May 2, 1939. R. H. OLLEY 2,156,572

ENCLOSED HOUSING FOR ELECTRICAL SWITCHES

Filed May 27, 1936 2 Sheets-Sheet 1

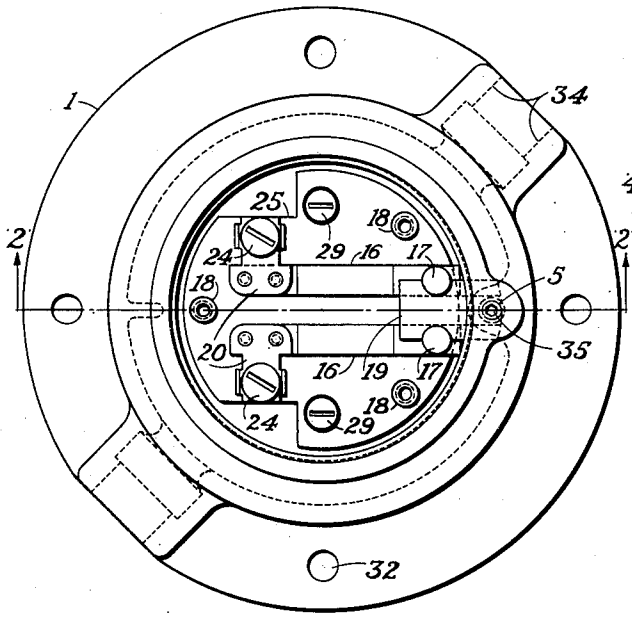


Fig. 1.

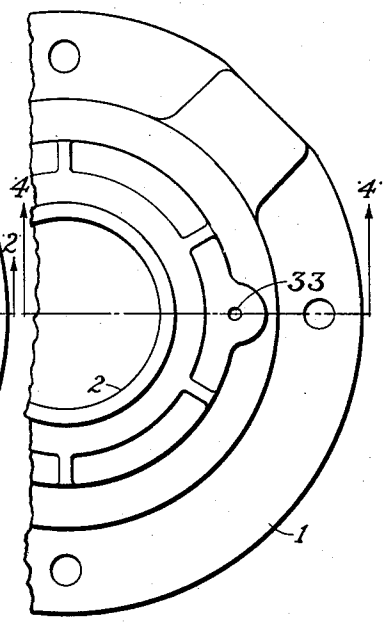


Fig. 3.

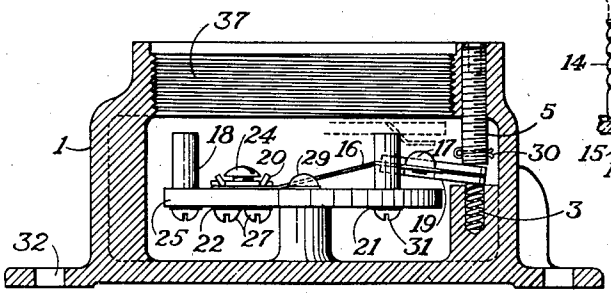


Fig. 2.

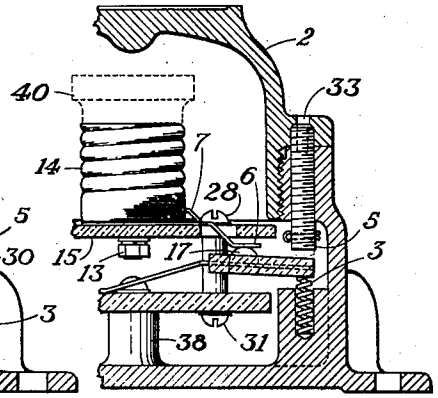


Fig. 4.

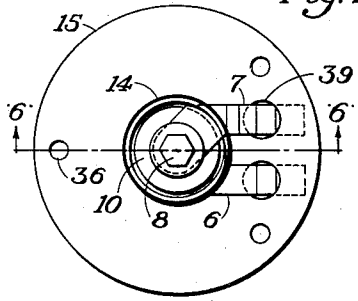


Fig. 5.

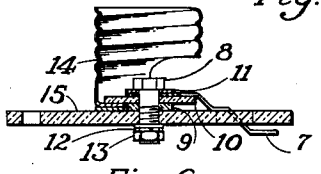


Fig. 6.

