

No. 840,451.

PATENTED JAN. 1, 1907.

M. E. FULD.  
COMMUTATOR.  
APPLICATION FILED JAN. 30, 1906.

Fig. 1.

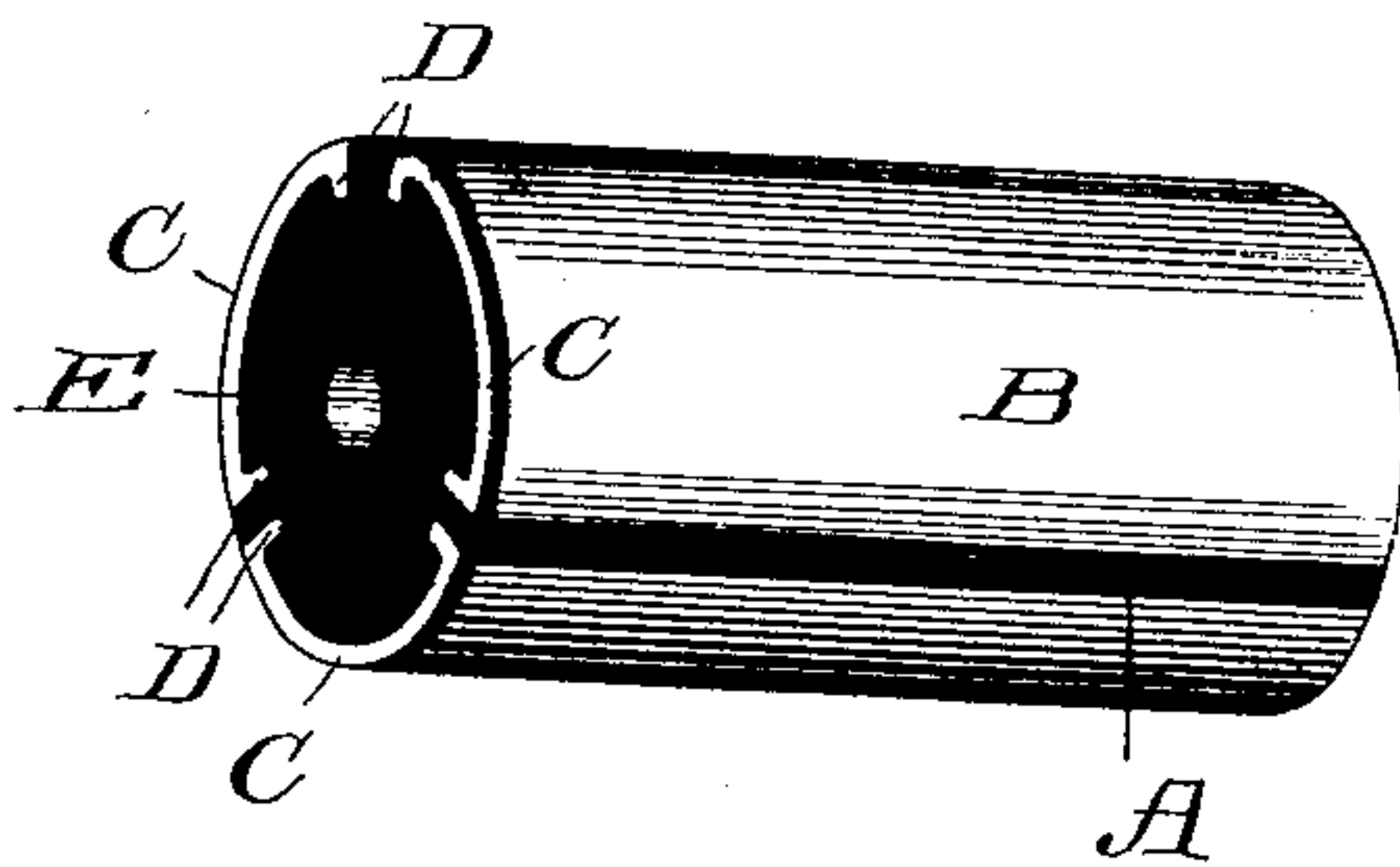


Fig. 2.

