UNITED STATES PATENT OFFICE.

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DEVICE FOR UNDERCUTTING COMMUTATOR INSULATION.

1,356,810.

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 Device for Undercutting Commutator Insulation, of which the following is a specification.

This invention consists in a pair of supports for the shafts of the armatures of electric motors and generators, and a reciprocating device embodying a saw moving longitudinally of these shafts whereby the insulation between the segments of the commutators may be removed to a pre-determined depth.

This invention further consists in means for elevating the shaft support adjacent the commutator ends of the armatures in order that the commutators may be pressed against the reciprocating cutter.

It also consists in movably mounting one of the supports in order that the armature shafts may be swung out of alinement with the reciprocating cutter so that the reciprocating cutter may operate to remove the insulation between segments of the commutator when these are at an angle instead of being secured longitudinally of the shaft.

It also consists in the details of construction illustrated in the accompanying drawings and particularly pointed out in the claims.

In the drawings, Figure 1 is a plan of this improved insulation removing mechanism. Fig. 2 is a side elevation thereof. Fig. 3 is a view on a larger scale of the cutter bar and a commutator positioned beneath it. Fig. 4 is a section on the line 4—4 of Fig. 1. Fig. 5 is an elevation of a foot lever for raising the commutators.

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

Referring to the drawings, 1 is a base of any desired character on which is mounted a block 2 which constitutes a support for the anti-friction bearing sleeve 3 in which is mounted a shaft 4, any desired means being provided to keep this shaft from moving endwise, a pin 5 being shown in the drawing extending down across a groove 6 in the shaft. On one end of this shaft is a pulley 7 by means of which the shaft may be driven, while the other end of the shaft is formed with a crank pin 8 on which is mounted a collar 9, preferably of hard steel, which is held in place by means of the washer 10 and the screw 11.

Slidable in this support 2 and held in position by the plate 13 and screws 14 is a cutter 60 bar 15 which has secured to one end the bearing plates 16 and 17 which are held spaced to properly engage the collar 9 by means of the small blocks 18 and the screws 19. At the opposite end of this bar 15 in a rectangular depression is a short piece 20 of hack-saw material held in position by screws 21. The bar 15 is reciprocated horizontally by means of the crank pin 8.

Mounted on a pin 23 carried by the block 70 2 is a supporting lever 24 having a V-groove 25 at one end and which is connected at the other end by means of a link 26 to the foot lever 27 which is pivoted on a small pedestal 28. Depression of the end 29 of this foot lever will elevate the notched end of the lever 24. It is apparent that this foot lever may be at any desired angle to the supporting lever 24 so as to accommodate the workman.

A plate 31 is movably secured to the base 80 by means of a bolt 32 and at its opposite end it carries a pedestal 33 provided with a V-groove 34. The plate also has a slot 35 into which extends a pin 36 connected to the base 1. This plate 31 may be swung upon the screw 32 within the limits fixed by the slots 33 and the pin 36.

An armature 38 and its shaft 39 are shown in dotted lines resting in the V-grooves 25 and 34 in such position that the commutator 40 is just below the saw 20. The insulations 42 between the copper segments of these commutators are usually of mica which is much harder than the copper. Ridges of mica are therefore left on the surface of the commutator after the machine has been in use only a comparatively short time because the copper between these ridges wears faster than the mica. After such wear has begun, arcing takes place and the copper soon becomes pitted. It is, therefore, desirable to undercut the mica so as to leave a substantially continuous surface of copper, the unfilled spaces between the segments not having any effect.

The workman takes an armature and shaft and places its journals in the V-grooves 25 and 34, the end of the shaft being positioned by means of the small pin 44 in the groove 34 shown in Fig. 1. The 110
shaft is then rotated until an insulation 42 is immediately below the saw blade 20 and the plate 31 is swung, if necessary, so as to carry the bearing 34 laterally until the insulation is in exact alignment with the saw 20. This adjustment need usually be made only once for each commutator. The foot lever 27 is then depressed to bring the commutator up against the saw 20, which immediately undercut the mica beneath it to the desired depth. The operation is extremely rapid, and the lever 29 is soon released and is moved upward by a spring 46 which permits the groove 25 to descend and carries the commutator out of engagement with the saw. The workman now turns the armature so as to bring a new insulation underneath the saw and again depresses his foot lever.

When the operator is skilled and all the parts are in proper relation to each other, the undercutting of the insulation of a commutator need not require more seconds than the number of segments in the commutator.

The machine is so simple and has so few parts to get out of order that the cost of upkeep is merely nominal. In every large shop hack-saw blades become broken or merely worn at a few points so that the raw material for these blades 20 is always on hand.

The details and proportions of this undercutting machine may all be modified by those skilled in the art without departing from the spirit of my invention as set forth in the following claims.

I claim:

1. An undercutting machine for the insulations of armature commutators, the combination of a reciprocating bar and a saw blade connected thereto, a pair of supports for the armature shaft, and means to elevate one of the supports to bring the commutator in engagement with the saw.

2. In an undercutting machine for the insulations of armature commutators, the combination of a longitudinally reciprocating bar and means to actuate the bar, a guide to support the bar, a cutter blade connected thereto, a pair of supports for the armature shaft, one of said supports being movable laterally, and means to move the other support vertically toward and from the cutter.

3. In an undercutting machine for insulations of armature commutators, the combination of a base and a block mounted thereon, a shaft mounted in the block and means to rotate the shaft, a cutter bar slidable in the block and a toothed cutter secured to one end thereof, a cam and slot connection between the opposite end of the bar and the shaft, a lever pivoted on the block to move in a plane at right angles to the cutter bar and having a V-groove below the cutter, said lever being adapted to support one end of the armature shaft, means to swing the lever on its pivot, and laterally movable means to support the opposite end of the armature shaft.

4. In an undercutting machine for the insulations of armature commutators, the combination of a longitudinally reciprocating bar and means to actuate the bar, a guide to support the bar, a cutter blade connected thereto, a vertically movable support for the commutator end of the armature shaft, and a laterally movable support for the opposite end of the armature shaft.

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