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ENCLOSED HOUSING FOR ELECTRICAL SWITCHES

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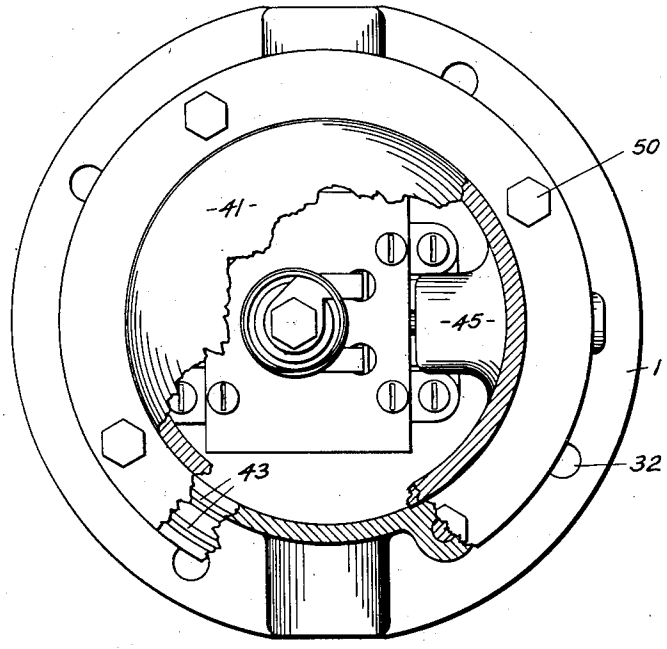


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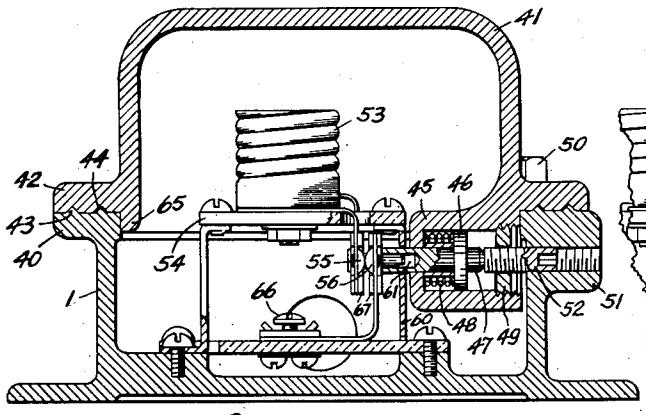


Fig. 8.

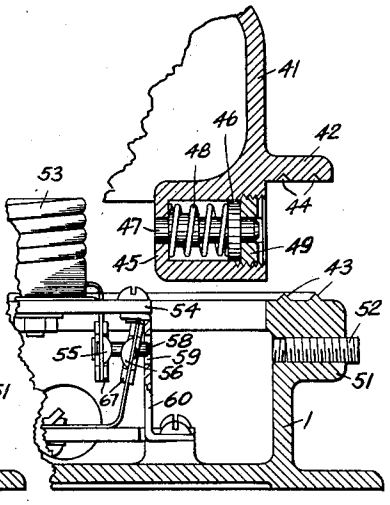


Fig. 9.

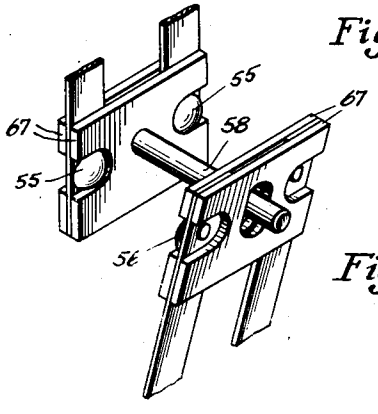


Fig. 10.

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UNITED STATES PATENT OFFICE

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ENCLOSED HOUSING FOR ELECTRICAL SWITCHES

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Application May 27, 1936, Serial No. 82,076

9 Claims. (Cl. 200—50)

This invention, in general, relates to enclosed explosionproof housings for electrical apparatus such as switches, and the like.

The invention has as an object an enclosed housing having an open side, a cover detachably secured to the open side of the housing, means operable to lock the cover against removal and actuate the switch into closed position, said means being also operable to open the switch and unlock the cover from the housing while the switch is in open position.

The invention has as a further object a switch actuating mechanism and cover lock which is inoperable to close the switch while the cover is removed from the housing.

The invention has as a further object an enclosed explosionproof housing of the type referred to of such structure as to prevent accidental closing of the switch while the cover is removed from the housing, the structure being particularly economical and efficient in operation.

The invention consists in the novel features and in the combinations and constructions hereinafter set forth and claimed.

In describing this invention, reference is had to the accompanying drawings in which like characters designate corresponding parts in all the views.

Figure 1 is a top plan view of the housing with the cover thereof and a portion of the switch therein removed.

