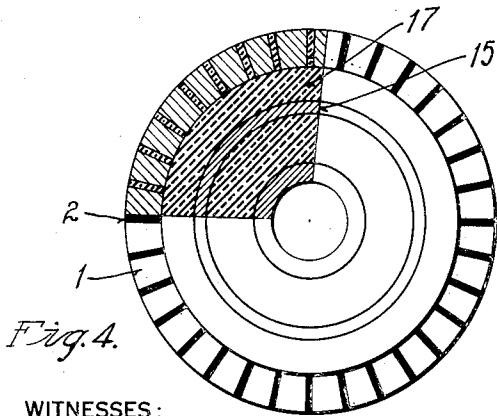
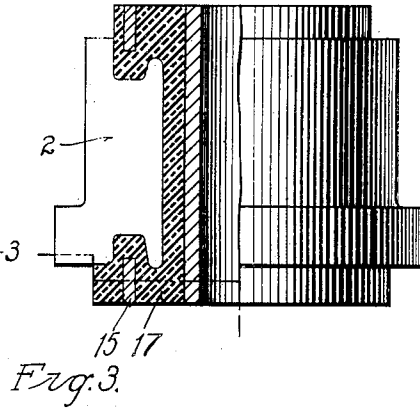
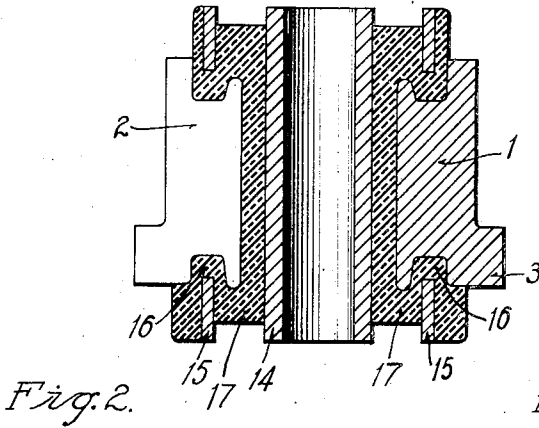
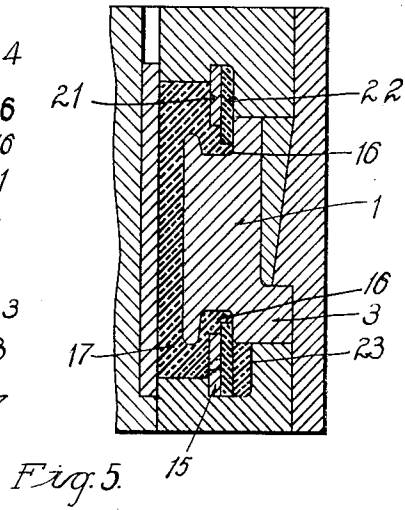
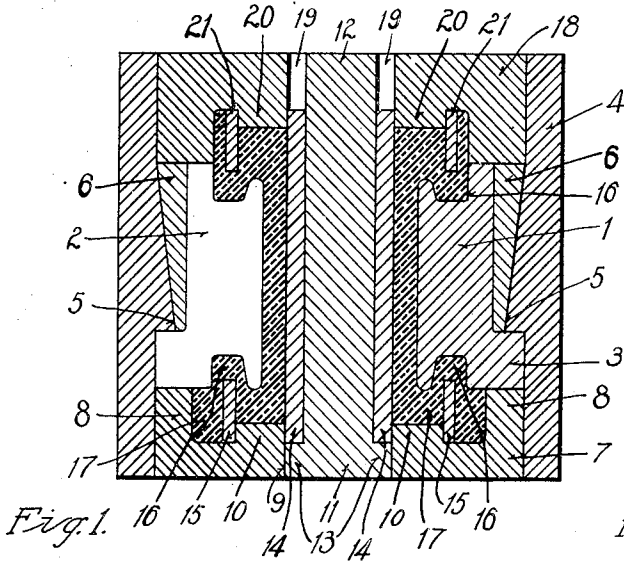


W. H. KEMPTON.
MOLDED COMMUTATOR CYLINDER.
APPLICATION FILED FEB. 3, 1915.

1,284,362.

Patented Nov. 12, 1918.



WITNESSES:

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MOLDED COMMUTATOR-CYLINDER.

1,284,362.

Specification of Letters Patent.

Patented Nov. 12, 1918.

Application filed February 3, 1915. Serial No. 5,899.

To all whom it may concern:

Be it known that I, WILLARD H. KEMPTON, a citizen of the United States, and a resident of Wilksburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Molded Commutator-Cylinders, of which the following is a specification.

