

May 3, 1932.

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1,856,448

ELECTRIC SWITCH

Filed Oct. 17, 1928 3 Sheets-Sheet 1

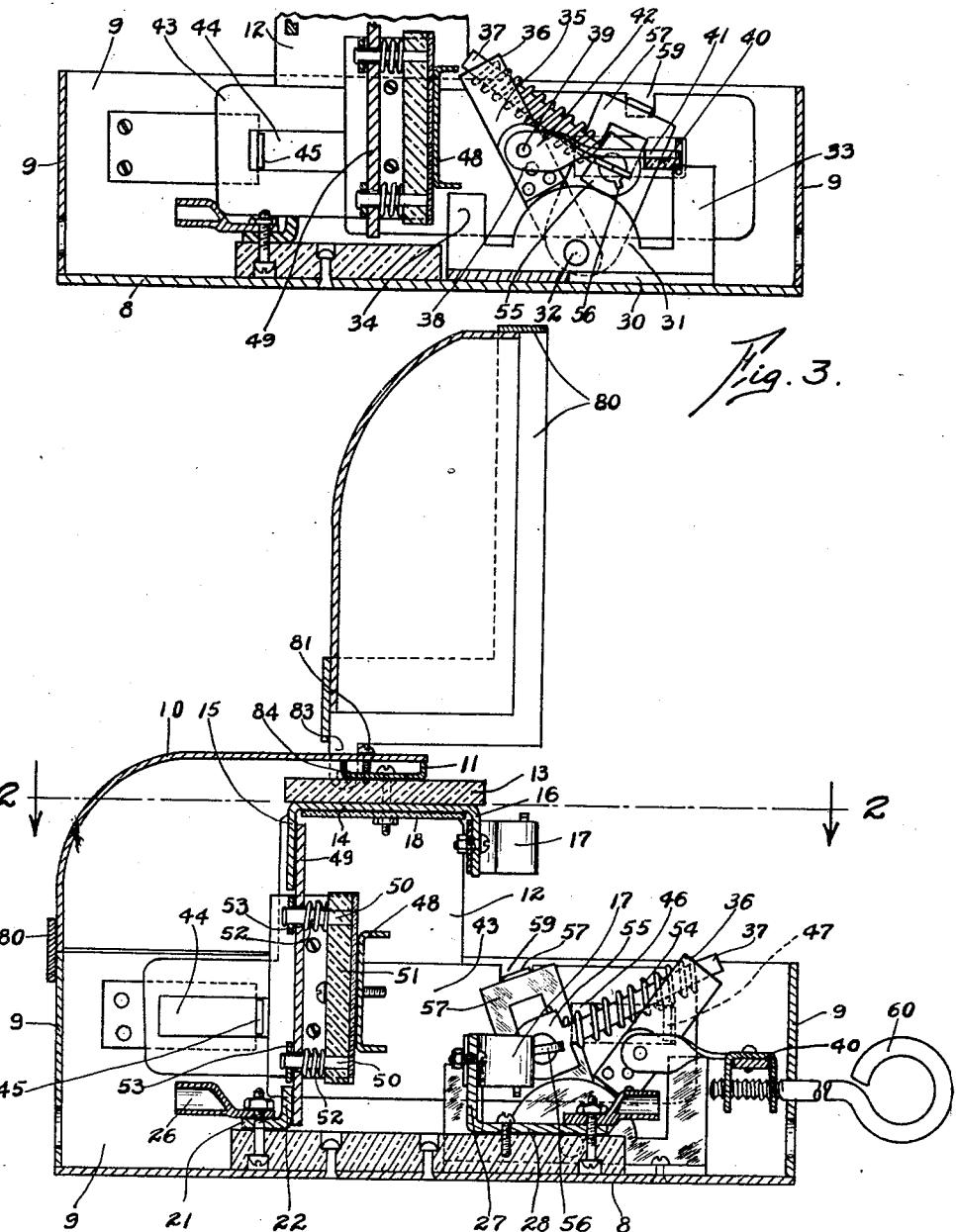


Fig. 1.

