

J. F. CULLIN.
COMMUTATOR INSULATION TESTING DEVICE.
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1,372,945.

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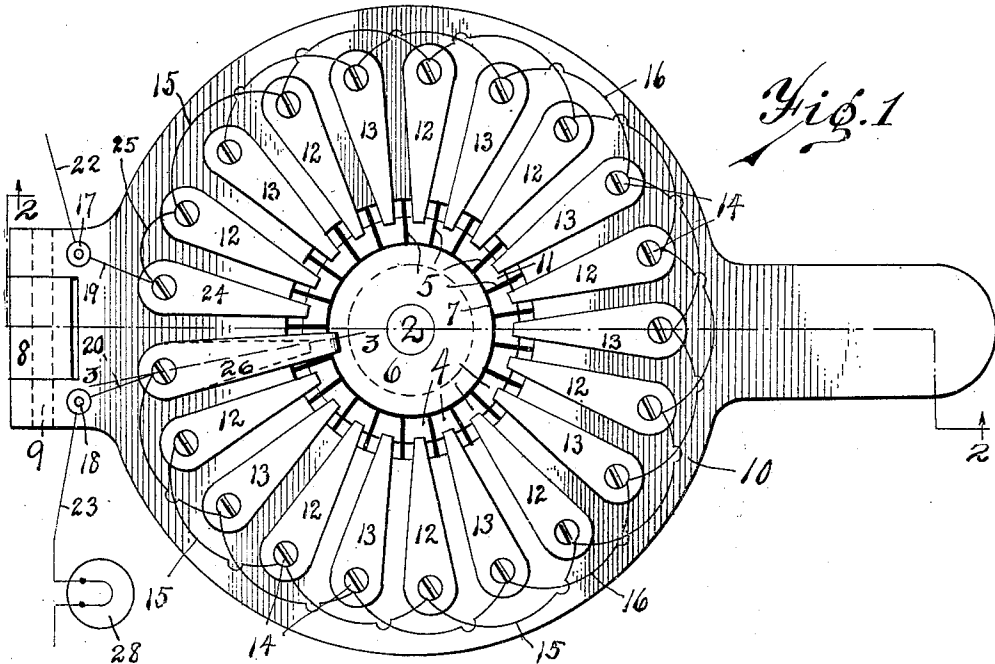


Fig. 1

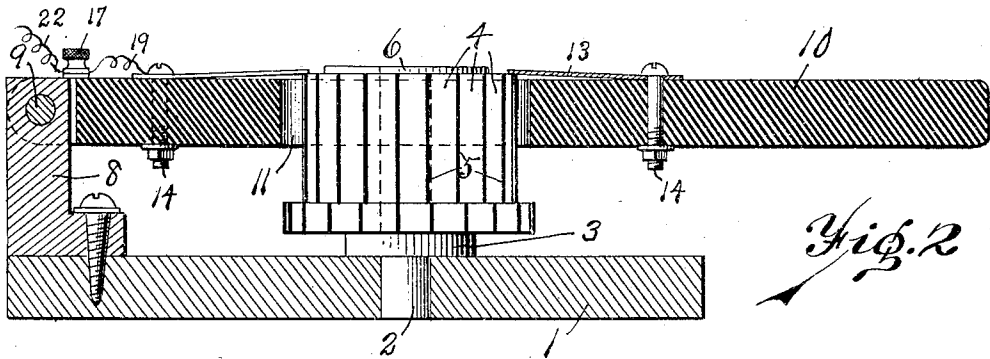


Fig. 2

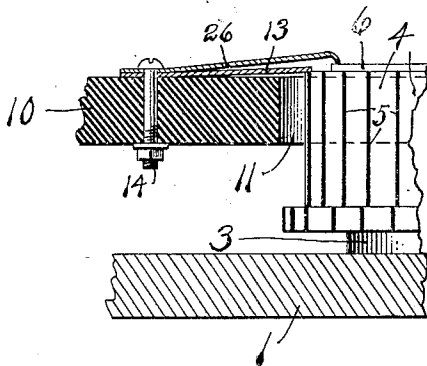


Fig. 3

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COMMUTATOR-INSULATION-TESTING DEVICE.

