May 10, 1932. J. F. DOHRWARDT 1,857,442

FUSE BOX STRUCTURE

Filed Nov. 14, 1929 2 Sheets-Sheet 1

Fig. 3.

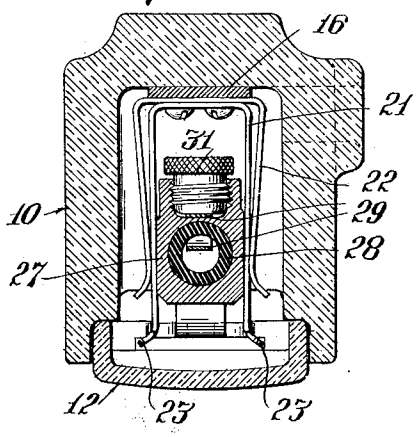


Fig. 4.

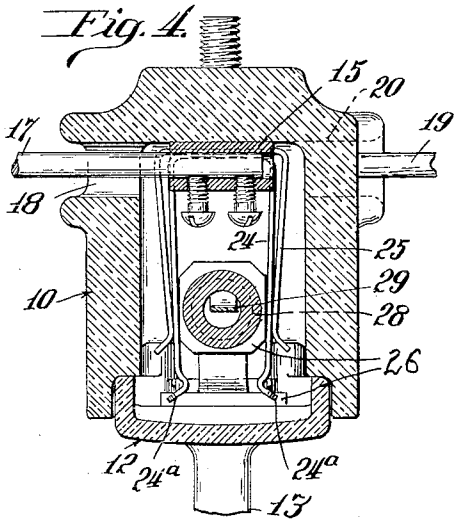


Fig. 1.

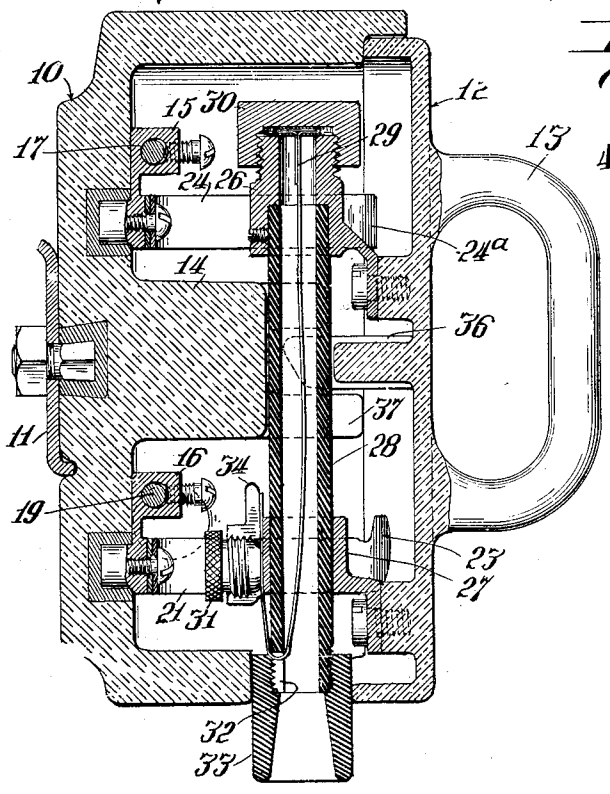
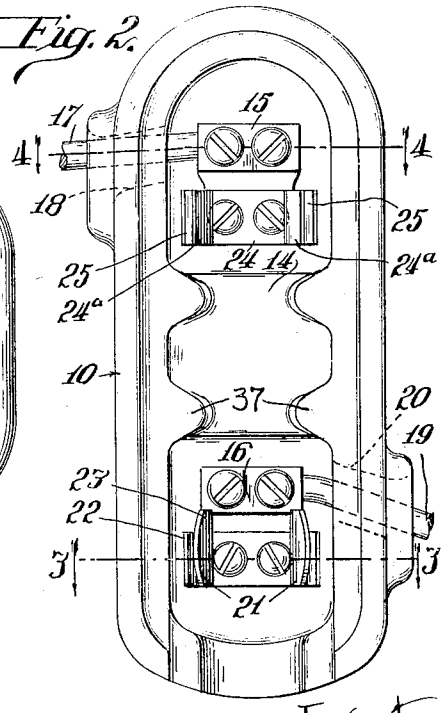


Fig. 2.