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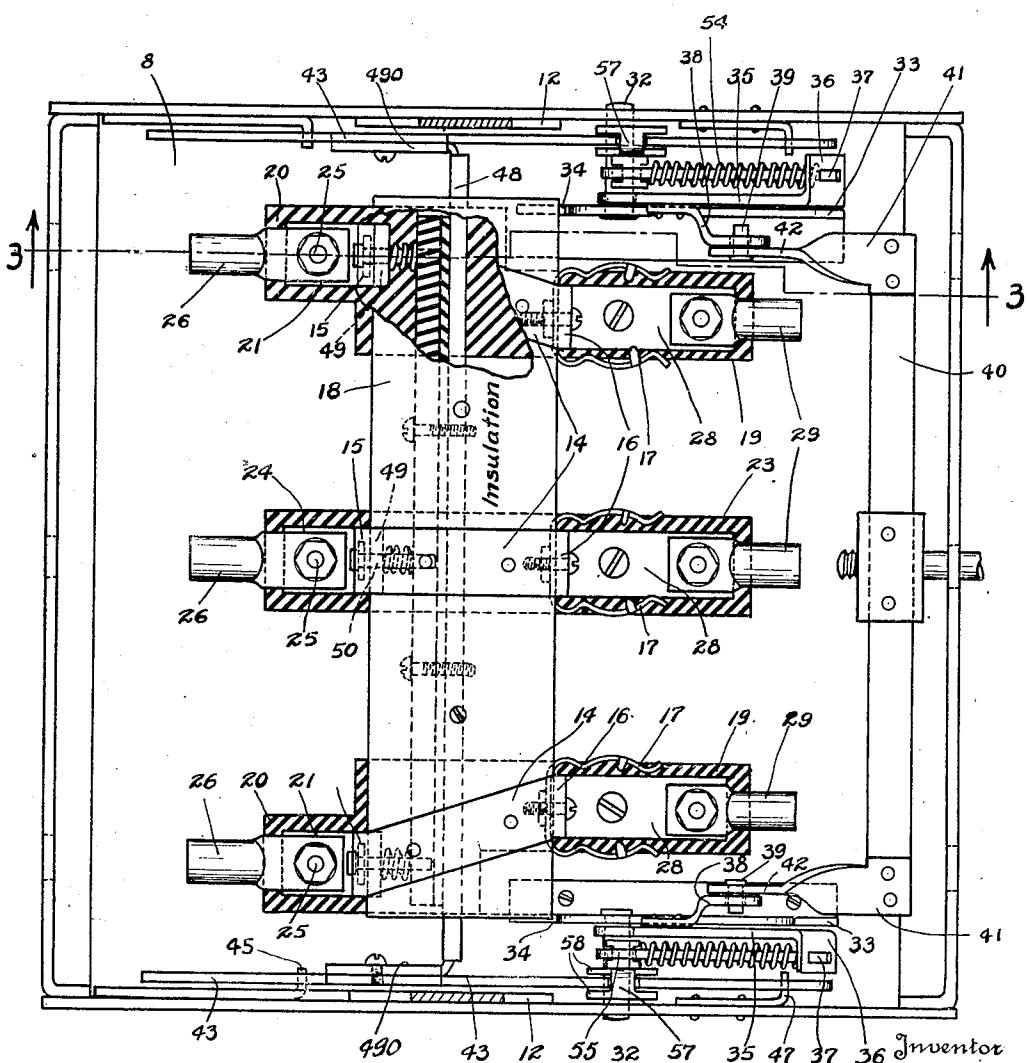
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Fig. 2.