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To all whom it may concern:

Be it known that I, JASPER F. CULLIN, a citizen of the United States, and residing at Detroit, in the county of Wayne and State of Michigan, have invented a new and Improved Commutator-Insulation-Testing Device, of which the following is a specification.

This invention relates to means for determining whether or not the segments of the commutators of electric dynamos or motors are properly insulated from each other and from the core, and consists in means for connecting the core and alternate commutator segments to one end and the other segments to the other end of a normally open electric circuit including an indicator, so that, should any segment be short circuited or grounded, this fact may be made known. It consists particularly of a support for the commutator, a contact carrier, a series of spring contacts, one for each commutator segment, two electric circuits, one connecting alternate contacts in series and the other circuit connecting the remainder of the contacts in series, and an indicator in one of the circuits. It also consists in providing an additional spring contact for the core of the commutator and in connecting this contact to one of the series of segment contacts.

In the accompanying drawing, Figure 1 is a plan of this testing mechanism. Figs. 2 and 3 are sections on the line 2-2 and 3-3 of Fig. 1, respectively.

Similar reference characters refer to like parts throughout the several views.

Commutator segments are practically universally of copper and mounted on a steel core and insulated therefrom and from each other by means of strips of mica. This insulation sometimes becomes broken during the assembling of the commutator and the present device is designed to determine whether any break in the insulation has occurred. No special attempt is made to locate the break, as every break in the insulation necessitates disassembling the commutator.

In the drawing, 1 is a base on which is

mounted a pin 2 having a collar 3 to center and support the commutator, which is shown to have an odd number of segments or bars 4, separated by strips 5 of insulation, usually mica. The core 6 is formed in the usual manner and is insulated from the segments by means of rings 7 and strips of mica (not shown), in any desired manner. The manner of insulating the segments from each other and from the core forms no part of this invention, it being understood that in substantially all electric machines now in use or being built, the commutator segments must be insulated in some manner, and that the electric machine is defective when such insulation is broken.

A small pedestal 8 carries a pin 9 on which the contact carrier 10 is mounted, provided with a central hole through which a commutator may project. On this carrier are secured the contact springs 12 and 13 in any desired manner, bolts 14 being shown, and these contact springs are united into two series by means of the wires 15 and 16, alternate springs belonging to one series, and the two series being connected to the posts 17 and 18 by the wires 19 and 20. Line wires 22 and 23 may connect these posts to the usual lighting mains of the factory. A current indicator 28 of any desired character, an electric lamp preferred, may be connected into one of these circuits.

These wires may be on either side of the carrier and the current is on at all times. When the commutator is in position and the carrier is brought down, a contact will engage each segment. If an odd number of segments are present, a contact spring 24 is preferably connected to the adjacent contact spring 12 by means of a wire 25. The engagement of the contacts with the segments is but momentary and, as the carrier is lifted, the operator observes the indicator to determine whether any current passes, for this occurs if there is a short circuit between segments. If there is no indication of current, he turns the commutator the distance of one segment and again engages the contact springs. Any arcing at any of the contacts indicates a short

circuit between the segment engaged thereby and another segment or the core.

An additional contact 26 is mounted on the carrier 10, and preferably secured in position by a bolt 14 that also secures a contact 13. This contact 26 engages the core, and so, if any of the contacts 12 or 24 engages a segment which is not insulated from the core, the indicator 28 will announce this fact and arcing will occur between this contact 26 and the core as the carrier 10 is lifted. The commutator is turned one step and the test is repeated in order to determine whether any of the other segments are grounded.

