Nov. 10, 1925. 1,561,248

H. K. KRANTZ

SWITCH MECHANISM

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Fig. 1.

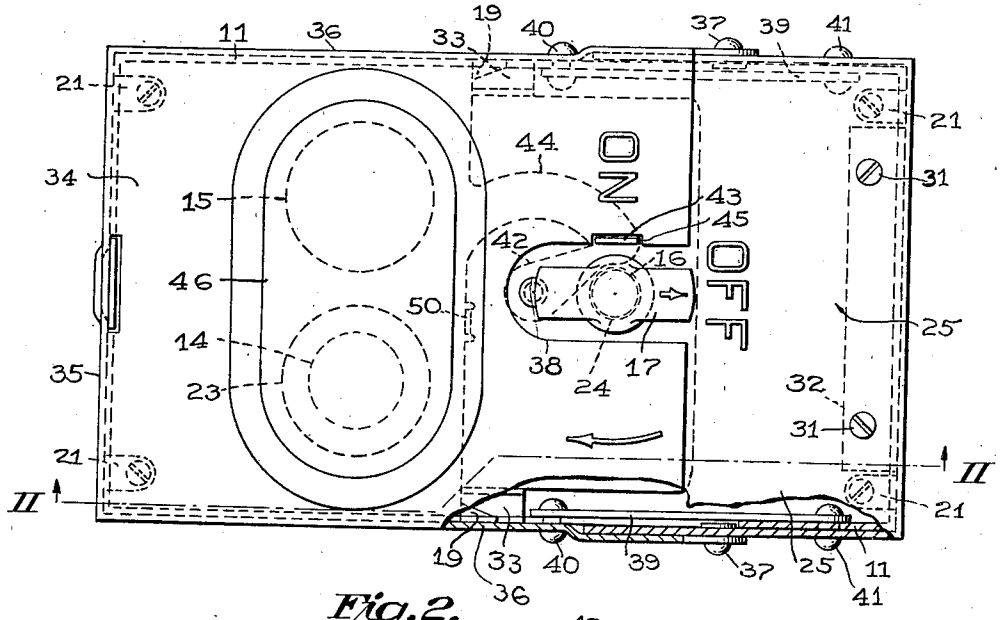
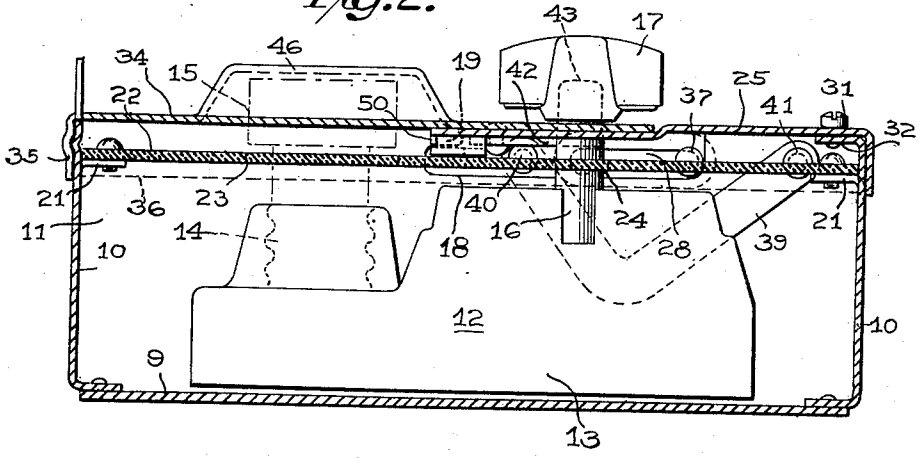


Fig. 2.



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SWITCH MECHANISM

Filed Jan. 7, 1922 3 Sheets-Sheet 2

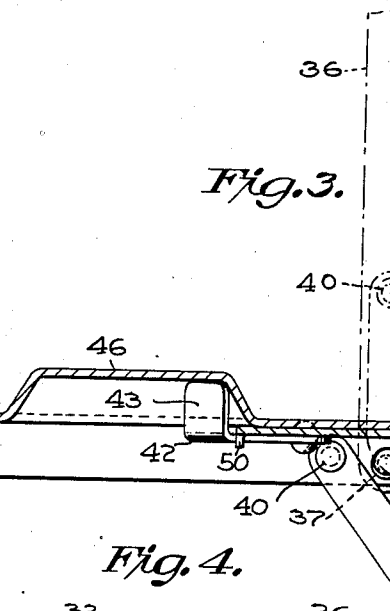


Fig. 3.

