

Jan. 5, 1932.

G. LINTON ET AL
SWITCH CLEANING DEVICE

1,840,116

Filed Oct. 7, 1926

3 Sheets-Sheet 1

Fig. 1.

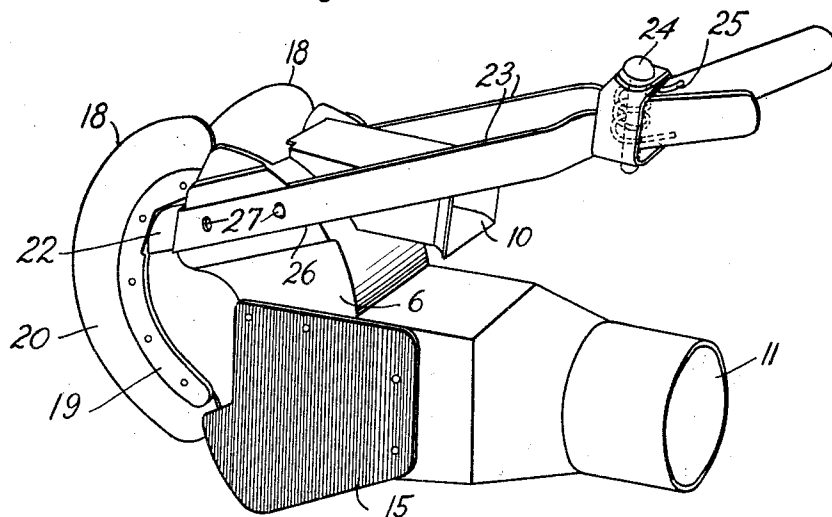
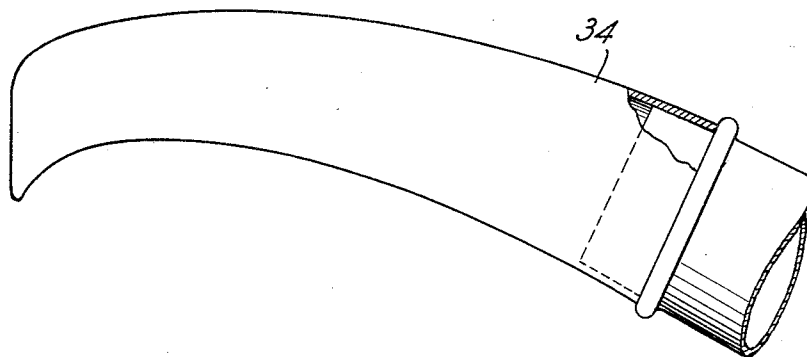


Fig. 2.