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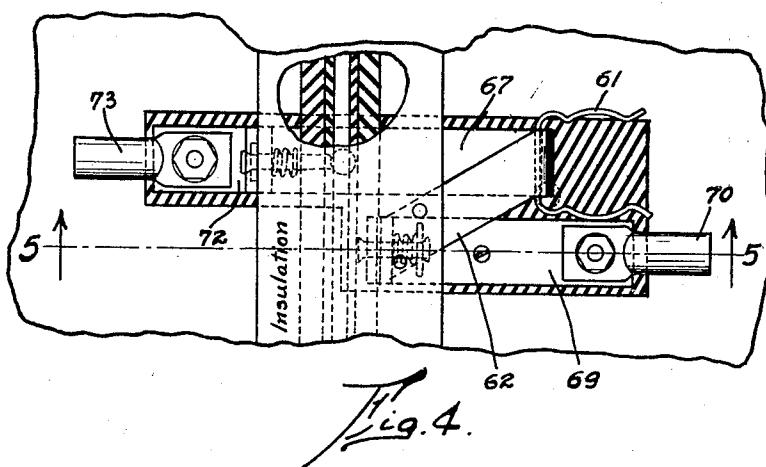


Fig. 4.

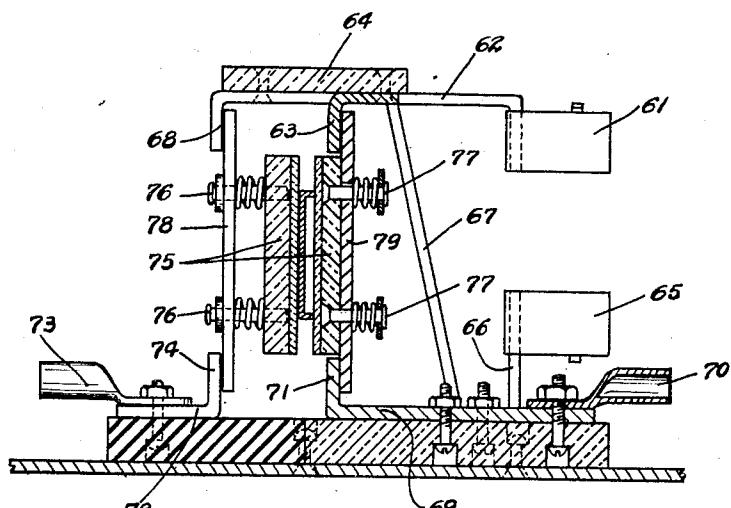


Fig. 5.

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UNITED STATES PATENT OFFICE

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ELECTRIC SWITCH

Application filed October 17, 1928. Serial No. 313,150.

This invention relates to an electric switch mechanism and has for an object a provision of a device wherein there is effected a saving of space due to a reduction of space necessary for operation of the moving parts switch.

Another object is to provide a device wherein the space which is usually filled up with insulating bases and the like, is utilized for the contacts and fuses.

Another object is to provide a structure of this kind wherein the parts indicating contacts are visible and accessible for inspection when the cover is removed.

Another object is to provide a switch structure adapted for quick make and break of the contact and one which is inexpensive of manufacture and very efficient in operation. These and other objects are attained by the means described herein and disclosed in the accompanying drawing in which:

Fig. 1 is a cross-sectional elevation of a switch box of the invention.

Fig. 2 is a cross-sectional view taken on line 2—2 of Fig. 1.

Fig. 3 is a view taken on line 3—3 of Fig. 2.

Fig. 4 is a detail showing in plan a fragment, in modified form, of the invention.

Fig. 5 is a view taken on line 5—5 of Fig. 4.

In the embodiment shown herein the switch comprises a sheet metal box having a bottom wall 8, side walls 9 and a two part detachable cover member 10. Secured to a transverse metallic bridge 11, the uprights or supports 12 of which are secured to the interior faces of one pair of opposed walls 9. Secured beneath the lower face of the metallic bridge 11 is an insulating strip 13 on the under-face of which are secured straps 14 of electricity conducting material, such as copper, the ends of which are turned downwardly at 15 to provide switch contacts disposed along one edge of the member 13. The opposite ends 16 of the straps 14 are turned down in substantial parallelism and have electrically attached thereto, fuse clips 17. A thin sheet of insulating material 18 covers the lower faces of the straps 14. It will be noted in Fig. 2 that the outermost of the straps 14 may diverge for

the purpose of securing ample separation between the contacts 15.

