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CLEANER FOR MACHINE SWITCHING BANKS

Filed Oct. 23, 1924

2 Sheets-Sheet 1

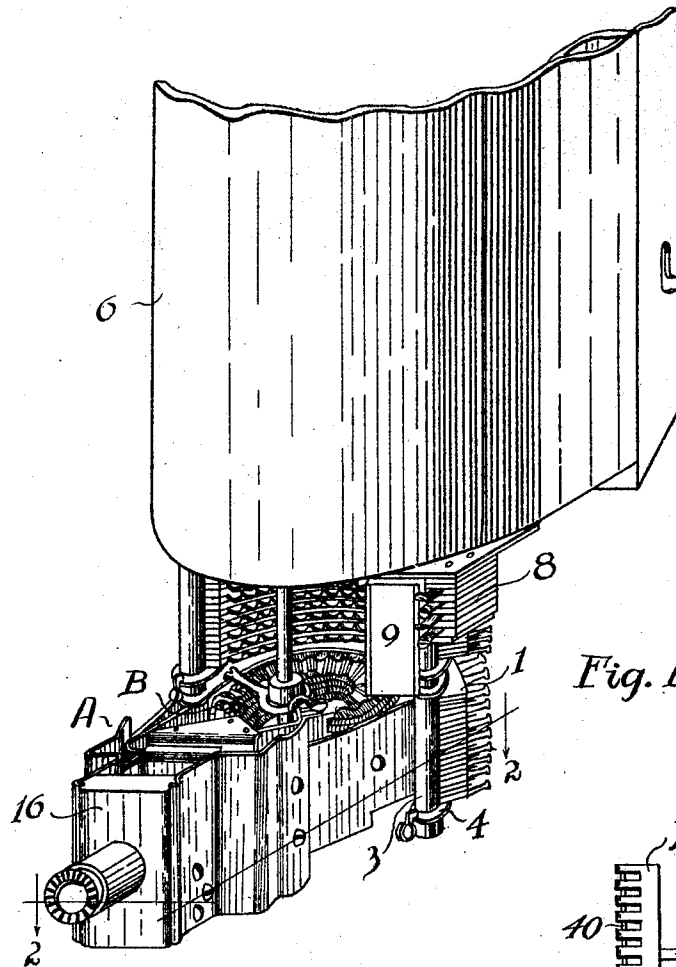


Fig. 1

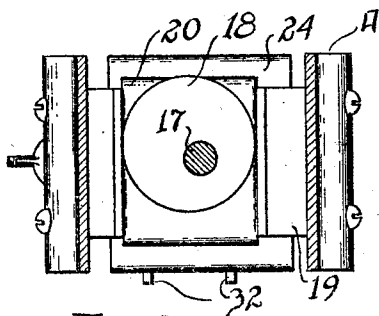


Fig. 7

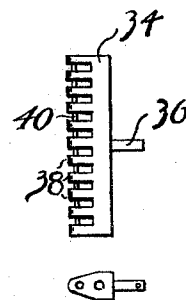


Fig. 6

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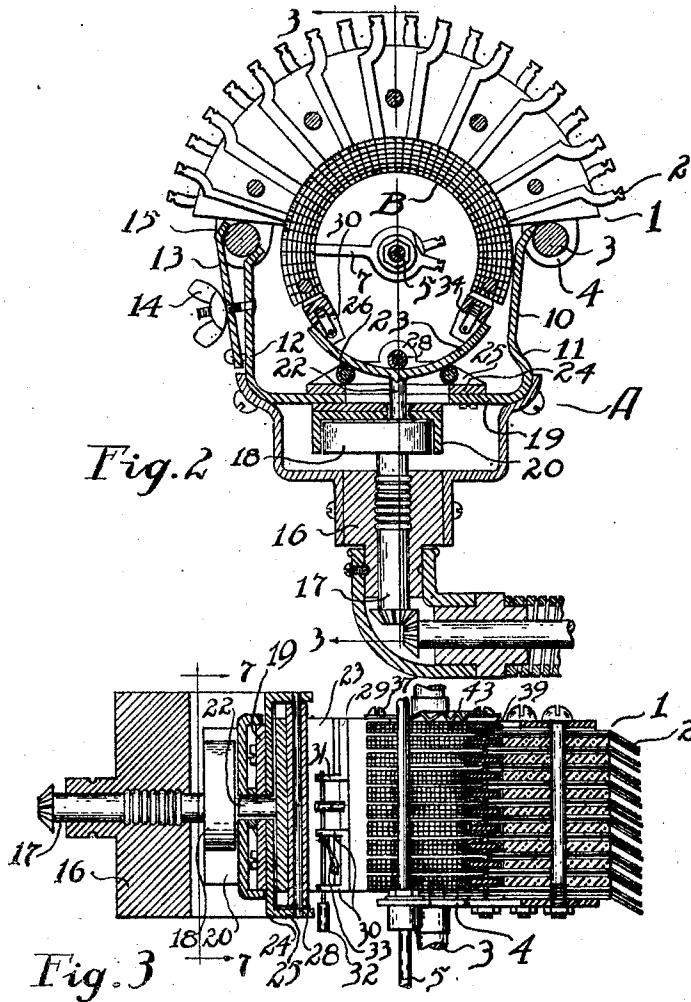
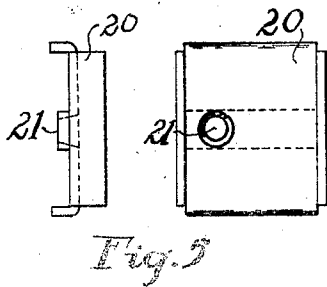
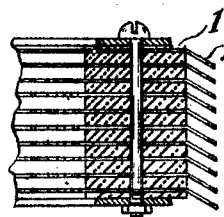
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CLEANER FOR MACHINE SWITCHING BANKS

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2 Sheets-Sheet 2



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UNITED STATES PATENT OFFICE.

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CLEANER FOR MACHINE-SWITCHING BANKS.

Application filed October 23, 1924. Serial No. 745,531.

The present invention relates to a mechanical cleaner for machine switching apparatus.

In a machine switching apparatus of a type employing a plurality of super-imposed segmental banks of contact terminals of the type commonly known as the Strowger or step-by-step type, it is desirable to keep the contact terminals thereof free from dust and foreign matter, which is carried by the air and which may settle on the contact terminals to prevent electrical contact therewith of a brush or wiping member to complete a call.

An object of the present invention is to make a mechanical cleaner for machine switching apparatus.

Another object is to clean an article by a mechanically operated, oscillatory, cleaning device.

Another object is to clean simultaneously a plurality of superposed segmental contact banks of a machine switching apparatus.

In order to attain these objects there is provided, in accordance with one feature of the invention, a frame which lockingly engages a portion of a machine switching apparatus, a plurality of arcuate cleaning members to fit between the superposed banks of such machine switching apparatus, and mechanically actuated means operatively connected to the arcuate cleaning members to cause an oscillatory movement thereof to clean said banks.