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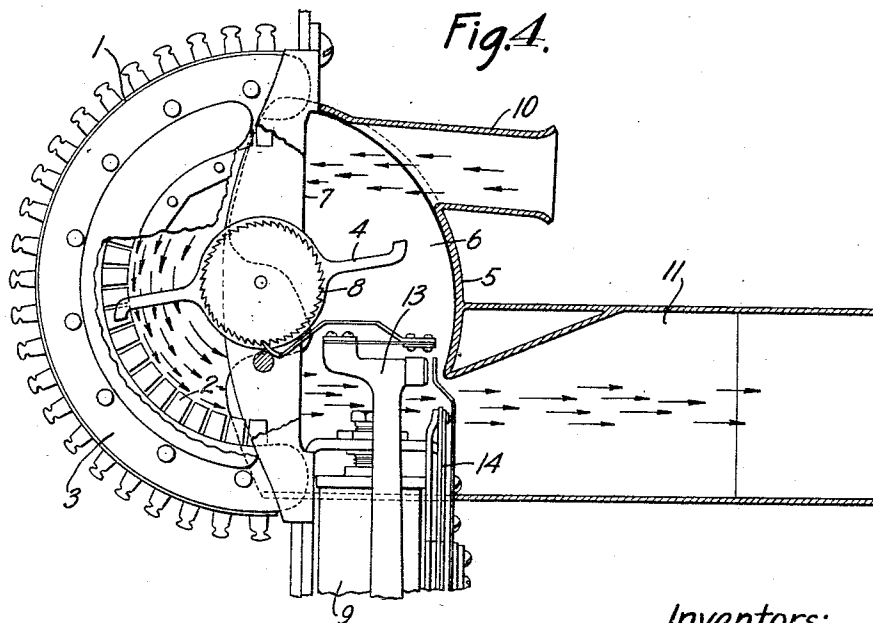
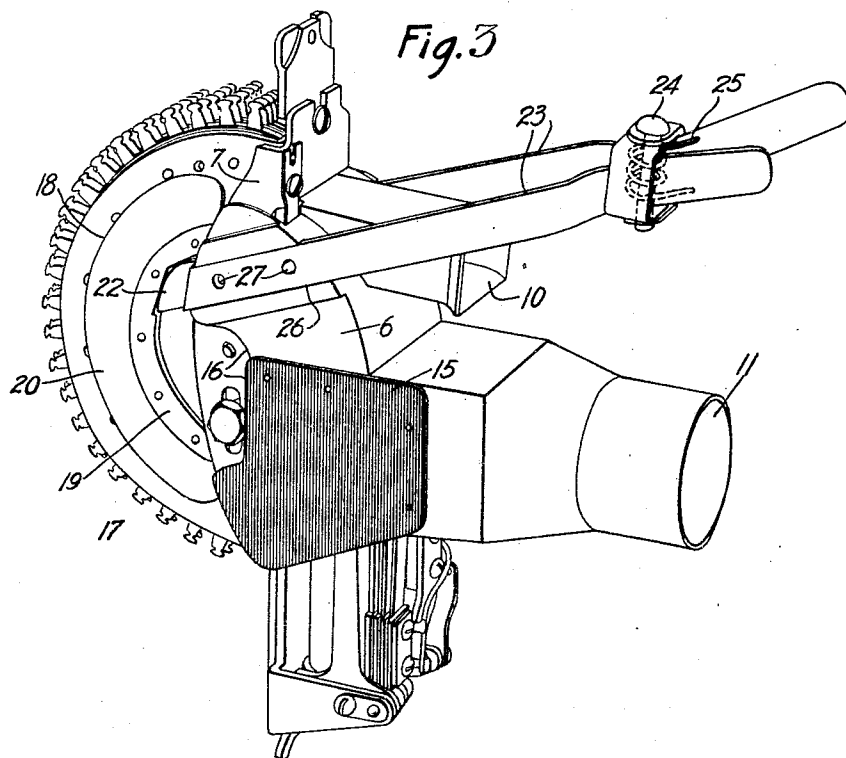
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Fig. 5.

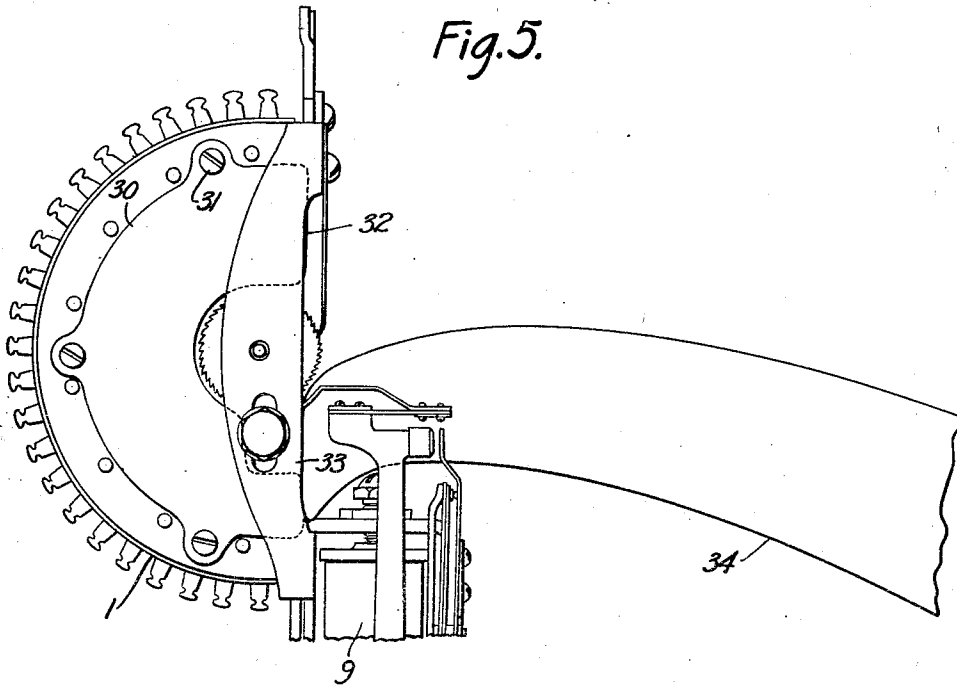
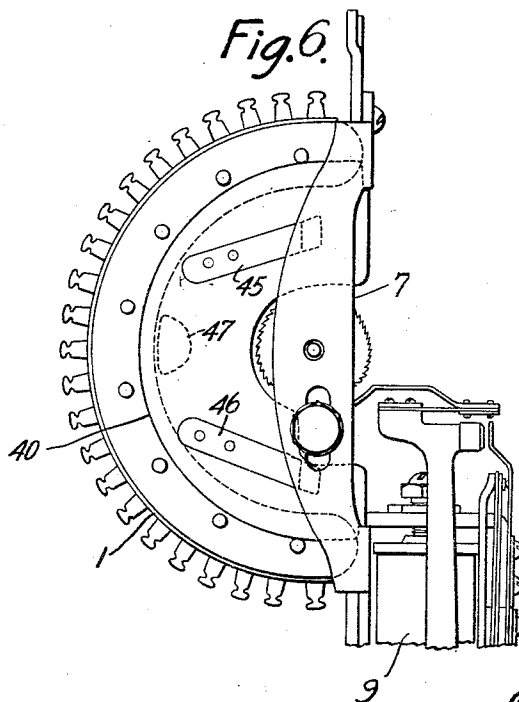


