

Nov. 24, 1925.

1,562,647

W. KAISLING

CONTACT BANK STRUCTURE

Original Filed July 9, 1920

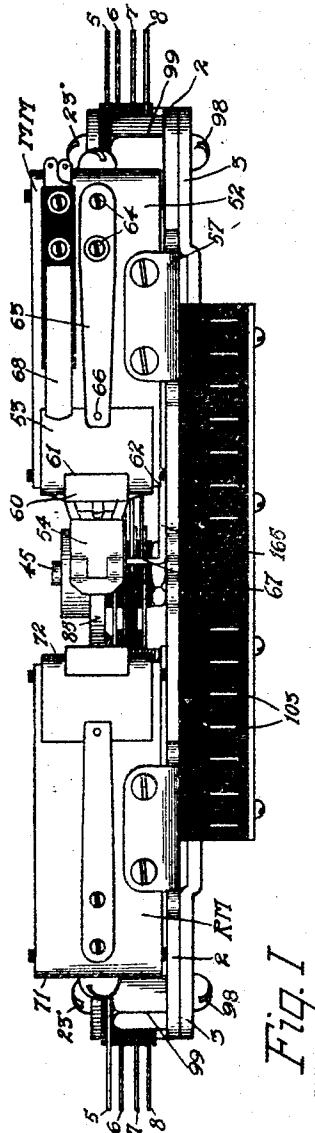


Fig. 1

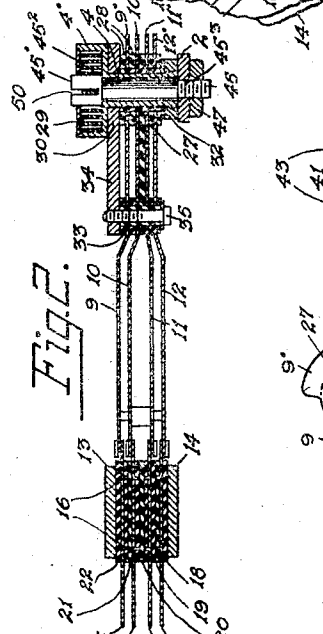


Fig. 2

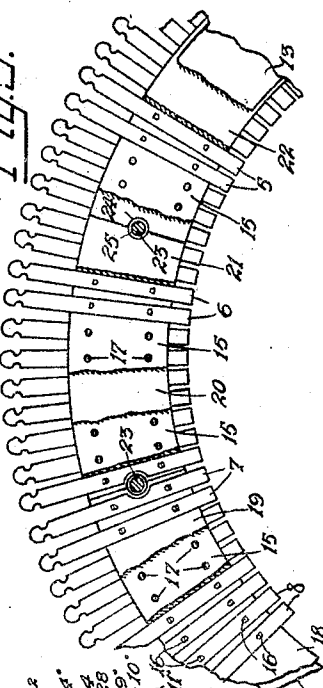


Fig. 3

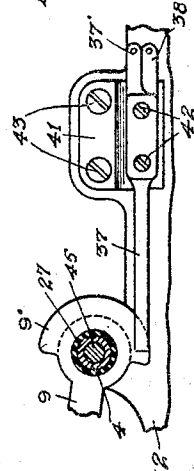


Fig. 4

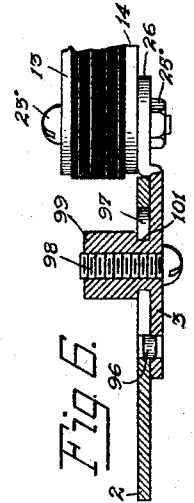


Fig. 5

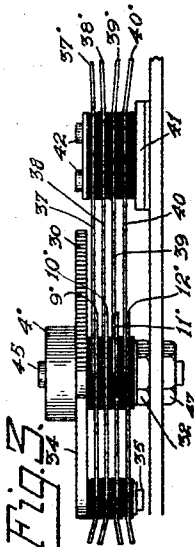


Fig. 6

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Patented Nov. 24, 1925.

1,562,647

UNITED STATES PATENT OFFICE.

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CONTACT-BANK STRUCTURE.

Original application filed July 9, 1920, Serial No. 394,889. Divided and this application filed April 1, 1922. Serial No. 548,859.

To all whom it may concern:

Be it known that I, WILLIAM KAISLING, a citizen of the United States of America, residing in Chicago, county of Cook and State of Illinois, have invented certain new and useful Improvements in Contact-Bank Structures, of which the following is a specification.