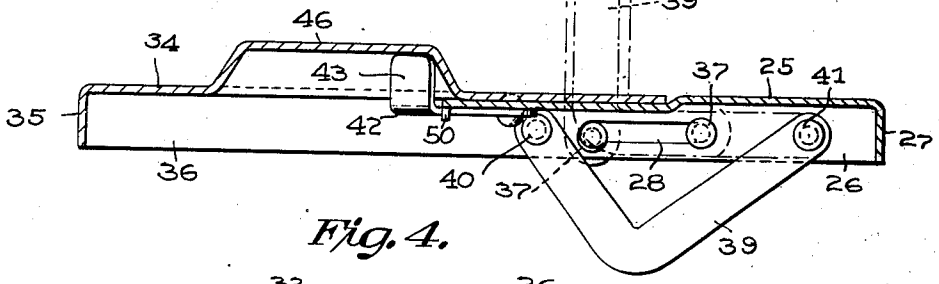


Fig. 4.

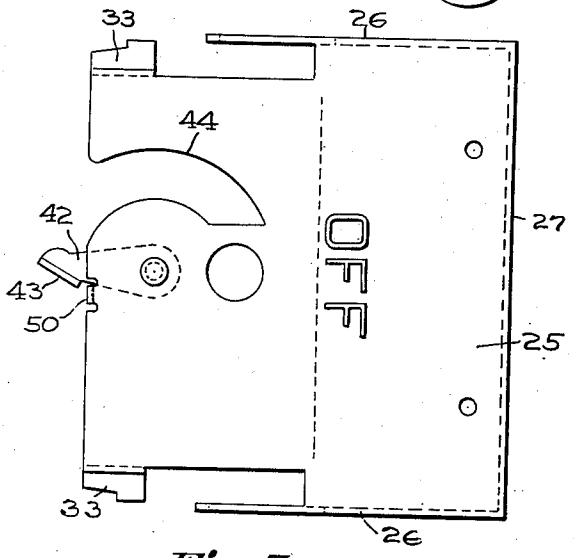
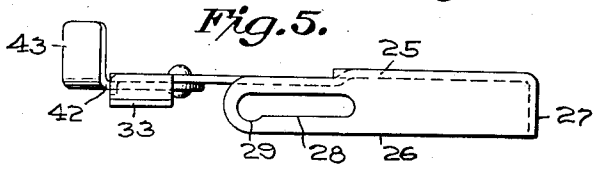


Fig. 5.



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SWITCH MECHANISM

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3 Sheets-Sheet 3.

Fig. 6.

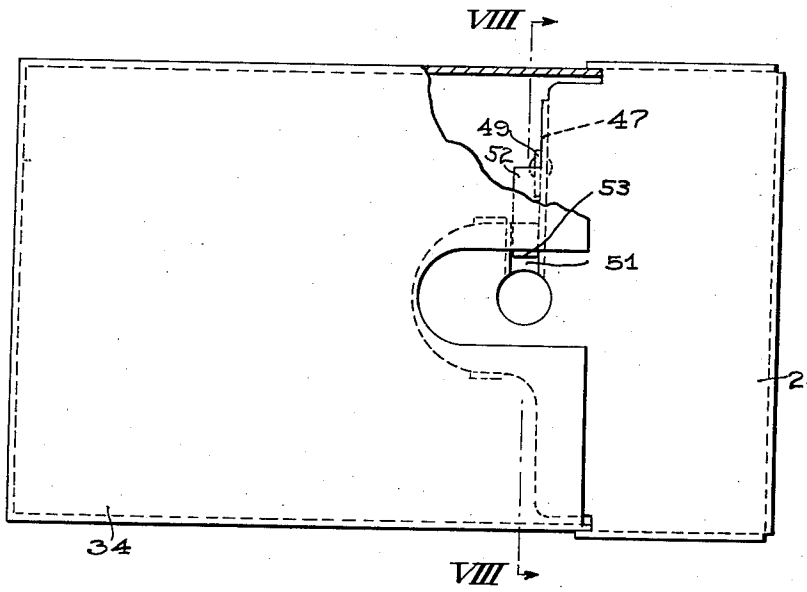


Fig. 8.

