

H. M. SCHEIBE.
COMMUTATOR.
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1,241,559.

Patented Oct. 2, 1917.

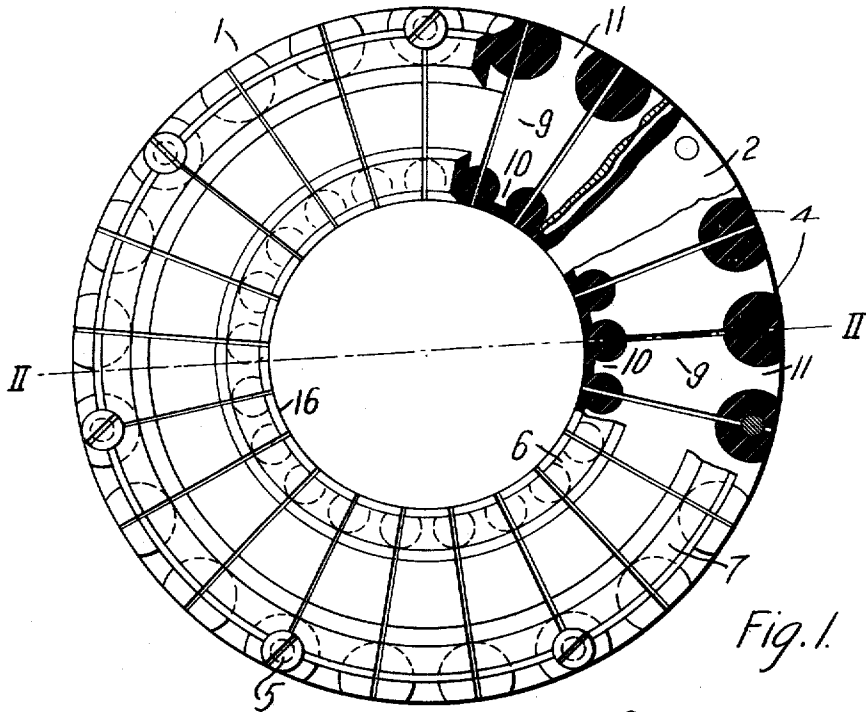


Fig. 1.

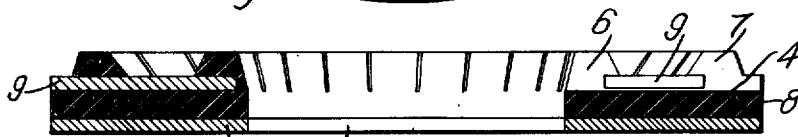


Fig. 2.

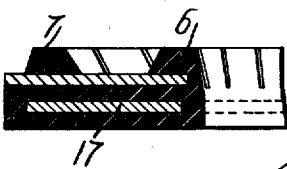


Fig. 4.

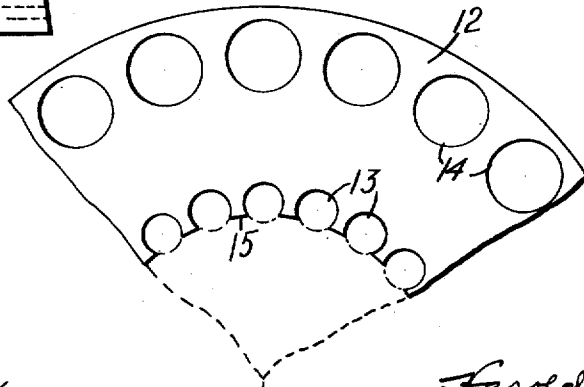


Fig. 3.

WITNESSES:
Fred. A. Lind.
J. P. Langley.

INVENTOR
Harold M. Scheibe
BY
W. H. S. Carr
ATTORNEY

UNITED STATES PATENT OFFICE.

