

July 18, 1950

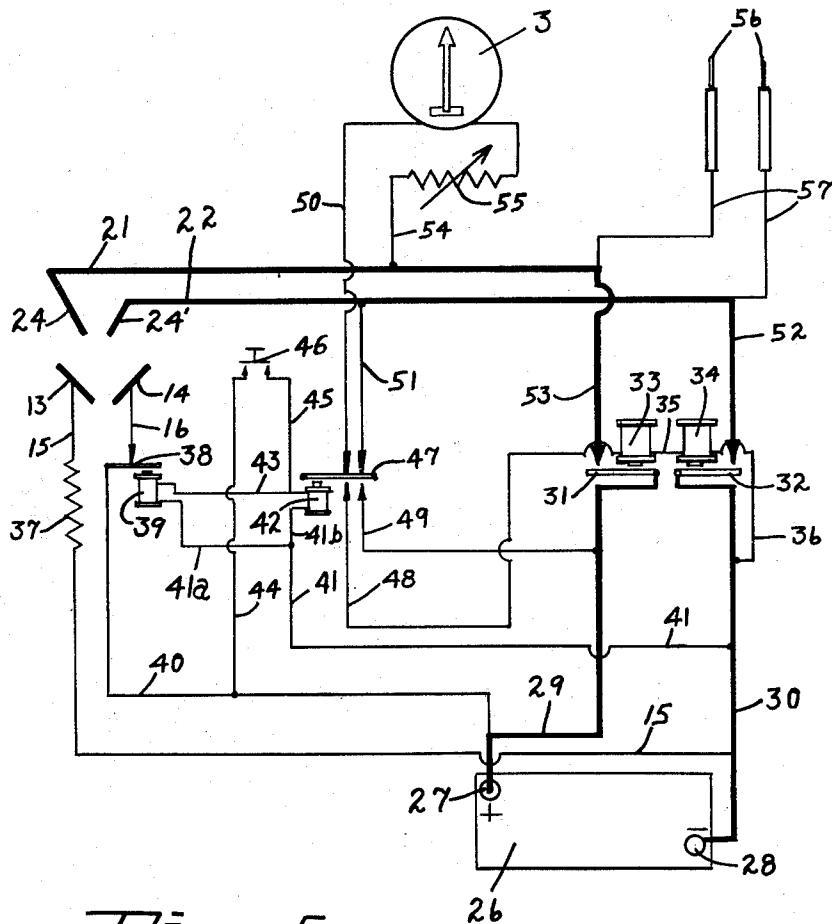
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2,515,623

DEVICE FOR TESTING ARMATURES OF MOTORS AND GENERATORS

Filed Sept. 3, 1946

2 Sheets-Sheet 2



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2,515,623

DEVICE FOR TESTING ARMATURES OF
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Application September 3, 1946, Serial No. 694,658

1 Claim. (Cl. 175-183)

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This invention relates to a device for testing armatures of motors and generators in order to determine if there is a short or break in the armature and it is one object of the invention to provide an apparatus so constructed that it may not only be used for testing an armature but also for eliminating a short if a short is found to exist.

Another object of the invention is to provide an electrical apparatus wherein electric wiring and switches are housed in a casing and a meter and means for supporting an armature to be tested mounted upon the top of the casing, there being also upon the top of the casing a block carrying insulated contacts for engaging commutator bars of the armature and an arm mounted for movement toward and away from the armature and through which pass wires connected with terminals of contacts for engaging commutator bars of the armature.

Another object of the invention is to provide the apparatus with a circuit so arranged that if a short is discovered high amperage current may be passed through the armature and burn out metal particles which have caused the short in the armature.

Another object of the invention is to provide an apparatus of this character which is simple in construction and very easy to operate.

The invention is illustrated in the accompanying drawings wherein:

Fig. 1 is a perspective view of the improved armature tester.

Fig. 2 is a view upon an enlarged scale showing the pivoted arm of the tester in longitudinal section and disposed over an armature to be tested.

Fig. 3 is a view in elevation of the block upon which the armature rests while being tested.

Fig. 4 is a sectional view taken transversely through the arm along line 4-4 of Figure 2.

Fig. 5 is a wiring diagram.

This improved armature testing device has a casing or cabinet 1 closed at its top by a panel 2 carrying a meter 3 and also carrying a block 4 secured by bolts 5 and a second block or post 6, the block and the post being formed of insulation. Tubes 7 project from the block 4 across the casing top and into these tubes are slidably engaged the arms 8 of a bracket 9 having a depressed bridge 10 constituting a seat for the shaft 11 of an armature 12. The other end of the armature rests upon contact strips 13 and 14 mounted upon the block and having wires 15 and 16 secured to them, the wires passing

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through openings 17 formed in the top panel 2 of the casing. Since the arms 8 of the bracket are slidably engaged in the tubes 7, the bracket may be shifted longitudinally to adjusted positions and accommodated to the length of an armature to be tested.

An arm 18 which is formed of insulation is pivotally mounted between the ears 19 of the post 6 by a pin 20, and referring to Figure 2 it will be seen that this arm is of tubular formation and open at both ends, the free end of the arm terminating above block 4 and being cut diagonally so that conductors 21 and 22 which extend longitudinally through the arm and are insulated from each other by strips of insulation 23 which may have end portions protrude downwardly from the arm. The downwardly bent ends of the conductors terminate in side extensions constituting terminals or contacts 24 and 24' for resting upon the armature and extending longitudinally thereof when the arm 18 is pressed downwardly to bring the contacts into engagement with the armature. A spring 25 carried by the post 6 between its ears 19 yieldably holds the arm 18 in the normally raised position shown in Figure 2.

