Dec. 18, 1923. 1,478,042

H. T. MARTIN

MULTIPLE UNIT SWITCH

Filed Aug. 11, 1920 2 Sheets-Sheet 1

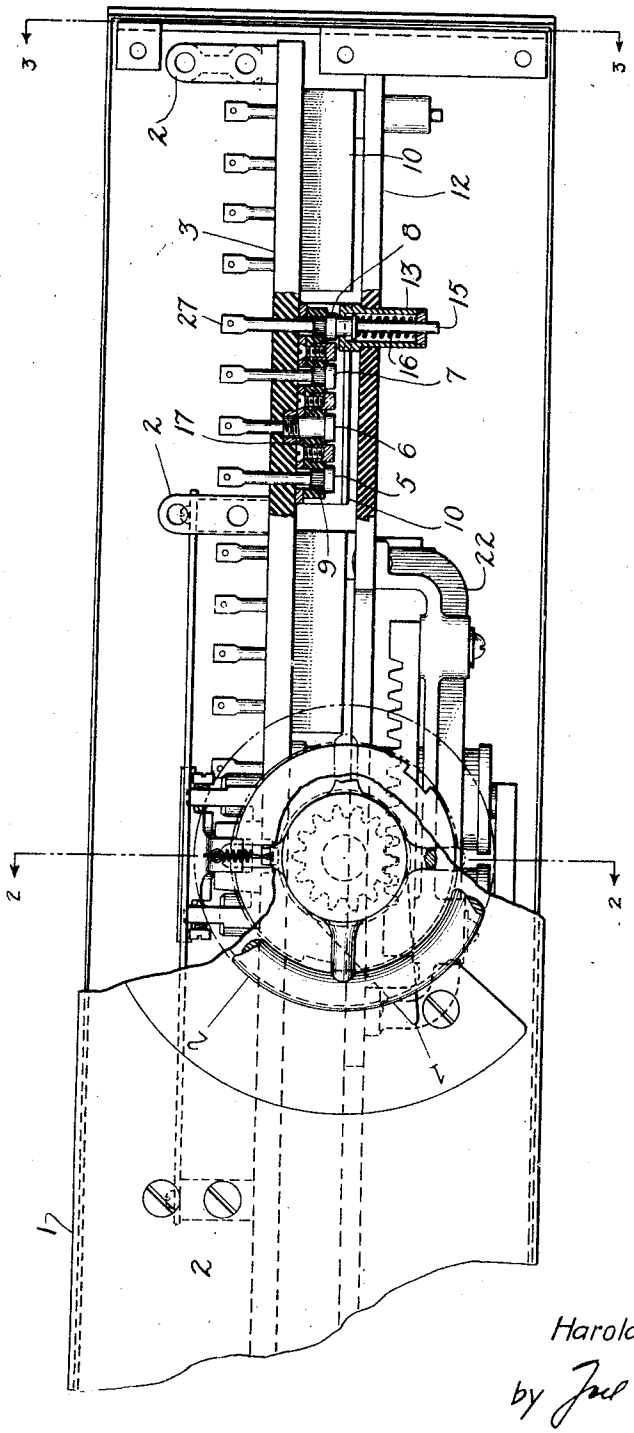


Fig. 1.

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Filed Aug. 11, 1920 2 Sheets-Sheet 2

Fig. 3.

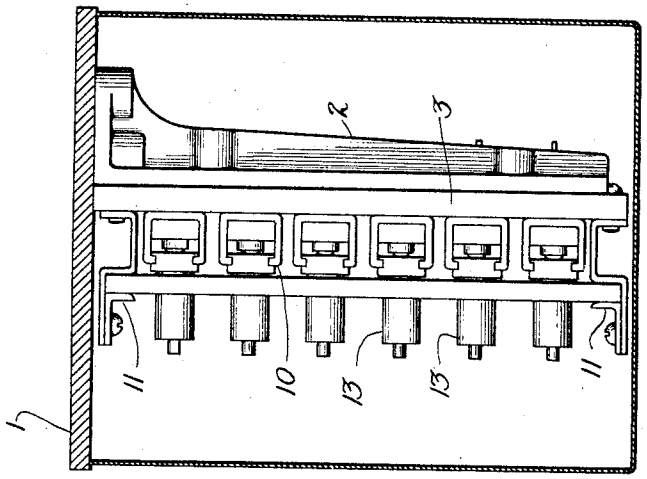
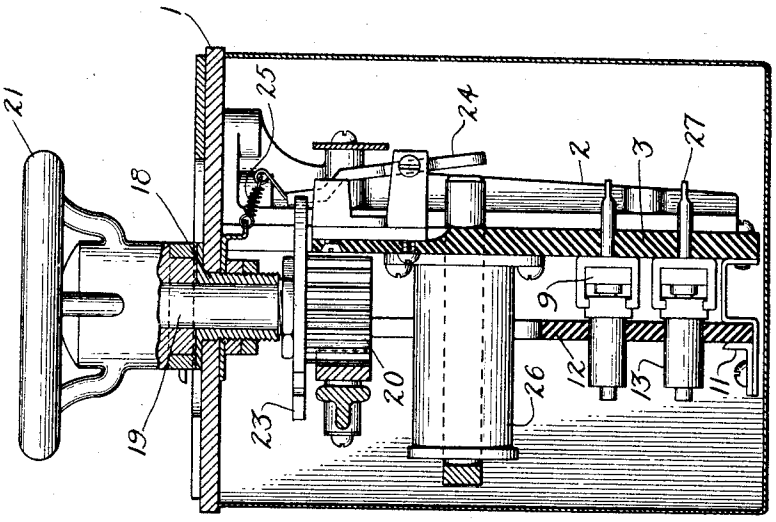