HAROLD M. SCHEIBE, OF SOMERVILLE, MASSACHUSETTS, ASSIGNOR TO WESTINGHOUSE ELECTRIC AND MANUFACTURING COMPANY, A CORPORATION OF PENNSYLVANIA.

COMMUTATOR.

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To all whom it may concern:

Be it known that I, HAROLD M. SCHEIBE, a citizen of the United States, and a resident of Somerville, in the county of Middlesex and State of Massachusetts, have invented a new and useful Improvement in Commutators, of which the following is a specification.

My invention relates to commutators for dynamo-electric machines, and it has particular reference to commutators of the radial type.

My invention has for one of its objects to provide a device of the above indicated character which is simple and durable in construction and effective in operation.

A second object of my invention is to provide a simple method of constructing a commutator of the radial type which possesses important advantages over methods heretofore in use.

In the construction of commutators, it has been customary to shape the individual bars of copper before assembling and then to fasten them together by suitable mechanical means.

I propose to prepare a disk of copper and then cover the same with a suitable thickness of insulating material. The mass is shaped, as desired, by machine tools and the copper disk is cut into radial segments while embedded in the insulating material. The insulating material serves as the supporting structure or frame of the commutator.

It may be desirable to reinforce the body of insulating material and this may be accomplished by an embedded metal plate, for example, of steel, which is separated from the commutator segments by a suitable thickness of insulating material.

The details of my invention will be described in connection with the accompanying drawings in which Figure 1 is an end view, partially in section and partially in elevation, of a commutator constructed in accordance with my invention. Fig. 2 is a view in section on line II—II of Fig. 1. Fig. 3 is a fragmentary view of a copper disk. Fig. 4 is a view in section of a portion of a commutator in which a reinforcing plate is employed.

Referring particularly to Figs. 1 and 2, a commutator 1 comprises a circular base plate

2 of a suitable metal and provided with a circular opening 3 for the shaft of a dynamo-electric machine (not shown). A ring 4, of insulating material is attached to the plate 2, by suitable screws 5, or is molded thereon and is provided, upon its outer side, with integral flanges 6 and 7 which are near the inner and outer circumferences, respectively, of the ring 4.

Tapered copper bars 9, which are spaced apart and extend radially from the axis of the commutator, are held between the flanges 6 and 7 and the body portion 8 of the insulating material. The bars 9 are provided, at their respective inner and outer ends, with reduced portions 10 and 11 which lie between substantially cylindrical portions of insulating material that connect the flanges 6 and 7 to the body portion 8. The inner ends of the bars 9 are covered by the flange 6. The reduced outer portions 11 of the bars 9 are also bridged over by the flange 7 and their extremities are flush with the outer periphery of the commutator and furnish a convenient means for attaching the terminals of armature coils.

One method of constructing the commutator will now be described in detail. The insulating material may be that known to the trade as micarta which is composed of layers of fabric, such as paper, cloth or fibrous material, and a liquid adhesive material which is preferably that known as bakelite. It is also feasible to use molded material provided its composition and qualities are such as to adapt it for this particular use. If paper be used, it is first coated on one side with liquid binding material and then dried, after which it is cut into sheets of any desired size.

In the construction of the commutator, the prepared sheets of fabric are cut larger than the finished commutator. The sheets are placed with the untreated side next to the treated side of the adjacent sheet until a plate is built up to the required thickness to form the body portion 8 of the commutator. A circular copper plate 12, Fig. 3, which has been provided with two concentric sets of holes 13 and 14, is provided with a concentric central opening 15 which intersects the inner holes 13. The copper plate 12 is then placed upon the built-up sheets of

paper, and the holes 13 and 14 and the opening 15 are filled with disks of treated paper. Sheets of paper are then placed on the copper plate until the number is sufficient to produce the required thickness. If a reinforcing plate 17, such as is shown in Fig. 4, be employed, it will be added at such a point in the building-up process that it is properly located in the finished product.

