C. ZENK.

COMMUTATOR.

APPLICATION FILED MAY 21, 1912.

1,046,928. Patented Dec. 10, 1912.

Fig. 1.

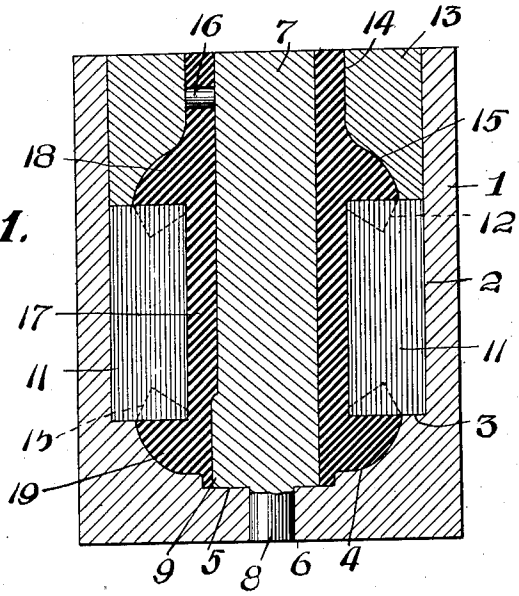


Fig. 2.

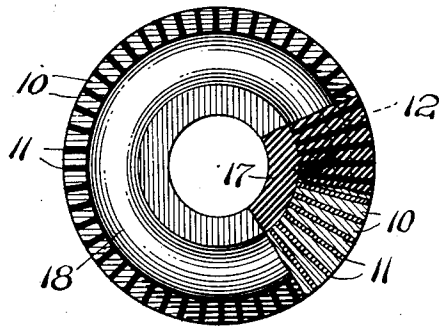


Fig. 3.

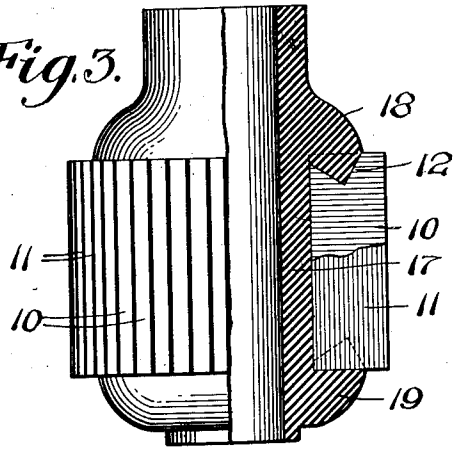


Fig. 4.

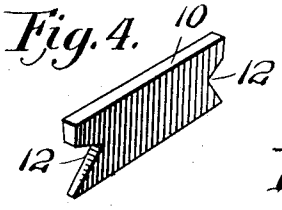


Fig. 5.

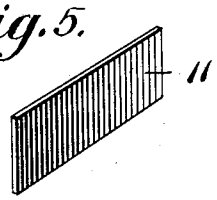
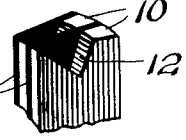


Fig. 6.



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COMMUTATOR.

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To all whom it may concern:

Be it known that I, CHARLES ZENK, a citizen of the United States of America, residing at Wilkinsburg, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Commutators, of which the following is a specification, reference being had therein to the accompanying drawing.

This invention relates to commutators, and my invention aims to provide, first, a high voltage commutator that has a molded body supporting the insulated commutator bars; second, a commutator comprising a body, bars and insulation, all of which are capable of standing a high ground test and are not susceptible to heat, consequently the insulation and bars are not loosened when an armature is overheated; third, a commutator construction that eliminates short circuits that heretofore have been caused by the interior of the commutator not being properly cleaned when turned or machined.

My invention further aims to accomplish the above and such other objects as may hereinafter appear by a mechanical construction that is durable and highly efficient for the purposes for which it is intended.

My invention will be hereinafter specifically described and then claimed, and reference will now be had to the drawing, wherein:—

Figure 1 is a vertical sectional view of one form of mold in which a commutator in accordance with this invention can be produced. Fig. 2 is an end view of the commutator partly broken away and partly in section. Fig. 3 is a side elevation of the same partly broken away and partly in section. Fig. 4 is a perspective view of a detached commutator bar. Fig. 5 is a perspective view of a detached strip of mica, and Fig. 6 is a perspective view of two of the commutator bars assembled with strips of mica.

A commutator in accordance with this invention is composed of only three classes of material, namely, copper, mica and either of the well known insulating composition styled "Bakelite, Condensite or Vulcabestine." Either of these last three mentioned substances is noted for its insulation, tenacious and lasting quality, and it is from one of these substances that I form the body of the commutator.

