

Jan. 10, 1939.

J. G. JACKSON

2,143,697

ELECTRIC SWITCHING DEVICE

Filed Dec. 27, 1934

3 Sheets-Sheet 1

FIG. 1.

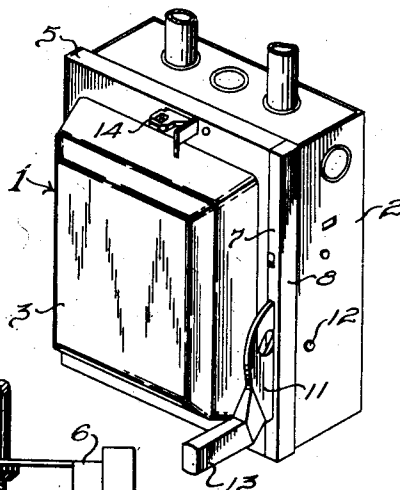
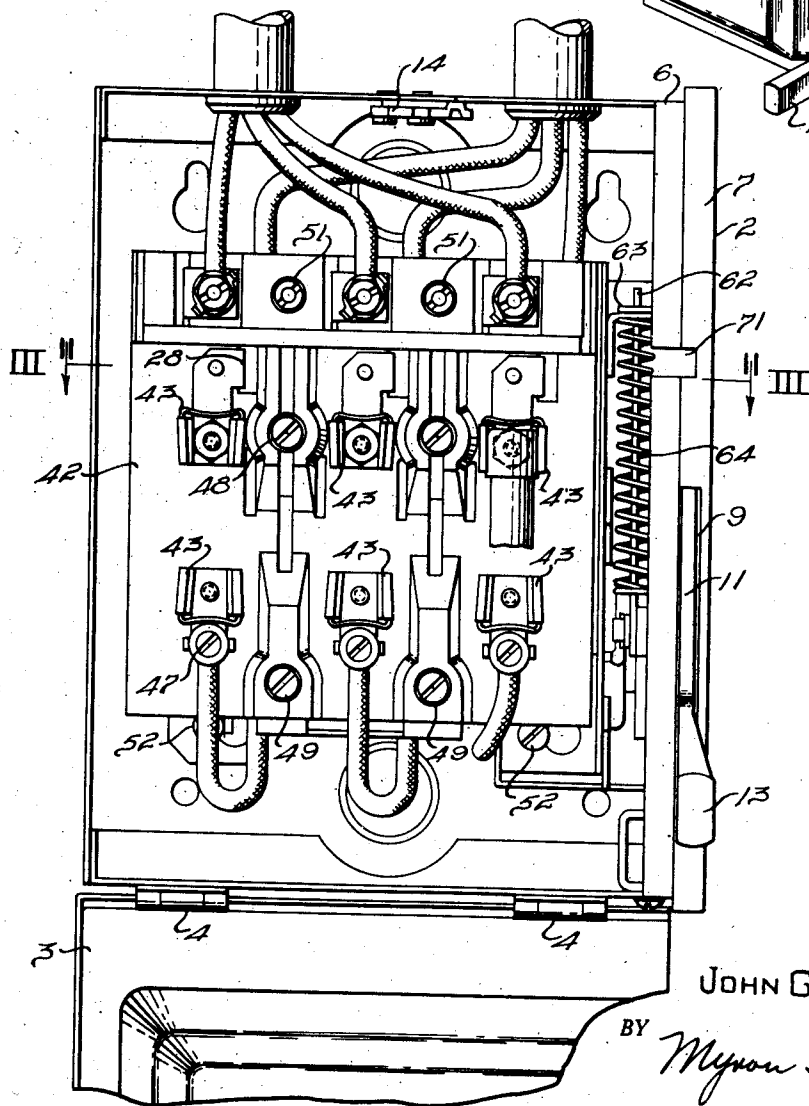


FIG. 2.



INVENTOR.
JOHN G. JACKSON.

BY *Myron T. Eichold*
ATTORNEY.

Jan. 10, 1939.