Inventor,
John F. Dohrwardt,
By Fricke & DuBusk,
Attorneys.

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Fig. 5.

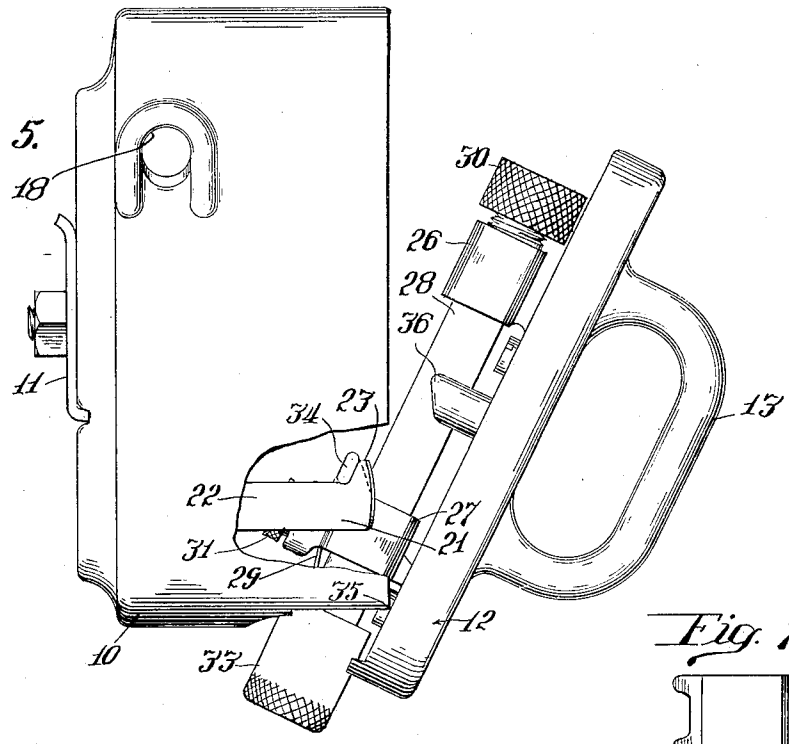


Fig. 6.

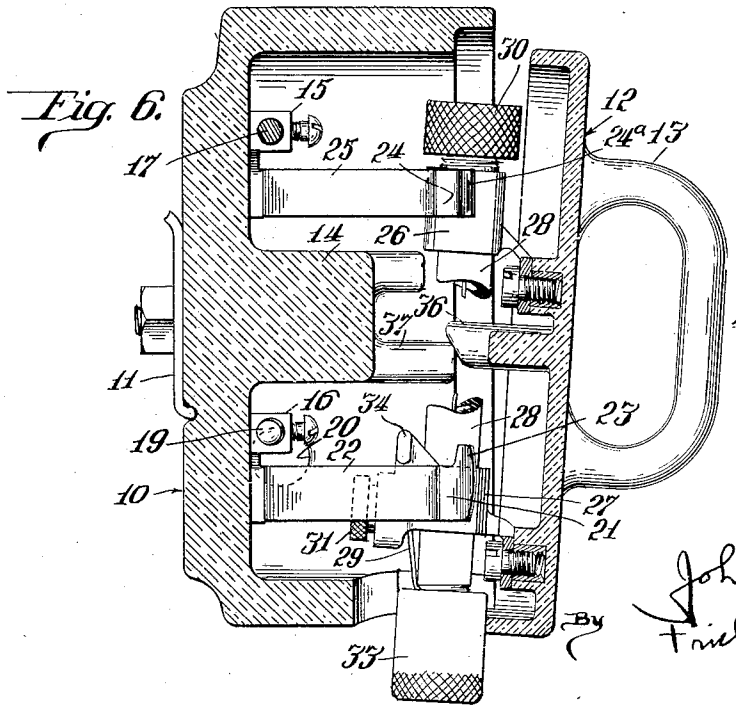
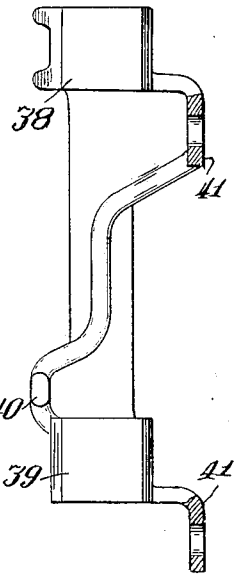


