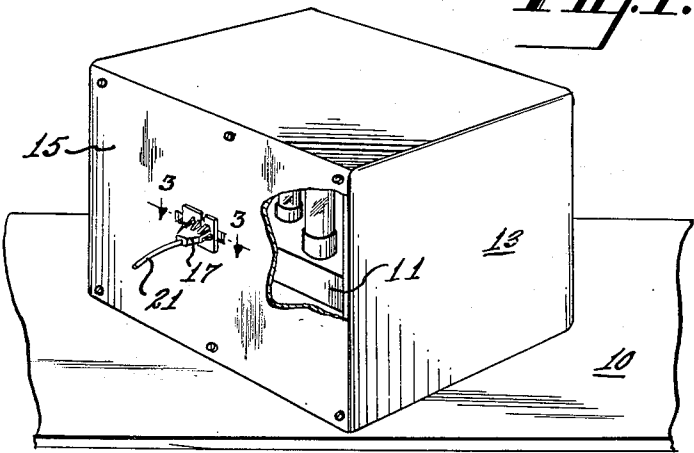


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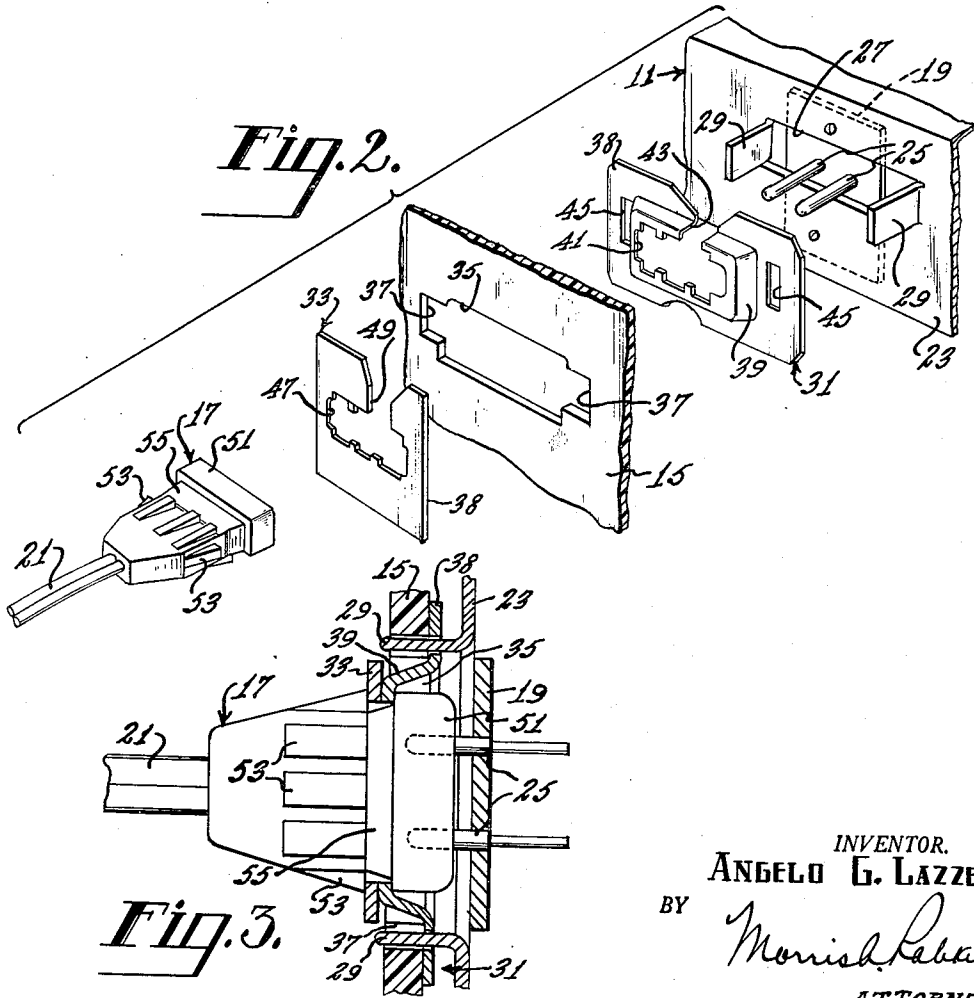
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INTERLOCK ASSEMBLY  
Filed July 1, 1957

2,938,188

*Fig. 1.*



*Fig. 2.*



*Fig. 3.*

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2,938,188

## INTERLOCK ASSEMBLY

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Filed July 1, 1957, Ser. No. 669,010

2 Claims. (Cl. 339—59)

This invention relates to an interlock for electrical apparatus, and more particularly to a novel interlock assembly for attachment to a removable cover of a cabinet for electrical apparatus.

In electrical apparatus, particularly for the consumer market, wherein the apparatus includes high voltage circuits, it is desirable to provide means for disconnecting the power circuit from the apparatus when a cabinet cover, or similar safety member, is removed.

