J. L. McQUARRIE.

TELEPHONE SYSTEM.

APPLICATION FILED DEC. 28, 1918.

1,387,282. **Patented Aug. 9, 1921.**

Fig. 1.

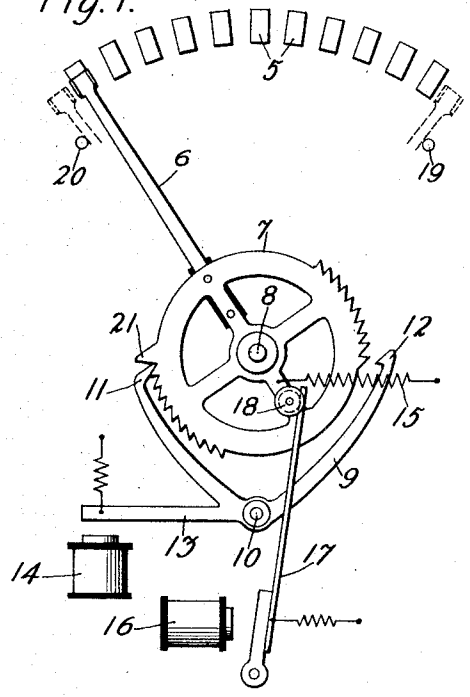
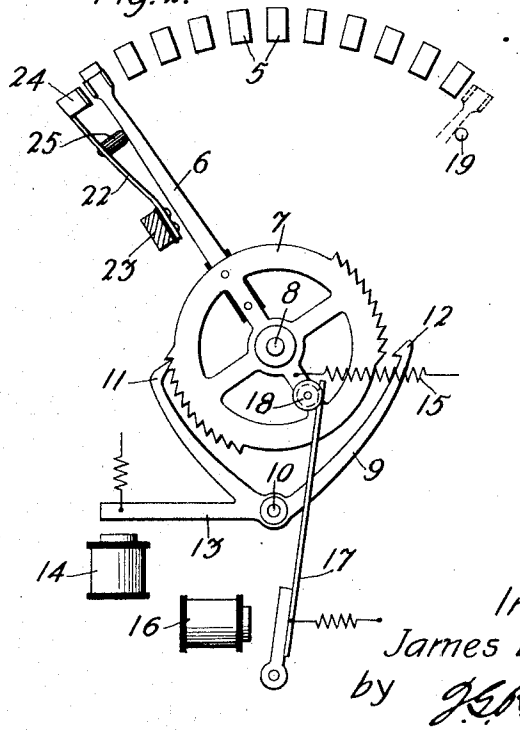


Fig. 2.



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UNITED STATES PATENT OFFICE.

JAMES L. McQUARRIE, OF MONTCLAIR, NEW JERSEY, ASSIGNOR TO WESTERN ELECTRIC COMPANY, INCORPORATED, OF NEW YORK, N. Y., A CORPORATION OF NEW YORK.

TELEPHONE SYSTEM.

1,387,282. Specification of Letters Patent. Patented Aug. 9, 1921.

Application filed December 28, 1918. Serial No. 268,623.

To all whom it may concern:

Be it known that I, JAMES L. McQUARRIE, a citizen of the United States, residing at Montclair, in the county of Essex, State of New Jersey, have invented certain new and useful Improvements in Telephone Systems, of which the following is a full, clear, concise, and exact description.

This invention relates to improvements in automatic telephone systems and has particular reference to switches therefor.

In the operation of automatic switches of the step-by-step type, and of side switches, it has been found that trouble due to accumulation of dirt upon the contacts of a bank occurs more frequently between the brush or wiper and the end contacts of said bank. This accumulation is partly the result of the brush not passing completely over said end contacts.

An object of this invention is to remove accumulations of dirt from the end contacts of a terminal bank by providing means which will pass completely over and beyond said contacts and return to positions thereon.

The inventive idea involved is capable of receiving a variety of expressions some of which, for the purpose of illustrating the invention, are shown in the accompanying drawing; but it is to be expressly understood that said drawing is employed merely for the purpose of facilitating the description of the invention as a whole and not to define the limits thereof, reference being had to the appended claims for this purpose.

In the drawing, Figure 1 illustrates diagrammatically one form of the invention as applied to a rotary switch. Fig. 2 is a similar view showing another form of the invention.

The invention is disclosed in connection with a rotary switch which may be employed for various purposes, but it will be understood, of course, that the same may also be used with equal facility in other types of switches such as a side switch.

