V. G. APPLE.

METHOD OF BUILDING COMMUTATORS.

APPLICATION FILED JAN. 22, 1917.

1,243,795. Patented Oct. 23, 1917.

Fig. 2.

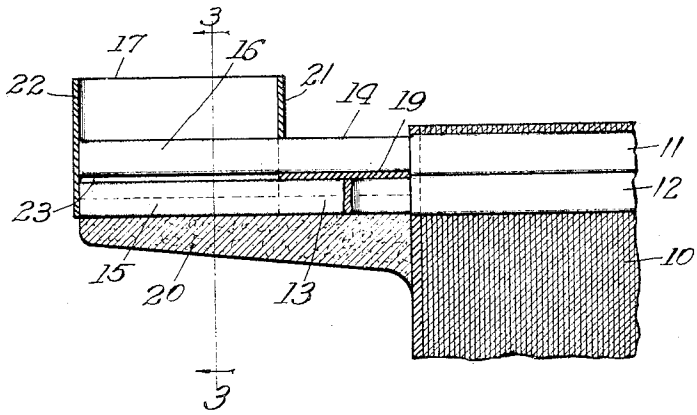


Fig. 3.

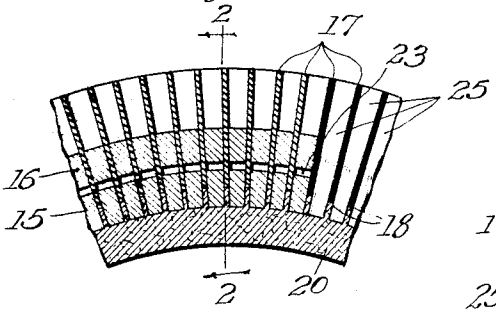


Fig. 1.

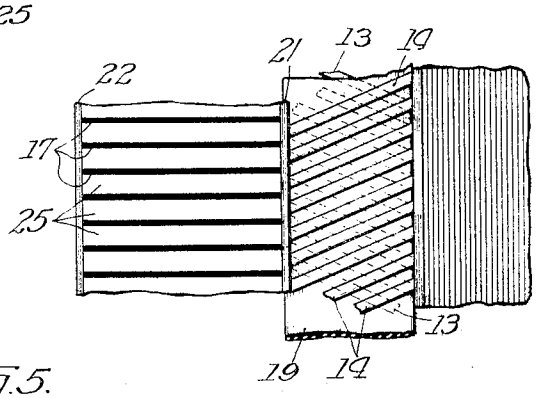


Fig. 5.

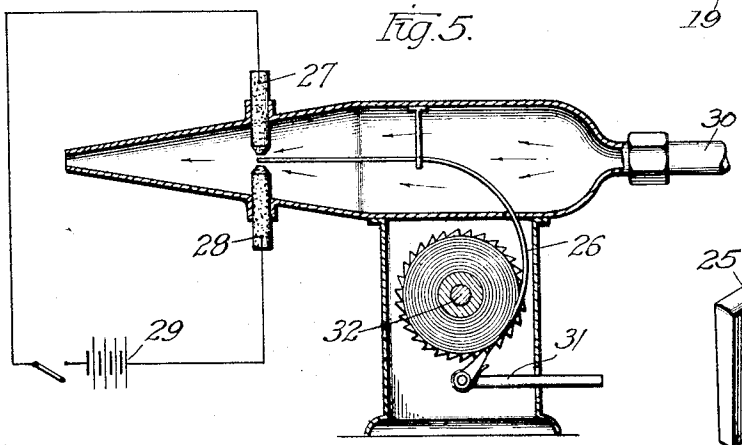
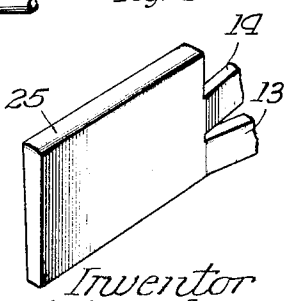


Fig. 4.



Witnesses:
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UNITED STATES PATENT OFFICE.

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METHOD OF BUILDING COMMUTATORS.

1,243,795. Specification of Letters Patent. Patented Oct. 23, 1917.

Application filed January 22, 1917. Serial No. 143,829.

To all whom it may concern:

Be it known that I, VINCENT G. APPLE, a citizen of the United States, residing at Dayton, in the county of Montgomery and State of Ohio, have invented certain new and useful Improvements in Methods of Building Commutators, of which the following is a specification.

My invention relates to a method of building commutators for armatures of dynamo-electric machines.

One of the objects of my invention is to provide a method of operation whereby to enlarge the coil terminals of the conductors of an armature sufficiently to thereby provide commutator segments, which subsequently become substantially integral parts of said inductor terminals, to improve the character of the commutator and to cheapen its construction.

Other and further objects of my invention will become readily apparent to persons skilled in the art from a consideration of the following description when taken in conjunction with the drawings, wherein:—

Figure 1 is a plan view of a fragment of an armature core, of a commutator and the connecting conductors.

Fig. 2 is a section taken on line 2—2 of Fig. 3.

Fig. 3 is a transverse section taken on line 3—3 of Fig. 2.

Fig. 4 shows a completed commutator segment built up around a pair of coil terminals.