Figure 2 is a sectional view taken on lines 2—2, Figure 1.

Figure 3 is a fragmentary top plan view of the housing with the cover in place.

Figure 4 is a fragmentary, sectional view taken through the housing on lines 4—4, Figure 3.

Figure 5 is a top plan view of a receptacle and supporting plate, the same being removed from the housing in Figure 1.

Figure 6 is a sectional view taken on line 6—6, Figure 5.

Figure 7 is a top plan view of a modified form of housing with a portion of the cover being broken away.

Figure 8 is a cross sectional view of the housing and the apparatus mounted therein shown in Figure 7.

Figure 9 is a fragmentary, sectional view of the right hand portion shown in Figure 8 and with the cover removed from the housing.

Figure 10 is a perspective view of the switch contacts.

In Figures 1 to 6, 1 designates the housing, which, as here shown, is of circular contour, being open at the top and being provided with a detachable cover 2. The top opening of the housing 1 is threaded internally, as at 37, and the bottom portion of the bell-shaped cover 2 is provided with complemental threads. The cover 2 is formed with a radially extending flange coacting with the marginal top edge of the housing 1 about the opening thereof, as shown in Figure 4. The housing here shown is adapted particularly to house a fuse receptacle.

The bottom wall of the housing is provided with an outwardly radially extending flange provided with a plurality of holes 32 by which the housing is mounted upon the wall or other suitable support and within the housing, the bottom wall is formed with a pair of upwardly extending bosses 38 on which is supported a disk 25 of suitable insulating material. The disk 25 is secured to the bosses 38 by means of screws 29.

A pair of resilient contact members 16 are secured at one end to terminals 20 which in turn are secured to the insulating disk 25, as by screws 27 . The outer or free ends of the contact arm 16 are secured to an insulating block 19 which extends a short distance beyond the periphery of the disk 25. The outer ends of the arm 16 are also provided with contacts 17 which coact with stationary contacts 6, 7, carried by a disk 15 of insulating material superimposed upon and supported by the disk 25. The contacts 6, 7, are electrically connected to the center contact and the shell of the fuse receptacle.

Spacer posts 18 are inserted between the disks 25, 15, and are secured to the disk 25 by screws 31 and to the disk 15 by screws 28. The contact arm 16 and contacts 6, 7 are so arranged relatively that the contacts 17 of the arm 16 normally engage the contacts 6, 7. The wires of the circuit controlled by the fuse 40 mounted in the shell 14 are connected to the terminals 20 by the screws 24. In addition to the resiliency of the arm 16, a helical compression spring 3 may be arranged beneath the block 19 to elevate the terminals 17 into engagement with the contacts 6, 7.

In order to prevent removal of the cover 2 while the fuse circuit is alive, means is provided for disengaging the contact 17 from the contacts 6, 7, previous to the removal of the cover 2 from the housing.

As here shown, this means comprises a screw 5 threaded through a vertically extending aperture in the side wall of the housing and being arranged to engage the flange of the cover 2. The flange of the cover 2 is provided with an

opening 33 arranged to receive the upper end of the screw 5, when the cover is screwed into place. The opening 33 is preferably counterbored from the bottom of the flange to receive the upper end of the screw 5 and the upper portion of the hole 33 is of reduced diameter sufficient to receive a screw driver, or other implement, for operating the screw 5. The screw 5 is arranged to coact with the upper surface of the insulating block 19 adjacent the outer edge thereof whereby, when the screw 5 is threaded downwardly, the lower end of the screw engages the block 19 and forces the contacts 17 from engagement with the contacts 6, 7. The screw 5 is of such dimension and so arranged that when threaded downwardly a sufficient distance to move the upper end of the screw out of the hole 33, the contacts have been entirely separated. The cover 2 may be now unscrewed from the housing, and during the removal of the cover, the circuit through the fuse receptacle is open. Accordingly, when the blown out fuse is removed and a new fuse inserted, no arcing will take place, and thus the possibility of igniting inflammable gases is eliminated, after the cover 2 has been replaced and threaded on with the opening 33 arranged in alinement with the screw 5. The screw 5 is threaded upwardly into the flange of the cover 2, until the contacts 17 are permitted to engage with the contacts 6, 7. The lower end of the screw may be provided with a small cotter pin or other means to prevent unintentional displacement of the screw from the housing.