In Fig. 1, a terminal bank is provided consisting of a plurality of contacts 5 over which a brush or wiper 6 is moved in selecting one of said contacts and in returning to normal position. An escapement mechanism is preferably employed for stepping the brush 6, and comprises an escapement wheel 7 rotatably mounted on a shaft 8 and having the inner end of said brush secured thereto in a well-known manner. Associated with the escapement wheel 7 is a lever or anchor 9, pivoted intermediate its ends at 10, and provided upon its ends with pallets 11 and 12, which alternately engage the teeth of escapement wheel 7 as the same is operated to step the brush 6 over contacts 5. The lever or anchor 9 further comprises an extension 13 forming an armature for escape magnet 14 which is controlled in a manner well known in the art for attracting and releasing said armature whereby brush 6 will be stepped from its normal position onto any one of the contacts 5. A spring 15 has one end secured to escapement wheel 7 so as to rotate the same in a counter-clockwise direction, when escape magnet 14 is operated, so that brush 6 will be moved from its normal position at the right of the drawing onto one of the contacts 5.

To return brush 6 to its normal position there is preferably provided a reset or release magnet 16 which, when energized, will attract its armature 17, the free end of which engages an abutment 18 carried by escapement wheel 7 so that said wheel will be rotated in a clockwise direction against the tension of the spring 15. Brush 6 will continue to move to the right until the same has passed completely over the normal end contact and engaged the stop pin 19. In this position the last tooth of escapement wheel 7 associated with pallet 12 will have passed slightly beyond said pallet, and upon release of magnet 16, the spring 15 will rotate wheel 7 in a reverse direction until said last tooth engages said pallet. Brush 6 will thereupon return to position upon the normal end contact, and it will thus be obvious that said brush, by moving completely over said end contact and returning to position thereon, will remove any accumulation of dirt therefrom.

Should escape magnet 14 be operated to step brush 6 upon the end contact 5 of the terminal bank at the left of the figure, lever 9 will be actuated by the operation of said magnet, and under the influence of spring 15, escapement wheel 7 and brush 6 will be moved to the left until the latter has passed completely over the left end contact and engaged stop pin 20. This movement is made possible by providing escapement wheel 7 with a large tooth 21 associated with pallet 11, the space between said tooth and the

next adjacent tooth being greater than that between the other teeth. Thus, upon the last release of escape magnet 14, escapement wheel 7 will be permitted to move a slightly greater difference than usual in order to carry brush 6 over the end contact, but in such movement pallet 11 will engage tooth 21 and upon retraction of armature 13 it will rotate wheel 7 slightly in an opposite direction and thus return brush 6 onto said end contact, as shown in full lines in Fig. 1. It will thus be seen that brush 6 is again moved completely over the end contact to remove any dirt therefrom.

In Fig. 2, the identical operating mechanism described in connection with Fig. 1 is again employed but, in this instance, the brush 6 is not moved completely over and beyond the end contact 5 at the left of the terminal bank. In order that this contact may be cleaned, there is preferably provided a spring member 22 having one end secured to a suitable support 23 and its other end provided with a pad 24 which normally engages the adjacent end contact. A pin 25 is secured to said member 22 intermediate its ends, and is arranged in the path of movement of brush 6 so that as the same is stepped to the left, it will engage said pin and cause the pad 24 to move completely off of the contact and in so doing clean the same. In this form of the invention, escapement wheel 7 need not be provided with the large tooth 21, as shown in Fig. 1, as no additional rotary movement of escapement wheel 7 is required. The brush 6 is returned to its normal position in the same manner as described in connection with Fig. 1, and as soon as brush 6 is disengaged from pin 25, pad 24 will be returned to position upon the adjacent end contact due to the resiliency of spring member 22.

What is claimed is:

1. In an electrical switching device, a terminal bank comprising a row of equi-distantly spaced contacts, a brush for engaging said contacts, and means operable to step said brush by equi-distant steps over the intermediate contacts of said bank, and operable when said brush is on the contact next to the end to impart a long step to said brush whereby the latter is carried over and to a position out of engagement with the end contact, and to return said brush to a resting position on said end contact.

2. In an electrical switching device, a terminal bank comprising a row of equi-distantly spaced contacts, a brush for engaging said contacts, and an escapement mechanism operable to step said brush by equi-distant steps over the intermediate contacts of said bank, and operable when said brush is on the contact next to the end to impart a long step to said brush whereby the latter is carried over and to a position out of engagement with the end contact, and to return said brush to a resting position on said end contact.

3. In an electrical switching device, a terminal bank comprising an arcuate row of equi-distantly spaced contacts, a rotatable brush for engaging said contacts, an escapement wheel for rotating said brush, an escapement anchor comprising two pallets for coöperating with said escapement wheel, and a stop on said escapement wheel conjointly operable with one of said pallets to permit said brush to move over an end contact of said bank, and to return said brush to a resting position on said end contact.

In witness whereof, I hereunto subscribe my name this 27th day of December, A. D. 1918.

JAMES L. McQUARRIE.