Jan. 30, 1940. G. E. ANDREWS 2,188,423

METHOD OF MAKING A COMMUTATOR

Filed July 9, 1938

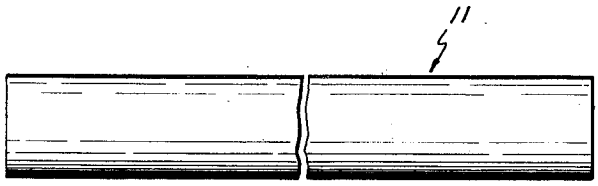


Fig. 1

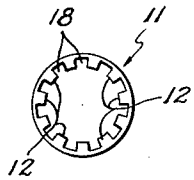


Fig. 2

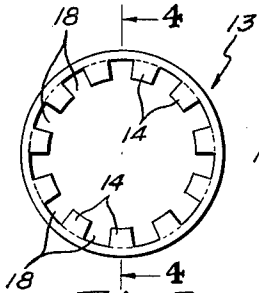


Fig. 3

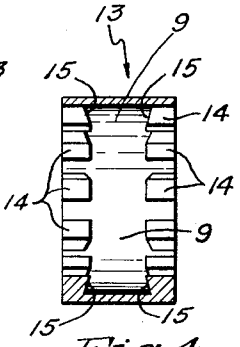


Fig. 4

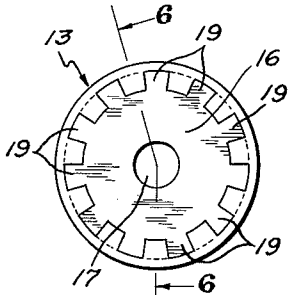


Fig. 5

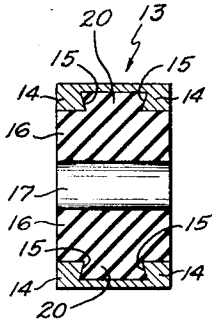


Fig. 6

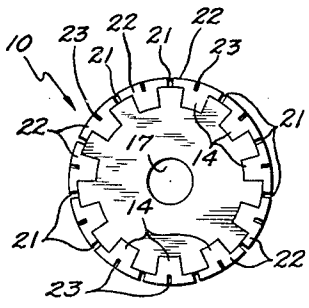


Fig. 7

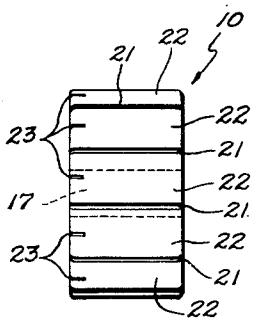


Fig. 8

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METHOD OF MAKING A COMMUTATOR

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Application July 9, 1938, Serial No. 218,319

2 Claims. (Cl. 29—155.54)

This invention relates to new and useful improvements in commutators and method of making the same, and more particularly to commutators of the smaller sizes such as are used on small motors.

An object of the invention is to provide an inexpensive construction of commutator wherein the metal conducting segments are securely held by an insulating hub.

Another object is to provide a simple and inexpensive method of making said commutators.

Other objects and advantages will become apparent from a consideration of the following detailed description taken in connection with the accompanying drawing wherein a satisfactory embodiment of the invention is shown. However, it is to be understood that the invention is not limited to the details disclosed but includes all such variations and modifications as fall within the scope of the invention and of the appended claims.

In the drawing:

Fig. 1 is a side elevational view showing a tube of conducting material from which the segments of the commutators of the invention are to be made;

Fig. 2 is an end view of such tube;

Fig. 3 is an enlarged end view of a section of the tube cut to the length desired for the commutator to be made;

Fig. 4 is a sectional view as along the line 4—4 of Fig. 3;

Fig. 5 is a view similar to Fig. 3 but with the insulating hub molded into the tube section;

Fig. 6 is a sectional view taken as along the line 6—6 of Fig. 5;

Fig. 7 is an end view of the finished commutator; and

Fig. 8 is a side elevational view of the commutator of Fig. 7.

Referring in detail to the drawing, the completed commutator is shown in Figs. 7 and 8 wherein it is generally designated 10. The first step in making up the commutator 10 is the providing of a tube 11 of any suitable metal, such for example as copper or copper alloy, which may be of any desired length and which is made by extruding, drawing, or the like. On its inner surface tube 11 is provided with a series of longitudinally extending spaced ribs 12 extending for the length of and formed integral with the tube.