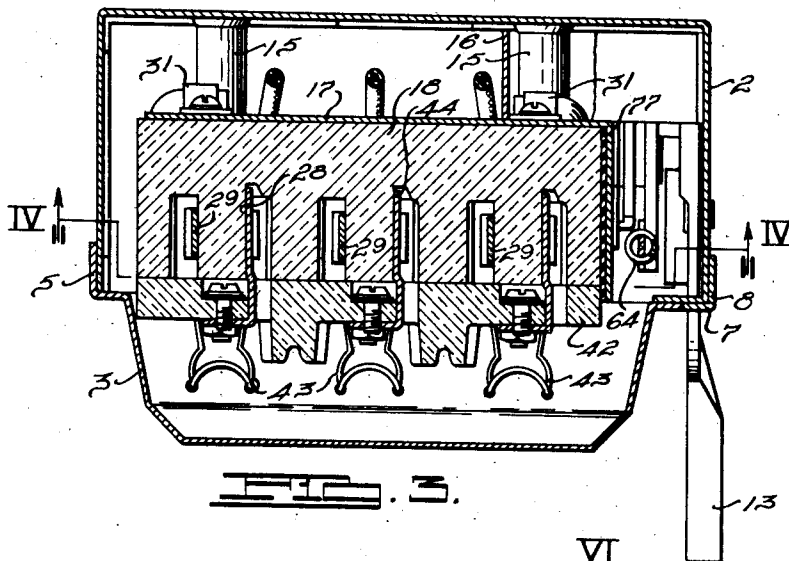
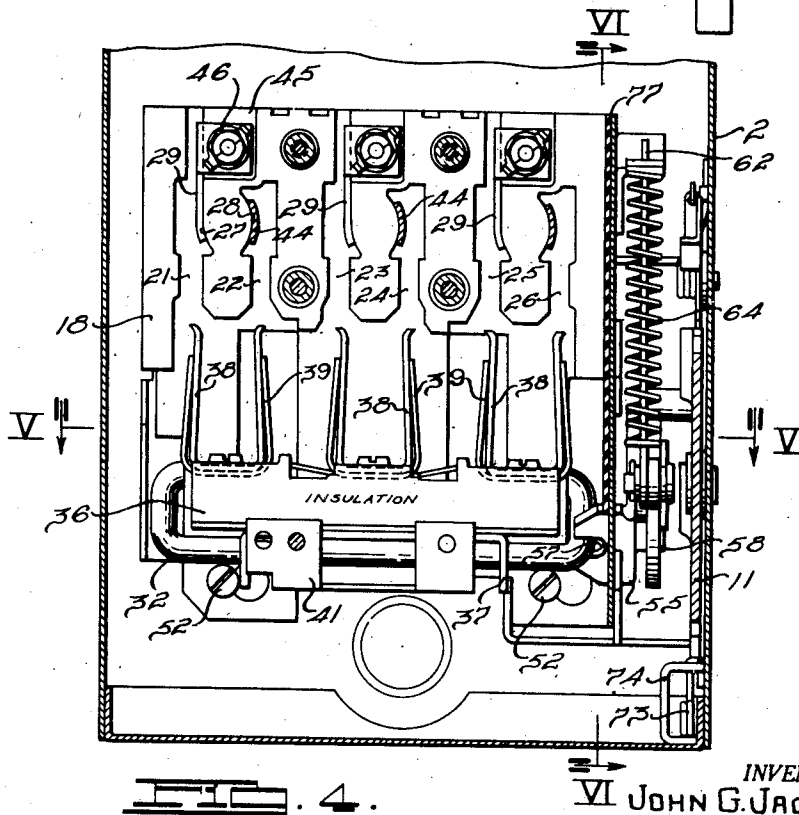
J. G. JACKSON

2,143,697

ELECTRIC SWITCHING DEVICE

Filed Dec. 27, 1934

3 Sheets-Sheet 2



INVENTOR.
VI JOHN G. JACKSON.

BY
Myron J. Gebold
ATTORNEY.

Jan. 10, 1939.

J. G. JACKSON

2,143,697

ELECTRIC SWITCHING DEVICE

Filed Dec. 27, 1934

3 Sheets-Sheet 3

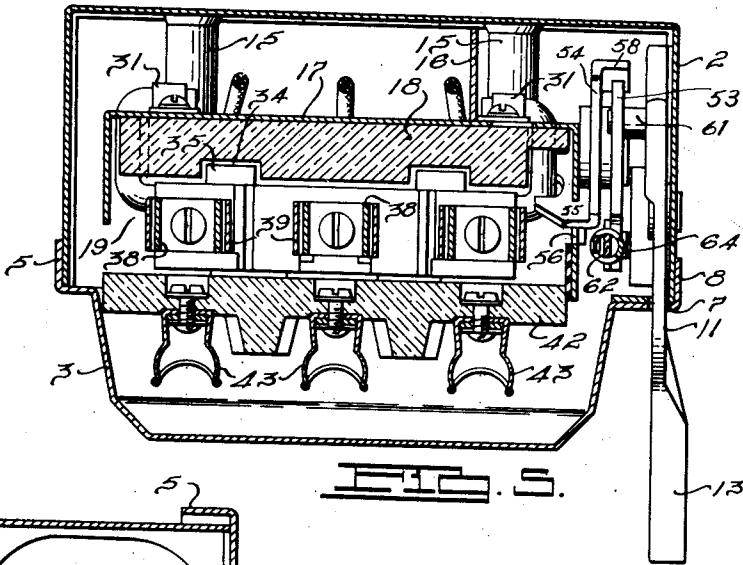


FIG. 5.

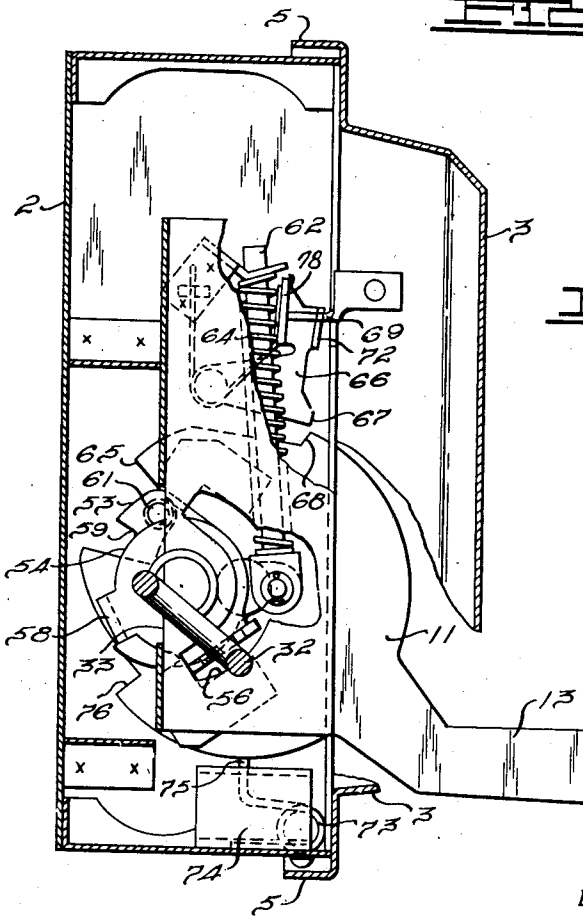


FIG. 6.

