

V. G. APPLE.
MOLD.

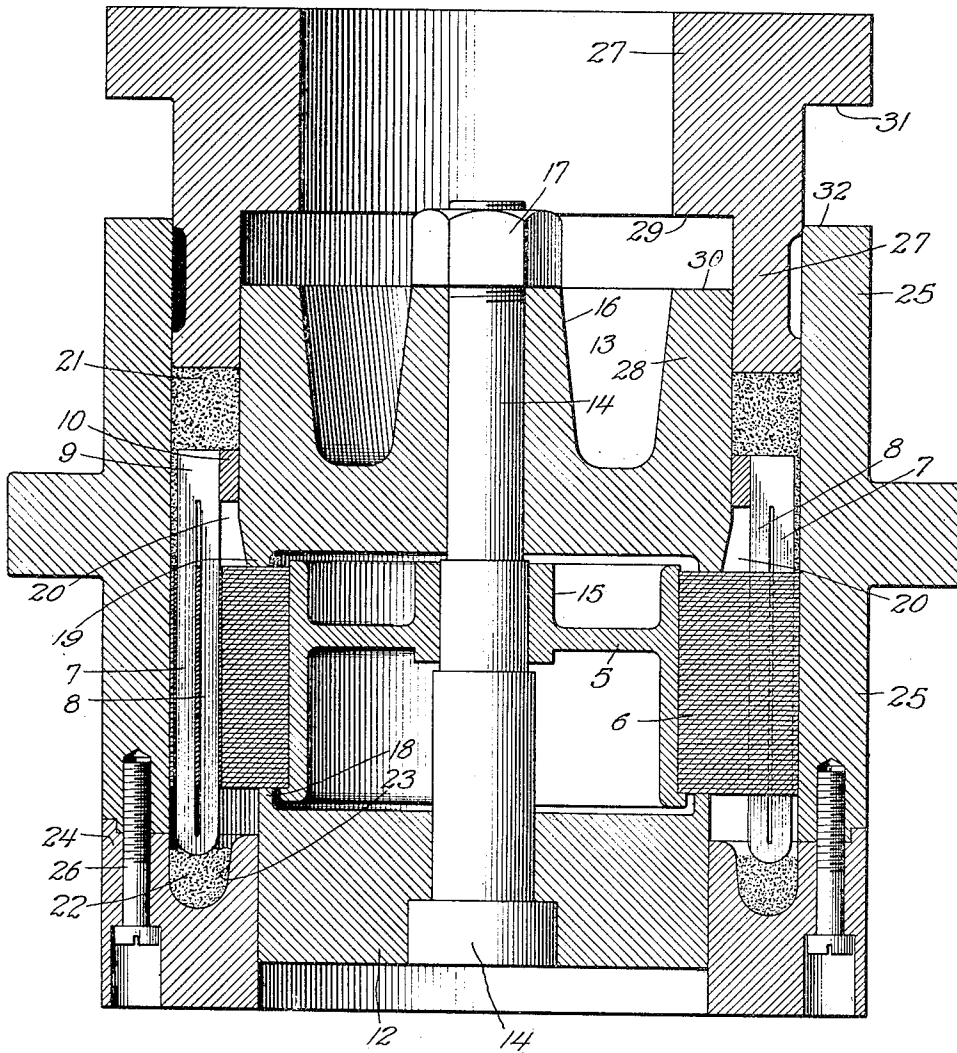
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2 SHEETS—SHEET 1.

Fig. 1.



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2 SHEETS—SHEET 2.

Fig. 2.



Fig. 3.



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UNITED STATES PATENT OFFICE.

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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 Molds, of which the following is a specification.

My invention relates to molds for plastic material and has especial reference to molds for insulating armatures, whereby to force a hot, plastic insulator into openings between and around the conductors that have been temporarily supported on an armature core.

One of the objects of my invention is to provide a mold having suitable matrices or grooves to receive an insulating material, capable of axial contraction by application of pressure, to force the material into the spaces between electric conductors and to provide a suitable coating of refractory insulation around the vulnerable parts of the armature and commutator.

Another object of my invention is to provide an inner, armature holding element of the mold, insertible in the major part of the mold, and in coöperation therewith forming part of the matrices and by which the armature is independently supported.

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 central axial section of the mold with an armature contained therein and before pressure is applied.

Fig. 2 is a similar view showing the insulation pressed into the spaces between armature conductors and commutator sections and surrounding the vulnerable or conducting portions of the armature.

Fig. 3 is a plan view of the mold, in reduced size.

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

In the illustrative embodiment 5 is a spider of an armature, supporting the core 6 upon which conductors 7 and 8 are properly spaced apart and temporarily held on the armature core before the latter is inserted in the mold.

9 is the part where the conductors 7 and 8 are welded together after which the parts 9 are welded to the commutator sections 10, re-

spectively. The commutator sections are also held temporarily spaced apart.

