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L. E. POOLE

ARMATURE TESTING APPARATUS

Filed May 28, 1926

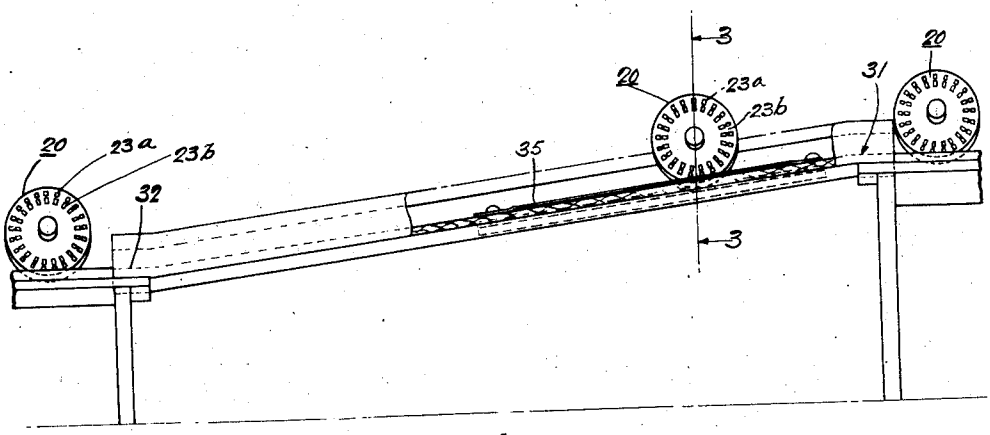


Fig. 1.

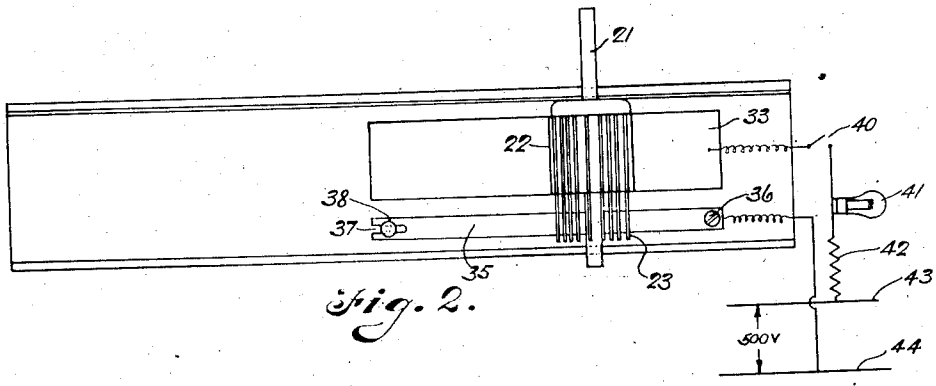


Fig. 2.

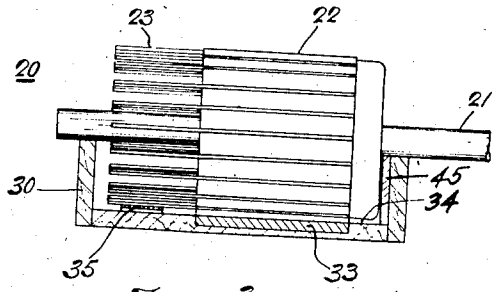


Fig. 3

Inventor

Lora E. Poole

By Spencer Sewall & Hardman

his Attorneys

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LORA E. POOLE, OF ANDERSON, INDIANA, ASSIGNOR, BY MESNE ASSIGNMENTS, TO DELCO-REMY CORPORATION, OF DAYTON, OHIO, A CORPORATION OF DELAWARE.

ARMATURE-TESTING APPARATUS.

Application filed May 28, 1926. Serial No. 112,255.

This invention relates to the manufacture of bar-wound armatures for dynamo-electric machines, and one of the objects of the invention is to make a rapid and effective test of the armature for short-circuits between the bar conductors and the armature core.

Further objects and advantages of the present invention will be apparent from the following description, reference being had to the accompanying drawings, wherein a preferred form of the present invention is clearly shown.

In the drawings:

Fig. 1 is a side elevation of a testing device constructed in accordance with the present invention;

Fig. 2 is a top plan view thereof; and

Fig. 3 is a transverse sectional view on the line 3—3 of Fig. 1 and drawn to a larger scale than the other Figs.

Referring to the drawings, 20 designates an armature assemblage which comprises a shaft 21, a core 22 and a plurality of bar conductors 23, commonly known as hairpins. Before assembling the bars 23 in the slots of the core 22, the core slots are lined with insulating paper. Each bar conductor 23 is placed in certain spaced slots of the armature core, each slot receiving the active coil sides of two different hairpin conductors. Then the outer row of conductor leads are twisted in one direction and the inner row in the opposition direction relative to the shaft 21, in order to locate the coil ends in the proper position for attachment to the risers of a commutator, which is assembled later upon the shaft 21.

As shown more particularly in Fig. 1, the assembly 20 includes a plurality of coil ends which are arranged in two concentric circular rows. The conductor ends in the outer row are designated 23^a and those in the inner row 23^b. Each armature conductor will have a coil end 23^a in the outer row. The circuit testing machine which is about to be described takes advantage of this feature of construction of the armature assemblage.

