

No. 678,171.

Patented July 9, 1901.

H. GEISENHÖNER.
COMMUTATOR FOR ELECTRIC MACHINES.

(Application filed Apr. 27, 1901.)

(No Model.)

Fig. 1.

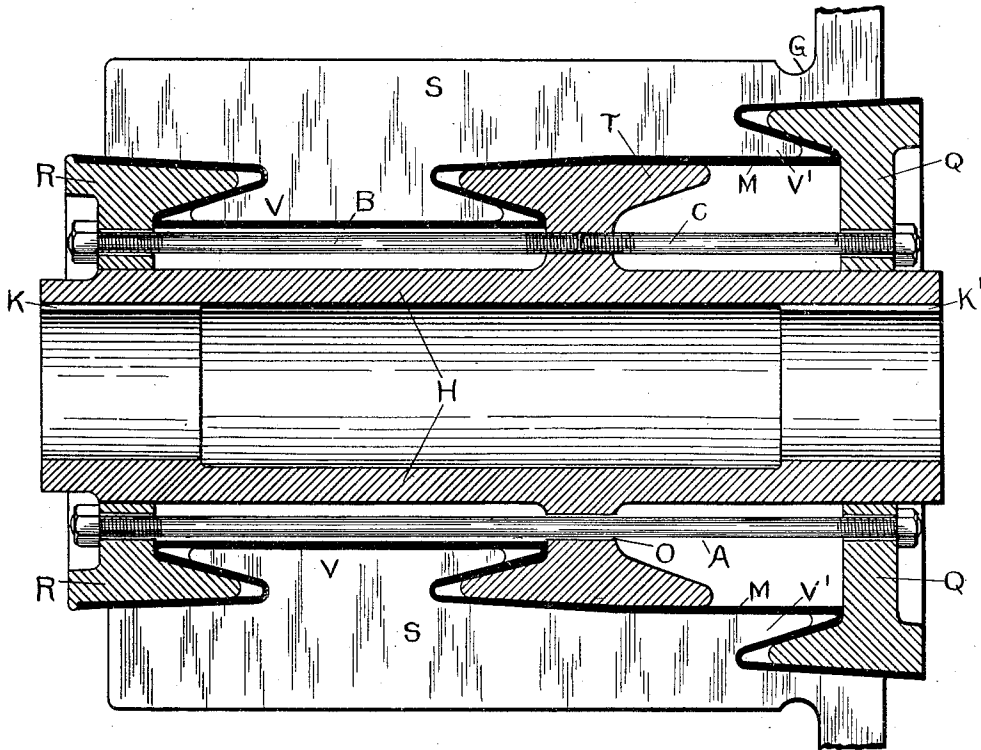
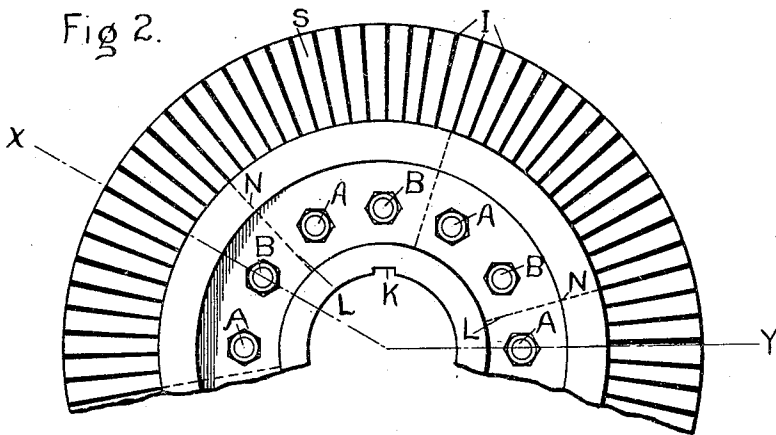


Fig 2.



Witnesses:

Art. C. Chapman
Benjamin B. Hill

Inventor

Henry Geisenhöner.

by *Albert H. Davis*
Atty.

UNITED STATES PATENT OFFICE.

HENRY GEISENHÖNER, OF SCHENECTADY, NEW YORK, ASSIGNOR TO THE
GENERAL ELECTRIC COMPANY, OF NEW YORK.

COMMUTATOR FOR ELECTRIC MACHINES.

SPECIFICATION forming part of Letters Patent No. 678,171, dated July 9, 1901.

Application filed April 27, 1901. Serial No. 57,671. (No model.)

To all whom it may concern:

Be it known that I, HENRY GEISENHÖNER, a citizen of the United States, residing at Schenectady, county of Schenectady, State of New York, have invented certain new and useful Improvements in Commutators for Electric Machines, (Case No. 1,857,) of which the following is a specification.