An object of this invention is to provide a novel interlock assembly for mounting on a cabinet cover whereby a power circuit is connected to electrical apparatus secured within the cabinet.

Another object of this invention is to provide a novel interlock assembly which is simple in design and which is very readily assembled to a cabinet cover without the use of tools.

A further object of this invention is to provide a novel interlock assembly which is very readily assembled to a cabinet cover and which is very difficult to remove from the cover.

A still further object of this invention is to provide a novel interlock assembly for mounting on a cabinet cover which includes support means so that the weight of the cover is not borne by the contacting elements of the interlock connectors.

A still further object of this invention is to provide a novel interlock providing self-aligning means for the contacting elements.

An interlock is provided for use with an electrical chassis enclosed in a cabinet having one open face, for example, and wherein a removable cover closes the cabinet. The interlock comprises two mating connector elements. A pin connector having pin contacts, for example, is rigidly mounted on the chassis adjacent the open face of the cabinet. A socket connector having socket contacts, for example, is mounted on the cabinet cover in alignment with the pin connector element. The connector, mounted in the cover, is secured in an aperture in the cover by means of two retaining plates which hold the connector and which overlie the cover aperture on the two faces of the cover.

The socket connector comprises a resilient body having means defining a peripheral groove. The two retaining plates are provided with apertures dimensioned to receive the grooved portion of the connector body. One of the retainer plates is provided with a boss which is adapted to seat in the cover aperture in order to orient the socket connector with respect to the cover.

The novel features of the invention, as well as additional objects and advantages thereof, will be understood more fully from the following description when read in connection with the accompanying drawing, in which:

Figure 1 is a perspective view, partially broken away, of an enclosed electrical apparatus including an interlock;

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Figure 2 is an exploded view of the several elements of the interlock assembly of Figure 1; and

Figure 3 is a sectional view of the interlock assembly, taken along the line 3—3 of Figure 1, looking in the direction of the appended arrows.

Referring now to Figure 1 of the accompanying drawing, an enclosed electrical apparatus is shown supported on a shelf 10. This apparatus includes a chassis 11 mounted in a cabinet 13 which has an open back wall. A removable cover 15 for the back wall provides a complete enclosure for the apparatus. An interlock includes a socket connector 17, having socket contacts, secured to the cover 15, and a pin connector, having pin contacts, fixed to the chassis 11. The connectors are mounted so that, when the cabinet and cabinet cover are assembled, the connectors are aligned and engage each other. The socket connector 17 is attached to the end of a power cord 21 which is adapted to be connected to any suitable source of power. The pin connector 19 is mounted in a chassis wall 23 which lies parallel to, and adjacent to, the open back of the cabinet so that the pin contacts 25 extend outwardly from the back of the chassis.

Referring now particularly to Figures 2 and 3, the chassis wall 23 is provided with an aperture 27. The pin connector 19 is positioned behind the chassis wall and is secured to the chassis by means of rivets, for example, so that the pins 25 extend through the aperture 27 perpendicular to the chassis wall 23. A pair of fingers 29, which may be integral with the chassis wall, extend outwardly from the chassis, at opposite ends of the aperture 27, parallel to the connector pins 25. The fingers 29 are rigid, with respect to the chassis, and serve to guide and support the mating portions of the interlock assembly during engagement and disengagement of the interlock.

The elements of the interlock assembly associated with the cover 15 consist of the socket connector 17 and retainer plates 31 and 33. The cover 15 is provided with an aperture having a central rectangular portion 35, elongated in a horizontal direction, and end portions 37 extending from the two ends of the rectangular portion. The cover 15 may be made of metal, fiber board, or any other suitable material.

A first retainer plate 31 is adapted to lie over the cover aperture on the inner face of the cover 15 when it is assembled with the cabinet 13. The plate 31 comprises a flat flange portion 38 surrounding a rectangular boss 39. The boss 39 is dimensioned to seat loosely within the rectangular portion 35 of the cover aperture so that the plate is oriented rotationally within the aperture and yet some movement of the plate is permitted with respect to the cover 15. A substantially rectangular aperture 41 is provided in the central portion of the boss 39, and a slot 43 extends between the aperture 41 and the edge of the plate. A slot 45 is provided in the flange portion 38 of the plate adjacent each end of the boss 39. The slots 45 are parallel to each other and lie over the end portions 37 of the cover aperture.

A second retainer plate 33 is adapted to lie over the cover aperture on the outer face of the cover 15. The plate 33 is flat and is provided with a substantially rectangular aperture 47 and a slot 49 corresponding, respectively, to the aperture 41 and slot 43 of the plate 31. The plate 33 is dimensioned to overlie only the rectangular portion 35 of the cover aperture.