In Figure 7, 8 and 9, the housing 1 is provided with a radially extending flange 40 which forms a marginal edge surrounding the opening in the top of the box. The cover 41 is provided with a flange 42 complemental with the flange 40, and the abutting surfaces of the flanges 40, 42, are provided with means for baffling ignited or exploded gases within the housing. As here shown, the flange 40 is provided with a plurality of radially spaced apart ribs 43 and the cover with complemental circumferential grooves 44. Also, the cover is provided with a depending annular flange 65 closely fitting the wall of the opening in the housing.

The cover 41 is provided with an inwardly extending boss 45 in which is mounted the switch actuating mechanism. The boss 45 is bored or recessed for a substantial depth to slidably receive the collar 46 of plunger 47, the inner end of which is slidably mounted in an aperture formed in the inner end of the boss 45 and arranged coaxial with the bore of the boss. A helical compression spring 48 encircles the plunger 47 and coacts against the collar 46 to urge the plunger outwardly until the collar 46 coacts with disk 49 threaded into the outer end of the bore of the boss 45.

The cover 41 is secured to the housing as by cap screws 50 and the side wall of the housing is preferably provided with a thickened portion 51 arranged in alinement with the boss 45 on the cover when the cover is secured in place on the housing. The thickened portion 51 is threaded to receive a screw 52 which is arranged coaxial with the plunger 47 and contacts the outer end of the same when the screw is threaded inwardly, causing the plunger to move inwardly against the action of spring 48 with the inner end of the plunger 47 extending through the boss 45. As here shown, a receptacle 53 is mounted within the housing on a suitable support 54 and is provided with contacts 55 arranged below the supporting plate 54. A pair of contacts 56, complemental to the contacts 55, are also arranged below the supporting plate 54 and are provided with screw terminals 66 to which the line is connected. The contacts 55, 56, are resilient and the contacts 56 assume an outward position, as shown in Figures 9 and 10. That is, they are normally disengaged, or spaced apart from the contacts 55. The respective pairs of contacts 55, 56, are bridged by insulating plates 67, and the plates 67, associated with the contacts 55, are provided with an outwardly extending stem 58 which projects through an elongated slot in the plates associated with contacts 56, and the stem 58 is arranged concentrically with an opening 59 in the bracket 60 which supports the plate 54 and receptacle 53. The stem 58 and the aperture 59 are also arranged concentrically with the plunger 47, and the inner end of the plunger 47 is provided with a recess 61 whereby the inner end of the plunger 47 is permitted to be sleeved over the stem 58 and to contact the plate 67 of the contacts 56.

In operation, the screw 52 is threaded outwardly through the housing to the position shown in Figure 9. The cover 41 is then placed upon the housing and secured thereto by means of cap screws 50 and with the boss 45 in alinement with the screw 52 and the contacts 55, 56. The plunger 47 is now pressed outwardly by the spring 48, as illustrated in Figure 9. After the cover 41 is thus secured in place, the screw 52 may be threaded inwardly contacting the outer end of the plunger 47 and causing the plunger 47 to move inwardly, the inner end of the plunger passing over the stem 58 coacting with contacts 56 and springing them inwardly into engagement with contacts 55, thus completing the circuit to the receptacle 53. With the parts in this position, it is impossible to remove the cover 41 from the housing, due to the fact that the inner end of screw 52 extends through the collar 49 in the bore of the recess of boss 45 on the cover, and also the inner end of plunger 47 extends through the aperture in bracket 60 which is secured to the base of the housing. Preferably, there is but slight clearance between the screws 52 and the aperture and collar 49, and also a slight clearance between the inner end of the plunger and the aperture in bracket 60, with the result that even though the cap screws 50 are loosened, the baffle joint between the flange 40 of the housing and 42 of the cover is not rendered inoperable because of the ridges 43 and grooves 44.

The cover 41 can not be removed from the housing until the screw 52 is threaded outwardly and the parts, including the contacts 55, 56, are so arranged relatively that the contacts are separated prior to the time that the screw 52 and plunger 47 are moved outwardly from disengagement with their associated parts.

The purpose of the stem 58 on contacts 55, and the formation of the inner end of the plunger 47, is to prevent a person unfamiliar with the device from accidentally closing the contacts 55, 56, while the cover is removed from the housing. If it is attempted to insert a tool or implement through the aperture 59 in bracket 60, contact will be made with the outer end of the stem 58, causing the inner contacts 55 to be moved away from the contact 56. In order to close the contacts, it would be necessary to have an implement provided with a recess similar to the inner end of plunger 47, and such an implement would presumably be only possessed by a person familiar with the device and the circuit in which it was

connected, and the closing of the contacts would then be intentional rather than accidental.