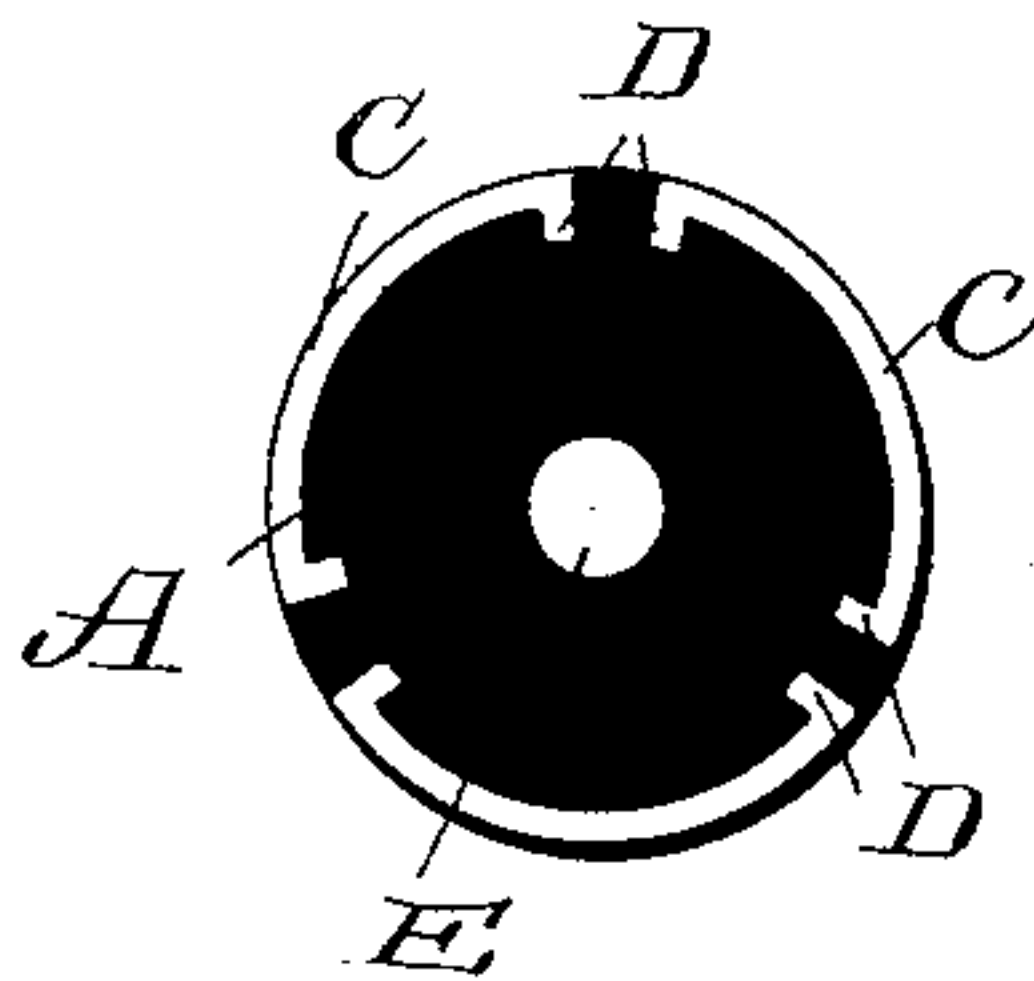


Fig. 4.

