V. G. APPLE.

METHOD OF MAKING COMMUTATORS.

APPLICATION FILED FEB. 14, 1918.

1,276,856. Patented Aug. 27, 1918.

Fig. 1.

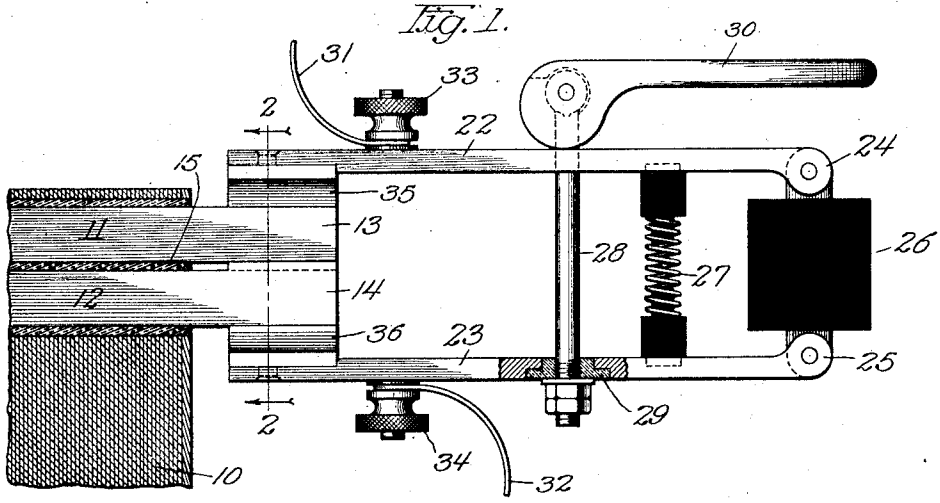


Fig. 6.

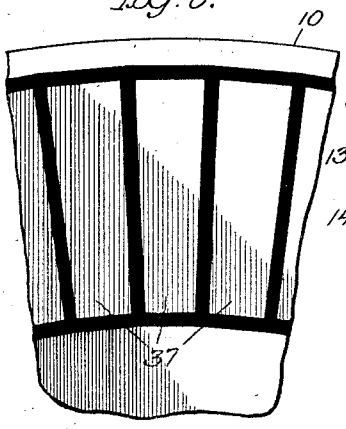


Fig. 2.

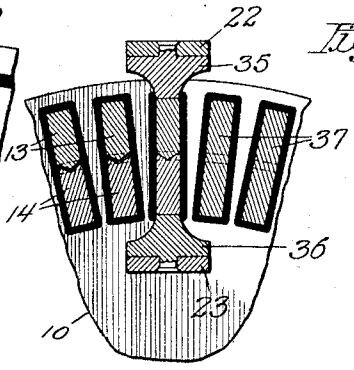


Fig. 3.

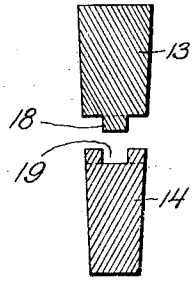


Fig. 4.

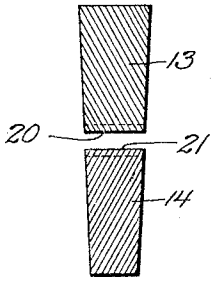
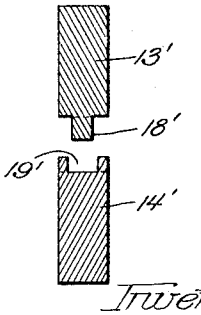


Fig. 5.



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UNITED STATES PATENT OFFICE.

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METHOD OF MAKING COMMUTATORS.

1,276,856. Specification of Letters Patent. Patented Aug. 27, 1918.

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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 Making Commutators, of which the following is a specification.

My invention relates to improvements in the method of making commutators for dynamo electric machines.

One of the objects of my invention is to provide a method of making a commutator and the conducting bars of a dynamo electric machine in one integral unit.

Another object of the invention is to make the conducting bars of such configuration at their ends before being placed on the armature core, that each pair will, jointly, when welded together, form the outlines of a truncated cone or, a commutator segment, thereby providing a commutator of the ends of the conductors that project from the armature core, which is entirely supported by the core.

And another object of my invention is to provide a method of making a commutator whereby the interior and exterior circumferential surfaces may be utilized, for contact by the commutator collecting brushes.