These and other features of the invention will be more specifically brought out in the following description and the accompanying drawings, wherein:

Figure 1, shows a view in isometric projection of a portion of a machine switching apparatus with a cleaning mechanism made in accordance with the present invention connected thereto.

Figure 2, is a view in horizontal section of Figure 1, taken on the line 2—2 of Figure 1.

Figure 3, is a view in vertical section on the line 3—3 of Figure 2.

Figure 4, is a view in vertical section of a portion of a switch bank of a different type from that shown in Figure 3.

Figure 5, shows a top and side elevation respectively of a channeled slide member employed in the cleaning mechanism.

Figure 6, shows a top and side elevation

respectively of an end of a cleaning member; and

Figure 7, is a sectional view on the line 7—7 of Figure 3.

Referring to the drawings in detail, a switch bank 1 may be composed of superposed arcuate strips of insulative material having contact members 2, which may be of brass gripped between the layers of insulative material in a well known manner. Banks are usually mounted in pairs, one above the other, as shown in Figure 1, and are affixed in position on posts 3 at either end of each bank by means of metallic strips 4 integrally connected to the top and bottom of each bank.

A rod 5 is positioned centrally of the arc of switch banks 3 and extends upward into a container 6 where it is operatively associated with mechanism contained therein to actuate the rod to bring wipers 7 carried by the rod 5 into electrical contact with a predetermined pair of terminals in an upper and a lower bank in a well known manner. The wiper 7 in Figure 1 is associated with the upper bank, and a second similar wiper, not shown, is positioned on rod 5 to be associated with the lower bank. The wipers are positioned, when the rod 5 is in a normal, unoperated condition, one step below and to the left of the switch banks.