Next a section of the tube of the desired length, and which section is hereinafter designated 13, is cut from the tube 11. Either before or after section 13 is cut from the tube 11 the ribs on the inner surface of said section are cut away intermediate their ends as indicated at 9 whereby in the section the ribs provide spaced lugs 14 located adjacent the ends of the section.

In cutting away the intermediate portions of the ribs to provide the lugs 14 the metal is removed in such a manner that the inner opposing ends of the lugs are undercut as shown at 15 whereby such ends 15 comprise oppositely inclined surfaces each inclining toward the outer surface of the section. Thus with each two aligned lugs 14 being considered a pair it will be apparent that the spaces 9 between the opposing ends of the lugs of each pair are dovetailed.

A center or hub 16 of insulating material is then molded into the section 13 providing the construction shown in Figs. 5 and 6, this insulating material preferably filling the space within the section. Hub 16 has a shaft opening 17 therethrough and it is noted that the material of the hub has entered into the spaces 18 (see Fig. 3) between the laterally adjacent lugs 14 whereby to provide portions or ribs 19 (see Fig. 5). By reference to Fig. 6 it will be noted that there are dovetail shaped portions 20 of the molded hub 16 located in the spaces between the inclined end surfaces 15 of the lugs 14. Thus it will be apparent that the hub 16 and the tube section 13 are mechanically connected or locked together.

A convenient method of molding the insulating center or hub portion 16 in the section 13 is to insert the section in an opening in a die and of a diameter equal to that of the section, with means to hold a pin of the proper size at the center of the section. Then the proper amount of the moldable material, such for example as "Bakelite" or similar material is placed in the section about the pin and compressed by a plunger between heated platens or plates. After the molded material has hardened or set the section is removed from the die, and after the parts have cooled the pin can be easily slid out leaving the opening 17 for mounting the commutator on a shaft or other support.

To complete the commutator the section 13 is now cut longitudinally as shown at 21 at each side of each pair of aligned lugs 14. Slots 21 are thus provided dividing the metal tube section into a plurality of commutator segments 22 (see Figs. 7 and 8) separated laterally from one another by said slots. Each segment 22 includes a pair of the lugs 14 embedded in the molded insulating hub 16 so as to have portions of the lug locked to the hub as some of the material of the latter has formed the dovetail interlocks 20 with such lugs.

Each segment 22 may be provided with a short slot or notch 23 to be used in connecting the necessary lead wires to the segments. As the lugs or rib sections 14 are at the ends of the commutator they provide plenty of stock for these slots or notches 23.

From the foregoing it will be seen that the commutator of the invention may be inexpensively made and that yet the article is of sturdy construction, the individual conductor segments being each securely locked to the insulating hub. The ribs 12 are formed in the tube 11 as the latter is formed and then insofar as the conductor portions of the commutator are concerned the only further treatment required is that the ribs be cut to provide the undercut ends 15 and that finally the tube be cut or slotted to separate the segments 22 from one another. The lugs 14 securely lock the segments to the hub 16 as the integral dovetailed hub portions 20 overlie the lugs in such manner that the latter cannot pull outof the hub. These portions 20 also effectively hold the segments against sliding movements longitudinally of the commutator.

Having thus set forth the nature of my invention, what I claim is:

1. The method of making a commutator comprising providing a short tubular element of wrought conducting material having circumferentially spaced longitudinal ribs of substantially uniform thickness on its inner surface integral therewith along their outer longitudinal edges, cutting each of said ribs transversely intermediate its ends to provide it with a pair of spaced opposed surface portions inclined in opposite directions so they are spaced farther at their outer than their inner edges, molding a hub of insulating material into said tubular element with portions of the hub entering and filling the spaces between the opposed surfaces of said ribs, and then slitting said element longitudinally between said ribs to divide the element into a plurality of spaced segments.

2. The method of making a commutator comprising forming a tube of wrought conducting material having circumferentially spaced longitudinally extending ribs on its inner surface integral therewith along their longitudinal edges, the side walls of said ribs extending substantially radially of the tube so that the ribs are of substantially uniform thickness, severing from said tube a section thereof equal to the length of the commutator segment desired, removing portions of said ribs intermediate their ends in a manner to provide each rib with opposed undercut end surface portions, molding a hub of insulating material into said tube section with portions of the hub entering and filling the spaces between the opposed undercut surface portions of the ribs, and then slitting said tube section longitudinally between said ribs to divide the section into a plurality of spaced segments.

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