My invention relates broadly to composite machine elements and specifically to commutator cylinders for dynamo-electric machines having segment-supporting bodies of molded insulating material.

The principal object of my invention is to provide a commutator cylinder that shall be simple and inexpensive in construction and possessed of sufficient strength and durability to permit operation thereof at high peripheral speeds without danger of short circuits between commutator segments.

Commutator cylinders, as heretofore constructed, with the well known arrangement of V-rings, sleeves and bushings, have been found unsuitable for use in connection with dynamo-electric machines of small capacity operating at high speeds, such as are employed in automobile starting and lighting equipments. Commutator cylinders so constructed are expensive and difficult to manufacture and, furthermore, are liable to complete failure or displacement of the conducting segments because of inability to withstand the severe centrifugal stresses developed at high peripheral speeds.

By my invention, I propose to manufacture a commutator cylinder having a body of molded insulating material in such manner that the assembled conducting and insulating sections, together with the body, constitute a substantially unitary structure. For commutator cylinders of relatively large diameter, I further propose to increase the strength and durability thereof by the use of reinforcing rings composed of material having a relatively high tensile strength embedded in the insulation.

In the accompanying drawings, Figure 1 is a longitudinal sectional view of a mold for use in the manufacture of commutator cylinders according to my invention, with the parts contained therein; Fig. 2 is a longitudinal sectional view of a commutator cylinder after it has been removed from the mold; Fig. 3 is a view, partially in section and partially in side elevation, of the com-

pleted commutator cylinder; Fig. 4 is a view, partially in section and partially in end elevation, of the commutator cylinder shown in Fig. 3; and Fig. 5 is a fragmentary sectional view of the mold shown in Fig. 1, but indicating a modification in the commutator-cylinder structure.

In forming a commutator cylinder in accordance with my invention, a number of conducting segments 1 are assembled with alternate insulating sections 2 to form a cylinder. The several conducting segments 1 are of substantially H-shape and are provided, at one end, with neck portions 3. The mold comprises a hollow cylindrical holder 4 provided, intermediate the ends thereof, with an inclined projecting portion, thereby forming an inverted cone shape seat 5, so that, when the assembled conducting and insulating sections 1 and 2 are disposed within the lower end of the holder 4; the neck portions 3 will bear against the shoulder formed by the seat 5. A wedge shaped ring 6, the inner diameter of which is substantially equal to the outer diameter of the assembled cylinder, is then forced into engagement with the cone shaped seat 5 to effectually prevent any displacement of the commutator sections 1 and 2. In this way the assembled commutator cylinder is maintained in a position intermediate the ends of the holder 4. A cup shaped pressure plate 7 disposed within the lower end of the holder 4 is provided with an upwardly projecting wall portion 8 adapted to engage the neck portions 3 of the cylinder. The pressure plate 7 is further provided with a central opening 9 and an annular projection 10 surrounding the opening, the purpose of which will be hereinafter set forth. A vertical cylindrical core member 11, of substantially the same length as the holder 4, is adapted to fit closely within the opening 9 and is provided with a portion 12 of reduced diameter, thereby forming a shoulder 13 adjacent to the annular projection 10. A sleeve 14 of the same outside diameter as the large end of the core member 11 is slipped over the reduced portion 12 so that the lower end thereof is supported by the shoulder 13.

In carrying out the process of molding, the parts are assembled as described above and, when the commutator cylinder is of such proportions as to require reinforce-

ment, a metal strengthening ring 15 is placed upon the annular projection 10 before the pressure plate 7 is placed within the mold. The ring 15 is so proportioned as to project into the annular groove 16 formed by the assembled H-shaped segments 1 and 2. The mold is then filled with a suitable insulating material 17, such as bakelite in a fusible condition, after which a second cup shaped pressure plate 18 is placed within the upper portion of the holder 4. The plate 18 is provided with a central opening 19 and an annular projection 20 adapted to carry a ring 21 similar to the ring 15. The quantity of insulating material 17 placed within the mold causes the pressure plates 15 and 18 to project slightly beyond the ends of the holder in order to allow for consequent compression of the material. The ring 6 maintains the commutator cylinder in its proper position at all times. Pressure and heat are simultaneously applied to the mold, and the insulating material 17, by reason of its plasticity, first completely fills all of the previously unoccupied space within the mold and finally forms a compact and homogeneous body partially surrounding the assembled conducting and insulating segments 1 and 2. The commutator cylinder is then withdrawn from the mold, and the projecting portions of the sleeve 14 and of the strengthening rings 15 and 21, as shown in Fig. 2, are then removed by machining or in any other suitable manner.