There is illustrated in Fig. 1 a mold that I can use in the manufacture of commutators in accordance with this invention. The mold 1 is made of a suitable material and has a cylindrical molding cavity 2 that extends from the top of the mold to a point in proximity to the bottom thereof, the lower end of the cavity being reduced to provide an annular shoulder 3, a head recess 4 and a seat 5, said seat having a central opening 6 terminating at the bottom of the mold 1.

Mounted upon the seat 5 is a cylindrical vertical core 7 that extends to the top of the mold 1, said core having a depending pin 8 that extends into the opening 6 and supports the core 7 concentrically of the mold 1. Either end of the core 7, preferably the lower end thereof is provided with a longitudinal rib 9 and this rib is adapted to form a key or spline way in the body of the commutator, as will hereinafter appear, although it is to be understood that this rib can be dispensed with in certain forms of commutators.

Arranged upon the annular shoulder 3 of the mold 1 are circumferential radially disposed commutator bars 10 and strips of mica 11 or other insulation. The commutator bars 10 are segment shaped and are punched from copper. The copper segments are approximately half the depth of the mold cavity 2, as best shown in Fig. 1. The inner vertical edges of said segments extend into proximity to the core 7. The upper and lower ends of the copper segments are provided with notches 12, preferably V shaped, and arranged between said segments are strips of mica 11.

After the commutator bars and the strips of mica have been assembled, a molding block 13 is placed in the upper end of the mold upon the upper ends of the commutator bars. The mold block has a vertical bore 14 and a head recess 15, said recess being somewhat similar to the recess 4 of the mold. The bore 14 is of a greater diameter than the core 7 and corresponds in diameter to the distance between diametrically opposed commutator bars located upon the annular shoulder 3. The wall of the bore 14 can be provided with an inwardly projecting pin 16 to engage the core 7, and this pin is adapted to produce an opening in the body of the commutator, for a purpose that will presently appear.

After the elements just described have

been assembled, the mold is in condition for loading and pressing. Bakelite, Condensite or Vulcabestine, in a plastic condition is now pressed into the mold and within the mold it forms a cylindrical body 17 and circular heads 18 and 19 that engage the end of the commutator bars and becomes interlocked therewith, by reason of the plastic material entering the notches 12 in the ends of the commutator bars, between the strips of mica 11. This is best shown at the right hand side of Fig. 3 and by reference to Fig. 6, where it will be observed that cavities are formed at the ends of the commutator bars and the ends of the strips of mica. After the material in the mold has been pressed, the mold is subjected to heat, whereby the plastic material forming the body of the commutator will be baked. After having been baked, the mold 1, which is made of two or more sections, is removed. The molding block 13 is also made of two or more sections, particularly when the pin 16 is used, and it is obvious that the core 7 can be easily removed from the body 17, whereby the body will have a longitudinal bore extending from one end thereof to the opposite end. The commutator having been produced thus far is now machined or turned on the outside, slotted for an armature wire, and then tested for short circuit and ground.

The rib 9 is used in connection with the core 7 when it is desired to produce the keyway in the end of the body 17, especially in connection with large size commutators, but for small size commutators, the pin 16 can be used to form an opening, adjacent to the end of the body 17 and then the opening screw threaded or tapped, whereby the commutator can be secured to a shaft by a set screw. When the pin 16 is not used, the end of the body 17 can be drilled and tapped, as the Vulcabestine or other materials used to form the body can be drilled similar to metal.

While in the drawing there is illustrated a preferred embodiment of my invention, it is to be understood that the structural elements are susceptible to such changes, as in the size, proportion and manner of assemblage by the appended claims.

What I claim is:—

1. A commutator comprising a circular row of longitudinally extending commutator bars each provided with a notch at one end, insulating strips interposed between said bars and a hollow body formed of insulating material surrounded by said bars and strips, a portion of the material of said body overlapping the strips at their inner portions and extending between the bars to prevent short circuit, the material of said body further engaging in said notches, and the end edges of the bars whereby the bars are secured to the body.

2. As a new article of manufacture, a commutator comprising a circular row of longitudinally extending commutator bars provided at each end with a notch, a strip of insulating material interposed between said bars, and a body of insulating material surrounded by said bars and strips, the material of said body extending between the strips and bars and into the notches of the bars, said strips and bars projecting laterally from the periphery of said body, said body projecting at one end to provide a hub to facilitate the securing of said commutator to a shaft.

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

CHARLES ZENK.

Witnesses:
W. M. EBBERTS,
K. H. BUTLER.