The socket connector 17 comprises an elongated, resilient body secured to the end of the power cord 21. The socket contacts are mounted in a face opposite from the power cord. The connector body is substantially rectangular in cross-section and is provided with a peripheral shoulder 51 at its contact face. Several wedge

shaped bosses 53 are spaced around the body 17 to define a shoulder which faces the shoulder 51. The two shoulders, described above, define a peripheral groove 55 constituting a seat adjacent the contact face of the body 17. The bosses 53 are tapered toward the cord end of the body 17 so that the body is generally smaller at its cord end. The groove 55 is wide enough to receive the thickness of the two retainer plates 31 and 33.

The apertures 41 and 47, of the plates 31 and 33, respectively, are irregular in configuration so that the plates may be moved over the bosses 53, toward the shoulder 51, with a minimum of difficulty. The plate apertures 41 and 47 are dimensioned, generally, so that the plates seat relatively snugly in the groove 55, and so that they will be retained between the shoulder 51 and the shoulder defined by the bosses 53 after they have been assembled. After assembly, there is substantially no relative movement between the plates and the body 17.

Referring to Figure 3, the elements of the interlock are shown assembled and engaged. It will be seen that the socket connector and the retainer plates are readily assembled to the cover 15 without the use of tools. The assembly steps are as follows: (1) insert the socket connector 17 through the cover aperture; (2) place the retainer plate 31 over the cord 21, by means of the slot 43, and move the plate over the bosses 53 so that it is retained in the groove 55; (3) withdraw the body 17 partially through the cover aperture to seat the boss 39 within the rectangular portion 35 of the cover aperture; and (4) place the retainer plate 33 over the cord 21 by means of slot 49, and move the plate over the bosses 53 so that it is retained in the groove 55. Since the connector body 17 is resilient, the bosses 53 will compress while the plates 31 and 33 are moved over them to the groove 55. The shoulder, defined by the bosses 53, then prevents the plates from being readily removed from the body.

The socket connector 17 is now held, quite rigidly, by the plates 31 and 33 which lie on opposite faces of the cover 15. However, some movement of the socket connector and plate assembly is permitted since the boss 39 of the plate 31 does not fit tightly within the cover aperture.

When the cover 15 is now assembled with the cabinet 13, the chassis fingers 29 are received within the slots 45 of the retainer plate 31 and pass through the end portions 37 of the cover aperture. The fingers 29 engage the slots 45 before the pins 25 of the pin connector engage the socket connector. This provides for the aligning of the two connectors to facilitate the mating of their respective contact elements. This aligning is facilitated by the limited movement which is provided for the socket connector assembly with respect to the cover 15. The fingers 29 also serve to support the weight of the cover 15 while the connector elements are being engaged and, thereby, exclude any lateral forces which may be applied to the connector contacts and which may cause damage to the contacts.

There has been described a novel interlock for electrical apparatus which is enclosed in a cabinet having a removable cover. The portion of the interlock assembly, which is secured to the removable cover, is simple in design and is very readily assembled to the cover with-

out the use of tools. The assembly is quite difficult to remove from the cover and thereby performs the desired safety function. The interlock assembly provides self-aligning features and self-supporting features so that damage to the interlock contacts is substantially prevented.

What is claimed is:

1. An interlock assembly for use with an electrical chassis enclosed in a housing, said chassis having a fixed, pin connector and guide fingers adjacent said connector extending parallel to the pins thereof; said interlock assembly comprising a removable cover for said housing formed with an opening at a location for alignment with said pin connector, said opening defining a central rectangular portion, a first retainer plate overlying said cover opening on one side thereof, said plate having a rectangular boss dimensioned to seat loosely within said rectangular portion of said opening to permit limited movement of said plate in the plane of said cover, said plate being formed with openings lying over said cover opening for receiving said chassis guide fingers, a second retainer plate overlying said rectangular portion of said cover opening on the other side thereof, a socket connector having an elongated resilient body provided with a peripheral groove adjacent one end, the other end of said body being tapered away from said groove, said retainer plates being formed with aligned openings dimensioned to seat in said body groove, and said retainer plates being held adjacent each other when seated in said groove whereby said socket connector and said plates are secured relative to each other and to said cover, said chassis guide fingers serving to align said socket connector with said pin connector and to support the weight of said cover.

2. An interlock assembly for enclosed electrical apparatus having a first, fixed connector, said assembly comprising a removable panel for said equipment, a second connector adapted to engage said first connector, said second connector comprising a body of resilient material having a grooved portion of reduced cross-section spaced from one end and constituting a seat, first and second retainer plates being formed with apertures for receiving said grooved portion, said plates being seated in said grooved portion at their respective said apertures whereby said plates are retained on said body, said panel being formed with an aperture large enough to permit said second connector to be loosely disposed therein, one of said retainer plates having a boss dimensioned to seat in said panel aperture, said plates overlying said panel aperture on opposite sides of said panel to support and position said second connector loosely within said panel aperture, and a power cord secured to said second connector, said retainer plates being formed with narrow openings communicating with said plate apertures whereby said plates may be placed over said cord.

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