June 24, 1930. O. BRACKE 1,768,394

SELECTOR SWITCH

Filed Aug. 23, 1929

FIG. 1

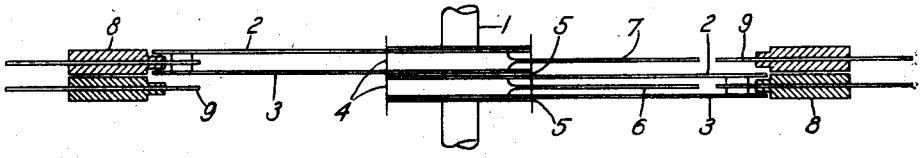


FIG. 2

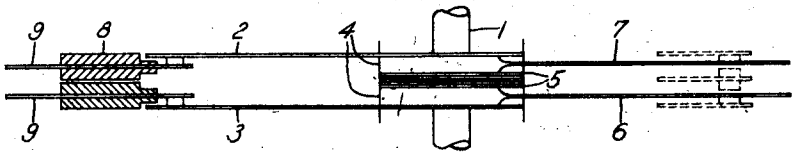


FIG. 3

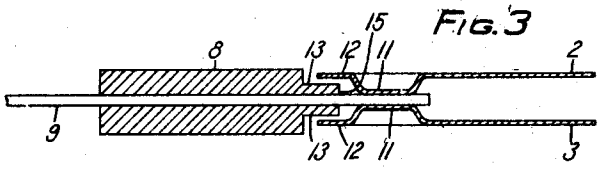


FIG. 4

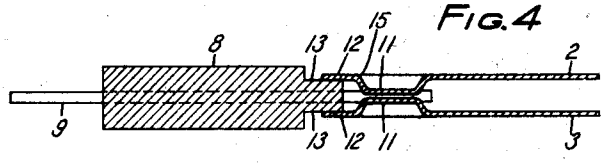
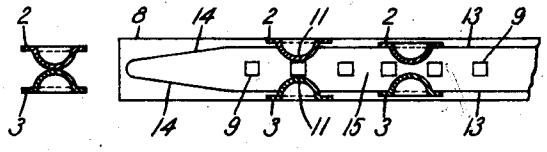


FIG. 5



INVENTOR
O. BRACKE
BY
ATTORNEY

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UNITED STATES PATENT OFFICE

OSCAR BRACKE, OF ANTWERP, BELGIUM, ASSIGNOR TO WESTERN ELECTRIC COMPANY, INCORPORATED, OF NEW YORK, N. Y., A CORPORATION OF NEW YORK

SELECTOR SWITCH

Application filed August 23, 1929, Serial No. 387,883, and in Great Britain October 31, 1928.

This invention relates to improvements in selector switches of the kind used in automatic telephone systems and more particularly to an improved brush and terminal bank structure for such switches. The object of this invention is to provide a switch structure wherein less energy is required to advance the switch brushes and whereby the tendency of the brushes to snag on the bank terminals is greatly reduced.

In the usual construction of selector switches particularly those of the rotary step-by-step hunting type, the several rows of terminals are assembled in arcuate rows in an insulating support commonly molded about the terminals. For cooperation with the several rows of arcuately arranged terminals a plurality of pairs of brushes are provided, the brushes of each pair engaging one on each side of the row of terminals with which they cooperate. Unless some provision is made to prevent the brushes of each pair from springing toward each other due to their normal spring tension, the brushes of a pair will spring together upon leaving contact with one terminal and before engaging a succeeding terminal of a row whereby considerable energy is required in the advance of the brushes to separate them sufficiently to enable their contact surfaces to wipe over the faces of the next terminal. Furthermore, the brushes have a tendency to snag on the near edges of the terminals due to the fact that they have sprung into engagement with each other upon leaving the last preceding terminal.

To prevent brushes of such brush pairs from springing to an unnecessary extent toward each other when out of engagement with terminals, various types of stops associated with the brushes themselves have been proposed.

In accordance with the present invention a support is provided adjacent the contacts in the terminal bank and the brushes of a brush pair are arranged to cooperate with this support when they are out of engagement with adjacent contacts, whereby they are restrained in their movement toward each other and a definite relationship between the make and the break of the brushes with the contacts is assured. This support is constituted by the extension of the insulating material of the terminal bank, upon which the free ends of the brushes are arranged to wipe. The contact surfaces of the brushes are formed by depressing a portion of the brushes at a sufficient distance from the ends of the brushes to allow the ends of the brushes to make contact with the support in the terminal bank when the brushes are between contacts.

For a more comprehensive understanding of the invention reference may be had to the specifications and drawings in which:

Figs. 1 and 2 each show in side elevation a portion of the brush assembly and in cross section the bank assembly of a rotary switch embodying the invention. In Fig. 1 the brushes are shown arranged in pairs to engage opposite faces of bank terminals and in Fig. 2 single brushes are shown.

Figs. 3 and 4 are enlarged sectional views of the contact ends of a pair of brushes, such as are shown in Fig. 1 and their relationship to the bank terminals in the make and break positions, respectively.

Fig. 5 is an enlarged view showing the brush contact ends of a pair of brushes in various positions in relation to an arc of bank terminals.

Referring to Figs. 1 and 2 the shaft of the switch is represented at 1. Mounted upon this shaft is a brush assembly consisting of the brushes 2 and 3 spaced apart by means of the collars 4 and insulating discs 5 surrounding the shaft. The usual feeder brushes of the switch are represented at 6 and 7 in engagement with the portions of the brushes 2 and 3 which encircle the shaft. Bank terminals 9 of the switch are disposed in two arcuate rows about the shaft 1 supported in insulating material shown at 8.