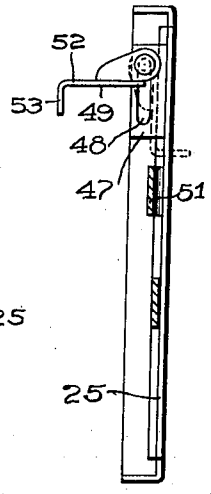
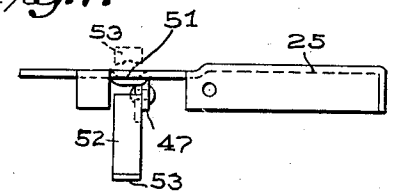


Fig. 7.



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UNITED STATES PATENT OFFICE.

HUBERT K. KRANTZ, OF WILKINSBURG, PENNSYLVANIA, ASSIGNOR TO WESTINGHOUSE ELECTRIC & MANUFACTURING COMPANY, A CORPORATION OF PENNSYLVANIA.

SWITCH MECHANISM.

Application filed January 7, 1922. Serial No. 527,782.

To all whom it may concern:

Be it known that I, HUBERT K. KRANTZ, a citizen of the United States, and a resident of Wilkinsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Switch Mechanism, of which the following is a specification.

My invention relates to switch mechanism and particularly to switch mechanism of the enclosed safety type.

One object of my invention is to provide an enclosed safety switch mechanism wherein the cover is so interlocked with the switch that the switch cannot be closed while the cover is open and the door cannot be opened so long as the switch is closed.

Another object of my invention is to provide a switch mechanism, having the above characteristics, wherein the cover co-operates with the handle of the switch for constituting an interlock and wherein the handle prevents appreciable opening movement of the cover when the switch is in closed position.

Another object of my invention is to provide the switch housing with a cover having a compound opening movement whereby it is moved into co-operative relation to the switch for preventing closing movement of the switch while the cover is in open position.

Another object of my invention is to provide a simple means whereby the switch may be retained in open position when the cover is in closed position.

These and other objects, that will be made apparent throughout the further description of my invention, are attained by means of the switch mechanism hereinafter described, and illustrated in the accompanying drawings, wherein:

Figure 1 is a front view of an enclosed switch mechanism embodying features of my invention;

Fig. 2 is a longitudinal section, taken on the line II—II of Fig. 1 and showing parts in section and parts in elevation;

Fig. 3 is an elevational view of the cover mechanism illustrated in Figs. 1 and 2, showing the door in open position;

Figs. 4 and 5 are front and side elevational views of the stationary cover of the housing;

Fig. 6 is a front view of a modified form of switch housing;

Fig. 7 is a side elevational view of the stationary cover shown in Fig. 6; and

Fig. 8, is a transverse section through the stationary cover taken on the VIII—VIII of Fig. 6.

In my co-pending application Serial No. 408,849, filed Septemeber 8, 1920, I have shown a switch mechanism and housing somewhat similar to the construction illustrated in the drawings except that the door is pivoted to a fixed hinge and that lugs are secured to the door for interlocking with the switch handle. The lugs are required on the door of the device illustrated in the above-mentioned application because of the necessity for locating the hinge at a distance from the operating handle in order to prevent opening movement of the door when the handle is in closed position. The lugs extend across the path of movement of the handle and prevent closing movement thereof so long as the door is open. When the cover is closed, the lugs project into the housing and, in some instances, through the partition or barrier, their length being determined by the distance the cover hinge is spaced from the operating handle.

The present invention is adapted for use in switch mechanism wherein the space between the barrier and the cover is limited and wherein the switch mechanism beneath the barrier is of such proportions that it is not expedient to use interlocking lugs carried by the door.

Referring to the drawings, the apparatus includes a housing having bottom walls 9, end walls 10 and side walls 11 forming a rectangular receptacle in which a snap switch 12 of the rotary type is mounted upon a suitable base 13. Fuse receptacles 14 are mounted upon the base and are connected in series with the terminals of the switch. The receptacles are of the screw type and are adapted to ordinarily receive left-hand threaded plug type thermal cutouts, but plug fuses 15 of standard design may also be used.

The switch 12, which may be of any preferred construction, is provided with an operating shaft 16 upon the end of which is mounted an oblong operating handle 17. The handle is so mounted upon the operat-

ing shaft that its major axis extends longitudinally of the housing, as indicated in Fig. 1, when the switch is in open or "off" position and is disposed transversely of the housing, as indicated in dot-and-dash lines in Fig. 1, when the switch is in closed or "on" position.

The side walls 11 of the housing are provided, at their edges, with notches 18, one end of which is undercut as to provide an overhanging ledge 19, the purpose of which will hereinafter appear.