On the interior face of the bottom 8 are secured insulating blocks 19 with offset ends 20 upon which are secured contacts 21 having upstanding contact faces 22, which are in alignment with the endmost of the depending members 15 above. An intermediate insulating block 23 is secured to the bottom 8 of the box and has a contact member 24 secured thereto with an upstanding portion aligned with the intermediate contact portion 15. These contacts 21 and 24 are secured in position by suitable screws 25 which also serve to connect line terminals 26 in electrical contact therewith. On the blocks 19 and 23, opposite the terminals 26, are secured upstanding L shaped electrical members 27 secured through arms 28 to the blocks and having their upstanding portions 27 aligned with the depending member 16 above. On each of the upstanding members 27 is a fuse clip member 17, paired with a similar clip member above it for receiving a cartridge type fuse and holding it perpendicular to the base 8 of the box. Suitably secured upon the members 28 are the load terminals 29.

At opposite ends of the row of load terminals 29 are secured interiorly of the box, a pair of angle plates 30 comprising a central mounting 31 for a pivot 32 and stops 33 and 34 on opposite sides of the portion 31. These parts are substantially uniform, wherefore only one need be described. The pair of aligned pivots 32 have their outer ends riveted in the side walls 9 of the box. A pair of pivoted levers 35 are mounted one each upon the opposed pivots 32 and have their ends 36 turned at right angles thereto and perforated for slidably receiving spring retaining rods 37. The arms 35 also have securely mounted thereon, offset arms 38 which receive pivots 39 for operatively connecting members 35 with a reciprocating actuator yoke 40. The yoke 40 may comprise a strip to which are secured members 41, the ends 42 of which are turned and perforated to complete the sliding pivotal connection with the arm 38.

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The members just described are operatively connected with a pair of reciprocating plates 43, which are slotted as at 44 and are limited in their movement along the side walls by a lug 45 extending into the slot. An elongated aperture 46 is formed in the opposite end of the plates 43 and similarly guides and limits the opposite ends of the plates on lugs 47.

10 A transverse strip 48, which may be channel shaped to impart rigidity to it, has its ends 490 turned at right angles and secured to the plates 43. The sliding plates 43 and the transverse members 48 provide a reciprocating carriage which has movement parallel to the bottom or base 8 of the box. The member 48 however, extends perpendicular to the base and carries a bridge contact 49 for each pair of terminal members 22-15.

15 20 The bridge contact members 49 are capable of limited yielding movement, being slidably mounted on pins 50 secured in an insulating bar 51 mounted on the member 48. Springs 52 surround the pins 50 and provide a yielding abutment for the bridge bars 49. Any suitable means, such as rivet heads 53, preclude separation of a bridge contact 49 from the pins 50.

Thus when the carriage bearing the bridge contacts 49 is moved from the position shown in Fig. 3, to the position shown in Fig. 1, the top of the contact 49 strikes the face of depending contact 15 while the bottom portion of the face of contact 49 strikes the up-standing face 22 of contact 21, thus completing an electric circuit from the line terminal 26 through contact 21, bridge contact 49, depending contact 15, strap 14, from upper fuse clip 17, through a fuse (not shown), through lower face clip 17, contact 28 and load terminal 29.

The springs 52 previously described, serve to cushion the impact of bridge contact 49 against the contacts 22-15.

45 Any suitable means may be employed for reciprocating the carriage structure, however, as shown herein, the manual actuation of the carriage serves to build up force against spring tension which is automatically released for providing an automatic quick make and break between the contacts.

As previously explained, the arm 35 has a bent-over end portion 36, slotted to receive a relative reciprocating member 37. A compression spring 54 encircles the rod 37 which is enlarged as at 55 to provide an abutment for one end of spring 54, the other end of which abuts the face of the member 36 on arm 35. The enlarged end 55 of rod 37 is perforated with a sort of key-hole opening which is best seen in Fig. 3 so that a key 56, which forms a part of a clip 57, may be pivotally connected with the arm 37. The clip 57 has a flat leaf-like portion 58 disposed on each side of the plate 43 and these leaves are

connected by the narrow neck 57 which may move in a vertical slot 59 in plate 43. Thus, by pushing on the bar 40 the arms 35 are turned about their fixed axes on the pivots 32 and in doing so the projecting ends 36 compress springs 54. When the arms 35 have been moved off-center the force of the springs now presses upon the keys 56 which rocks the clip structure 57 on the plates 43 and allows the force of the spring to quickly thrust the carriage structure forwardly to form a contact between the bridge contacts 49 and the contacts 22-15.