By this simple mechanism the insulation of these commutator segments may be quickly tested. The proportions and sizes of the various parts of this device may all be changed by those skilled in the art without departing from the spirit of my invention as set forth in the following claims.

I claim:

1. In combination, a shaft upon which a commutator may be mounted, a contact carrier, a series of contacts adapted to engage alternate segments of the commutator, a conductor connecting the contacts in series and to one pole of a current source, a second series of contacts adapted to engage the remaining segments of the commutator, and a separate conductor connecting the second group of contacts in series and to the other pole of said current source.

2. In combination, a base and a shaft thereon upon which a commutator may be mounted, a contact carrier pivotally mounted on said base and having a central opening and adapted to be swung down over the commutator, a series of radial contacts mounted on the carrier and adapted to engage alternate segments of the commutator, a conductor connecting the contacts in series and one pole of a current source, a second series of radial contacts mounted on the carrier and adapted to engage the remaining segments of the commutator, and a separate conductor connecting the second series of contacts to the other pole of the current source.

3. In combination, a base and a shaft thereon upon which a commutator may be mounted, a contact carrier pivotally mounted on said base and having a central opening and adapted to be swung down over the commutator, a series of radial contacts mounted on the carrier and adapted to engage alternate segments of the commutator, a conductor connecting the contacts in series and one pole of a current source, a second series of radial contacts mounted on the carrier and adapted to engage the remaining segments of the commutator, a separate conductor connecting the second series of contacts to the other pole of the current source, and an additional contact connected to one of the conduc-

tors and adapted to engage the core of the commutator.

4. In combination, a base and a shaft thereon upon which a commutator may be mounted, a contact carrier pivotally mounted on said base and having a central opening and adapted to be swung down over the commutator, a series of radial contacts mounted on the carrier and adapted to engage alternate segments of the commutator, a conductor connecting the contacts in series and one pole of a current source, a second series of radial contacts mounted on the carrier and adapted to engage the remaining segments of the commutator, a separate conductor connecting the second series of contacts to the other pole of the current source, and an additional contact connected to one of the conductors and adapted to engage the core of the commutator, said contacts being evenly spaced and attached at their outer ends to the carrier and pointing toward a common center.

5. In combination, a support upon which a commutator may be rotatably mounted, a contact carrier and two series of contacts mounted on the carrier and each series adapted to engage alternate segments of the commutator, and electric conductors connecting the contacts into two series.

6. In combination, a shaft upon which a commutator may be mounted, a contact carrier, a series of contacts adapted to engage alternate segments of the commutator, a conductor connecting the contacts in series and to one pole of a current source, a current indicator connected into said conductor, a second series of contacts adapted to engage the remaining segments of the commutator, and a separate conductor connecting the remaining contacts in series and to the other pole of said current source.

7. In combination, a base and a shaft thereon upon which a commutator may be mounted, a contact carrier pivotally mounted on said base and having a central opening and adapted to be swung down over the commutator, a series of radial contacts mounted on the carrier and adapted to engage alternate segments of the commutator, a conductor connecting the contacts in series and one pole of a current source, a current indicator connected into said conductor, a second series of radial contacts mounted on the carrier and adapted to engage the remaining segments of the commutator, and a separate conductor connecting the second series of contacts to the other pole of the current source.

8. In combination, a base and a shaft thereon upon which a commutator may be mounted, a contact carrier pivotally mounted on said base and having a central opening and adapted to be swung down over the commutator, a series of radial contacts

mounted on the carrier and adapted to engage alternate segments of the commutator, a conductor connecting the contacts in series and one pole of a current source, a second
5 series of radial contacts mounted on the carrier and adapted to engage the remaining segments of the commutator, a separate conductor connecting the second series of contacts to the other pole of the current source, a current indicator connected into one of said 10 conductors, and an additional contact connected to one of the conductors and adapted to engage the core of the commutator, said contacts being evenly spaced and attached at their outer ends to the carrier and pointing toward a common center. 15

JASPER F. CULLIN.