Fig. 6.



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UNITED STATES PATENT OFFICE

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SWITCH CLEANING DEVICE

Application filed October 7, 1926. Serial No. 140,046.

This invention relates to cleaning devices employing air currents and more particularly to devices of this type for cleaning switches.

5 The object of this invention is to attain effective cleaning of selector switch terminal banks by currents of air drawn through the banks by any suitable suction apparatus whereby the dust which may have collected
10 on the terminals of the bank may be dislodged and collected in a suitable container or otherwise disposed of in a manner to prevent it from settling on surrounding objects.

A device for cleaning switches constructed
15 in accordance with this invention may for example, in the case of rotary switches having semi-circular terminal banks, consist of plates or cowl members attachable to the ends of a terminal bank to form with the
20 switch structure an air passage past the terminals of said bank. This arrangement may be used in combination with conventional dust collecting apparatus so applied to one end of said air passage that the dust particles
25 dislodged from the terminals of the bank by the current of air created by said apparatus are effectively removed from the switch and collected by said dust collecting apparatus.

This invention has been illustrated in the
30 accompanying drawings, in which three different modifications have been shown. Fig. 1 shows in perspective the preferred form of the vacuum cleaning attachment in accordance with the invention. Fig. 2 shows a simplified form of suction nozzle. Figs. 3 and 4
35 illustrate the preferred form as applied to a rotary switch of the type commonly used in automatic telephone offices. Fig. 3 is a perspective view of such a switch with a structure in accordance with this invention applied thereto, while Fig. 4 is a partial longitudinal cross-section of the arrangement shown in Fig. 3. Fig. 5 shows the modified
40 form of nozzle shown in Fig. 2 applied to the same type of switch. Fig. 6 shows another modification of the invention similar to that shown in Fig. 5.

Reference may now be had to Figs. 1, 3 and 4. It should be understood in connection
50 with these two figures that although rotation

of the brushes is not contemplated as a necessary part of the cleaning operation, it is desirable to provide an arrangement that can easily be clamped onto a switch regardless of whether the switch is idle or is in operation. Hence, to construct the desired air passage
55 past the terminals 2 of the semi-circular switch bank 3 of this switch 1 and yet not interfere with the normal functions of the switch and particularly its brushes 4, a semi-cylindrical box-shaped cover or casing 5 is
60 provided which is so shaped that it can be readily placed over the open side of the switch structure. The semi-circular end plates 6 of the cover or casing 5 are fitted over the end pieces of the frame 7 of the switch. This switch frame 7 serves, as is evident from the drawings, as a mounting for the switch bank and stepping magnet and as bearings
70 for the shaft on which the brushes 4 and the usual ratchet wheel 8 driven by the stepping magnet 9 are mounted. The cover is provided with an inlet duct 10 and an outlet nozzle 11. The nozzle 11 is of a cross section to fit the usual standard size air hose of a suction dust collecting apparatus. The duct 10
75 is preferably of a smaller cross-section than 11. The bottom portion of the cover 5 is cut away to clear the stepping magnet structure 9 with its stepping pawl 13 and spring contact arrangement 14. One side wall 6 of the cover 5 is cut away at a point opposite the
80 stepping magnet 9 and a plate 15 of insulating material is attached to the side wall 6 to complete the closure of the side wall. The side wall is constructed of insulating material at this point to guard against having this side of the cover come into electrical contact with the stepping magnet structure 9 and the spring contact arrangement 14. A clearance
85 is also made in this side plate 6 and its insulated portion 15 at 16 for a stop screw employed to adjust the pawl 13.