My invention relates to switches in general and has to do more particularly with switches of the step-by-step type that travel in a single direction during the selecting operation. The switch of my invention is adapted for use in semi-automatic and call distributing systems, but I do not wish to be limited to this use, as it may be used for a variety of purposes without departing from the scope of the invention. An object of my invention is the provision of a switch of the above type that is simple in construction, cheap to manufacture and positive and efficient in its operation.

A feature of my invention is the construction and method of securing the contacts of the bank against movement, and still another is the sectional construction of the contact bank, which greatly facilitates the assembly of the same.

The above features, as well as others, will be more particularly pointed out in the ensuing specification and appended claims. Reference may also be had to applicant's parent application S. N. 394,889, filed July 9, 1920, of which this application is a division.

For a more complete understanding of my invention, reference may be had to the accompanying drawings, in which like reference characters in the several views denote like parts, and in which

Fig. 1 is a front elevation of a switch with which the contact bank of my invention is applicable;

Fig. 2 is a sectional view of the contact bank, the wiper unit associated therewith and its supporting hub;

Fig. 3 shows the wiper carrying hub and associated parts;

Fig. 4 is a plan view thereof, with parts broken away to more clearly illustrate the construction;

Fig. 5 is a view of part of a contact bank with parts broken away to more clearly illustrate its construction and assembly; and

Fig. 6 is a sectional view illustrating the method of securing the plate which supports the bank contacts to the mounting plate.

Referring to the structure illustrated in Figs. 1 to 6, the switch comprises a mounting plate 2, to which are secured the various operating parts. The said plate 2 also carries the auxiliary plate 3 to which the bank of contacts B is secured, which latter cooperate with the wipers W carried by hub 4. The said hub 4 is rotatably supported upon the mounting plate 2 in any suitable manner.

The contact bank B may comprise any suitable number of contact sets, and each set may include a test contact 5, an auxiliary contact 6 and a pair of line contacts 7 and 8. Wipers W, of which there are four, cooperate with the contacts, there being a test wiper 9, a wiper 10 associated with the contacts 6, and the line wipers 11 and 12, which latter are associated with the line contacts 7 and 8. The contact bank B is semi-circular and may include fifty-five sets of contacts 5, 6, 7 and 8, radially disposed between the clamping plates 13 and 14. The contact bank B, as a whole, is built up of a plurality of similar arcuate sections, and a detailed description of one will be sufficient. Each semi-circular row of contacts, as for example that of contacts 5, is built up of five arcuate sections 15, each arcuate section having mounted thereon eleven contacts 5. Each contact is provided with a pair of ears 16, angularly disposed, preferably integrally formed with the said contact. Openings 17 in the sections 15, in proper alignment with the ears 16 of the contacts, are provided, but these openings are slightly smaller than the ears and receive the ears 16 by a forced fit, thus holding the said contacts radially disposed upon the arcuate section. The sections 15 are of suitable insulating material, such as micarta. In assembly, sectional plates 18, conforming in shape with the arcuate plates 15 and of suitable insulation, are placed between the semi-circular clamping plates 14 and the arcuate sections which carry the contacts 8. Sectional strips 19, 20 and 21, also arcuate in shape and of insulating material, are placed between the arcuate sections 15, which carry the contacts 7, 6 and 5 to properly insulate the contact rows one from the other, and also properly space them. (Refer to Fig. 2.) Sectional arcuate plates 22

of suitable insulation material are placed between the contacts 5 and the semi-circular clamping plate 13 to insulate the said contacts 5 from the clamping plate. Clamping screws 23 pass through suitable openings in the clamping plate 13 and openings 24 formed by semi-circular notches 25 cut in the ends of the arcuate sections 15 and insulation sections 18, 19, 20, 21 and 22. The screws 23 have screw-threaded engagement with suitable tapped orifices in the clamping plate 14 to securely clamp the arcuate sections 15 which carry contacts 5, 6, 7 and 8 and insulation sections 18, 19, 20, 21 and 22 between the semi-circular clamping plates 13 and 14 to form the contact bank B.

The contact bank B is secured to the auxiliary plate 3 by means of the end clamping screws 23', which pass through suitable openings in the ears 26 integrally formed with the auxiliary plate 3, the nuts 25' having screw-threaded engagement with the screws 23'.