In Fig. 1 two pairs of brushes are shown each pair making contact with a separate arcuate row of terminals. The brush 2 of each pair makes contact with the upper faces of the terminals of a row and brush 3 makes contact with the lower faces of the terminals of the same row. In Fig. 2 a

single set of brushes 2 and 3 is shown, the brush 2 making contact with the upper faces of the terminals of one row of the bank and brush 3 making contact with the lower faces of the other row of terminals.

Referring now to the enlarged detail views, Figs. 3, 4 and 5, it will be noted that each brush is formed adjacent its free end with a cup-shaped portion 11 pressed from the metal of the brush which serves to make contact successively with a face of the terminals of a row of terminals as the switch shaft rotates. The tip portion 12 of each brush extending beyond the contact portion 11 is arranged to cooperate with the support 13 formed in the insulating material of the terminal bank.

Preferably the arcuate row of terminals 9 is molded into a strip of insulating material 8 in such a manner that a rib 15 of less depth than the depth of the body of the insulating material 8 is formed, through the edge of which the terminals 9 project radially toward the switch shaft. The tip portions 12 of the brushes 2 and 3 are arranged to rest upon the opposite faces 13 of this rib when the brushes are out of engagement with the faces of the terminals 9.

The rib 15 as shown is molded as an integral part of the insulating support 8, but may be formed separately and embodied in the bank assembly. The depth of the rib is preferably such that when the tip portions 12 of a pair of brushes rest on the faces 13 thereof as shown in Fig. 4, the contact portions 11 of the brushes are just out of contact with each other. The relative position of the rib 15 with respect to the terminals 9 and the relative position of the tip portions 12 of the brushes with respect to the contact portions 11 is such that when the contact portion 11 is in engagement with a terminal 9, the tip portion 12 is out of engagement with the shoulder or face 13 of the rib 15. This is clearly shown in Fig. 3 and in the left portion of Fig. 5. When the contact portion of the brush passes between successive terminals 9, the brush drops down until the tip 12 comes into engagement again with the face 13 of the rib 15 as clearly shown in Fig. 4 and at the right of Fig. 5. By varying or adjusting the relative position of the tip portion 12 with respect to the contact portion 11 of the brush, it is possible to change the relationship between the make and break period of the brush with a terminal.

The rib 15 is shown at the left of Fig. 5 as tapered or inclined at 14 to form a guide to assure the proper engagement of the brushes with the arc of terminals as the brushes enter the arc upon the rotation of the switch shaft. At the extreme left of Fig. 5 the brushes 2 and 3 of a pair are shown in the position which they assume with relation to each other just prior to entering the terminal bank.

From the foregoing description it will be apparent that by the provision of the rib 15 and by the brush construction for cooperation therewith, the brushes are prevented from springing toward each other to such an extent when out of engagement with bank terminals as to snag on the edges of terminals and further thereby the power required to lift the contact portions 11 into engagement with the contact faces of the terminals is greatly reduced.

What is claimed is:

1. In a selector switch, a bank comprising one or more rows of terminals supported in insulated relationship, a support adjacent each row of terminals formed by an extension of said insulation and brushes to engage each row of terminals, the extremity of each of said brushes adapted to rest on said support when out of engagement with said terminals.

2. In a selector switch, a bank comprising one or more rows of terminals supported in insulated relationship, said insulation being extended to form a shoulder on either side of each row of terminals and a pair of brushes for engagement with either side respectively of each row of terminals, the extremities of the brushes of a pair being adapted to rest on said shoulders when out of engagement with said terminals.

3. In a selector switch, a bank comprising a row of terminals supported in insulated relationship, said insulation being extended to form a rib through which the terminals project, a pair of brushes normally tensioned toward each other for making contact with the opposite faces of said terminals, and extensions on said brushes for engagement with the faces of said rib, the thickness of said rib being sufficient to hold said brushes in spaced relationship when said brushes are between adjacent contacts, but insufficient to prevent said brushes from engaging the faces of said terminals.

4. In a selector switch, a bank comprising a row of terminals supported in insulated relationship, said insulation being extended to form a rib through which the terminals project, a brush normally tensioned toward the contact faces of said terminals for making contact therewith as it is progressed over the row of terminals, and an extension of said brush beyond the contact portion thereof for engagement with the face of said rib, the distance between the face of said rib and the contact faces of said terminals being sufficient to hold said brush from springing to its full extent but insufficient to prevent said brush from engaging the contact faces of said terminals.

5. In a selector switch, a bank comprising a row of terminals molded into an insulated

support, said support being extended to form a rib through which the terminals project, a brush normally tensioned toward the contact faces of said terminals for making contact there with as it is progressed over the row of terminals, and an extension on said brush beyond the contact portion thereof for engagement with the face of said rib, the distance between the face of said rib and the contact faces of said terminals being sufficient to hold said brush from springing to its full extent, but insufficient to prevent said brush from engaging the contact faces of said terminals.

6. In a selector switch, a bank comprising a row of terminals supported in insulated relationship, a support adjacent the row of terminals formed by an extension of said insulation and a brush to engage the terminals, the end of said brush adapted to rest on said support and said brush being formed adjacent its end with a cup-shaped depressed portion forming a contact surface for engagement with the contact faces of said terminals.

7. In a selector switch, a bank comprising a row of terminals supported in insulated relationship, said insulation being extended to form a rib through which the terminals project, a pair of brushes normally tensioned toward each other for making contact with the opposite faces of said terminals and extensions on said brushes for engagement with the faces of said rib, the thickness of said rib being sufficient to hold said brushes in spaced relationship when said brushes are between adjacent terminals, but insufficient to prevent said brushes from engaging the faces of said terminals, and said rib being tapered at the end engaged by said brush extensions where said brushes enter the bank.

In witness whereof I hereunto subscribe my name.

OSCAR BRACKE.