Fig. 7.



Inventor,
John F. Dohrwardt,
By Fricke & DeBusk,
Attorneys

Patented May 10, 1932

1,857,442

UNITED STATES PATENT OFFICE

JOHN F. DOHRWARDT, OF SOUTH MILWAUKEE, WISCONSIN, ASSIGNOR TO LINE MATERIAL COMPANY, OF SOUTH MILWAUKEE, WISCONSIN, A CORPORATION OF DELAWARE

FUSE BOX STRUCTURE

Application filed November 14, 1929. Serial No. 407,038.

My invention relates to fuse box structures of the type in which a fuse or other conductor is removable bodily from a circuit in which the box is connected in series. It is the object of my invention to provide a new and improved arrangement of parts by reason of which the operator is enabled more easily and more safely to insert the fuse or other conductor element into the box in operative position for closing the circuit.

In devices of this type, it is important that adequate means be provided for guiding the removable fuse or other switching element positively and surely to its operative circuit closing position so as to prevent any possibility of arcing under ordinary conditions by reason of faulty placement of the switching element. To this end, it is one of the objects of my invention to provide means adapted by engagement with one end of the fuse element to locate such end definitely in substantially its operative position before the other end of the element is brought into position for bridging the gap. It is another object of my invention to provide an arrangement of this type in which the fuse or other conductor member may be swingingly anchored in position with at least one end of the conductor element out of engagement with its ultimate circuit connection in such manner that a blow on the outer face of the movable conductor assembly serves to move it to operative circuit closing position without the necessity for being actually grasped and supported by the hand of the operator at the time when the closing of the circuit is effected.

It is another object of my invention to improve devices of this type in sundry details hereinafter pointed out. The preferred means by which I have accomplished my several objects are illustrated in the drawings and are hereinafter specifically described. That which I believe to be new and desire to cover by Letters Patent is set forth in the claims.

In the drawings,—

Fig. 1 is a central vertical section through the preferred form of my improved fuse box structure;

Fig. 2 is a front face view of the box member of my improved construction, with the cover member removed;

Fig. 3 is a horizontal cross section taken substantially at line 3—3 of Fig. 2, but with the cover member and the parts carried thereby in position;

Fig. 4 is a horizontal cross section taken at line 4—4 of Fig. 2, with the cover member in position on the box member;

Fig. 5 is a side face view of my improved construction, showing a changed position of the cover member and the parts carried thereby, a portion of the box being broken away for better illustrating my construction;

Fig. 6 is a central vertical section similar to Fig. 1, but showing a changed position of the parts, with certain of the parts broken away for clearness of illustration; and

Fig. 7 is a side view of a modified form of conductor means.

Referring now to Figs. 1 to 6 of the drawings, in which corresponding parts are indicated by the same reference characters, 10 indicates a box member made of porcelain or other suitable insulating material, provided in the construction shown with a bracket 11 of any suitable type by which it may be supported rigidly in position. The box member 10 is open at its front face, such front face of the box being normally closed by a lid or cover member 12 in the form of a plate, being preferably provided with a handle 13 of any suitable type on its outer face.