70 75 In breaking the contact, member 40 is moved in the opposite direction, which stores up the energy in springs 54 until the arms 35 are well past top dead center, whereupon the force of the spring is released for effecting instantaneous breaking of the contact. Thus, regardless of whether the operator may attempt to move the switch rapidly or slowly, his manual movement serves merely to store up energy in the springs 54 and upon a pre-determined relation of the parts, as explained, the carriage structure will automatically become released to the movement of the springs.

90 95 In the present embodiment the transverse member 40 is shown with a ring 60 suitably connected and serving to actuate the switch with a simple push and pull movement. It will be readily appreciated that the same movement however, may be attained through other means, as for example, a crank lever at the side of the box.

100 It will be further understood that the flat contact members 15 and 22 and their bridging contact 49, may be of a shape other than flat, for example, the members 15 and 22 may be in the form of V shaped jaws.

105 The embodiment heretofore described, provides for the making and breaking of a circuit through the switch in which the fuses are not cut off from the load side of the circuit when contact is broken with the supply or line contacts. In Figs. 4 and 5 are shown details of a structure of the invention which is modified to provide a double break which simultaneously disconnects the contacts on the line or supply side of the box and disconnects the fuses from the load terminals of the box. 110 In order to provide for the double break between the line, fuses and load terminals, the upper fuse clips 61 are mounted on straps 62 which have downwardly projecting contacts 63 beneath insulating strips 64, while the lower fuse clips 65 are mounted on up-standing projections 66 of a strap 67, which has a depending contact 68 on the end thereof diagonally arranged with contact 63. An L shaped member 69 has a load terminal 70 mounted at its one end and has its other end developed into an up-standing contact 71. A second L shaped member 72 has the line terminal 73 attached thereto and has its end developed into a contact 74. A pair of insulat-

ing members 75 mounted on a carriage as previously described, has pins 76 extending from one side and pins 77 extending from the other side, for mounting bridging contacts 78 and 79, respectively, in the manner previously taught. Upon movement of the insulating members 75, the bridging contact 78 will contact with members 74 and 68, while the bridging contact 79 actuated simultaneously therewith, will complete a circuit between contacts 68 and 71. Thus, the electrical circuit through the structure shown would be from line terminal 73, through contact 74, bridge contact 78, contact 68, strap 67 and its upstanding projections 66, to fuse clip 65, then through the fuse (not shown), to upper clip 61, through strap 62, contacts 63, bridge contact 79, contact 71, member 69, to load terminal 70. Upon reversing the carriage, the contact would be broken at two places, thus leaving the fuse clips dead from the line and disconnected from the load as well.

The two part cover 10 has suitable flanging 25 around its edges to provide for a neat edge to edge contact between the box wall 9 and the cover members. The member 10 connects with the bridging member 11 by means of screws 81 which are easily removed to detach the cover from the box entirely. When the cover is attached as shown in Fig. 1, the line terminals 26 are inaccessible and the hinged portion 82 of the cover may be raised to afford access to the fuses. The hinge connection may be simple as disclosed in Fig. 1 35 where a pair of perforate ears 83 are pivotally connected with the sides of cover member 10 by means of pins 84.

It will be understood that the fixed and 40 movable contacts, herein described and shown in the drawings as perpendicular to the base or bottom wall of the box, need not necessarily be so disposed. It is contemplated within the scope of this invention, that all or 45 certain sets of the contact members may be inclined at other angles when desirable to accommodate the structure herein to changes in design.