A test jack 8 is affixed to the right side of the upper bank, and to the test jack, and extending inwardly therefrom is a tag holder 9 which is used to contain designating indicia for the switch upon which it is mounted. The cleaning mechanism of applicant's invention comprises a U-shaped frame A, a leg 10 of which is curved inwardly at 11 to clear a tag holder 9 carried by switch 1, the end of leg 10 being bent outwardly to engage post 3. The other leg 12 of the U-shaped frame is bent inwardly at the end thereof and a clamp member 13 is pivotally connected to leg 12. A thumb screw 14 is connected to the leg 12 to operate upon the outer surface of clamp member 13 to draw it toward the leg 12 so that an inwardly bent end 15 of the clamp engages post 3 to hold the device in position thereon.

A shaft housing 16, integral with the frame A, rotatably carries a shaft 17 upon which is affixed an eccentric cam 18. Slidably mounted upon a cross member 19 of the U-shaped frame in a manner to receive the

cam therein is a channeled member 20, the side walls of which are acted upon by the periphery of the cam to receive a reciprocatory motion therefrom when said cam is rotated. The channeled member is provided with an opening 21 which receives a post 22 integrally connected to an oscillating member 23 which is arcuate in cross section and is concentric with the interior face of switch banks 3. Integrally affixed to the lower surface of cross member 19 is a plate 24 between bent up sides 25 of which are affixed in a manner to rotate freely therebetween rollers 26, 27, and 28. Rollers 26 and 27 are positioned to engage the outer curved surface of arcuate member 23, and roller 28 is positioned to engage the inner surface thereof, when arcuate member 23 is mounted in an operative position in the frame.

The ends 29 of arcuate member 23 are each bent inwardly to lie in a plane coincident with a radius of the arcuate member 23. The central portion of each inwardly bent end of member 23 is stamped up to form supports 30 and 31. A locking pin 32 is slidably connected to the support members 30 and 31, having a released position in which it is slid outwardly to be clear of the space intermediate the members 30 and 31, and a locking position where it is slid inwardly to extend across the space between said members. A spring 33 connected to the ends 29, is positioned to engage an annular flange on locking pin 32 to hold the pin in position when said pin is pushed in to a locking position.

A cleaning member B is composed of two end portions 34 and 35, to the back of each of which is affixed a perforated post 36, located in the central portion thereof. Affixed to the upper end of each end member, by means of a screw 37, is an arcuate strip 43 of thin spring metal such as spring brass which is preferably corrugated. A plurality of lugs 38 are provided on each of the end members 34 and 35 and these lugs are spaced apart so that the space between each pair of lugs shall be opposite a space between two adjacent rows of contact terminals on the inner face of a switch bank when the device is in operative position thereon. A plurality of arcuate cleaning leaves 39 are secured to the end members by means of pins 40 which extend entirely through all of the lugs 38, and through an end of each of the arcuate cleaning leaves. Each arcuate cleaning leaf comprises a stiff central portion which may be of fiber board, and a covering therefor which may be of cloth or similar material. It is to be understood that the structure of the cleaning leaves is not essential and that any cleaning member suited for the purpose will come within the spirit and scope of the invention.

The spring member 43 is normally posi-

tioned to lie in a plane extending slightly downward from that of the top surface of end members 34 and 35 so as to maintain a pressure upon the top surface of the upper cleaning leaf.

Certain types of switch banks are of the structure shown in Figure 3, where each terminal comprises an upper and a lower contact point separated by a strip of mica or other insulating material. In another type of switch bank each terminal comprises but one contact point (see Figure 4). It is apparent that the same cleaning leaf would not be suitable for both types of banks since the separation between rows of terminals is greater in a bank of the type shown in Figure 4, than that in Figure 3. A cleaning member having thicker leaves is, therefore, required to clean a switch of the type shown in Figure 4 than that required to clean a switch of the type shown in Figure 3, and, since the cleaning member is removable, a cleaner for each type of bank may be provided and used interchangeably with the same operative mechanism.

The operation of the device is as follows:

A cleaning member B is inserted in a switch bank 1, the rows of contact terminals of the switch acting as guides to cause each leaf of the cleaning member to enter a space between adjacent rows of contact terminals. The spring 43 presses the top cleaning leaf into intimate contact with the upper row of contact terminals. The other leaves, being of a thickness to have a fairly snug fit between the rows of contact terminals, require no additional pressure to bring them into intimate contact with the contact terminals to be cleaned. The under side of the lower row of contact terminals does not collect sufficient dust to require a vigorous cleaning action and, therefore, it is not necessary to provide a spring member to hold the bottom cleaning leaf in intimate contact with terminals.