INVENTOR.
JOHN G. JACKSON.

BY *Myron J. Seibold*
ATTORNEY.

UNITED STATES PATENT OFFICE

2,143,697

ELECTRIC SWITCHING DEVICE

John G. Jackson, Detroit, Mich., assignor to
Square D Company, Detroit, Mich., a corporation
of Michigan

Application December 27, 1934, Serial No. 759,354

36 Claims. (Cl. 200—50)

This invention relates to apparatus for making and breaking electrical circuits and more particularly to enclosed electrical switches.

One object of this invention is to provide an improved construction of cabinet arranged to provide a maximum accessibility within the cabinet interior.

Another object of this invention is to provide a switching device having a front projecting handle in which substantially the entire front face will be open under the removable cover member.

A further object of this invention is to provide a switching device in which the switching unit is mounted forwardly of the rear wall of an enclosing cabinet to provide a wiring space therebetween.

Another object of this invention is to provide a switching device in which a switching unit is mounted forwardly of the rear wall of the enclosing cabinet to provide a wiring space and in which the unit is readily demountable to provide unobstructed access to said wiring space.

Another object of this invention is to provide a switching unit having operating mechanism mounted thereon and readily detachable from an operating handle secured to an enclosing cabinet to provide ready demountability to the switching unit.

Another object of this invention is to provide an improved construction of switching unit having a reciprocable switching element providing for a multiple break and having arc suppressing features.

Another object of this invention is to provide an improved electric switch construction.

Further objects and features of the invention will be readily apparent to those skilled in the art from the following specification and the appended drawings illustrating certain preferred embodiments of the invention in which:

Figure 1 is a perspective view of a switching device according to the present invention with the cover closed.

Figure 2 is a front elevational view of a switching device according to present invention with the cover open and showing one manner of wiring the device.

Figure 3 is a transverse sectional view corresponding to that taken on line III—III of Figure 2 with the cover closed.

Figure 4 is a sectional view taken on the line IV—IV of Figure 3.

Figure 5 is a sectional view taken on the line V—V of Figure 4.

Figure 6 is a sectional view taken on the line VI—VI of Figure 4 with parts broken away to more clearly show the operating mechanism.

Referring now to the different figures of the drawings in which like reference numerals indicate like parts in the various figures, the embodiment of the invention as illustrated comprises a cabinet 1 having a box like body portion 2 and a cover 3 hinged as at 4, 4 to the body portion. The top and bottom and one side of said cover member are flanged as at 5 to enclose the corresponding sides of the body portion of the cabinet. The opposite side of said cover member extends adjacent to but short of the fourth side of the body portion. This side of the body portion is provided with a flange or strip 6 beneath the edge of cover member 3. This strip 6 may be a flange integral with the side of the cabinet or may be a strip otherwise secured thereto. A narrow trimming strip 7 extends along strip 6 from the edge of the cover to the side of the cabinet and is provided with enclosing flanges 8 to give a finished appearance to the outside of the cabinet. Strips 6 and 7 are provided with a slot 9 closely adjacent to the side of the cabinet, one edge of said slot extending along the edge of the cover member. Within said slot a flat plate like handle portion 11 is disposed. This handle portion is pivoted to the side of the cabinet as at 12. The handle portion 11 is provided with a gripping extension 13 for manipulating the switching elements. A latching device 14 is secured to the wall of the cabinet and projects through a slot in the cover member to latch it in closed position. Secured to the rear wall of the cabinet and extending forwardly thereof are mounting posts 15 disposed in pairs adjacent the top and bottom of the cabinet and slightly closer to the side of the cabinet opposite to the one upon which the handle member is pivoted, the pair of posts at the top of the cabinet being spaced closer together than those at the bottom. A guard element 16 is disposed in the cabinet adjacent to the rear wall thereof and encloses the lower portion of the operating handle and the parts of the operating mechanism projecting below the base of the switching unit to be hereinafter described. The rear wall of the cabinet is provided with the usual attaching holes for securing the cabinet in position.

