Jan. 20, 1925. 1,523,407

H. F. DOBBIN

SWITCHING MECHANISM

Filed Dec. 30, 1922

Fig. 1.

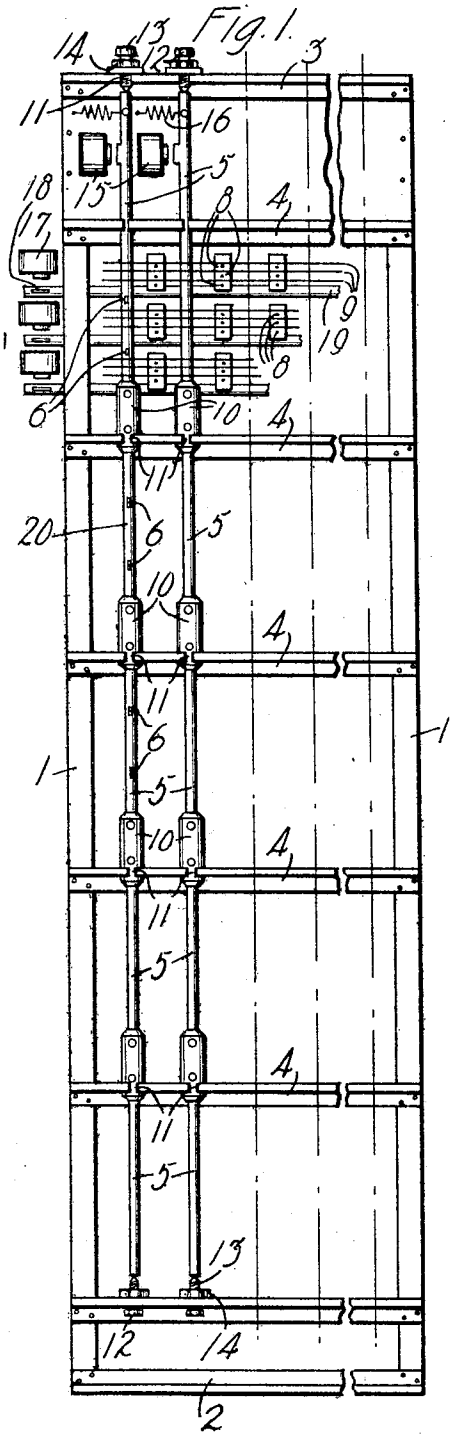
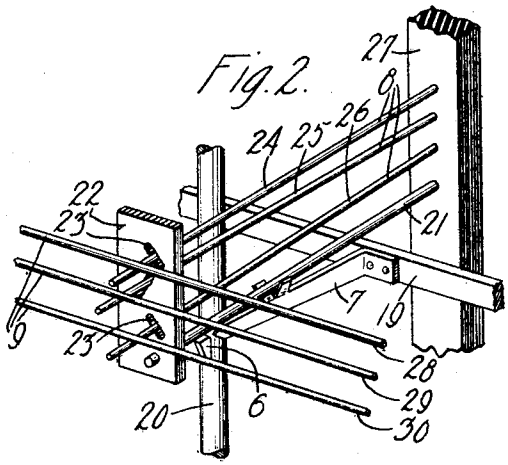


Fig. 2.



Inventor:
Henry F. Dobbin,
by W. E. Beatty, Atty.

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UNITED STATES PATENT OFFICE.

HENRY F. DOBBIN, OF NEW YORK, N. Y., ASSIGNOR TO WESTERN ELECTRIC COMPANY, INCORPORATED, OF NEW YORK, N. Y., A CORPORATION OF NEW YORK.

SWITCHING MECHANISM.

Application filed December 30, 1922. Serial No. 609,892.

To all whom it may concern:

Be it known that I, HENRY F. DOBBIN, a citizen of the United States, residing at New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Switching Mechanisms, of which the following is a full, clear, concise, and exact description.

This invention relates to automatic switching apparatus and more particularly to a coordinate switch of the type employed in automatic telephone exchanges.

Switches of the above mentioned type and as disclosed in British Patent No. 197,891, issued to Western Electric Company, Limited, accepted May 24, 1923 are characterized by a plurality of sets of coordinately disposed active and passive contacts which are adapted to be brought into engagement with each other by the conjoint operation of coordinately disposed operating members to effect the establishment of telephonic connections.

In the general type of coordinate switch, each vertical operating member or bar is designed to serve a plurality of groups of passive contacts or link circuits which are arranged in horizontal rows and permanently mounted on the framework of the switch. It has been generally proposed to make each vertical operating bar as a single member irrespective of the number of groups of links served thereby and of the vertical dimension of the switch.

The switch disclosed in the above mentioned British patent is constructed in such a manner that after assembly the vertical operating bars may be removed only by pulling them vertically the entire length of the switch structure. Since the operating bars are provided with camming fingers which are continuously being subjected to distorting forces thereby necessitating repair and replacement, it is necessary that the operating bars be removable from the switch without any undue disturbance to the remaining switch equipment. In exchanges wherein the ceiling height is only slightly greater than the vertical dimension of the switch frame, the removal of the vertical operating bars in the manner heretofore mentioned would be difficult. By sectionalizing the vertical operating bars, a more accurate alignment of the camming fingers is made possible.

It is, therefore, an object of this invention to effect the easy removal, repair and replacement of vertical operating members of a coordinate switch.

This object is attained by dividing each vertical operating member into as many sections as there are groups of horizontal link circuits included in the switch structure and by providing couplings to unite the various sections to effect a unitary operating member adapted to be controlled by a single operating means. In this manner, as will hereinafter be described in detail, a vertical operating bar may be removed in sections with comparative ease and without any disturbance to other equipment on the switch.