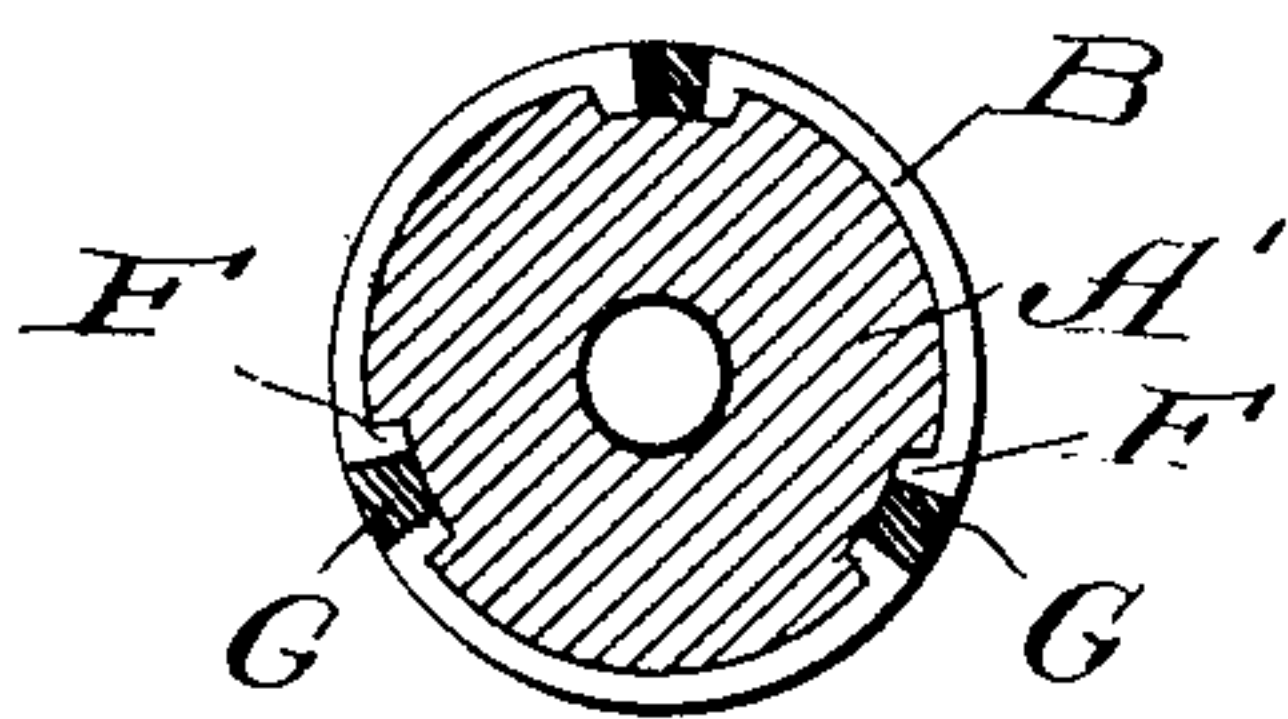


Fig. 5.

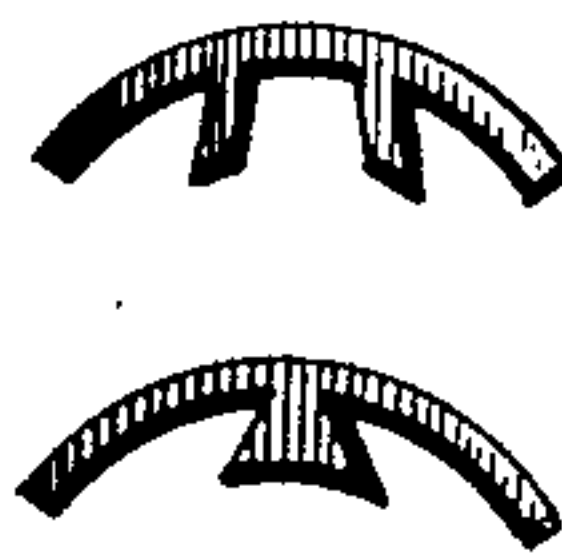


Fig. 3.