It will be observed that the structure of my invention is economical in manufacture, highly efficient in operation, and particularly well adapted to small explosionproof housings in which are mounted switching devices that are not normally manually actuated from the outside of the housing. Such, for example, as a fuse, as illustrated in the accompanying drawings.

What I claim is:

1. The combination of an enclosed explosion resisting housing provided with an opening, a cover for said opening detachably secured to the housing in flame tight relation therewith, an electrical switch mounted within the housing, means carried by the cover and being operable to open and close the contacts of said switch, and means carried by the housing and operable from the outside thereof for operating said means carried by the cover and to prevent inoperativeness of the flame tight joint between the cover and the housing while said contacts are closed.

2. The combination of an enclosed explosion resisting housing formed with an opening in one side thereof, a cover for said opening detachably secured to the housing in flame tight relation thereto, a switch mounted within the housing, means carried by the cover and operable to close the contacts of said switch, and a member threaded in said housing and operable from the outside thereof to operate said means carried by the cover to close the contacts of the switch and to prevent inoperativeness of the flame tight joint between the cover and the housing while said contacts are closed.

3. The combination of an enclosed explosion resisting housing for electrical switches being provided with an internally threaded opening in one side thereof, a switch mounted in said housing, a cover member threading into said opening, a screw threading into the wall of said housing adjacent said opening and being operable from the outside of the housing to close the contacts of said switch and engage the cover and prevent rotation of the same relative to the housing while said contacts are closed.

4. The combination of an explosion resisting housing for electrical apparatus, said housing being provided with an internally threaded opening in one side thereof to permit installation and removal of said apparatus, an electrical switch mounted in said housing, a cover for said opening provided with threads complemental to those in the housing and being provided with a radially extending flange overlapping the margin of said housing about said opening, a screw threaded through the housing adjacent said opening and being operable from the outside of the housing to engage the flange of said cover to prevent removal of the cover from the housing and to effect closing of the contacts of said switch.

5. An explosion resisting housing for electrical apparatus provided with an opening to permit installation and removal of said apparatus, an electrical switch mounted in said housing in flame tight relation therewith, a cover for said opening detachably secured to said housing, a screw member threaded in the wall of said housing and being cooperable with the contacts of said switch and said cover to effect closing of said contacts and to prevent inoperativeness of the flame tight joint between the cover and the housing while said contacts are closed.

6. An enclosed explosion resisting housing for electrical switches provided with an opening to permit installation and removal of said switch, a cover for said opening detachably secured in flame tight relation to said housing, a plunger carried by said cover and arranged in juxtaposition to the contacts of said switch, and means operable from the outside of the housing to lock the cover against removal from the housing and to move said plunger into engagement with said contacts to effect closing of the same.

7. An enclosed explosion resisting housing for electrical switches, said housing being formed with an opening and having a marginal flange surrounding said opening, a cover for said opening detachably secured to the housing and having a flange overlapping said marginal flange of the housing, and said flanges being provided with coacting means effecting a flame tight joint between the cover and the housing, a switch mounted in the housing, means carried by the cover and operable to effect closing of the contacts of the switch, and a member threaded through the side wall of the housing and arranged to engage said switch actuating means and to operate the same to close the contacts of the switch and to prevent inoperativeness of the flame tight joint between the cover and housing while said contacts are closed.

8. An enclosed explosion resisting housing for electrical switches, said housing being provided with an opening to permit installation and removal of a switch, a switch mounted in the housing, a cover for the opening detachably secured to the housing and provided with an inwardly extending portion, a plunger slidably mounted in said portion and arranged when moved inwardly to close the contacts of said switch, a member threaded through the side wall of the housing and arranged to engage said plunger and move the same inwardly when the cover is secured to the housing and to lock the cover against removal while said plunger is in its inner position.

9. The combination of an enclosed explosion resisting housing, an electrical switch mounted therein, said housing being formed with an opening in one side to permit installation and removal of the switch, a cover detachably secured to the housing in a flame tight relation therewith and forming a closure for said opening, a member screw threaded in the side wall of the housing adjacent the marginal edge of said cover and being operable from the outside of the housing to effect closure of the switch contacts and to prevent inoperativeness of the flame tight joint between the cover and the housing while said switch contacts are closed.

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CERTIFICATE OF CORRECTION.

Patent No. 2,156,572. May 2, 1939.

RAYMOND H. OLLEY.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 3, first column, line 66, and second column, line 1, claim 5, strike out the words "in flame tight relation therewith" and insert the same after "housing" and before the comma, second column, line 2, same claim; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 27th day of June, A. D. 1939.

Henry Van Arsdale

(Seal) Acting Commissioner of Patents.

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