Fig. 5 is a conventional representation of a metal spraying machine.

In all the views the same reference characters are employed to indicate similar parts.

In the drawings 10 is a conventional representation of an armature core, perforated or slotted near or through its perimeter, for armature conductors, or inductors 11 and 12. In this particular instance there are two series of conductors, one above the other, in each slot or perforation, but for the purpose of my invention there may be a greater or less number of conductors in each slot and furthermore the slots or perforations through which the conductors may pass in the armature core are not essential to my method of constructing a commutator.

The conductor terminals, of the respective coils or inductors, are circumferentially deflected into vertical planes in which a companion terminal is to be located, as shown in dotted lines in Fig. 1 to provide commutator pairs. The lower terminals 12 are shown to be deflected in one direction, as at 13, and the upper terminals are deflected in the opposite direction, as at 14, when the pairs of terminals to be connected together, and to a commutator section are in the same radial plane, as shown in Fig. 3, the bars or terminals are straightened to lie in parallel axial planes, as at 15 and 16. These terminals are then adjusted so as to lie in circumferential planes, concentric with the armature axis and equally spaced apart for insertion of strips or plates of insulating material, 17, such as mica, or the like. The mica plates 17 extend radially beyond the upper series of conductors, or terminals 16. The mica plates 17 extend preferably down to a point 18 about half way through the lower terminals 15. A band of insulating material, such as micanite 19 or the like is then placed between the series of upper conductors and lower conductors, as more clearly shown in Figs. 1 and 2, after which an insulating material 20, as bakelite or the like, forming substantially a ring, is placed in the spaces below the mica plates 17 and between adjacent terminals 15 and 16. When this material is placed, in a manner shown, and properly baked it forms a solid foundation upon which a commutator to be built up is to be supported. A mica ring 21 is now pushed over the ends of the terminals 15 and 16 to the point where the terminals are bent into axial planes, as shown in Fig. 1. Another ring of micanite 22, or like material, is placed over the ends of the terminals 15 and 16, as shown in Figs. 1 and 2, after which the spaces formed between the radially disposed plates 17, and the rings 21 and 22 are to be filled with finely divided metal of a suitable character, such as copper, or the like, sprayed into these receptacles to completely fill them up and to homogeneously unite with the conductors 15 and 16 and to increase their radial dimensions until the receptacles are full of the sprayed metal. After this has been done, if the spaces between the commutator conductors or terminals 15 and 16, as shown in Figs. 2 and 3, have not been completely filled by the sprayed metal, then the end plates 22 may be removed and the metal sprayed into the interstices 23 until they are completely

filled, thereby uniting the terminals 15 and 16 by solid masses of copper homogeneous therewith, and building them out radially until they resemble the shape shown in Fig. 4, in which the commutator segments 25, as completed, in a manner described, are shown.

Fig. 5 shows a conventional metal spraying machine. 26 represents a coil of wire of suitable character, such as copper, or the like, passed between carbon conductors 27 and 28, between which an arc is sprung as a result of a suitable source of electric current 29. Air under pressure is connected to the tube 30, whereby to spray or blow the metal, melted by the effects of the carbon 27 and 28, in finely divided particles into the receptacles or interstices provided in and around the armature terminals 15 and 16, in a manner heretofore described. 31 is a ratchet mechanism for feeding the wire 26, and 32 is a spool or drum upon which the wire is wound.

The device shown in Fig. 5 may be varied in many respects. It is only essential that the metal should be projected with considerable force, by compressed air, or otherwise, so as to build up the armature terminals 15 and 16 to an extent sufficient to provide integral commutator sections 25.

When the finely divided metal is projected into contact with the commutator conductors 15 and 16, it homogeneously unites said conductors and forms therewith a solid mass or block of copper, or other metal as may be used, into contact therewith.

It will be manifest, to persons skilled in the art, that metal other than copper, may be employed, and which may be more suitable for commutator purposes, and which will as readily unite and become a part of the copper conductors as copper of the same character.

After the commutator has been built up, in the manner described, it may be well to put the armature into a lathe and turn off the commutator periphery so as to thereby provide a smooth surface upon which the brushes are to bear.

While I have herein shown a single embodiment of my invention for the purpose of clear disclosure, it will be manifest to persons skilled in the art, that the showing is of a conventional or schematic character, and that many changes in the general arrangement, form and disposition of the parts may be made within the contemplation of the appended claims.

Having described my invention, what I claim is:

1. Steps in the method of making commutators which consists in separating the terminals of armature conductors and enlarging the terminals of said conductors, between said separators, by application of comminuted metal to said terminals which will unite therewith to form a substantially homogeneous mass.

2. Steps in the method of making commutators which consists in arranging the terminals of armature conductors in pairs in radial planes; separating adjacent pairs by radially disposed plates of insulating material and spraying metal between said plates to build up said terminals into commutator sections.

3. Steps in the method of making commutators which consists in arranging the terminals of armature conductors in pairs; separating adjacent pairs by plates of insulating material; supporting the terminals by an underlying insulating backing and spraying metal between said plates to build up said terminals into commutator sections.

In testimony whereof I hereunto set my hand in the presence of two subscribing witnesses.

VINCENT G. APPLE.

In the presence of—
F. W. COTTERMAN,
E. V. MARTIN.