Wipers 9, 10, 11 and 12, which cooperate with the contacts 5, 6, 7 and 8, are alike. For example wiper 9 has a disc-shaped portion 9' provided with an orifice of a size to permit it being slipped over the hub 4. The disc portions 9', 10', 11' and 12' of all the wipers 9, 10, 11 and 12 are slipped over the hub 4 but insulated therefrom by means of a sleeve of insulation 27 and from each other by means of the insulation washers 28. The hub 4 has integrally formed therewith a cup-shaped portion 4', which forms a container for the motor spring 29. A sector 30 is provided having a central orifice of a size to permit it being slipped over the hub 4 and resting between the cup portion 4' of the said hub and an insulation washer 28 which insulates the disc portion 9' of the wiper 9 from the sector. The sector 30 and the discs of wipers 9, 10, 11 and 12 are clamped in place upon the hub 4 by means of the clamping nut 32, which has screw-threaded engagement with the threaded portion of the hub 4. Wipers 9, 10, 11 and 12 have drilled intermediate portions and are properly spaced by means of insulation washers 33 and are secured at these intermediate portions to an arm 34 of sector 30 by the screw 35. The latter engages a suitable tapped orifice in the forward end of the arm, and said screw is suitably insulated from the wipers by a bushing. The free ends of the wipers are flared for the purpose of forming engaging or contacting surfaces with the contacts 5, 6, 7 and 8. The disc portions 9', 10', 11' and 12' form contacting surfaces for wiper brushes 37, 38, 39 and 40 suitably mounted upon a bracket 41 by means of the screws 42, the said brushes being suitably insulated from the screws 42 and from each other. The bracket 41, upon which the brushes 37, 38, etc., are mounted,

is secured to the mounting plate 2 by means of the screws 43. The wiper brushes 37, 38, 39 and 40 contact, respectively and permanently, with the disc portions 9', 10', 11' and 12' of the wipers 9, 10, 11 and 12, so the said wipers 9, 10, 11 and 12 are always conductively connected to terminals 37', 38', 39' and 40'. The hub 4, which carries the wipers 9, 10, 11 and 12 and sector 30, is as a whole rotatably secured to the mounting plate 2 by means of a combined motor spring tensioning and bearing screw 45. The hub 4 is provided with a central opening through which the screw 45 passes. The screw 45 is provided with a slotted head 45' and a reduced portion 45², this reduced portion 45² forming a bearing about which the hub 4 as a whole rotates. The shoulder formed by the reduced portion rests against the surface of the cup-shaped portion 4' and the threaded end of the reduced portion 45², which protrudes through a suitable orifice in plate 2, is adapted to receive a nut 47, which holds the screw 45 in rigid relation with plate 2 by clamping said plate between shoulder 45³ (integral with 45) and said nut 47. A motor spring 29 fits into the cup-shaped portion 4' of the hub 4, the said spring having its one end fastened to the cup portion 4' of the hub 4, and its other end resting in the slot in the head of the bearing screw 45. A cover-cap is provided which covers the spring cup container 4'. To give the proper tension to the spring 29, the nut 47 is loosened and the screw 45 is turned to the right or left, as the case may be, by means of a suitable tool inserted in the slot 50, and when the proper tension is obtained, the nut 47 is again tightened to hold the screw 45 against rotation and also hold the spring 29 at its properly adjusted tension.

The motor magnet MM, which is adapted to move the wipers 9, 10, 11 and 12 over bank contacts 5, 6, 7 and 8, includes a heel iron 52, an armature 53 and a driving pawl 54. The electromagnet is suitably secured to the pole pieces 52 by means of a screw, which has screw-threaded engagement with a suitably tapped opening in the core of the electromagnet. The mounting plate 2 has integrally formed therewith an angular extension or bracket 57, the said magnet MM as a whole being secured thereto by means of screws, which have screw-threaded engagement with suitably tapped orifices in the pole pieces 52. The pole piece 52 at its free end has a tongue portion 60 which extends through a suitable orifice 61 in the angle portion of the armature 53. The armature 53 is thus pivotally supported upon the forward end of the pole piece 52, the edge 62 of the forward end of the pole piece 52 forming a pivot about which the said armature 53 rocks. The armature 53 is secured upon the edge 62 against displace-

ment by means of a leaf spring 63 which has one end fastened to the pole piece 52 by means of screws 64 and its free end provided with an orifice of a size to receive a pin 65 secured to the armature 53. The spring 63 also acts as a tension spring to hold the armature in its normal position. As the armature 53 vibrates through the agency of the motor magnet MM, the pawl 54 engages successive teeth of the sector 30, stepping the wipers 9, 10, 11 and 12 from one contact set 5, 6, 7 and 8 to the next on each back stroke of the armature. A pair of interrupter springs 68 are insulatingly secured to the heel iron 52 associated with the motor magnet MM for the usual purpose.

A release magnet RM to restore the wipers 9, 10, 11 and 12 is provided and comprises a heel iron 71, armature 72 and electromagnet and in general construction and mounting arrangement, it is quite similar to magnet MM.