The switching unit comprises a metallic supporting member 17 having a flat base plate and upstanding sides. An insulating base 18 is secured to said base plate and is provided at one end with a rabbet portion 19 more particularly shown by the open space in Figure 5. The vertical wall of the base member adjacent to the rabbet portion is provided with plurality of slots 21, 22, 23, 24, 25 and 26, alternate ones of which extend through to the top surface of the block. These slots are provided with restricted openings formed by extensions on their side walls adjacent to the entrances to the slots. Above these restricted openings, the adjacent side walls of the slots are provided with curved portions 27, 28. A plurality of contact members 29 are secured

60

to the base and have fingers projecting into alternate slots, the ends of the fingers being curved to conform to the curvature 27 on the walls of the slots. At the underside of the supporting plate bearing brackets 31 are provided in which are pivoted the ends of an operating bar 32 extending through slots 33 in the supporting plate forwardly around the front of the rabbet portion of the base block. The front surface of the rabbet portion is provided with guiding grooves 34 in which are disposed guide lugs 35 on an insulating contact bar 36. A metallic U-shaped bracket 37 is secured to the bottom of the bar 36 and is provided with slotted portions loosely and removably engaging the operating bar 32.

On the top of the insulating bar are disposed a plurality of U-shaped contact members 38, each leg of which is disposed opposite one of the slots of the base block. Enclosing each of said contact members is a U-shaped clip 39 of a spring material such as steel to maintain the position of the contact fingers and to exert the desired contact pressure between movable and stationary contact members.

A metallic supporting bracket 41 for the cover member is secured to the base plate at the bottom thereof. The unit is provided with an insulating cover member 42 which is supported on the top of the base and on the bracket 41. This cover member has cooperating pairs of fuse clips 43 mounted thereon, the upper clips of each pair being electrically and mechanically attached to contact members 44 which extend within the alternate slots 22, 24 and 26, from the front thereof, and which are curved to form with the curvature 28 on the walls of the slots. The top of the cover is cut away as at 45 to provide access to terminals 46 attached to contact members 29. The lower fuse clips of each pair are connected to terminals 47. It is, of course, understood that if an unfused switch is desired contacts 44 and terminals 47 are directly connected by conducting strips on the front of the cover 42. The cover member is attached to the supporting base plate by studs 48, 48 which pass through the base block and screw into threaded holes in the base plate and is further secured by studs 49, 49 which are screwed into bracket member 41. The unit is demountably attached to mounting posts 50 15 by studs 51, 51 which extend through the cover plate and bear against the front of the base block to permit removal of the cover while the base block is mounted in position. The base plate is secured to the lower mounting posts by studs 52, 52 which pass through openings in extensions on said plate.

The operating mechanism for the switching elements is shown as mounted on an upstanding side of the supporting base plate. This operating mechanism comprises a pair of concentric pivoted discs 53 and 54, disc 54 having a projecting portion 55 extending through an arcuate slot 56 in the side wall and provided with a notch 57 engaging the operating bar 32. Disc 54 is provided with another and oppositely extending lug portion 58 which is received within an arcuate notch 59 in disc 53. A post 61 projects from the side of the disc 53 and is adapted for engagement with a notch in the operating handle to be hereinafter described. A plunger 62 is attached to an edge of disc 53 and extends through a slot in member 63 secured on the side of the supporting plate. A compression spring 64 is disposed surrounding said plunger 62 between element 63 and disc 53. It is seen from this description of

the parts that disc 53 will have a considerable rotation tending to compress the spring 64 without moving disc 54 or bar 32. When, however, the rotation of disc 53 becomes sufficient to move the then compressed spring 64 past its dead center which occurs when the plunger 62 is in line with the pivot for the disc 53, the energy of the spring will be expended in quickly continuing the rotation of the disc 53. By this time a side of notch 59 has engaged with lug 58 so that disc 54 is also quickly moved with disc 53 under the action of spring 64. This moves operating bar 32 and the switching bar 36 to move the contacts 38 quickly within the slots and into engagement with the associated contacts 29 and 44. The reverse movements of these parts occur in a similar manner which provides a quick break.

A flat plate-like handle portion 65 is provided with a notch 66 for engagement with post 61, the notch portion being wide enough to provide for movement free of the operating handle after spring 64 passes dead center in either direction.

An interlock comprising a pivoted spring urged member 66 is disposed on the side wall of the cabinet and has a latching surface 67 engaging a wall 68 on the handle portion and preventing operation of said handle into switch "on" position when the cover is removed. The cabinet cover 3 is provided with an L-shaped depending portion 69 which, as the cover is closed, passes through the slot 71 in the cabinet. The foot of the L engages a lug 72 on the member 66 and rotates it counterclockwise as shown in Figure 6, thus moving the latching surface 67 out of engagement with the wall 68 on the handle. This rotation of the member 66 moves the locking lug 72 thereon over the foot of the L, as also shown in Figure 6. Movement of the switch handle into the "on" position places the large circular portion of the handle alongside the member 66. In this position the handle positively prevents the clockwise rotation of the member 66 under its spring bias and if it is attempted to raise the cover 3 while the switch is "on", the foot of the L-shaped member 69 will engage with the locking lug 72 and prevent opening of the cover. When the switch is in the "off" position the handle will be in the position shown in Figure 6 and as the cover is raised member 66 is free to rotate clockwise under its spring bias, thus moving the locking lug 72 out of the path of the foot of the L-shaped member 69, whereupon the cover may be freely moved to its open position. Provision is also made for disabling this interlock and permitting opening of the cover while the switch is in the "on" position when desired. As shown in Figure 1, a portion of the slot 72 is exposed while the cover is closed. By the insertion of a screwdriver or other tool in this exposed portion of the slot, the member 66 may be further rotated counterclockwise against its spring bias until the back portion of the locking lug 72 has passed beyond the path of the foot of the L-shaped member 69 whereupon the cover may be opened although the switch is in its "on" position. In the bottom corner of the cabinet is provided a spring 73 having a guard enclosure 74, one end of this spring as at 75 rubbing against an edge of the handle and engageable under a surface 76 thereof to urge the handle into "on" position and to restrain initial movement of said handle toward "off" position. An insulating sheet 77 is disposed between the side of the base plate on which operating mechanism is mounted and the base block 18.