This invention relates to commutators for electric machines; and it consists in an improved means for securing and supporting the commutator-segments.

Commutator-segments have hitherto been held in place between a separate clamping-ring at one end of the support or shell and an adjustable clamping-ring at the other end of the support. This means is generally adequate when the segments do not exceed twelve or fourteen inches in length, although at about the maximum of such lengths if the commutator is rotated at a very great speed its operation is not absolutely reliable. In a commutator where the segments are of greater length—sometimes as long as thirty inches—and especially when the commutator is rotated at a high rate of speed, it frequently happens that the central unsupported portions of the segments are caused by centrifugal force to bulge outwardly, so that not only are the segments bent out of shape, but the insulation is strained and may eventually be impaired to such extent as to cause short-circuiting of the segments. In any commutator it is very desirable that the segments should not be permanently secured in place, but that they should be adjustable as occasion may require. Furthermore, in order that they may be adjusted after the commutator has been placed in position on its machine it is necessary that the adjusting means shall be operative from the outer end of the commutator. This result is easily obtained when there are two clamping-rings, one at each end of the commutator; but the problem presented here is to prevent bulging and at the same time to provide means for adjusting the clamping-rings from the outer end of the commutator.

The problem has been solved by this invention in the following manner: The segment support or shell which is to be mounted upon

an armature-shaft is provided with a stationary clamping-ring, either cast integral with or fixed to the support. A plurality of independent clamping-rings are adjustably mounted on the support and are adjusted with respect to the stationary clamping-ring by means of bolts which extend freely through any ring or rings other than the one which they are designed to adjust. This improved feature of the invention may be applied in other embodiments than the one herein illustrated; but the latter is a clear disclosure of the manner in which the invention can be employed in practice.

I believe that I am the first to provide a locking means for intermediate portions of the commutator-bars in combination with means for adjusting the clamping-rings with respect to such locking means.

In accordance with the form of the invention shown herein the stationary clamping-ring is the one which is located intermediate the ends of the support; but this ring may be located in any other desired place. Such ring serves to prevent the intermediate portions of the segments from being forced outwardly when the commutator is rotated. This ring also serves as a support for the segments of greater length to prevent sagging of the intermediate portions, so that the entire commutator is thus strengthened. The outer surface of the central, or rather the intermediate, ring is made of considerable length along the axis of the commutator for the purpose of supporting the segments and strengthening the entire structure.

Of the drawings, Figure 1 is a longitudinal section of one form of commutator constructed in accordance with the invention, taken along the line X Y of Fig. 2; and Fig. 2 is a partial end elevation of the same.

The support or shell H, as shown, is provided with an integral clamping-ring T, which is of course stationary with respect to the main support. On opposite sides of this stationary ring are adjustably mounted the independent clamping-rings R and Q, which are machined to fit the periphery of the support H and adapted to be moved longitudinally of the same. All three clamping-rings are provided with the customary beveled

edges. Furthermore, in accordance with the patent to Edison, No. 438,302, the segments S are separated by insulation M from the contact-rings and by insulation I from each other.

5 The outer end of the commutator is at the left, and the right-hand portion of the commutator, as shown in Fig. 1, is next to the armature-winding, the segments S being provided with the circumferential groove G for

10 the attachment of the leads in accordance with the patent to Potter, No. 608,299. A plurality of bolts A secure the adjustable clamping-rings R and Q together. These bolts pass freely through the perforation O in the stationary ring T and are arranged at intervals

15 entirely around the axis of the commutator, as shown in Fig. 2. Between each two of these bolts A around the commutator-axis and connecting the adjustable ring R with the stationary ring T are bolts B, which are seated in

20 the stationary clamping-ring T. After the segments S, which are beveled to form portions V and V', in accordance with the beveled edges of the three clamping-rings, are put in

25 place the bolts B are operated to clamp the portions V of the segments between the stationary ring T and the movable ring R. As will readily be seen, the bolts B are accessible from the left at the outer end of the commu-

30 tator, although at this stage of the manufacture the commutator is not assembled with the machine. Next the bolts A are operated to draw the adjustable ring Q toward the adjustable ring R, and therefore toward the

35 stationary ring T, to which the ring R is rigidly connected by means of the bolts B. As the commutator is not yet mounted on its machine, these bolts A may at this time be operated from either end of the support.