Fig. 2.



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Patented Dec. 18, 1923. 1,478,042

UNITED STATES PATENT OFFICE.

HAROLD T. MARTIN, OF NEW YORK, N. Y., ASSIGNOR TO WESTERN ELECTRIC COMPANY, INCORPORATED, OF NEW YORK, N. Y., A CORPORATION OF NEW YORK.

MULTIPLE-UNIT SWITCH.

Application filed August 11, 1920. Serial No. 402,867.

To all whom it may concern:

Be it known that I, HAROLD T. MARTIN, 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 Multiple-Unit Switches, of which the following is a full, clear, concise, and exact description.

This invention relates to electrical switching apparatus and more particularly to multiple unit or so-called gang switches.

The objects in view leading to the present invention were the provision of a simple, compact, readily accessible multiple unit switch wherein all the units are operable simultaneously by a common operating means, and the provision of a simple self contained interchangeable multiple contact switch unit particularly adapted for use in the above switch.

In accordance with the above enumerated objects, one feature of this invention is a self contained interchangeable multiple contact switch unit consisting of a stationary multiple contact unit and a removable contact plunger unit. The stationary unit comprises a plurality of stationary contacts mounted in a row in a block of insulating material and a metal channel member inside of which the block of insulating material together with the contacts is mounted. The contact plunger unit comprises a hollow cylindrical shell, a contact plunger, and a helical spring mounted inside the hollow shell. The plunger unit is slidably attached to the channel member of the stationary unit and the contact plunger is arranged to make contact with each of the stationary contact members individually.

Other features of the invention reside in the combination of the several elements of the switch.

A detailed description of the multiple unit switch comprising this invention will now be given.

Referring to the drawings, Fig. 1, is a fragmentary plan view of the switch, in which a part of the base plate is broken away in order to show more clearly the interior mechanism; Fig. 2, is a sectional view taken along the line 2—2 of Fig. 1 and Fig. 3, is a sectional view taken along the line 3—3 of Fig. 1.

Attached to and extending at right angles from the base plate 1, are a number of brackets 2, to which, in turn, is attached a plate 3, preferably of insulating material. Attached to one side of the plate 3 and arranged in parallel rows thereon, are a number of metal channel shaped members 10. To the inside of each of which is secured a block of insulating material 9, and in each block 9, there is mounted a row of stationary contact members 5, 6, 7 and 8, each of which is provided with a soldering terminal 27, extending through plate 3. Slidably mounted on the channel member 10 of each unit is a hollow cylindrical shell 13, provided with a rectangular head having recesses, one on each side thereof which engage the inwardly projecting edges of the channel member. A contact plunger 15 is mounted in the hollow cylindrical shell and a helical spring 16 therein, retains the contact plunger in contact with the stationary contact members 5, 6, 7 and 8. The helical spring 16 not only provides the contact pressure required between the contact plunger 15 and its associated stationary contact but also provides the pressure whereby good electrical contact is maintained between the shell 13 and the channel member 10.

It will be noted that contact member 6 differs from contact members 5, 7 and 8 in that it is provided with a nut 17 whereby it is in electrical contact with the channel member 10. Contact terminals 27 of contact members 6 are, therefore, the means whereby contact plungers 15 are connected in circuit. The contacting surface of contact member 6 has no function, other than to help fill the gap between contact members 5 and 7. This arrangement facilitates manufacture.