As is best shown in Fig. 1, the box 10 is provided with a partition 14 extending from side to side of the box at about its middle point, such partition being formed integrally with the box. Line terminals 15 and 16 of any suitable type are mounted rigidly in position in the box member 10 at opposite sides of the partition 14, such line terminals being preferably in the form of copper or bronze castings. The line terminal 15 has connected thereto a circuit wire 17 extending inwardly through an opening 18 in the side of the box member (see Fig. 4), and the terminal 16 has connected thereto a circuit wire

19 extending through an opening 20 (see Figs. 2 and 6).

The line terminal 16 has connected therewith a clip 21 comprising two spaced resilient fingers which extend toward the open face of the box member, such spaced resilient fingers comprising the clip 21 being preferably reenforced by a second resilient clip 22, as is best shown in Fig. 3. At their outer ends, the fingers 21 are provided with upwardly extending lugs or fingers 23 for a purpose to be hereinafter set forth. The line terminal 15 likewise is provided with resilient clips 24 and 25 of similar construction, except that they are not provided with the upwardly extending lugs.

As is best shown in Fig. 3, the outer end portions of the fingers of the clip 21 are diagonally disposed adjacent to and including the upwardly extending lugs 23, so as to act as guides for the part to be entered between them.

In like manner, the outer end portions of the fingers of the clip 24 (see Fig. 4) are diagonally disposed at 24*a* so as to guide the removable conductor member into position therebetween as hereinafter described.

Upon the inner face of the lid or cover member 12, I have mounted a conductor member in the form of a fuse or otherwise as may be desired. In the construction shown in Fig. 1, this conductor structure comprises terminals 26 and 27 in the form of blocks of copper, such terminals being mounted upon the cover member 12 in position to have operative engagement with the clips 24 and 21 respectively, the terminals 26 and 27 being preferably mounted upon the cover member in such manner as to have a limited amount of play thereon. In the construction shown, the terminals 26 and 27 are provided with aligned openings through which a tube 28 of insulating material extends, forming a conduit for the fusible conductor member 29 which is connected with the terminal 26 by means of a screw-threaded cap 30 and is connected with the terminal 27 by means of a set screw 31 having a screw-threaded seat at the inner face of the terminal 27. In the construction shown, the fuse member 29 extends outwardly through a notch 32 formed in the lower end of the tube 28, an auxiliary tube member 33 also of insulating material being employed as an extension for the tube 28, serving substantially to close the notch 32 about the fusible element 29, the auxiliary tube member 33 being secured in position upon the tube 28 by means of screw threads.

By the use of the construction as above described, the line wire 17 is operatively connected with the line wire 19 through the medium of the clip 24, the fuse terminal 26, the cap 30, the fuse member 29, the set screw 31, the fuse terminal 27, and the clip 21. When it is desired to break the circuit comprising the lead wires 17 and 19, this result is effected by drawing the lid or cover member 12 by a direct pull out of operative position for carrying the fuse terminals 26 and 27 out of engagement with the clips 24 and 21 respectively. When it is desired to place a new fuse member in position, ready access is afforded to the parts, with the cap 30, the set screw 31, and the extension sleeve 33 all removed. When a fuse element has been burned out, so as to make necessary the installation of a new fuse element in the box, there is ordinarily no means for determining by conditions at the box whether the rupture of the fuse has been caused by a temporary overload at some point along the circuit or has been caused by a permanent overload which must be located and obviated. It very often happens that when a new fuse is inserted in the tube 28 upon the reinsertion of the lid or cover member 12 in operative position the fuse is again immediately blown. By reason of the possibility or probability that a fuse will blow at any time when the cover member is moved to its operative position, it is important that precautions be taken for obtaining the best possible conditions with respect to the operation of inserting the fuse member so as to prevent possible injury to the operator by being burned or by reason of being surprised into losing his balance and falling to the ground.