The end walls 10 of the housing are provided with inwardly extending lugs 21 that are upstruck from the body of the plates constituting the end members and serve to support an insulating barrier 22 that preferably extends the entire length and width of the housing and is provided with openings 23 through which the threaded ends of the fuse plugs 15 extend into the receptacles. The barrier is also provided with an opening 24 through which the operating shaft 16 projects. The barrier serves to prevent access to all of the live members and terminals of the switch and fuse mechanism therebeneath.

The housing is provided with a stationary cover portion 25 that is illustrated in detail in Figs. 3, 4 and 5. The cover is provided with side flanges 26 and an end flange 27 that overlap the side walls and end wall of the housing. The side flanges 26 are provided with slots 28 having an enlarged portion 29 at one end. The slots are so disposed that they register with the notches 18 in the side walls of the housing.

The cover is adapted to be attached, at one end, to the housing by means of screws 31 that are threaded into lugs 32 secured to, or integral with, the end walls 10. The other end of the cover 25 is provided with two inwardly projecting lugs 33 that extend beneath the projection 19 on the side walls, and thereby prevent relative displacement of the cover and housing. The tongues 33 also engage the upper surface of the barrier 22 for retaining the barrier in assembled relation to the housing.

A hinged door or cover 34 is provided for closing the opening over the fuse receptacles. This cover is provided with an end flange 35 and side flanges 36 that overlap the side walls and end walls of the housing. The side walls 36 extend slightly beyond the hinged end of the cover and are provided with hinge rivets 37 that slidably operate in the slots 28 in such manner that the axis of rotation of the cover may be moved longitudinally of the housing within the limits of the slots, the purpose being to provide means whereby the hinge of the door may be moved substantially into the plane of the axis of the switch-operating shaft.

The door is provided with a slot 38 in the vicinity of the operating shaft that permits of opening movement of the cover without interference with the operating handle, when the switch is in the "off" position. When the cover is moved to open position, indicated in dot-and-dash lines in Fig. 3, the hinges 37 drop into the enlarged portions 29 of the slots 28 and serve to releasably retain the hinges in the open position.

When the cover is in the open position, closing movement of the switch is prevented by reason of engagement of the operating handle with the edges of the slot 38 in the door. It will be seen that, if provision were not made for shifting the hinge longitudinally of the housing, the door would not interfere with the operation of the switch handle when in open position.

In order to impart a compound motion to the door during its opening movement, links 39 of L-shape are pivoted, at one end, to the cover 25 by means of rivets 41 and, at the other end, to the door 34 at a point intermediate the hinge pivot 37 and the end thereof by rivets 40. During the opening movement, the door simultaneously swings around the pivots 41 and the hinge pivots 37 slide in the slots 28 from one end thereof to the other. When the door is moved to open position, the hinge pivots 37 engage the ends of the slots 28 and prevent further opening movement. Closing movement is prevented by reason of the engagement of the hinge pivots 37 with the enlarged portions 29 of the slots 28. In order to close the door, it must be raised slightly before turning movement is permitted. Pressure applied to the free end of the door causes the pivots 37 to slide upward and out of the enlarged portion 29 of the slot 28.

By reason of the foregoing construction, it will be apparent that, when the switch is in closed position and the major axis of the operating handle is disposed transversely of the housing, opening movement of the cover is prevented by reason of the engagement of the cover with the operating handle. However, when the switch is moved to open position, the cover may be opened. When the cover is in open position, closing movement of the switch is prevented by the cover.

It is frequently desirable to lock the switch in the "off" position when the cover is closed. For this purpose, I have pivotally mounted a latch arm 42 on the underside of the cover 25. The arm is provided with a projection 43 that extends above the outer face of the cover and operates in an arcuate slot 44 of the cover which is normally closed by the door 34.

In order to lock the switch in open posision, the door is first opened and the arm 42 is then swung into the position indicated in Fig. 1 wherein the projection 43 occupies

a position adjacent the hub of the switch-operating handle 17. The door is provided with a notch 45 through which the projection 43 extends which serves to prevent movement of the arm 42 when the cover is closed. The projection 43 interferes with the operating handle 17 and prevents closing movement thereof. When the operating arm 42 is not in use, it is moved to the positions indicated in Figs. 3 and 4. The cover 34 is provided with a raised portion 46 which provides clearance for the fuse plugs 15. The projection 43 of the latch arm projects into the raised portion 46 when the door is closed and is held by friction in inoperative position against a stop 50 (as shown).