A modification of my invention is shown in Fig. 5 wherein rings 22 and 23 composed of insulating material of relatively great tensile strength, such, for example, as laminated material comprising layers of paper or other fabric and a resinous binder manufactured in accordance with Patent No. 858,385 granted to Emil Haefely or by a substantially equivalent method and generally known by the trade name "micarta", which may be easily machined, are placed within the mold in such position as to project into the annular grooves 16 in order to prevent short circuiting of the conducting segments by distortion of the reinforcing rings 15 and 21, or the metal rings may be omitted when the tensile strength of the rings 22 and 23 is great enough to withstand the centrifugal stresses that may be developed within the commutator cylinder. When the metal rings 15 and 21 are employed, they are preferably so disposed as to be located within the rings 22 and 23 in order to cooperate therewith as strengthening means for the molded material 17.

The completed commutator cylinder is strong and durable by reason of its substantially unitary construction, and the possibility of any displacement of the conducting segments resulting in the formation of "high bars" is practically eliminated. When

a commutator cylinder is formed without reinforcement, the strength of the cylinder is limited by the tensile strength of a section of the molded insulation through a diameter of the cylinder. This area is necessarily small but, with the metal reinforcing rings molded into place, it becomes impossible for the commutator cylinder to fall without first breaking or distorting the rings, the tensile strength of which is many times that of the molded insulation.

While I have shown my invention in a simple and preferred form and as adapted for a specific use, it is not so limited but is susceptible of various modifications of structure and service adaptations within the scope of the appended claims.

I claim as my invention:

1. A composite element comprising bodies of conducting material, a body of molded insulating material for holding said bodies in place and a non-conducting reinforcing member of relatively great tensile strength embedded therein.

2. A composite element comprising bodies of conducting material held in place by a body of heat-hardened resinous condensation product, and a non-conducting reinforcing ring of relatively great tensile strength embedded therein.

3. A commutator member comprising metal commutator bars, a body of heat-hardened resinous condensation product serving to hold said bars in place and a non-conducting reinforcing member embedded in said heat-hardened condensation product.

4. A commutator member comprising a plurality of conducting and insulating sections alternately disposed to constitute a hollow structure, a body of molded insulating material disposed within said structure, and a non-conducting strengthening ring of relatively great tensile strength embedded in said molded insulating material.

5. A commutator member comprising a plurality of conducting and insulating sections alternately disposed to constitute a hollow cylinder, a sleeve centrally located within said cylinder, a body of molded insulating material disposed between said sleeve and said cylinder, and a non-conducting strengthening ring of relatively great tensile strength embedded in said molded insulating material and in engagement with said conducting sections.

6. A commutator structure comprising a plurality of conducting and insulating sections alternately disposed to constitute a hollow cylinder, the said sections being provided with aligned notches to form an annular groove, a body of molded insulating material located within said cylinder, and a strengthening ring of non-conducting material embedded in said molded insulating material and extending into said groove.

7. A composite element comprising insulated bodies of conducting material, a body of heat-hardened resinous condensation product for holding said bodies in position, 5 embedded rings of insulating material of relatively great tensile strength and embedded reinforcing rings of metal.

8. A composite element comprising insulated bodies of conducting material, a body 10 of heat-hardened resinous condensation product for holding said bodies in position, an embedded strengthening ring composed of insulating material of relatively great tensile strength and a metal reinforcing ring 15 also embedded in said heat-hardened body and located within said insulating ring.

9. A commutator structure comprising a plurality of conducting and insulating sections alternately disposed to constitute a hollow cylinder, a sleeve centrally located within said cylinder, a body of molded insulating material between said sleeve and said cylinder, a ring of insulating material of rela-

tively great tensile strength embedded in said molded insulating material, and a metal 25 ring serving to reinforce said insulating ring.

10. A commutator structure comprising a plurality of conducting and insulating sections alternately disposed to constitute a hollow cylinder, a sleeve centrally located within said cylinder, a body of molded insulating material between said sleeve and said cylinder, insulating rings of relatively great tensile strength embedded in said molded insulating material at the respective ends of 35 the said cylinder and metal rings located within, and serving to reinforce, said insulating rings.

In testimony whereof, I have hereunto 40 subscribed my name this 29th day of Jan. 1915.

WILLARD H. KEMPTON.

Witnesses:

GOLDIE E. MCGEE,
B. B. HINES.