The invention will be readily understood from the following detailed description and by reference to the accompanying drawings in which Fig. 1 shows a view of a section of a coordinate switch embodying the features of this invention. Fig. 2 shows the vertical and horizontal operating members and their positions relative to the coordinately disposed active and passive contact sets. This view shows the horizontal bar in its operated position.

The main switch frame consists, in general, of the uprights 1 and a plurality of horizontal bracing members, such as 2, 3 and 4. The uprights and bracing members may be made of angle iron or any other suitable material and are each (2 excepted), provided with a plurality of apertures, the object of which will hereinafter be pointed out.

Each vertical operating member 20 is divided into a plurality of sections 5 and each section is provided with a plurality of camming surfaces or projections 6 which cooperate with the flexible spring members 7 in moving their respective sets of active contacts, such as 8, into engagement with an associated set of passive contacts, such as 9. The passive contacts 9 are bare wires suitably held to the switch frame by means not shown. The apertures in the bracing members 4 are circular and are large enough to

permit the passage of coupling members 10 longitudinally therethrough. Channels or slots 11 are provided on the bracing members 4 and communicate with the circular apertures to permit the passage of the camming members 6, when the vertical operating member is being removed. The coupling 10 which is free to rotate in the above mentioned circular apertures serves as a bearing for the rod sections and consists of a cylindrical sleeve and two set screws which secure the sleeve to adjacent ends of the rod sections 5. Each end of a vertical rod is provided with a step bearing 12 consisting of a bolt 13 and a lock nut 14. The end of the bolt 13 is provided with a projection of a slightly decreased diameter which fits a cylindrical cavity in the end of the rod sections 5 of the vertical rod. By adjusting the lock nut 14, any slight variations in the vertical dimension of the switch may be accounted for.

To remove a vertical operating member from an assembled switch, the procedure is as follows:

The restoring springs 16 and the upper bearing 12 are removed from the uppermost section of the rod which is rotated so as to align the camming fingers 6 with the slots 11. The rod is then lifted vertically until the uppermost coupling 10 has passed through the circular aperture in the switch member 3, the camming fingers passing through the slot 11. This coupling is then removed from the end of the uppermost section which may be then laid aside. The remaining sections are then drawn upwardly until the second coupling 10 has passed through the aperture in the switch member 3, whereupon it is removed from the second section. This procedure is continued until all sections have been removed. The rod may be placed on the switch by reversing the foregoing procedure.

The operation of the switch in general is as follows:

A subscriber, desiring to establish a connection, will cause a vertical line magnet 15 to be energized and attract its armature which is securely mounted on the uppermost section of the vertical rod. The rod, including all the sections 5 and their associated couplings, is thereby rotated through a small arc whereupon the camming fingers 6 are brought into operable relation with the operating finger member 7. A horizontal link magnet 17 is then energized and attracts its armature 18 which is securely mounted on the horizontal operating bar 19. The horizontal bar 19 is thereupon rotated through a small arc and causes the free end of the operating finger 7 to slide along the camming surface 6 and engage the spring member 21 which is thereupon forced upwardly. Normally associated with the free end of the spring member 21 is a card 22 which is provided with a plurality of obliquely disposed slots 23. Normally associated with the card 22 and positioned in the slots 23 are active contacts 24, 25 and 26 which are rigidly mounted on an insulating member 27 which in turn is rigidly supported on the switch framework. Coordinately disposed to the active contacts 24, 25 and 26 are the link conductors 28, 29 and 30 which are securely mounted on the framework of the switch. Upon the upward movement of the spring member 21, the card 22 experiences a like movement and carries with it the active contacts 24, 25 and 26 to effect engagement with the passive contacts or link conductors 28, 29 and 30 respectively. By virtue of the obliquely disposed apertures 23, the active contacts are brought into engagement with the passive contacts with a wiping effect which insures perfect contact. The magnet 17 is maintained energized throughout the establishment of the connection but the vertical line magnet 15 may become deenergized subsequent to the energization of magnet 17 without disturbing the established connection. Restoring springs 16 are provided for each vertical operating bar to return them to normal subsequent to the deenergization of their respective operating magnets 15.

What is claimed is:

1. The combination in a switch structure having a plurality of sections of an operating member for each section, means for joining said operating members to form a single operating unit and a plurality of members apertured for permitting the removal of the single operating unit in sections.

2. The combination in a switch structure of a plurality of bracing members dividing the switch into sections, an operating member for each of said sections and a single means for operating said operating members as a unit, the aforesaid bracing members cooperating in supporting said operating members and adapted to permit the removal thereof.

3. A switch comprising coordinately disposed sets of active and passive contacts, means for operating said sets comprising intersecting bars, operating members on certain of said bars, bearings for said last mentioned bars and having apertures to permit the longitudinal withdrawal of the bars and operating members therethrough.

4. The combination in a switch structure of a plurality of bracing members dividing the switch vertically into sections, an operating member for each of said sections, and means for uniting said operating members to form a vertical operating unit, the aforesaid bracing members being provided

with apertures to permit the passage of said means therethrough to effect the removal of the unit.

5. The combination in a switch structure of a plurality of bracing members dividing the switch into sections, an operating member for each of said sections united to form an operating unit, the operating unit being laterally inaccessible for removal purposes, and the aforesaid bracing members being apertured in such a manner as to permit the removal of the unit vertically.

In witness whereof, I hereunto subscribe my name this 29th day of December A. D., 1922.

HENRY F. DOBBIN.