In the particular arrangement of Figs. 1, 3 and 4 the ends of the terminal bank itself
95 are covered by semi-circular plates such as 18, one on each end of the bank. These plates may consist of an inner semi-circular portion 19 of metal and an outer portion or gasket 20 of a flexible material such as rubber sheet.
100

End plates constructed in this manner serve to provide a substantially air-tight cover for the ends of the terminal bank, as will hereinafter be described. In the arrangement 5 shown, the plates 18 are connected respectively at 22 to handles 23 pivoted together at 24 and normally held by a spring 25 so as to press the plates 18 closely against the ends of the terminal bank. The handle 23 incidentally serves to secure the cover 5 in place 10 by being fitted into recessed portions 26 in the plates 6 and having lugs 27 registering with holes (not shown) in the recessed portions 26 and by being bent inwardly near the ends 22 15 over the switch frame 7.

To prepare for the cleaning of a switch by means of the device hereinbefore described, the cover 5 is first placed in position to enclose the open front side of the switch bank 20 and then the outer ends of the handles 23 carrying the side plates 18 are pressed to separate the plates to such an extent that they may be passed over the side walls 6 of the cover. The handles 23 are then released, 25 thereby permitting the plates 18 to tightly engage the sides of the terminal bank with the lugs 27 registering with the corresponding holes in the plates 6. Suction is then applied from a suction dust collecting device which 30 may be connected by means of an air hose to the suction nozzle 11. Experimentation has shown that with this structure the main body of the air stream created by the suction apparatus will pass through the inlet duct 10 35 around the shaft holding the brushes 4 over the terminals 2 and out through the nozzle 11, as indicated by the arrows. This path is followed rather than the shorter path from the inlet duct 10 directly to the nozzle 11, by 40 virtue of the shape and positioning of the duct 10 with relation to the terminals as shown in Fig. 4 and the momentum acquired by the air during its passage through this inlet duct. It should be noted that, with the 45 correct relation between the strength of the air stream and the flexibility of the gaskets 20, the latter will be drawn tightly against the sides of the terminal bank to create a substantially air tight passage around the bank. 50 This, coupled with the fact that the air stream is directed along the path indicated, causes the removal of dust particles from the portions of the switch forming part of the enclosing wall of the passage, to wit, terminals, brushes and the ratchet mechanism. 55

Referring now to the modified form of the invention as represented by Fig. 5, semi-circular plates 30 are shown permanently secured to the sides of the terminal bank 1 by 60 means of screws such as 31.

A further modification of the invention, as represented in Fig. 6, is similar to that shown in Fig. 5, except that the end plates 40 in this case are so constructed as to be easily 65 inserted on switches already in position on

frames. As shown, semi-circular plates 40 fit snugly against the sides of the terminal bank and each is provided with two flat springs 45 and 46 that rest under tension with their free ends against the insides of the supporting frame 7 to hold the plates in place. A raised portion, such as 47, on the inner side of each plate is provided to locate the plates correctly and to prevent them from shifting from the proper position. 70 75

In the two modifications of the invention represented in Figs. 5 and 6 cleaning can be conducted in conjunction with the use of a built-up cover member incorporating an inlet duct and an outlet nozzle substantially similar to cover 5 of Figs. 3 and 4, but the need of using the special temporary cowl arrangement constituted by the parts 18, 19, 20, 22, 23, 24, 25, and 27 of Figs. 1, 3 and 4 is obviated. The general method of cleaning 85 described may therefore be considerably facilitated by the use of the permanent cowls of Figs. 5 and 6.