The mounting of the switching element as a

readily demountable unit spaced forwardly of the rear wall of the cabinet provides a wiring space between the base of the unit and the cabinet free from moving parts which might interfere with wires disposed therein. One method of wiring a switch in accordance with present invention is shown in Figure 2, the wires leading to the lower terminals being disposed behind the base of the switching unit. The demountability of the unit provides a means of easy access to the back of the cabinet and facilitates the pulling of the wires through the conduits attached to the cabinet. At the same time the cabinet construction according to the present invention is adapted to provide a maximum of accessibility to the interior of the cabinet portion with the desired front projecting handle, it being noted that with the cover removed almost the entire front face of the cabinet is exposed. The improved switching unit also facilitates the ready removal of the operating parts from the cabinet, the post 61 being readily removable from the slot 65 in the handle as the unit is moved to the left to uncover the large openings permitting passage of the heads of studs 52. The curvature of the contact elements 29 and 44 provides a wiping action with the movable contact elements 38. The restricted openings into the slots in which the stationary contacts are disposed provides a desirable arc suppressing construction. The extensions of slots 21, 23 and 25 to the top of the block constitute vents for the arc gases. It is noted that each circuit is broken in two points which further facilitates the quenching of the arc. The elements of the unit are also constructed with the purpose in view of providing for ready removal and replacement of the parts.

While certain preferred embodiments of the invention have been specifically disclosed, it is understood that the invention is not limited thereto as many variations will be readily apparent to those skilled in the art and the invention is to be given its broadest possible interpretation within the terms of the following claims.

I claim:

1. In an electric switching device, a box-like cabinet having an open top, a narrow strip extending along one side of the top of said box, a narrow, elongated opening in said strip, a narrow, flat handle member extending through said opening and a hinged cover for said box enclosing three sides thereof and extending to said strip on the fourth.

2. In a switching device, a box-like cabinet open at the front, a narrow cover strip extending along one side of said cabinet from top to bottom, a narrow opening in said strip, an operating handle having a flat portion extending through said opening and a grip portion exterior to said cabinet, and a movable cover for said cabinet extending to its three sides and said cover strip.

3. In a switching device, a box-like cabinet having an open front, a movable closure for said cabinet extending fully to three sides thereof and short of but closely adjacent to the fourth side for at least a portion of its length, a narrow flange on said fourth side extending under said closure, a slot in said flange with one side thereof closely adjacent to the edge of the closure, and an operating handle having a narrow, flat portion extending through said slot.

4. In a switching device, a box-like cabinet having an open top, a movable closure for said cabinet extending fully to three sides thereof and short of but closely adjacent to the fourth side

for at least a portion of its length, a narrow strip extending from said fourth side beneath the adjacent edge of said closure, the top of said strip being level with the top of the box, a narrow trimming strip extending along said first mentioned strip from the edge of the closure to the fourth side at said portion, the strips having a narrow, elongated slot therethrough for a projecting handle member.

5. In a switching device, a box-like cabinet having an open top, a movable closure for said cabinet extending fully to three sides thereof and short of but closely adjacent to the fourth side for at least a portion of its length, a narrow strip extending from said fourth side beneath the adjacent edge of said closure, the top of said strip being level with the top of the box, a narrow trimming strip extending along said first mentioned strip from the edge of the closure to the fourth side, the strips having a narrow, elongated slot therethrough for a projecting handle member, the closure and trimming strip having flanges overlapping the sides of the cabinet.

6. In an electric switching device a box-like cabinet having an open top, a hinged cover for said cabinet having flanges on three sides thereof, the fourth side being unflanged for at least a portion of its length and having said unflanged portion terminating a small distance short of the adjacent side of the cabinet, a narrow top strip extending along the side of the cabinet and beneath the adjacent edge of the cover, the top of said strip being level with the top of the cabinet, a slot in said strip, a narrow, flat, handle portion passing through said slot, a side of the slot extending along the unflanged portion of the cover, and a narrow, trimming, cover member extending on said strip from the cover to the side of the cabinet, the trimming cover member being flanged to complement the unflanged portion of the cover to effect an orderly appearance of the exterior of the cabinet, said trimming cover member being slotted to conform with the slot in the strip.

7. In a switching device, a box-like cabinet having an open top, a narrow strip extending along one side of the top of said box and having a narrow, elongated slot therein, a narrow, flat, handle member, extending through said slot, a hinged cover for said box enclosing three sides thereof and extending to said strip on the fourth, a switching unit mounted in said cabinet forwardly of the rear wall thereof and having an operative connection with said handle, said unit being readily detachable from said cabinet and handle to provide access to the cabinet interior.

8. In a switching device, a cabinet, switch operating means disposed on a stationary part of and extending to the exterior of said cabinet adjacent one side thereof, a switching unit mounted in said cabinet forwardly of the rear wall thereof, said unit having switching mechanism normally cooperating with and readily removable from said operating means, the space between said unit and said rear wall being free of projecting moving parts, and said unit being readily demountable to provide access to said space.