In the drawings, 30 designates a chute of non-conducting material and of channel-shaped cross section, through which the assemblages 20 may roll, by gravity, from a table 31 to a table 32 of lower elevation. The armature assemblages 20 are placed upon the table 31 after the conductors 23 are assembled upon the core 22. The chute 30 conveys the assemblages 20 to the table 32, which may be placed conveniently near a machine for shaping the ends of the conductors 23 to adapt them to be received by the risers of a commutator. As each assemblage 20 rolls down the chute 30, the core 22 will roll over a metal plate 33 having its upper surface flush with the bottom surface 34 of the chute, and each of the conductor ends 23^a in the outer row will move into engagement with a resilient strip 35 of conducting material. One end of the strip 35 is connected by a screw or rivet 36 to the bottom of the chute 30, and the other end is provided with a notch 37 which receives a rivet or screw 38 which holds the notched end of the strip 35 against the bottom of the chute 30 but prevents endwise movement of the strip. Normally, the strip 35 is bowed away from the bottom of the chute 30 to a greater extent than is indicated in Fig. 1. Due to the weight of the armature and the flexibility of the strip 35, the strip 35 will be bowed downwardly by the engagement of the conductor ends 23^a with it. The plate 33 is connected by a switch 40, a lamp 41 and a resistance 42 with one of the mains 43 of a relatively high-voltage circuit, for example, a 500-volt circuit. The other main 44 is connected with the conducting strip 35. When the testing device is used the switch 40 is closed. If the insulation between the core and any of the conductors is sufficient to withstand a potential of 500 volts, for example, the lamp will not burn as the armature rolls down the chute 30, since the insulation prevents the flow of current from any of the conductors of the core. If the insulation is imperfect and cannot withstand a potential of 500 volts at any point between any of the conductors and the core, the lamp 41 will burn. Then the operator will separate the defective assemblage 20 from those which have passed inspection. The core and conductors of the defective assemblage may be disassembled, and reassembled after the core has been reinsulated.

By the use of the present invention, inspection is made by the workman who removes the armatures from the table 31 to the chute, in order that they may be conveyed to the next operator. The conveying of the armatures from one table to the other is not retarded by the inspection device. There-

fore, no additional time is required for making the inspection for grounds between the core and armature conductors. The person who places the armatures upon the chute may be the operator of the machine which is used for assembling the hairpin conductors 23 upon the core 22. By eliminating entirely the labor charge for inspection, the cost of production has been materially reduced.

The chute 30 is laterally as well as longitudinally inclined in order that the armature assemblies 20, in rolling down the chute, will roll toward the wear piece 45 lining a side of the chute, rather than toward the opposite side which is adjacent the ends of the hairpin conductors.

While the form of embodiment of the invention as herein disclosed, constitutes a preferred form, it is to be understood that other forms might be adopted, all coming within the scope of the claims which follow.

What is claimed is as follows:

1. Apparatus for detecting short-circuits between an armature core and bar conductors supported by the core comprising, in combination, an inclined chute, a metal plate provided by the chute for engagement by the armature core which rolls over the plate in rolling down the chute, a conductor supported by the chute for engagement by the ends of the armature conductors which roll into and out of engagement with said conductor while the core rolls over the plate, and electrical signalling apparatus in circuit with the plate and conductor and rendered operative in case one of the armature conductors is grounded upon the core.

2. Apparatus for detecting short-circuits between an armature core and bar conductors supported by the core comprising, in combination, a laterally and longitudinally inclined chute, a metal plate provided in the bottom of the chute and nearest to the lower side of the chute for engagement by the armature core which rolls over the plate in rolling down the chute, and a conductor supported by the bottom of the chute and located nearest the upper side of the chute for engagement by the ends of the armature conductors, said armature conductor ends rolling over said conductor while the core is rolling over the plate, and electrical signalling apparatus in circuit with the plate and conductor and rendered operative in case one of the armature conductors is grounded upon the core.

3. Apparatus for detecting short-circuits between an armature core and bar conductors supported by the core comprising, in combination, an inclined chute, an oblong metal plate forming a portion of the bottom of the chute and so located as to be engaged by the armature core while it is rolling down the chute, and a flexible strip conductor supported by the bottom of the chute and located parallel with the plate and spaced therefrom in order to be engaged by the ends of the armature conductors as they roll down the chute while the core is rolling over the plate, and electrical signalling apparatus in circuit with the plate and conductor and rendered operative in case one of the armature conductors is grounded upon the core.

4. Apparatus for detecting short-circuits between an armature core and bar conductors supported by the core comprising, in combination, a guide, a metal plate provided by the guide for engagement by the armature core, which rolls over the plate in rolling along the guide, a conductor supported by the guide for engagement by the ends of the armature conductors which roll into and out of engagement with said conductor while the core rolls over the plate, and electrical signalling apparatus in circuit with the plate and conductor and rendered operative in case one of the armature conductors is grounded upon the core.

5. Apparatus for detecting short-circuits between an armature core and bar conductors supported by the core comprising, in combination, a guide, a contact member disposed in said guide for engagement by the armature core which rolls over the contact member in rolling along the guide, and a conductor supported by the guide and located near one side of the guide for engagement by the ends of the armature conductors, said armature conductor ends rolling over said conductor while the core is rolling over the contact member, and electrical signalling apparatus in circuit with the contact member and conductor member and rendered operative in case one of the armature conductors is grounded upon the core.

In testimony whereof I hereto affix my signature.

LORA E. POOLE.