After inserting the cleaning member B in position in the switch bank the bent end of leg 10 of the U-shaped frame A is hooked into engagement with bank post 3. The frame A is then moved forward into an operative position, and clamp member 13 is forced by the wing nut 14 to grip post 3 to hold the frame in position. The perforated posts 36 are now in position between the members 30 and 31 and the locking pins 32 may be manually pushed upward to engage the perforations in posts 36 to lock the cleaning member B onto the arcuate oscillating member 23. The device is then set in operation by rotating the shaft 17 which causes the cam 18 to move the channeled member 20 back and forth on cross member 19 of the U-shaped frame. This in turn moves post 22 and oscillates arcuate member 23. The arcuate member is held in position between

the three rollers 26, 27, and 28, and these three rollers being positioned to define an arc of a circle having a curvature equal to that of arcuate member 23, cause said arcuate member to oscillate about its center of curvature. The cleaning leaves 39 being concentric with arcuate member 23 and also with the segmental switch banks 1, are moved so that the curved leaves pass back and forth across the contact terminals to thoroughly clean them.

What I claim is:

1. A switch cleaning device, comprising a laminated arcuate cleaning member, a perforated lug on each end thereof, and means to connect the lugs to an oscillating plate to oscillate said cleaning member.

2. A switch cleaning device, comprising a frame, an arcuate plate mounted for oscillation therein, means to oscillate said arcuate plate, and cleaning means removably connected to the arcuate plate to oscillate about the center of curvature of said arcuate plate to clean a switch.

3. A switch cleaning device, comprising a frame, a shaft rotatably mounted therein, arcuate cleaning means removably carried by the frame to oscillate with respect to said frame, and cam means carried by the shaft and having operative connection with the arcuate cleaning members to impart an oscillatory motion thereto.

4. A switch cleaning device, comprising a supporting frame, clamp means to connect the frame to a switch, a housing in said frame, a shaft journaled through said housing, a plate mounted to oscillate about a vertical axis operatively connected to said shaft, retaining pins connected to said plate, said retaining pins having an operative position and an inoperative position, and arcuate cleaning members having perforations in the ends thereof to be penetrated by the retaining pins when in an operative position to hold the cleaning members in a predetermined position with respect to the oscillating plate.

5. A switch cleaning device, comprising a plurality of superposed arcuate leaves, holding means connected to the end of said leaves, resilient means connected to the holding means and contacting with one of said superposed leaves to urge it at an angle to the plane of said leaf, a frame, means to

removably connect the frame to a switch, a shaft rotatably mounted in said frame, a plate slidably connected to the frame and operatively associated with the shaft to be reciprocated by a rotation thereof, a plurality of rollers connected to the frame, an arcuate member mounted to oscillate between said rollers, a support carried by the arcuate member and operatively associated with the reciprocating plate to oscillate said arcuate member, and retaining pins carried by the arcuate member to engage the holding means connected to the ends of the arcuate cleaning leaves to oscillate said cleaning leaves to clean a switch.

6. A switch cleaning device, comprising a frame, a shaft rotatably mounted in said frame, a plurality of rollers mounted transversely of the frame and positioned to support for oscillation an arcuate plate of a predetermined thickness and curvature, a plate oscillatably supported by said rollers, means operatively connecting the shaft to the oscillating plate to oscillate said plate upon a rotation of said shaft, retaining means connected to said oscillating plate, an arcuate cleaning member removably connected to the oscillating plate by the retaining means to oscillate about the center of curvature of said oscillating plate.

7. A switch cleaning device, comprising a frame, clamp means to removably support the frame on a switch, a housing carried by said frame, a shaft rotatably mounted in said housing, cam means integrally connected to said shaft, a plate slidably connected to the frame and connected to said cam means to be reciprocated by a rotation thereof, an arcuate plate of a predetermined thickness and having a predetermined curvature, friction reducing means mounted transversely of the frame to support said arcuate plate for oscillation therebetween, means connecting the arcuate plate to the reciprocating plate to oscillate said arcuate plate upon a reciprocation of said reciprocating plate, and cleaning means removably connected to the arcuate plate to be oscillated about the center of curvature of said arcuate plate upon an oscillation thereof to clean a switch.

In testimony whereof I affix my signature.

WALTER F. KANNENBERG.