9. A switching unit including an insulating base member having a rabbet portion in the front thereof, a reciprocable insulating bar mounted on said rabbet portion and carrying a U-shaped contact member, deep slots in the wall adjacent to said rabbet portion, stationary contact members disposed along the surfaces of a wall common to the slots, the entrances to the slots being re-

stricted to form arc suppressor surfaces, the U-shaped member bridging the stationary contact members when its fingers are inserted into the slots, and a cover for said base member spaced above the path of movement of said bar.

10. A switching unit including an insulating base member having slots therein, a stationary contact member disposed in each of said slots, a reciprocable U-shaped contact member disposed with a finger opposite each of said slots, means for reciprocating said U-shaped member, a portion of the slots adjacent to the entrance thereof being restricted to provide arc suppressor surfaces, and a cover for said base member, at least one of said contacts being carried by and removable with said cover.

11. A switching unit including an insulating base having a rabbet portion in its front face at one end thereof, a reciprocable switching element disposed in said portion, slots in the wall of said base adjacent to said portion, a contact attached to the base and extending into one of the slots, a removable cover for said base, and a contact supported on said cover member and extending into another slot, said switching element bridging said contacts when inserted into said slots.

12. A switching unit comprising a supporting plate, an insulating base mounted thereon, slots in said base, a stationary contact member in each of said slots, contact fingers insertable into said slots, an insulating carrier for said contact fingers, an operating bar pivoted on said plate, means for loosely and detachably connecting said carrier to said bar, and an insulating cover for said base carrying circuit protective receiving means connected to certain of said stationary contacts, said cover cooperating with the said base to prevent access to the switching parts.

13. A switching unit including an insulating base member having slots therein, a stationary contact member disposed in each of said slots, a reciprocable insulating member having contact fingers mounted thereon opposite said slots, a backing plate for said base, an operating bar pivoted at the back of said plate and extending forwardly thereof, and means for loosely and detachably connecting said member to said operating bar.

14. A switching unit comprising a supporting plate, an operating bar pivoted at the back and extending in front of said plate, an insulating carrier reciprocably mounted in front of said plate, means for loosely and detachably connecting said carrier to said bar, contact fingers mounted on and extending from said carrier in the direction of movement thereof, and stationary contacts bridged by said contact fingers.

15. A switching unit comprising a supporting bracket, an insulating base mounted in said bracket, one end of said base being cut away to provide an operating space for a movable switching member, said member comprising a reciprocable insulating bar having a plurality of U-shaped contact members mounted thereon, the vertical wall of the base adjacent to the cutaway portion having a plurality of slots therein extending to the top of the base and to the level of the cut-away portion, the entrance to said slots being a restricted opening to provide for arc suppression, curved portions on the walls bounding said slots, contacts fixed to the base and extending into certain of said slots, a cover member for said base, contacts carried by said cover and extending into other of said slots, all of said contacts being

curved about the curved walls of the slots, adjacent contacts on the base and cover being separated by the walls between the slots and engaged by the fingers of the U-shaped contact member inserted through said restricted openings.

16. A switching unit including an insulating base member having slots therein, a stationary contact member disposed in each of said slots, a reciprocable insulating member having contact fingers mounted thereon opposite said slots, a backing plate for said base, an operating bar pivoted at the back of said plate and extending forwardly thereof, means for loosely and detachably connecting said member to said operating bar, and means for mounting said unit in a cabinet forwardly of the rear wall thereof, said unit being bodily removable to provide access to the cabinet interior.

17. A switching unit including an insulated base member having slots therein, a stationary contact member disposed in each of said slots, a reciprocable insulating member having contact fingers mounted thereon opposite said slots, a backing plate for said base, an operating bar pivoted at the back of said plate and extending forwardly thereof, means for loosely and detachably connecting said member to said operating bar, a cabinet comprising an open-front, box-like body portion, a narrow strip extending along one side of the front of said body portion and having a slot therein, an operating handle extending through said slot, a hinged cover enclosing three sides of said body portion and extending to said strip on the fourth, and means for detachably mounting said unit in said cabinet forwardly of the rear wall thereof.

18. An electric switch comprising an insulating member, a plurality of slots in said member, a readily removable insulating plate engageable with said member to substantially close said slots while providing for entrance openings thereto, a stationary contact in each of said slots, a reciprocable insulating support, a U-shaped movable contact mounted on said support opposite said entrance openings, and mechanism for reciprocating said support to move the legs of said U-shaped contact into and out of the slots and bridging relation with said stationary contacts.

19. An electric switch comprising an insulating member, a plurality of slots in said member, a readily removable insulating plate engageable with said member to substantially close said slots while providing for entrance openings thereto, a stationary contact in each of said slots, a reciprocable insulating support, a U-shaped movable contact mounted on said support opposite said entrance openings, and mechanism for reciprocating said support to move the legs of said U-shaped contact into and out of the slots and bridging relation with said stationary contacts, the entrances to said slots being restricted to facilitate arc suppression.