Slidably mounted in the brackets 11 and parallel with the plate 3 is a second plate of insulating material 12. Apertures are provided in the plate 12 through which the cylindrical shells 13 extend, the shells be-

ing rather loosely fitted in the apertures. The plate 12, together with the contact plunger units, is movable longitudinally of the channel members 10, by means of the toothed rack 22 which is attached to the plate 12. Extending through the base plate 1, is a shaft 19, to the inner end of which is secured a pinion 10 operably engaging the rack 22. To the outer end of the shaft 19 is secured a hand wheel 21, by means of which the shaft and pinion are rotated. Rotation of the hand wheel effects movement of all the contact plunger units simultaneously.

Securely mounted on the shaft 19 and rotatable therewith is a disk 23 provided with three notches on its periphery, positioned to correspond with the three operative positions of the switch. An armature 24 is normally pressed against disk 23 by the tension of spring 25 and is arranged to engage the notches in the disk 23 so as to lock the switch in any of its operative positions, preventing its operation except when the electromagnet 26 is energized. The electromagnet 26 upon energizing, attracts its armature 24, pulling it out of engagement with the disk 23 permitting the switch to be operated. The circuit of the electromagnet 26 is intended to be remotely controlled.

The self contained switch units above described, are particularly advantageous on account of being independent in operation, of any warping of the plates 3 and 12, or slight misalignment thereof. There is also a further advantage in this arrangement, in that the contact plunger units can be readily removed from the plate 12, as well as from the channel member 10.

What is claimed is:

1. A multiple unit switch comprising a base, a plate secured to and extending at right angles from said base, a second plate situated in superposed relation to said first mentioned plate and movable in a direction parallel to its plane, a plurality of self contained multiple contact switch units, each comprising a stationary member and a movable contact member, each stationary member comprising a plurality of contact points situated in a row and insulated one from the other and a channel member on which the movable contact member is slidably mounted, said stationary member being mounted on said first mentioned plate and said movable contact member being mounted on said movable plate.

2. A multiple unit switch comprising a base, a plate secured to and extending at right angles from said base, a plurality of stationary multiple contact switch units secured to said plate, a plurality of contact plunger units, one for each multiple contact switch unit, each contact plunger unit operably engaging its respective stationary multiple contact switch unit and forming therewith a self contained switch unit, a second plate operably engaging said plunger units arranged parallel to said first mentioned plate and adapted to be moved forward and back in a direction parallel to its plane, a toothed rack secured to said second plate, a pinion engaging said rack and a hand wheel for rotating said pinion.

3. A multiple unit switch comprising a base, a plate secured to and extending at right angles from said base, a plurality of stationary multiple contact units secured to said plate, a plurality of contact plunger units, one for each multiple contact switch unit, each contact plunger unit operably engaging its respective multiple contact switch unit and forming therewith a self contained switch unit, a second plate having a plurality of apertures, one for each plunger unit and through which said plunger units extend, said second plate being arranged parallel to and in face to face relation to said first mentioned plate and adapted to be moved forward and back in a direction parallel to its plane, a toothed rack secured to said second plate, a pinion engaging said rack, a hand wheel for rotating said pinion, a locking device operable to retain the switch in any of its operated positions, and electromagnetic means for releasing said locking device.

4. A multiple unit switch comprising a base, a plate secured to and extending at right angles from said base, a plurality of stationary multiple contact switch units secured to said plate, a plurality of contact plunger units, one for each multiple contact switch unit, each contact plunger unit operably engaging its respective multiple contact switch unit and forming therewith a self contained switch unit, a second plate operably engaging said plunger units arranged parallel to said first mentioned plate and adapted to be moved forward and back in a direction parallel to its plane, a toothed rack secured to said second plate, a shaft extending through said base, a pinion on said shaft operably engaging said rack, means for rotating said shaft together with said pinion, a disk secured to and concentric with said shaft, provided with a plurality of notches, one for each operative position of the switch, an armature adapted to engage said notches and thereby lock the switch in any predetermined position and electromagnetic means cooperating with said armature for releasing the switch to permit operation thereof.

5. A self contained multiple contact switch unit, comprising a stationary member and a movable member, said stationary member comprising a plurality of contact members situated in a row and insulated one

from the other, a channel member to the inside of which said contact members are insulatively attached, said movable member comprising a hollow shell, slidably mounted on said channel member, a contact plunger, and a spring for actuating said contact plunger mounted inside said shell, said contact plunger being adapted to engage said stationary contact members individually in seriatim.

In witness whereof, I hereunto subscribe my name this 7th day of August A. D., 1920.

HAROLD T. MARTIN.