Other and further objects of my invention will become apparent from a consideration of the following description when taken in connection with the drawings, wherein:—

Figure 1 is a section through an armature core showing a pair of conductor bar terminals projecting from the end thereof and being welded together in pairs to form of each pair a commutator segment.

Fig. 2 is a section taken on line 2—2 of Fig. 1 showing the terminals of the armature being welded together in pairs, without forming a commutator.

Fig. 3 is a transverse section through a pair of enlarged armature terminals showing them ready to form a commutator section, before being welded together.

Figs. 4 and 5 are modifications.

Fig. 6 is an end view of a part of the finished commutator.

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

I have shown a schematic arrangement of the means for electrically welding the parts together. In the disclosure, 10 is the core of an armature, a starter, or the like, showing a pair of conducting bars 11 and 12 projecting from the end, as at 13 and 14. The projecting ends are, preferably, enlarged through a radial plane to compensate for reduction in dimensions due to pressure when welding, and to fill the inter-bar space that is occupied by insulating material 15 in the armature.

The process contemplates welding the terminals together, in the manner described to complete electrical continuity between them, or alternatively to join them in pairs, each in a homogeneous part to form a commutator segment. The ends of the conducting bars 13 and 14 may be shaped at confronting edges, concaved and convexed, as at 16 and 17, so as to maintain the parts 13 and 14 in the same radial plane when they are pressed together in the process of welding. They, however, may be shaped as shown in the modifications, Figs. 4 and 5, at 18 and 19, where the tenon enters the groove or they may be flat on their adjoining faces, as at 20 and 21. Or the tenon 18′ may be longer so that when it softens down by heat, it will be upset by pressure to fill the groove 19′, or any other suitable shape may be used.

The welding apparatus is shown to consist of two parallel bars 22 and 23, hinged, as at 24 and 25, respectively, to an insulating, separating block 26, and yieldingly held separated by the spring 27.

A rod 28 passes through the bars 22 and 23, being insulated by the bushing 29, and carries on its upper end a cam lever 30, by which to apply pressure to the parts to be heated by the electric current which is brought to the welding device by wires 31 and 32, which are secured by clamp nuts 33 and 34, respectively, to the bars, and which are connected to a source of current, not shown.

To the ends of the bars 22 and 23 are connector shoes 35 and 36, respectively, which are narrowed at their contacting sides to dimensions substantially as wide as the members 13 and 14, which are to constitute the joined terminals or the commutator segments 37 when the welding process has been completed. These shoes may be made of a metal that does readily respond to the welding process at the relatively low temperature at which copper is readily welded. The welding apparatus is applied, as shown,

to a pair of projecting armature terminals; the circuit is closed and the handle 30 is gradually turned from left to right, as the metals soften, to press the terminals together. The circuit is then opened and another pair is welded in the same manner, until the entire numbers of pairs have been welded or the commutator has thus been made.

The spaces between adjacent commutator segments may be left open or filled with any suitable insulating material when the terminals are used for commutating purposes.

While I have shown a conventional representation of a welding device, it is manifest that my invention is not limited to the means employed, but resides in the method of procedure.

Having described my invention, what I claim is:—

1. The art of joining separated armature conductors together in radially disposed pairs at their ends beyond the core, which consists in increasing the cubic area of copper in their ends and welding same together by application of electric current and pressure.

2. The art of making commutators which consists in enlarging the ends of armature conducting bars to compensate for reduction in size due to welding; placing them on an armature core with said ends projecting beyond the end of the core; applying a current of electricity to soften the ends and applying pressure to cause adhesion of the parts.

3. The art of making commutators which consists in enlarging the ends of armature conducting bars, so that radially disposed pairs, when placed on a core and welded together, will form properly shaped commutator segments; supporting said bars on a core in radially disposed pairs, with their enlarged ends projecting axially beyond the core end and electrically welding the pairs together.

4. The art of making commutators which consists in enlarging the ends of armature conducting bars; shaping them so that pairs located in radial planes on an armature, when welded together, will have an outline of a truncated cone; placing them on an armature with their ends projecting beyond the core in radial pairs, with the larger end of one conductor pairing with the smaller end of another conductor and welding the conductors of the pairs together.

In testimony whereof I hereunto set my hand.

VINCENT G. APPLE.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."