In Figs. 6, 7 and 8, I have shown a modified form of latch mechanism for locking the switch in open position when the cover or door is closed. In the modified construction, the stationary cover 25 is provided, at its free end, with an inwardly extending flange 47 that is provided with a slot 48 in which the latch 49 is slidably pivoted. Adjacent the flange 27 the cover 25 is provided with a groove or depression 51 which is adapted to receive the end 52 of the latch 49. The latch 49 is provided with a projection 53 that when in the operative position indicated in Fig. 6, extends above the door 34 across the path of movement of the operating handle and prevents closing movement thereof.

When the latch is in inoperative position, it extends into the housing as indicated in Fig. 8. In order to move it into operative position, it is first swung about its pivot into the position indicated in dot-and-dash lines in Fig. 8 and then moved in the groove 51 toward the axis of the switch handle to the position indicated in Fig. 6. When the cover is in closed position, movement of the projection 53 is prevented.

While I have described and illustrated but two embodiments of my invention, it will be apparent to those skilled in the art that various changes, modifications, substitutions, additions and omissions may be made therein within the spirit and scope of my invention, as set forth in the appended claims.

I claim as my invention:

1. Switch mechanism comprising a housing, a cover therefor having a transverse hinge slidable longitudinally of the housing and a slot adjacent the hinged end thereof, and a switch device within the housing having an operating handle extending through the slot and adapted to engage the cover and prevent opening movement thereof when the switch is in closed position, the said cover being adapted to move longitudinally of the housing during the opening movement thereof and to prevent closing movement of the switch when the cover is in open position.

2. Switch mechanism comprising a housing, a cover therefor having a transverse hinge slidable longitudinally of the housing and a slot adjacent the hinged end thereof, and a switch device within the housing having an operating handle extending through the slot and adapted to engage the cover and prevent opening movement thereof when the switch is in closed position, the said cover being adapted to move longitudinally of the housing during the opening movement thereof and to prevent closing movement of the switch when the cover is in closed position.

3. Switch mechanism comprising a housing, a switch within the housing, a cover for the housing having one end slidably hinged to the housing whereby movement of the hinged end of the cover bodily toward the switch in a direction transverse to the axis of the hinge, is permitted for so interlocking the cover with the switch that closing movement of the latter is precluded so long as the cover is in open position.

4. An enclosure for switch mechanism comprising a housing, a cover for the housing having one end hinged within a guide slot in the housing and slidable transversely of the axis of the hinge, and a link pivoted to the housing and to the cover intermediate the hinge and the free end of the cover for controlling movement of the cover.

5. Switch mechanism comprising a housing, a switch within the housing having a rotatable operating handle extending exteriorly thereof, a cover for the housing having an opening therein through which the handle projects for permitting opening movement of the cover without interference with the handle when the switch is in open position, the said handle being adapted to extend across the opening and overlap a portion of the cover adjacent the opening when the switch is in closed position, a hinge for the cover disposed remote from the axis of rotation of the handle when the cover is in closed position and slidably mounted on the housing for movement to a point adjacent to the said axis whereby the cover is moved into interference with the handle for preventing closing movement thereof when the cover is in open position.

6. An enclosure for electrical apparatus comprising a housing having a bottom portion and side walls provided with undercut notches in the edges thereof, projections extending inwardly from the side walls, a partition supported upon the said projections, and a cover portion for the housing having projections thereon engaging the undercut portion of the said notches and the said partition for holding the par-

tition and cover in assembled relation with the housing.

7. Switch mechanism comprising a housing, a switch within the housing having an operating handle extending exteriorly thereof, a cover for closing a portion of the housing, a door for completing closure of the housing and means mounted on the cover and movable into co-operative relation with the switch and adapted to be retained in such relation by the door, when the door is in closed position.

8. Switch mechanism comprising a housing, a switch within the housing having an operating handle extending exteriorly of the housing, a cover for a portion of the housing, means pivotally attached thereto and movable into co-operative relation with the handle for preventing movement thereof, and a door for completing the closure of the housing for retaining the said means in co-operative relation when the door is in closed position.

9. Switch mechanism comprising a housing, a switch member and a cover having one end hinged to the housing and movable bodily transversely of the axis of the hinge into interlocked relation with the switch member for precluding closing movement thereof so long as the cover is in open position.

10. Switch mechanism comprising a housing, a cover for the housing having one end hinged to the housing, a rotatable switch member projecting through an opening in the cover, the said cover being movable bodily transversely of the axis of the hinge during the opening movement thereof into interlocked relation with the switch member for preventing closing movement of the latter while the cover is in closed position.

In testimony whereof, I have hereunto subscribed my name this 9th day of December, 1921.

HUBERT K. KRANTZ.