

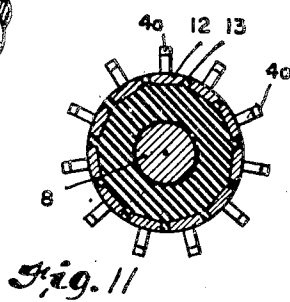
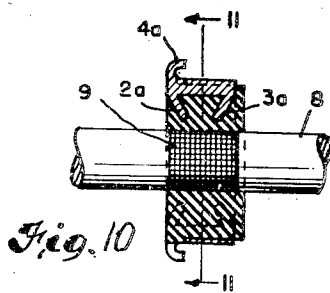
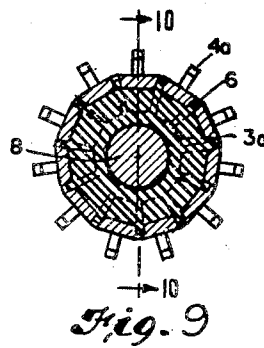
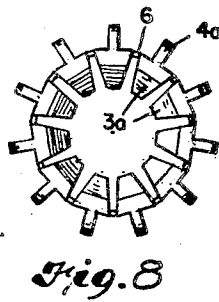
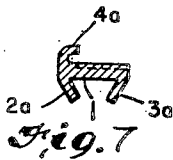
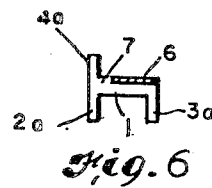
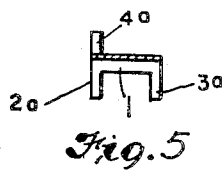
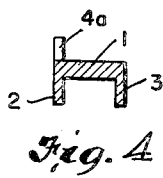
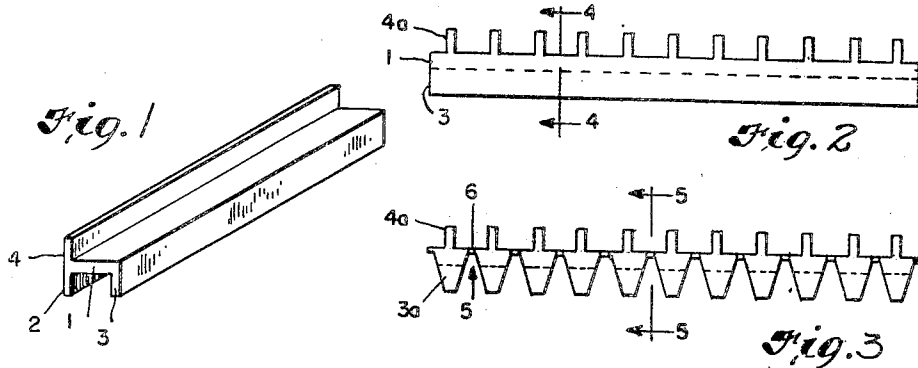
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2,451,500

METHOD OF MAKING COMMUTATORS

Filed April 26, 1945



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METHOD OF MAKING COMMUTATOR

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2 Claims. (Cl. 29—155.54)

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This invention relates as indicated to the method of manufacturing commutators such as are employed in dynamo-electric machines such as motors, generators, etc.

It is a principal object of this invention to provide a method whereby it is possible to produce very economically a commutator which is not only unusually strong structurally and in which the parts cannot become misaligned during use, but also in which the exterior surface of the commutator is a smooth continuous surface composed alternately of insulating material and conductive metal strips connected to the windings of the machine.

Other and more particular objects of the invention will appear as the description proceeds.

To the accomplishment of the foregoing and related ends, said invention then comprises the features hereinafter fully described and particularly pointed out in the claims, the following description and the annexed drawing setting forth in detail certain illustrative embodiments of the invention, these being indicative, however, of but a few of the various ways in which the principle of the invention may be employed.

In said annexed drawing—

Fig. 1 is a perspective view of a bar or strip of metal employed in the method of my invention;

Figs. 2 and 3 are side elevational views of the strip illustrated in Fig. 1 showing it at different stages in the process of my invention;

Fig. 4 is a transverse section of the strip as illustrated in Fig. 2 taken on a plane indicated by the line 4—4;

Fig. 5 is a transverse section of the strip as illustrated in Fig. 3 taken on a plane indicated by the line 5—5;

Fig. 6 is a view similar to Fig. 5 but showing a further notching of the strip;

Fig. 7 is a view similar to Figs. 4 and 6 showing the strip at still a further stage in its fabrication;

Fig. 8 is an end view of the strip after it has been built into the form of a polygon;

Fig. 9 shows the commutator in semi-finished form with the polygon of Fig. 8 filled with a moldable composition;

Fig. 10 is a side elevational view of a dynamo-electric machine shaft with the finished commutator molded thereon; and

Fig. 11 is a transverse sectional view of the structure illustrated in Fig. 10 taken on a plane indicated by the line 11—11.