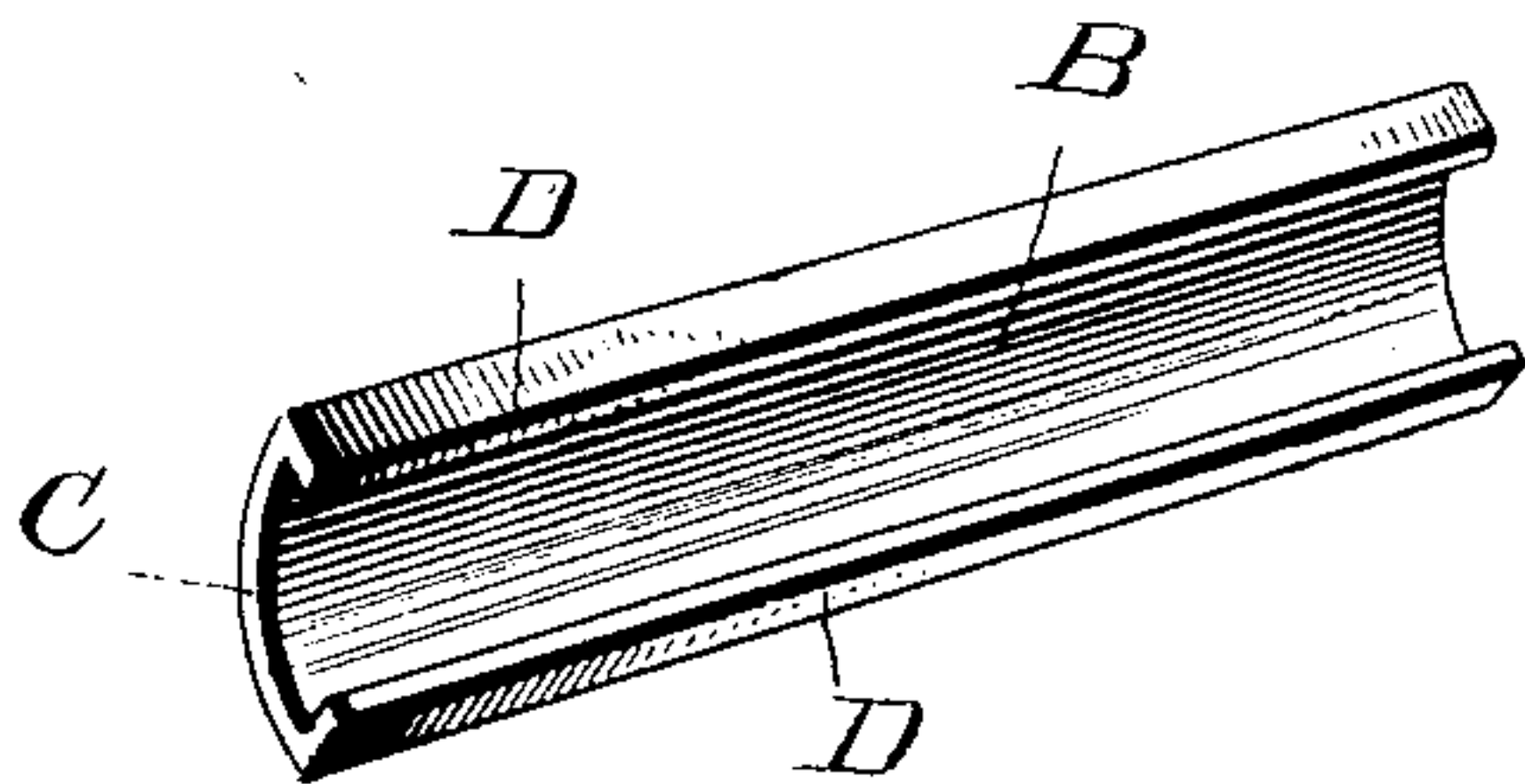
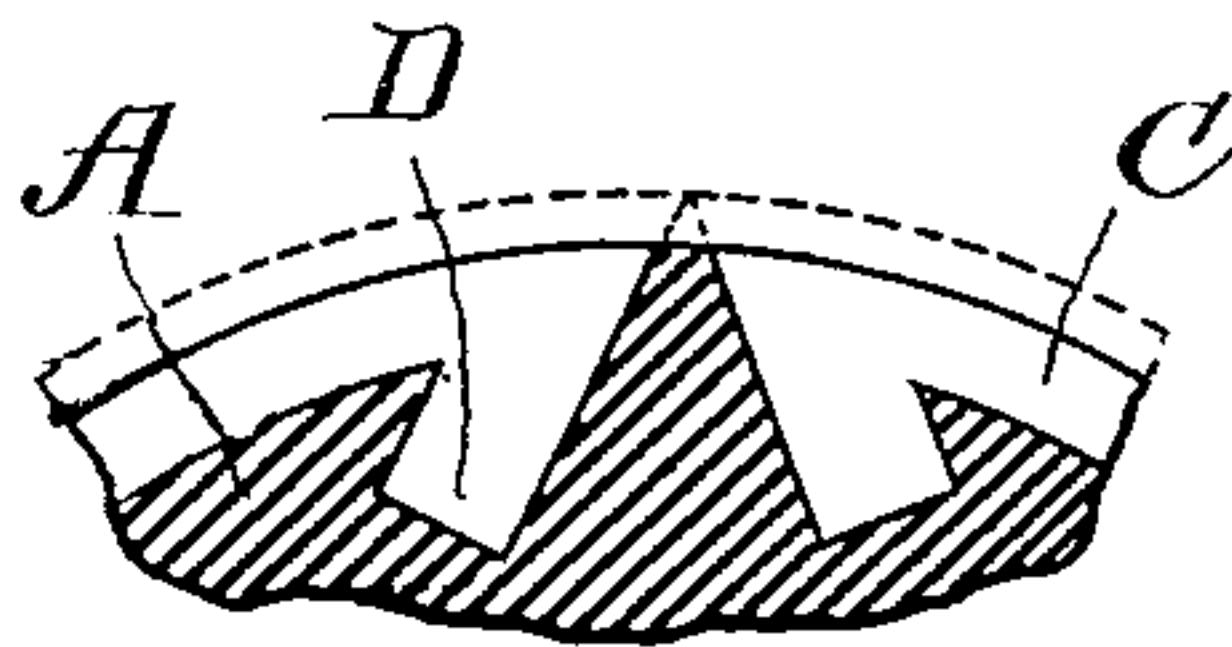


