, and in the instance just described not only will these results be accomplished, but also the outside of the commutator-bars 8 will be kept cool.

By means of this invention commutators of small size may be employed, since, because the surfaces which ordinarily become heated are kept cool, a large radiating-surface is not required. By means of this invention also there is embodied in the structure of the commutator itself provision for keeping the commutator cool with as great effect as if an outside blower were used.

If desired, the deflectors 13 may be dispensed with, as they are not absolutely essential, and the construction and arrangement of the parts may be varied from that set forth without departing from the essential features of the invention.

What we claim as new, and desire to secure by Letters Patent of the United States, is—

1. An automatic ventilating-commutator, formed with an internal radial fan, and a circumferential air-chamber having air-passages leading from the inside to the outside of the commutator, said air-chamber and fan serving

to maintain a forced circulation of air through the commutator.

2. An automatic ventilating-commutator constructed with a radial fan and air-passages leading from the interior of the commutator to the exterior thereof adjacent to its periphery, whereby a forced circulation of air is maintained through the commutator.

3. An automatic ventilating-commutator constructed with a radial fan, air-passages, deflectors and an annular chamber having outlets for the air at a point above the interior of the commutator.

4. An automatic ventilating-commutator constructed with a radial fan and air-passages, and means in conjunction with the fan for maintaining a forced circulation of air through and drawing air out of the commutator and over the commutator-bars, substantially as set forth.

5. An automatic ventilating-commutator comprising in its construction a ventilating-fan and an annular chamber serving to maintain a forced circulation through and draw the air out of the commutator.

6. An automatic ventilating-commutator constructed with plates radiating from the axis of the commutator, forming air-chambers, and serving as a fan, deflectors projecting into said air-chambers, air-passages leading into said chambers, and out of said chambers over the deflectors, and a circumferential air-chamber construction, substantially as set forth, for maintaining a forced circulation of air through and, in conjunction with the fan, drawing the air out of the commutator.

In witness whereof we have hereunto set our hands this 14th day of December, 1895.

DAVID P. THOMSON.
ALEXIS R. GORANSON.

Witnesses:

B. B. HULL,
GENEVIEVE HAYNES.