It should be noted in connection with the modification shown in Figs. 5 and 6, that if 90 the switches are of a type such that the brushes do not rotate beyond the front of the switch frame or have been made artificially busy so that the brushes cannot rotate beyond the front of the bank, cleaning may 95 be conducted by using a simple form of nozzle such as 34, represented in Figs. 2 and 5. When using nozzle 34, the air passage is formed merely by the side plates and the inner surface of the bank 1 and the tips of the terminals 4 projecting therefrom, and the passage may therefore be considered as beginning at the point 32 and ending at the point 33. When the nozzle 34 is used with 100 a switch made busy, and in which the brushes may occupy any position when made busy, the nozzle 34 may be placed either at 32 or at 33 dependent on the particular position in which the brushes are found. 105

The nozzle 34 is attached to the usual suction hose of a suction dust collecting apparatus and may be so shaped as to fit snugly in the opening at 33 or 32. It may be shaped as shown to prevent it coming into contact with the stepping magnet structure 9 and to 110 115 pull the air from the bottom of the terminal bank in order to direct the air current around the terminal side of the bank.

It should be noted that the use of the permanent cowl members such as 30 or 40 at the ends of a switch bank may to some extent prevent the accumulation of dust in the switches. 120

It is to be understood that this invention is not limited in its application to the above mentioned type of switches but it is capable of being applied to switches of other types or other apparatus in which the portions thereof desired to be cleaned are capable of 125 130

forming with attachable parts an air passage leading past said portions.

What is claimed is:

1. A suction cleaning attachment for a selector switch having an arcuate bank of contact terminals, said attachment comprising a suction nozzle and means cooperating with the open end and sides of the arcuate bank, for directing a current of air into said nozzle in an arcuate direction over the terminals of the bank.

2. A suction cleaning attachment for a selector switch having an arcuate bank of contact terminals, said attachment having a suction nozzle, and detachable closure plates for the sides of the bank forming with the inner arcuate face of the bank a semi-cylindrical chamber for directing a current of air into said nozzle in an arcuate direction over the terminals of the bank.

3. A suction cleaning attachment for an object to be cleaned having a substantially semi-cylindrical interior chamber normally open except along its cylindrical surface, and closure plates for the sides of said chamber, said attachment having a suction nozzle for engagement with a portion of the remaining open end of said chamber said closure plates and nozzle cooperating to direct a current of air in said chamber in an arcuate direction over the cylindrical surface thereof.

4. A suction cleaning attachment for a selector switch having an arcuate bank of contact terminals and brushes, said attachment comprising a semi-cylindrical casing for engagement with the open end of the arcuate bank and having an inlet duct and a suction nozzle, and closure plates for the sides of the bank said casing and closure plates forming with the inner arcuate face of the bank a chamber for directing a current of air in an arcuate direction over the terminals of the bank.

5. A suction cleaning attachment for a selector switch having an arcuate bank of contact terminals and brushes, said attachment comprising a semi-cylindrical casing for engagement with the open end of the arcuate bank and having an inlet duct tangential to the upper portion of the cylindrical wall of said casing and a suction nozzle tangential to the lower portion of the cylindrical wall of said casing, and closure plates for the sides of the bank said casing and closure plates forming with the inner arcuate face of the bank a chamber for directing a current of air in an arcuate direction over the terminals of the bank from said inlet duct into said nozzle.

6. A suction cleaning attachment for a selector switch having an arcuate bank of contact terminals and brushes, said attachment comprising a semi-cylindrical casing for engagement with the open end of the arcuate bank and having an inlet duct and a suction nozzle, detachable closure plates for the sides

of the bank, a handle attached to each of said plates, said handles being pivoted together, and a spring for pressing said plates firmly against the sides of said bank when said plates have been positioned adjacent thereto by said handles.

7. A suction cleaning attachment for a selector switch having an arcuate bank of contact terminals and brushes, said attachment comprising a semi-cylindrical casing for engagement with the open end of the arcuate bank and having an inlet duct and a suction nozzle, detachable closure plates for the sides of the bank, spring actuated pivoted handles attached to said plates for positioning said plates against the sides of said bank and for holding them firmly in engagement therewith, and lugs carried by said handles for engagement with the sides of said casing for holding said casing in position against the end of said bank.

8. A suction cleaning attachment for a selector switch having an arcuate bank of contact terminals, brushes, a brush shaft and a stepping magnet, said attachment comprising a semi-cylindrical casing for engagement with the open end of the arcuate bank and having an inlet duct and a suction nozzle, and detachable closure plates for the sides of the bank forming with the inner arcuate face of the bank and with the brush shaft a semi-toroidal chamber for directing a strong current of air through said inlet duct over the terminals of said bank and through said nozzle.

In witness whereof, we hereunto subscribe our names this 6th day of October, A. D., 1926.

GRANT LINTON.
JOHN R. TOWNSEND.