A battery 26 is mounted within the cabinet and from its terminal posts 27 and 28 extend wires connected with the movable contacts 31 and 32 of solenoid switches 33 and 34 which are connected in series by a wire 35, the switch 35 having its coil connected with the wire 30 by a wire 36. The wire 15 leading from the contact 13 is connected with wire 30 at a point near the post 28 of the battery and within this wire 15 is disposed a resistance 37. The wire 16 is connected with the movable contact 38 of a solenoid switch 39 and when the solenoid of this switch is energized the wire 16 is connected with a wire 40 extending between the stationary contact of switch 38 and the wire 29 with which it is connected at a point near the post 27 of the battery. A wire 41 which is connected with wire 30 between wires 15 and 36 has a branch 41a connected with the coil of the switch 39 and a branch 41b connected with the coil of switch 42 which is connected in series with the coil of the switch 39 by a wire 43. Wires 44 and 45 extend from the wires 40 and 43 to terminals of a push button switch 46 and when this switch 46 is closed the coils of the solenoid switches will be energized and both switches closed. The movable contact 47 of the solenoid switch 42 extends between stationary contacts with which wires 48, 49, 50, and 51 are connected and when the switch

42 is energized a circuit will be established between the wires 48 and 49 which are connected one with the wire 29 and the other with the coil of the solenoid switch 33 respectively. The wire 50 is connected with one side of the meter 3 and wire 51 is cut into a wire 52 which connects the conductor 22 with the stationary contact of switch 34. A wire 53 connects the conductor 21 with the stationary contact of switch 33 and a wire 54 having a resistance 55 therein connects wire 53 with the meter at the opposite side thereof from wire 50.

When an armature is to be tested for a short or open circuit it is set in place upon the tester with its commutator resting on the contacts 13 and 14 and its shaft resting on the depressed bridge of bracket 9 which is then shifted longitudinally to accommodate it to the length of the armature. The arm 18 is then lowered so that its contacts 24 and 24' rest upon the commutator. This gives a reading upon the meter 3 by which it may be ascertained if there is a short or broken circuit. When a short is found the pushbutton switch 46 is closed by applying pressure to its button and copper filings or bits of solder which have become lodged between bars of the commutator and caused a short circuit will be burned out by high amperage. If there is a broken circuit in the armature the reading on the meter will show this and the defect may be corrected.

Current from the battery passes through wires 30 and 15 to the contact 13, the resistance 37 lowering the voltage, and through the armature to contact 24 and through the conductor 21 and wires 53 and 54 to the meter, additional lowering of voltage being accomplished by the resistance 55. From the meter the current flows through wire 50, contact 47 of the solenoid switch 42, wire 51 to wire 52 and conductor 22 to contact 24' and through the armature to contact 14 from which it flows through wire 16 and the contact 38 of solenoid switch 39 and through wires 40 and 29 back to the battery. This test may also be made by using the testing prongs 56 which are connected with the wires 52 and 53 by wires 57 instead of disposing the contacts 24 and 24' in engagement with the armature if so desired. When a short is found the switch 46 is closed to establish a circuit from the battery through wires 29, 40, 44 to the button switch and through wire 45 to the solenoid switch 42 and through wires 41 and 30 back to the battery. This causes both solenoid switches 39 and 42 to be energized and contact 38 will be opened while contact 47 will be moved to bridge the wires 48 and 49 and allow the solenoid switches 33 and 34 to be energized by current flowing from the battery through wires 29, 49, and 48 to the switches and from the switches through wires 36 and 30 back to the battery. When the contacts 31 and 32 are moved to a closed position by energizing coils of the switches 33 and 34 they engage terminals of the wires 52 and 53 and full strength current may then flow from the battery through wires 29 and 53 and the conductor 21 to the contact 24 and to the armature, the current then flowing through the contact 24' and conductor 22 and wires 52 and 30 back to the battery. Flow of current through the armature only takes

place if metal particles are accumulated between commutator bars upon which the contacts 24 and 24' rest and during such flow of current the gathered metal will be burned out and the short eliminated. The armature will be turned to successively bring its commutator bars into position for engagement by the contacts 24 and 24' and the armature may thus be tested throughout its entire circumference.

We claim:

An armature tester comprising a support including a saddle formed of insulation and having sloping upper edge faces converging downwardly towards their inner ends, stationary contact strips mounted upon the converging upper edge faces of said saddle in position for engagement with lower ones of the circumferentially spaced commutator bars of an armature set at rest horizontally upon the said strips and adapted to be turned to adjusted positions successively moving the commutator bars into engagement with the stationary contact strips, a pivot block, an arm pivoted to said block and having one end terminating over said saddle, a pair of contacts extending longitudinally of said arm and constituting movable contacts having ends extending downwardly over the saddle in position for engaging upper ones of the commutator bars of an armature resting upon the stationary contacts, a battery, a pair of conductors leading from opposite poles of the battery and connected with the movable contacts, a pair of normally open solenoid switches having their solenoid windings connected in series and interposed one in each of the conductors, wires connecting the stationary contacts with opposite poles of the battery, a third solenoid switch interposed in one of said wires and normally closed, a meter, a wire connecting one side of said meter with one of said conductors, a wire connecting the other side of the meter with the second conductor and controlled by a fourth solenoid switch normally closing a gap in the said wire and having its solenoid winding connected in series with the solenoid winding of the third solenoid switch, a circuit for the first and second switches having a gap therein normally open and adapted to be closed by the fourth switch when the solenoid of said fourth switch is energized and its contact to open the gap in the wire leading from the meter, and a circuit for the solenoid windings of the third and fourth switches controlled by a normally open manually operated switch.

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