20. An electric switch comprising an insulating member, a plurality of pairs of slots in said member, a readily removable insulating plate engageable with said member to substantially close said slots while providing for entrance openings thereto, a stationary contact in each of said slots, a reciprocable insulating support, a U-shaped movable contact mounted on said support opposite said entrance openings, and mechanism for reciprocating said support to move the legs of said U-shaped contact into and out of the slots and bridging relation with said sta-

tionary contacts, the entrances to said slots being restricted to facilitate arc suppression.

21. In a switching device, a cabinet, mounting posts extending forwardly of the back of the cabinet, a supporting plate mounted on said posts, a switching unit supported on said plate, an operating element pivotally mounted on a stationary part of said cabinet, means for readily detachably connecting said element to said unit, said plate being readily detachable from said posts to permit said unit to be removed from the cabinet interior to facilitate the wiring operation.

22. In a switching device, a cabinet, an operating handle pivotally mounted on a stationary part of said cabinet, a switching unit mounted in said cabinet forwardly of the rear wall thereof to provide a wiring space, means for readily detachably connecting said handle to said unit, said unit being bodily removable from said cabinet and handle to uncover the wiring space.

23. In a switching device, a cabinet, a switching unit mounted in said cabinet forwardly of the rear wall thereof to provide a wiring space, an operating element pivotally mounted on a stationary part of said cabinet, quick make and break contact operating mechanism mounted on said unit, said unit and mechanism being bodily removable from said cabinet and element to uncover the wiring space.

24. In a switching device, a cabinet, a switching unit mounted in said cabinet and including stationary and movable contacts and a pivoted bail-shaped operating member for said movable contacts, a disc pivotally mounted on said unit and having an operative connection with said arm, a second disc pivotally mounted on said unit and having a lost motion connection with said first mentioned disc, an overcenter operating spring connected to said second disc, an operating handle pivotally mounted on a stationary part of said cabinet, and a lost motion connection between said handle and said second disc, said last connection being readily detachable to permit said unit and the parts carried thereby to be bodily removed from the cabinet.

25. An electric switch comprising a pair of substantially parallel contact elements, a pair of contact faces adapted to cooperate therewith, insulating means substantially enclosing said contact faces and having a generally central portion disposed between said contact elements, said insulating means having restricted openings in one direction only to relatively closely receive said contact elements and functioning to quench any arc drawn between said elements and faces, one pair being integrally joined and serving to electrically connect the cooperating pair, said pairs being relatively movable rectilinearly to connected and disconnected positions, and means for causing such rectilinear movement to effect the switching operation.

26. An electric switch comprising a plurality of pairs of substantially parallel contact elements, a plurality of pairs of contact faces adapted to cooperate therewith, insulating formations substantially enclosing said contact faces and providing individual slots each relatively closely receiving but one of said elements and limiting the relative movement between said elements and insulating formations to a straight line rectilinear movement, said formations serving to effectively quench any arc drawn between said pairs of contact faces and contact elements, one pair in each cooperating set of pairs being electrically

common, and means for rectilinearly moving said electrically common pairs into and out of engagement with their cooperating pairs to make and break the circuit through the switch.

27. An electric switch comprising a plurality of pairs of substantially parallel contact elements, a plurality of pairs of contact faces adapted to cooperate therewith, insulating formations substantially enclosing said contact faces and providing individual slots each relatively closely receiving but one of said elements and limiting the relative movement between said elements and insulating formations to a straight line rectilinear movement, said formations serving to effectively quench any arc drawn between said pairs of contact faces and contact elements, one pair in each cooperating set of pairs being electrically common, a pivotally mounted crank element, means operatively connecting said electrically common pairs to said crank element, and means for rotating said crank element to effect rectilinear movement of said electrically common pairs into and out of engagement with their cooperating pairs.

28. An electric switch comprising a plurality of pairs of substantially parallel contact elements, a plurality of pairs of contact faces adapted to cooperate therewith, insulating formations substantially enclosing said contact faces and providing individual slots each relatively closely receiving but one of said elements and limiting the relative movement between said elements and insulating formations to a straight line rectilinear movement, said formations serving to effectively quench any arc drawn between said pairs of contact faces and contact elements, one pair in each cooperating set of pairs being electrically common, a pivotally mounted crank element, means operatively connecting said electrically common pairs to said crank element, and means for rotating said crank element to effect rectilinear movement of said electrically common pairs into and out of engagement with their cooperating pairs, said means including an operating handle, an element having lost motion connections with both the handle and crank, and an overcenter spring connected to said element to cause the movement of said crank and movable pairs to be snap-like in action.

29. In an electric switch, spaced stationary contact elements, a rectilinearly movable contact element adapted to bridge said stationary contact elements, an insulating member carrying said movable contact element, a metallic bracket secured to said insulating element, an operating crank, said bracket loosely and removably engaging said crank to permit self-adjustment of the insulating member and movable contact relative to the stationary contacts during the switching operation, and operating mechanism for rotating said crank, the insulating member and movable contact moving rectilinearly into and out of engagement with the stationary contacts in response to movement of said crank.

30. In an electric switch, spaced stationary contact elements, a movable contact adapted to bridge and electrically connect said stationary contact elements, a carrier for said movable contact formed of insulating material, a metallic bracket secured to said carrier, an operating crank, said bracket loosely and removably engaging said crank to provide for limited adjusting movement of said carrier relative thereto and for removal and replacement of carriers and contacts, and operating mechanism for rotating said crank to effect rectilinear movement of the car-

rier to engage and disengage said movable contact with the stationary contact elements to make and break the circuit through the switch.