Fig. 6.



Witnesses

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# UNITED STATES PATENT OFFICE.

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## COMMUTATOR.

No. 840,451.

Specification of Letters Patent.

Patented Jan. 1, 1907.

Application filed January 30, 1906. Serial No. 298,650.

*To all whom it may concern:*

Be it known that I, MANES E. FULD, a citizen of the United States, residing at Baltimore, in the State of Maryland, have invented certain new and useful Improvements in Commutators; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to an improved construction of commutators; and one object of the invention is to provide a durable yet simple and cheap commutator for electric motors and dynamo-electric machines, which object is attained by so forming metallic commutator-sections that they may be spaced around the periphery of a suitable non-conducting body portion and be there held in place by reason of their peculiar formation without the aid of screws, dowel-pins, rivets, or other separate fastening means.

A further object of the invention is to provide a commutator of this character which when completely formed will have the insulating medium forming its interrupting spaces flush with the surfaces of the commutator-sections, thus obviating indentations between the sections, which have to be frequently cleaned of conducting particles, with which they become filled from time to time, and, furthermore, the smooth periphery of the commutator cures many defects found in the commutators using air-spaces between the commutator-sections as decreasing the brush friction to an appreciable extent, preventing short-circuiting at the commutator, aiding the delivery of power, &c.

To the accomplishment of these objects and such others as may hereinafter appear the invention comprises the novel construction hereinafter described, and particularly pointed out in the appended claims, reference being had to the accompanying drawings, showing the preferred embodiments thereof, in which the same reference characters designate like parts throughout the several views, and in which—

Figure 1 is a perspective view of the invention. Fig. 2 is a plan view thereof. Fig. 3 is a perspective view of one form of the metallic commutator-sections detached from the body portion. Fig. 4 is a sectional view of a modified construction using the sections of Fig. 3. Fig. 5 shows end views of two modified forms of commutator-sections, and

Fig. 6 shows a convenient mode of manufacturing the commutator herein described.