Referring now more specifically to the drawing and more especially to Fig. 1, the strip or blank which is first provided in the method of my in-

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vention comprises a generally channel-shaped section including the web 1, legs 2 and 3, and an additional marginal flange 4 along one side thereof so that at the edge where such flange is provided the blank is generally T-shaped.

The strip of Fig. 1 may be extruded, rolled, or otherwise similarly formed in a continuous fashion and then cut up into lengths determined by the circumference of the commutator to be formed.

The strip of Fig. 1 is then modified in the following manner:

As illustrated in Fig. 2, the flange 4 is cut away at regularly spaced intervals leaving regularly spaced projections 4a upstanding therefrom.

The next step is to transversely notch the opposite side of the strip as at 5, such notches extending throughout the transverse extent of the strip and up into the web 1 for such a distance as to leave only a relatively thin bridge 6 between adjacent portions of the notched strip. This notching operation provides a plurality of equally spaced downwardly extending legs which serve as anchor means in the final form of the commutator.

The next step is as illustrated in Fig. 6 and consists in cutting away as at 7 that portion of the bridge 6 on the side of the blank from which the projections 4a extend. The next operation is to bend inwardly the downwardly projecting legs 2a and 3a into the form illustrated in Fig. 7.

With the strip in the form illustrated in Fig. 7, the next operation is to bend the same in the area of the bridges 6 so as to form a regular polygon as illustrated in Fig. 8. At this point it should be noted that it is preferable not to weld together or otherwise secure together the ends of the strip after it has been formed as illustrated in Fig. 8.

After the strip has been formed into a polygon, it is then arranged coaxially around the shaft 8 of the dynamo-electric machine on which it is to be mounted. The shaft 8 will preferably have a knurled area 9 at the point where the commutator is to be attached thereto. The shaft 8 with the polygon arranged coaxially therewith is then placed in a suitable mold and the space inside of the polygon around the shaft 8 filled with a moldable composition which has electrical insulating properties and which will bond the polygon to the shaft of the dynamo-electric machine. After the polygon has thus been molded, the assembly is then placed in a lathe and the periphery of the polygon turned down for an amount sufficient to cut away all of the bridges 6, leaving a truly cylindrical commutator with the adjacent commutator segments 12 separated by means of exposed areas 13 of insulating material which are

a part of the body which holds the commutator in place. The windings of the machine may then be attached in any suitable fashion to the projections 4a.

From the foregoing it will be observed that the finished commutator has a truly continuous brush engaging cylindrical surface so that wear on the brushes of the machine is reduced to a minimum and that the space between the alternate commutator segments is completely filled with insulating material which is integral with the supporting body of the commutator. It will also be noted that this construction is arrived at in such a way that slotting as by sawing of the commutator sections as now practiced is entirely eliminated.

It may be well to point out that best results will be secured as previously indicated if the ends of the strip forming the polygon of Fig. 8 are not secured together. Accordingly during the molding operation, when the moldable material solidifies, resulting in a shrinkage, the commutator strip is able to follow this reduction in size so that no stresses are set up in the commutator body as the result of such shrinkage.

Other modes of applying the principle of the invention may be employed, change being made as regards the details described, provided the features stated in any of the following claims or the equivalent of such be employed.

I therefore particularly point out and distinctly claim as my invention:

1. The method of making commutators which comprises providing a channel-shaped metal strip having an additional marginal flange along one edge whereby such edge of said strip is T-shaped in cross-section, cutting away said flange at regularly spaced intervals to leave regularly spaced projections to which windings may be attached, transversely notching the legs and, to a portion of its depth, the web of said channel intermediately of said projections, slotting said web for a portion of its width intermediately of and from the side on which said projections occur, bending said strip in the areas of said notches to bring adjacent each other the ends thereof and to form

a regular polygon, filling the polygon thus formed with a moldable insulating material, and then turning off the outer portions of the polygon to a cylindrical form so that all of the metal is cut away in the notched areas, leaving a cylindrical commutator with a continuous outer surface consisting of alternate segments of metal and insulating material.

2. The method of making commutators which comprises providing a channel-shaped metal strip having an additional marginal flange along one edge whereby such edge of said strip is T-shaped in cross-section, cutting away said flange at regularly spaced intervals to leave regularly spaced projections to which windings may be attached, transversely notching the legs and, to a portion of its depth, the web of said channel intermediately of said projections, slotting said web for a portion of its width intermediately of and from the side on which said projections occur, bending toward each other the notched legs of such channel, bending said strip in the areas of said notches to bring adjacent each other the ends thereof and to form a regular polygon, filling the polygon thus formed with a moldable insulating material with such bent-in legs embedded therein, and then turning off the outer portions of such polygon to a cylindrical form so that all of the metal is cut away in the notched areas, leaving a cylindrical commutator with a continuous outer surface consisting of alternate segments of metal and insulating material.

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