The mounting plate 2 is detachably secured to the mounting plate 3. The mounting plate 3 is provided with a pair of lugs 96 integrally formed with the said plate 3 by means of a shearing operation, and the mounting plate 2 is provided with a pair of longitudinal slots 97 which cooperate with the lugs 96 for purposes as will be presently described. Screws 98, having screw-threaded engagement with suitably tapped orifices in the auxiliary mounting plate 3, extend up through the slots 97 in the mounting plate 2 when the said plate 2 is in the position as illustrated in Fig. 1. A pair of nuts 99 which have screw-threaded engagement with the screws 98 hold the mounting plate 2 in position upon the auxiliary mounting plate 3. With this arrangement, should any of the magnets or moving parts of the switch need adjustment or repair, the plate 2 may be quickly removed. To do so the nuts 99 are removed and the plate 2 may now be moved downward with reference to Fig. 1, until the wipers W are free of the contact bank B, and when in this position the mounting plate 2 and its parts as a whole may be lifted off. A substitute plate is placed upon the auxiliary plate 3 with the lugs 96 resting in the slots 97, and the screws 98 extend up through the said slots 97. When in this position the plate 2 may be moved upward and the slots 97 form guiding means and the lugs 96 serve as stops. When the plate 2 is in the position as illustrated in Fig. 1, the nuts 99 are again placed on the screws 98 and tightened. An enlarged circular orifice, intermediate of the ends of each of the slots 97, is adapted to receive the cylindrical reduced portion 101 of the nuts 99 when the said nuts 99 are in clamping position. These circular orifices in the slots 97 in relation with the cylindrical portions 101 of the nuts 99 prevent

longitudinal and side movement of the mounting plate 2. The contact bank B, as a whole, may also be removed by removing the nuts 23, as is readily apparent from the previous description in connection with the accompanying drawings.

While I have illustrated and described a specific form of the invention, I do not wish to be limited to the same, as changes and modifications will readily suggest themselves to those skilled in the art, and the mechanism is obviously usable in a large variety of relations, but what I do claim is:

1. A switch bank comprising a strip of insulation provided with openings, a spring bank contact having portions of its body formed to engage said openings in said strip of insulation by a drive fit to secure the same together, other strips of insulation and bank contacts secured to each other in the same manner, said strips of insulation and bank contacts assembled one over the other and spaced from each other by other strips of insulation, said strips of insulation having openings in alignment when in their assembled position, a pair of clamping members having openings, and threaded members provided with nuts for extending through the openings in said clamping members and said insulation strips for clamping said bank contacts and said strips of insulation in their assembled position, the ends of said bank contacts extending beyond the ends of said strips of insulation, and means including a pair of bolts for permitting said switch to be mounted and dismounted as a single unit by merely operating said pair of bolts.

2. A switch contact bank comprising a strip of insulation provided with openings, said strip divided to form sections, spring bank contacts each having portions of its body formed to engage openings in said strip of insulation by a drive fit to secure the same together, a plurality of other strips of insulation divided to form sections and bank contacts secured to each other in the contacts and assembled one over the other and spaced from each other by a plurality of other strips of insulation divided to form sections, whereby said sections of insulation strips and bank contacts are assembled to form units, members adapted to clamp said sections of insulation strips and bank contacts together in their assembled positions to form sectional contact bank units, said sectional units being arranged and clamped in position to form an arcuate switch contact bank, and means including a pair of bolts and nuts for permitting said switch contact bank to be mounted and dismounted as a single unit by merely operating said bolts and nuts.

3. In a switch bank a strip of insulation provided with openings, a spring bank con-

tact having portions of its body formed to engage said openings in said strip of insulation by a drive fit to secure the same together, other strips of insulation and bank contacts secured to each other in the same manner, said strips of insulation and bank contacts assembled one over the other and spaced from each other by other strips of insulation, whereby said strips of insulation and said bank contacts form a single bank contact unit, said strips of insulation being provided with orifices in alignment with each other, a plurality of these bank contact units positioned end to end and arranged to form an arcuate shaped switch contact bank, a pair of clamping members for engaging the top and bottom faces of said switch bank, members for extending through said pair of members and said aligned openings in said strips of insulation for clamping said strips of insulation and bank contacts together and also for clamping said bank contact units in their assembled position, and means for permitting said arcuate shaped switch bank to be mounted and dismounted as a single unit.

Signed by me at Chicago, in the county of Cook and State of Illinois, this 30th day of March, 1922.

WILLIAM KAISLING.