Referring to the drawings, the body portion A consists of any suitable non-conducting material which before being manipulated for use may be unyielding—as porcelain, vulcanite, wood, &c.—or in a plastic state—as gutta-percha, sawdust mixed with glue, plaster-of-paris, or Portland cement—and the metallic commutator-sections B are constructed to engage grooves cut in said hardened bodies or are embedded in the plastic material and are thus securely held in position without the use of any special fastening means, forming when constructed a perfectly smooth circular plug. To adapt the sections for this purpose, they are suitably curved, preferably in the arc of a circle, as shown at C, and provided with one or more inwardly-directed ribs or flanges D, which may project from any part of the inner face of said arc, the simplest form being one at each end extending in the direction of a radius of the circle of which the arc C is a portion.

In Figs. 1 and 2 the body A may be either of unyielding or of plastic material; but in Fig. 4 the body A' can only be the former kind of substance. In this construction the body A' is grooved, as at F, at predetermined points on its periphery, which grooves are somewhat wider than the intumed flanges of the commutator-sections B when this particular form of section is used, thus leaving a space therebetween, which space is filled with a strip of non-conducting material G, which is wedged in and so formed that its surface is flush with the surfaces of the commutator-sections.

The body portion A is provided with a central opening E for the reception of a shaft on which the commutator is to be placed. The commutator-sections are metallic and are preferably formed of brass, being punched, rolled, drawn, forged, brazed, or molded to their proper shape or formed in any other way as may be found convenient and desirable.

In one method of making the commutator the body of hard material may be turned or otherwise formed as a cylinder and then longitudinally grooved at suitable points for the reception of the intumed flanges of the commutator-sections.

When sections formed as shown in Fig. 3 are used, a section through the body, when properly grooved, may be similar to the



blackened portion shown in Fig. 2, leaving the non-conducting portions between the section-flanges integral with the body or to the central cross-hatched portion of Fig. 4, in which case the strips G must be afterward inserted, as hereinbefore described.

When sections formed as shown in Fig. 5 are used, the surface of the body must be grooved accordingly, and when properly grooved the sections may be slipped into engagement therewith by a longitudinal movement, and when so engaged are securely held in place.

In another method of making the commutator the sections are first placed in proper position around the inner periphery of a suitable mold, which may be provided with a central core, and the non-conducting material in a plastic condition is then pressed in the mold in the space between the core and the commutator-sections, forcing said material outwardly against the mold-wall between the ends of each of the sections, which are so spaced about the periphery of the mold as to leave a space therebetween against the inner walls of the commutator-sections and about the inwardly-directed ribs or flanges, thereby partly surrounding the sections, so that they become partly embedded in the material. The particular form of flange used acts in the nature of a securing means for the whole section, and the same is thus rigidly held in place without the necessity of any special fastening means on the hardening of the material.

In practice it may be preferable to put the contact-segments in place, completing the circle of the inner diameter of the mold, as shown in dotted lines in Fig. 6. Then after filling in the insulating material by turning off the exterior of the commutator to the desired depth the V-shaped portion of insulating material between the segments will be turned down to the required thickness, as indicated in full lines in Fig. 6. Moreover, the

space between the contact-segments may be accurately adjusted by cutting in the slot, so that the width may be uniform.

Although the commutator shown in the drawings is provided with but three sections, the number used depends largely upon the size, and any number may be used that is found convenient.

In practice the commutators are made of some length and then are cut off in the shorter lengths desired.

While the invention has been described with particular reference to the details of construction, it should be understood that it is not to be limited thereto, as minor changes and modifications may be made therein and still fall within its scope and principle. The right is therefore reserved to all such variations and modifications as properly fall within the scope of the invention and the terms of the following claims.

I claim—

1. A commutator for an electric motor or dynamo-electric machine consisting of a suitable body of non-conducting material provided with longitudinal grooves in its surface, and metallic sections each provided with an inwardly-directed rib or flange engaging said groove whereby they are securely held in place.

2. A commutator for an electric motor or dynamo-electric machine consisting of a suitable body of non-conducting material provided with longitudinal grooves in its surface, metallic sections each provided with an inwardly-directed rib or flange engaging said groove, and non-conducting strips between the ends of said sections.

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

MANES E. FULD.

Witnesses:

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C. B. HANCOCK.