What is claimed is:

- 50 1. In a switch box structure the combination of a cabinet having a base, a pair of spaced contact members disposed one above the other at one side of the base, a spring propelled carriage slidable parallel to the base, a bridge contact transversely mounted on one side of the carriage for effecting electrical connection between the spaced contacts and manually actuated means for initiating action of the spring on the carriage.
- 60 2. In a switch structure the combination of a cabinet having a base, pairs of spaced contacts, each pair arranged one contact above the other within the cabinet above the base, reciprocably mounted members for making and breaking electrical contact be-

tween pairs of said spaced contacts, a spring mechanism for effecting movement of the reciprocably mounted members, manually controlled means for conditioning and releasing the spring mechanism, line wire terminals connected with predetermined ones of the contacts of said pairs, and fuse receptacles electrically connected with the remaining contacts of the said pairs, the fuse receptacles being electrically connected and disconnected from the said line terminals instantaneously as the manually operated means conditions the spring mechanism for moving the reciprocating members.

3. In combination a closable cabinet having a base, spaced contacts disposed adjacent the top and bottom of the cabinet in alignment perpendicular to the base, a line terminal connected to one of said contacts, complementary fuse receptacle members connected to the other of said contacts and a spring actuated perpendicular member movable parallel to the base for connecting and disconnecting said spaced contacts.

4. In a device of the class described the combination of a cabinet comprising a base, pairs of aligned spaced contacts at one side of the cabinet, one of each pair at the bottom and the other at the top of the cabinet, fuse receptacles at the other side of the cabinet and electrically connected one each to one of each pair of contacts, supply line terminals electrically connected to the remaining of said contacts and a manually conditioned spring actuated member for effecting instantaneous making and breaking of electrical connection between the pairs of contacts.

5. In a device of the class described the combination of a relatively shallow cabinet having a base, a pair of spaced contact members arranged in alignment adjacent the top and base of the cabinet, a line terminal connected to one of said contacts, a fuse receiving means connected to the other of said contacts, a bridge contact member disposed vertically of the base and mounted for bodily reciprocation horizontally of said base, for connecting said pair of contacts, a spring mechanism adapted to be manually conditioned for subsequently self liberated projection of the bridge contact member toward and from said pair of spaced contacts.

6. In combination, a cabinet having a base, side walls, and a cover, pairs of contacts disposed at the top and bottom of the cabinet, a carriage slidably mounted on opposed side walls for movement parallel with the base, an insulating member extending across the cabinet and movable with the carriage, bridging members mounted on said insulating member and movable thereby into and out of contact with pairs of contacts, and means comprising springs and compressing means therefor to effect rapid projection of the carriage.

7. An actuating mechanism for a sliding carriage, comprising a pair of support lugs, a carriage member having slots therein for receiving said lugs and also having a transversely extending aperture therein, a pair of arms independently mounted for pivotal movement on a common fixed axis, a compression spring having its opposite ends in abutment with said arms and exerting its force in a plane parallel with said arms and means on one of said arms for operatively connecting it in the transverse aperture in the carriage.

8. In combination a line terminal, a load terminal, contacts connected with each terminal, a pair of spaced fuse clips, a connector extending from one clip and terminating in a contact paired with the line terminal contact, a connector extending from the other clip and terminating in a contact paired with the load terminal contact and a pair of movable members for making and breaking electrical connection between said pairs of contacts.

9. In combination a cabinet having a base, a transverse member spaced from the base, contact members extending from the base and said transverse member, a carriage reciprocable between the base and transverse member, electrical bridge members on the carriage and each arranged to have one end abut a contact on the transverse member and the other end abut a contact on the base when the carriage is moved to one limit of reciprocation and to break abutting contact when the carriage is moved away from said limit of reciprocation and means to initiate uncontrolled quick reciprocation of the carriage.

10. In combination a pair of oppositely extending contacts spaced at a distance one from the other, a sidewise movable carriage reciprocable in a plane between the contacts, bridge contact bars mounted transversely of the carriage for connecting said contacts and precluding movement of the carriage into the space between contacts and means connected to opposite ends of the carriage to effect rapid movement of the carriage whereby the opposite ends of each contact bar are carried into and from abutment with a given pair of the contacts.

In testimony whereof, I have hereunto subscribed my name this 1st day of October, 1928.

55 GEORGE B. WADSWORTH.