The two inner, separable members of the mold employed for holding the armature in proper position, consists of the end plates 12 and 13, forming with the armature a composite piston, each concentrically bored for a bolt 14. The bolt or shaft 14 passes through the plate 12 and through the hub 15 of the spider 5 and through an elongated hub 16 of the plate 13, the parts 12 and 13 being held closely in contact with the armature core 6, by the nut 17. The plate 12 is provided with an annular flange 18 which engages the adjacent surface of the armature core 6, and the plate 13 has a similar flange 19 which engages the opposite side of the armature core and which coöperates with the cylinder to provide a matrix space or annular opening 20, within which to contain the insulation material 21. A quantity of similar insulation material 22 is placed in the annular groove or matrix 23, which is formed in the inside surface of the head or ring 24. A cylinder 25 is shown to be separable from and secured to the ring 24 by any suitable means, screws 26 being shown for the purpose.

An annular ring plunger 27 fits neatly between the inner surface of the cylinder 25 and the confronting surface of the flange 28 of the hub or plate 13. The plunger 27 is provided with a thickened portion on the inside, to form a shoulder 29, which will be brought into contact with the shoulder 30 of the flange 28, and it is thickened on its outside surface to provide a shoulder 31 for contact with the upper edge of the cylinder.

After the conductors 7 and 8 and the commutator sections 10 are properly and temporarily spaced and held upon the core 6, the armature is then ready for application of the insulation. The bolt 14 is then passed through the plate 12, through the hub 15 of the spider 5 and through the hub 16 of the plate 13 and the parts secured together by the nut 17. The piston plate 12 fits neatly in the ring 24 of the head. Before placing the assembled parts together the insulating material 22 is placed in the annular groove or matrix 23, after which the armature with the electric conductors 7 and 8, projecting rearwardly from the rear end of the core, is suspended in the matrix 23, by placing the assembled piston parts in the cylinder

25 of the mold. Then insulating material 21 is placed in the matrix space between the inner surface of the cylinder 25 and the outer surface of the flange 28 of the plate

5 13. A certain definite amount, being just sufficient to fill the interstices or spaces between the electrical conductors and to form a coating thereon, is used, as clearly shown, as at 33 and 34, in Fig. 2. After the insulating material, 21 and 22, is placed in the
10 mold, pressure is then applied to the plunger 27, and at the same time heat is applied to the mold to soften the insulating material. The effect of the pressure and heat is to
15 cause the insulating material 21 and 22 to become more or less mobile, whereupon it is forced into the spaces in and around the conductors 7 and 8 and the core 6. When the pressure has caused the shoulders 29 and
20 30 and the shoulders 31 and 32 to be brought substantially in contact, as clearly shown in Fig. 2, the surrounding coating of insulating material, as at 35 and 36, is of proper dimensions, and thereby all parts of the
25 conductors are supported and the vulnerable portions of the electrical conductors 7 and 8 are protected. When sufficient heat and pressure have been applied to the insulating material, within the mold, it is allowed to
30 cool, whereupon the insulation becomes hard and refractory and will not become soft again by application of heat of the same or greater temperature.

In Fig. 2 the annular grooves or matrices, 35 20 and 23, are shown filled with the insulation 33 and 34 which has been pressed into place and cured.

After the insulation has cooled and the armature has been removed from the mold,
40 it is then ready for operative use.

In the operation of the mold, the plates 12 and 13 serve as component parts of a piston and are moved axially in the mold, proper, by the application of pressure,
45 whereby the rear end of the armature is forced into the annular matrix near the bottom of the mold and whereby the insulating material above the armature, in the space between the outer surface of the hub 13 and
50 the inner surface of the cylinder 25, is forced into the matrix 20.

While I have herein shown and described a single embodiment of my invention for the purpose of clear disclosure it is manifest, to
55 persons skilled in the art, that many changes in the disposition and configuration of the

parts may be made within the scope of the appended claims.

Having described my invention, what I claim is:—

60 1. A mold for forcing plastic insulating material between and around the conductors of an armature and commutator comprising a cylinder; a head in one end of the cylinder, having an annular groove extending axially
65 beyond the cylinder; means carried by the head for supporting an armature concentrically within the cylinder so that the armature windings at one end will extend into said groove; a hub at the other end of the
70 armature of a size to leave an annular opening between said hub and cylinder and a piston in said opening.

2. A mold for forcing plastic insulating material between and around the conductors
75 of an armature comprising a cylinder; a two-part head in one end of the cylinder consisting of a ring secured thereto having an annular groove extending axially beyond the cylinder and an axially movable plate
80 in said ring; means carried by the plate for supporting an armature concentrically within the cylinder so that the armature windings at one end will extend into the said groove when the plate and armature
85 are moved by the piston; a hub at the other end of the armature of a size to leave an annular opening between said hub and cylinder and a piston in said opening to move the armature axially of the cylinder and to
90 force insulating material in the openings between the conducting parts of the armature.

3. A mold for forcing plastic insulating material between and around the conductors
95 of an armature, comprising a cylinder provided with a head at one end having a bore smaller than the cylinder and having an inner axially extending groove between said bore and cylinder; a plate for attachment to
100 an armature axially movable in said bore; a hub, smaller than the bore of the cylinder attachable to the other end of the armature; a bolt taking through the plate, armature and hub to hold the parts together and a
105 piston between the bore of the cylinder and the hub, axially movable to force insulating material around the conducting parts of the armature.

In testimony whereof I hereunto set my
110 hand.

VINCENT G. APPLE.