40 Short bolts C, seated in the stationary ring T and extending to the right-hand end of the support, may be provided, and by these bolts the ring Q may be secured more firmly in the position to which it has been moved by the

45 operation of the bolts A before the commutator has been placed on its machine. The entire commutator is now baked in order to season the insulation, and as this process results in considerable contraction the bolts B,

50 A, and C are again operated in turn to secure the segments in position before the commutator is mounted on its armature-shaft. Subsequently at any desired time the bolts B and

55 A can be operated, respectively, from the outer end of the commutator to adjust the collars independently if they become loose. It will be seen that the beveled intermediate ring by its engagement with the beveled edge V of the segment S prevents the intermediate

60 portion of the segment from bulging outwardly owing to centrifugal force when the commutator is rotated rapidly. The outer surface of the ring has a considerable extent of surface along the axis of the commutator

65 in order to strengthen the series of segments at their weakest points. Keyways K are provided, as usual. If desired, the clamping-

ring R may be composed of sections, as indicated by the dotted lines LN of Fig. 2, whereby a portion of the ring may be removed to take

70 out one or more commutator-segments which may be injured without removing the entire ring R and disturbing the entire adjustment. It is preferable that each section should be provided with a bolt A and a bolt B in order

75 that each section can be adjusted with respect to both the ring T and the ring Q.

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

1. In a commutator, the combination with

80 the support and segments, of a clamping-ring which is stationary with respect to the support, two adjustable clamping-rings, and means for adjusting both of said rings toward the stationary ring from the outer end of the

85 support.

2. In a commutator, the combination with the support and segments, of a clamping-ring which is stationary with respect to the support, two adjustable clamping-rings, and

90 means for adjusting each of said rings independently with respect to the stationary ring from the outer end of the support.

3. In a commutator, the combination with the support and segments, of a clamping-ring

95 intermediate the ends of the support and stationary with respect thereto, two clamping-rings adjustably mounted on the support on opposite sides of the stationary clamping-ring, means for adjusting one of said rings

100 toward the stationary ring from the outer end of the support, and means for adjusting the other ring toward the stationary ring from the same end of the support.

4. In a commutator, the combination with

105 the support and segments, of a clamping-ring intermediate the ends of the support and stationary with respect thereto, two clamping-rings adjustably mounted on the support on opposite sides of the stationary ring, and

110 means operative from the outer end of the support for adjusting both clamping-rings toward the intermediate stationary ring.

5. In a commutator, the combination with a support provided with a stationary beveled

115 clamping-ring intermediate its ends, of segments, each of which has three beveled edges, the central one of which is engaged by the stationary ring, two beveled clamping-rings adjustably mounted on the support on oppo-

120 site sides of the stationary ring, to engage the corresponding beveled edges of the segments, and means operative at the outer end of the support for adjusting both adjustable rings toward the stationary ring.

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6. In a commutator, the combination with a support provided with a stationary clamping-ring intermediate its ends, of segments,

130 two clamping-rings adjustably mounted on the support on opposite sides of the stationary ring, bolts connecting the two adjustable rings, and bolts connecting an adjustable ring with the stationary ring.

7. In a commutator, the combination with

a support provided with a stationary clamping-ring intermediate its ends, of two clamping-rings adjustably mounted on the support on opposite sides of the stationary ring, bolts connecting the two adjustable rings, and bolts connecting one adjustable ring with the stationary ring, said bolts being located alternately around the axis of the commutator.

8. In a commutator, the combination with a support provided intermediate its ends with a continuous annular beveled clamping-ring having a broad outer surface, of two beveled clamping-rings adjustably mounted on the support on opposite sides of the stationary ring, and correspondingly-beveled commutator-segments, the broad outer surface of the stationary ring serving to support the intermediate portions of said segments.

9. In a commutator, the combination with a support provided with a stationary clamping-ring, of a plurality of clamping-rings adjustably mounted on the support, and means operative at the outer end of the commutator for adjusting all said adjustable rings toward the stationary ring.

10. In a commutator, the combination with a support provided with a stationary clamping-ring, of a plurality of clamping-rings adjustably mounted on the support, and adjusting-bolts which pass freely through a ring other than the one which they are designed to adjust.

11. In a commutator, the combination with the support and segments, of rings on the support for clamping the ends of the segments, and a continuous annular ring formed integral with the support for holding the intermediate portions of the segments rigidly in place.

12. In a commutator, the combination with the support and beveled segments, of rings for clamping the ends of the segments, and a continuous annular beveled ring intermediate said rings, which engages with the beveled segments to prevent their intermediate portions from bulging outwardly.

13. In a commutator, the combination with the support and segments, of a ring integral with the support and intermediate its ends, which ring is interlocked with said segments to prevent the latter from bulging outwardly.

14. In a commutator, the combination with the support and segments, of clamping-rings for the ends of the segments, means for preventing bulging of the intermediate portions of segments, and means for adjusting the clamping-rings with respect to said means.

In witness whereof I have hereunto set my hand this 25th day of April, 1901.

HENRY GEISENHÖNER.

Witnesses:

BENJAMIN B. HULL,
MARGARET E. WOOLLEY.