31. In an electric switch for industrial control service, insulating formations forming a contact chamber having at least an entrance opening leading thereto, a stationary contact mounted inside the chamber from one wall thereof, a movable contact cooperable therewith, a carrier assembly mounting the movable contact and having a part extending through the opening to carry the movable contact with a translating motion to and from engagement with the stationary contact, said chamber being of sectional construction, means on one of the sections for attaching the same to a support, another of said sections having as part thereof the wall upon which the stationary contact is mounted, and a readily separable connection between said sections so that said last mentioned section is readily separable from said first named section without disturbing said first named section.

32. In an electric switch for industrial control service, insulating formations forming a contact chamber having at least an entrance opening leading thereto, a stationary contact mounted inside the chamber from one wall thereof, a movable contact cooperable therewith, a carrier assembly mounting the movable contact and having a part extending through the opening to carry the movable contact with a translating motion to and from engagement with the stationary contact, said insulating formations and chamber being of sectional construction, a metal back plate for supporting said insulating formations to fix the contact chamber and stationary contacts in position, means on one of the sections for attaching the same to said metal back plate, another of said sections having as part thereof the wall upon which the stationary contact is mounted, and a readily separable connection between said sections so that said last named section is readily separable from said first named section without disturbing said first named section.

33. In an electric switch for industrial control service, insulating formations forming a contact chamber having at least an entrance opening leading thereto, a stationary contact mounted inside the chamber from one wall thereof, a movable contact cooperable therewith, a carrier assembly mounting the movable contact and having a part extending through the opening to carry the movable contact with a translating motion to and from engagement with the stationary contact, said insulating formation, and chamber being of sectional construction, a metal back plate for supporting said insulating formations to fix the contact chamber and stationary contacts in position, means on one of the sections for attaching the same to said metal back plate, another of said sections having as part thereof the wall upon which the stationary contact is mounted, a readily separable connection between said sections so that said last named section is readily separable from said first named section without disturbing said first named section, switch operating means also supported on said metal back plate, and means for removably mounting said metal plate within a switch enclosing cabinet.

34. In an electric switch for industrial control service, insulating formations cooperating to form a contact chamber having an entrance

opening leading thereto from the bottom thereof, a stationary contact mounted inside the chamber from one wall thereof, a movable contact surface cooperating with said stationary contact within the chamber, a carrier assembly substantially beneath said contact chamber and mounting the movable contact surface including means extending through the entrance opening and carrying the movable contact surface with a translating motion to and from engagement with the stationary contact, said chamber being of sectional construction, means on one of the sections for attaching the same to a support, another of said sections having as part thereof the wall upon which the stationary contact is mounted, and a readily separable connection between said sections so that said last named section is readily separable from said first named section without disturbing said first named section.

35. In an electric switch for industrial control service, insulating formations cooperating to form a contact chamber having an entrance opening leading thereto from the bottom thereof, a stationary contact mounted inside the chamber from one wall thereof, a movable contact surface cooperating with said stationary contact within the chamber, a carrier assembly substantially beneath said contact chamber and mounting the movable contact surface including means extending through the entrance opening and carrying the movable contact surface with a translating motion to and from engagement with the stationary contact, said insulating formations and chamber being of sectional construction, a metal back plate for supporting said insulating formations to fix the contact chamber and stationary contact in position, means on one of the sections for attaching the same to said metal back plate, another of said sections having as part thereof the wall upon which said stationary contact is mounted, and a readily separable connection between said sections so that said last named section is readily separable from said first named section without disturbing said first named section, and switch operating means also supported on said metal back plate and beneath said carrier assembly for effecting the translating movement of the contact surface to effect the switching operation.

36. In an electric switch for industrial control service, insulating formations cooperating to form a plurality of isolated contact chambers having entrance openings leading thereto from the bottom thereof, stationary contact means mounted within said chambers from a common wall thereof, movable contact means cooperating with said stationary contact means within the chambers, carrier assembly means mounting said movable contact means for translating movement to and from engagement with the stationary contact means, said carrier assembly and movable contact means including means extending through the entrance openings into the chambers, said insulating formations being of sectional construction with means on one of the sections for attaching the same to a support, another of said sections having as part thereof the wall upon which the stationary contact means are mounted, and a readily separable connection between said sections so that said last named section is readily separable from said first named section without disturbing said first named section.

JOHN G. JACKSON. 75

Disclaimer

2,143,697.—*John G. Jackson*, Detroit, Mich. ELECTRIC SWITCHING DEVICE. Patent dated Jan. 10, 1939. Disclaimer filed Dec. 31, 1948, by the assignee, *Square D Company*.

Hereby enters this disclaimer to claims 31, 32, 33, 34, 35, and 36 in said specification.

[*Official Gazette February 22, 1949.*]

Disclaimer

2,143,697.—*John G. Jackson, Detroit, Mich.* ELECTRIC SWITCHING DEVICE. Patent dated Jan. 10, 1939. Disclaimer filed Dec. 31, 1948, by the assignee, *Square D Company*.

Hereby enters this disclaimer to claims 31, 32, 33, 34, 35, and 36 in said specification.

[*Official Gazette February 22, 1949.*]