The whole mass is then placed in a hydraulic press and heated while under a high degree of pressure. The resulting product is a hard, compact, cylindrical mass of insoluble and infusible insulating material in which the copper plate is firmly embedded. The insulating material thus formed has great tensile strength and can be turned, bored and drilled in the same manner as wood.

If molded insulating material is employed, the process will be correspondingly modified, but similar results may be secured by utilizing a suitable mold.

The disk is then placed in a suitable machine tool and provided with a circular opening 16. The outside periphery of the insulating material and the copper disk are reduced to the circumference illustrated in Figs. 1 and 2. The flanges 6 and 7 are also formed, the insulating material between the flanges being cut away to expose the copper disk and thereby provide a bearing surface for co-acting brushes. The commutator segments 9 are formed with a saw or suitable tool by cutting through the flanges 6 and 7 and the disk 12. The saw-cuts produce the effect of deep undercutting between the bars. However, if desired, the interstices may be wholly or partially filled with a suitable cement.

From the above description, it will be noted that I have provided a simple and convenient method of assembling the component parts of a commutator and that the use of mica or other expensive insulating materials has been avoided. The structure is practically integral, thereby insuring that vibration or shock cannot loosen the several segments. The manner of machining the commutator insures that the faces of the bars will lie in the same plane and that they will be evenly spaced.

It is understood that such changes and modifications may be made in my invention as fall within the scope of the appended claims.

I claim as my invention:

1. A commutator comprising a disk-shaped supporting member of insulating material having a plurality of annular flanges disposed thereon, and a plurality of radially disposed conducting segments having their end portions embedded in the said flanges.

2. A commutator comprising a disk-

shaped supporting member of insulating material having a plurality of concentric annular flanges disposed thereon, and a plurality of radially disposed conducting segments having reduced end portions, said reduced portions being embedded in the said flanges.

3. A commutator comprising an annular disk-shaped supporting member of insulating material having a plurality of concentric flanges disposed thereon and a plurality of radially disposed conducting segments having their end portions embedded in the said flanges.

4. A commutator comprising an annular disk-shaped supporting member of insulating material having concentric flanges disposed adjacent to the inner and outer peripheries thereof, and a plurality of radially disposed conducting segments having reduced end portions, said reduced portions being embedded in the said flanges.

5. A commutator comprising a body member of insulating material, and a plurality of metal segments having reduced end portions, said reduced portions being wholly embedded in said body member.

6. A commutator cylinder comprising a disk-shaped body member of insulating material, a disk-shaped reinforcing member embedded in said material and a plurality of metal segments rigidly retained by said body member.

7. A commutator cylinder comprising an annular disk-shaped body member of insulating material, an annular metal plate embedded in said insulating material, and a plurality of metal segments rigidly retained by said body member.

8. A commutator comprising a plurality of radially disposed conducting segments having reduced portions, and a disk-shaped supporting member of insulating material in which said reduced portions are completely embedded.

9. A commutator comprising a plurality of radially disposed conducting segments, and a supporting member of insulating material, said member having a flange integral therewith in which portions of said segments are completely embedded.

10. The method of constructing a commutator which consists in embedding a metal plate in insulating material and then subdividing said plate to form segments.

11. The method of constructing a commutator which consists in covering a metal disk with insulating material, cutting away a portion of said insulating material and then cutting said disk into radial segments.

12. The method of constructing a commutator which consists in embedding a metal disk in paper and adhesive material, heating and pressing the same, cutting away a portion of said structure, and then subdividing said disk to form segments.

13. A commutator comprising a disk-shaped body member of insulating material, a metal plate embedded in said material and a plurality of radially arranged conducting plates embedded in said body member, the said metal plate and the said conducting plates being disposed in parallel planes.

In testimony whereof, I have hereunto subscribed my name this 24th day of December, 1913.

HAROLD M. SCHEIBE.

Witnesses:

N. B. HOWARD,
L. O. FRANCIS.