For providing the desired favorable conditions, I have employed a combination comprising means for guiding the fuse terminals into operative position with respect to the line terminals in the box. In the construction shown, this guiding means comprises the lugs or hooks 23 mounted on the outer ends of the fingers of the clip 21, such lugs or hooks being adapted to cooperate with outwardly extending lugs 34 carried by the fuse terminal 27, as is perhaps best shown in Fig. 5. When it is desired to insert the fuse member into operative circuit closing position, the operator, holding the structure through the medium of the handle 13, pushes the fuse terminal 27 into engagement between the outer ends of the fingers of the clip 21, with the lugs 34 in engagement with the hooks or lugs 23, and with the lid or cover member 12 in engagement with a portion of the box member 10, as at 35 as shown in Fig. 5, the weight of the cover member and the parts connected therewith serving to hold the cover member in position as shown in Fig. 5 at a slight angle from the vertical or operative position. After the cover member has been placed in the position as shown in Fig. 5, the member can be forced to its final operative position by a blow on the outer face of the member, which serves to swing the fuse terminal 26 toward the left into engagement with the clip member 24. This application of force to the outer face of the cover member also serves to push

the lower end of the assembly farther into the lower end of the box 10. At an intermediate portion of the movement into final operative position, the beveled outer end faces of guide pins 36 carried by the cover member 12 are brought into engagement with guide ribs 37 formed at opposite sides of the box 10, serving to move the cover member 12 upwardly by a camming action for bringing the cover member into its final operative position as shown in Fig. 1.

In Fig. 7, I have shown a modified form of conductor member for replacing the terminals 26 and 27, the tube 28, and the fusible element 29, together with their connected parts. This modified form of structure comprises blocks 38 and 39 corresponding with the terminals 26 and 27 of the construction above described, such blocks 38 and 39 being formed integrally with each other in the form of a bronze or copper casting. Outwardly extending lugs 40 are provided upon this conductor in the same relative position as that occupied by the outwardly extending lugs 34 of the construction first described. The arrangement is such that this device is adapted to be connected directly to the plate 12 in lieu of the fuse and its mounting parts as above described, being provided with attaching lugs 41 in suitable position thereon for effecting this purpose, Fig. 7 being shown on a slightly larger scale than that upon which Fig. 6 is shown.

By the use of my improved construction, comprising either the device as first above described or the device as shown in Fig. 7, an operator is enabled safely to place the parts in the condition as shown in Fig. 5 and then without danger to himself forcing the parts home to operative position without being compelled to effect this result while having the parts actually in his grasp.

While I prefer to employ substantially the construction as shown in my drawings and as above described, it is to be understood that my invention is not to be limited thereto except so far as the claims may be so limited by the prior art, it being understood that changes may well be made in the construction without departing from the spirit of my invention.

I claim:—

1. A device of the type described, comprising in combination a member in the form of a box open at one face, a member in the form of a plate loosely mounted on the box at said open face portion, terminals in said box in spaced relation to each other, a conductor element carried by said plate and movable therewith into releasable engagement with said terminals, and positively acting means for movably supporting said plate member in slight angular position with respect to its final operative position with at least one end of said conductor element out of engagement with the corresponding terminal.

2. A device of the type described, comprising in combination a member in the form of a box open at one face, a lid member in the form of a plate loosely mounted on the box for closing said face, terminals in said box in spaced relation to each other, a conductor element carried by said plate and movable therewith into releasable engagement with said terminals, and interengaging lugs carried by said lid member and said box member for swingingly supporting said lid member from its lower end and adapted positively to limit outward swinging of the lid on the box so as normally to hold said lid member swung outwardly to a slight angle from the vertical with the upper end of the conductor element out of engagement with the corresponding terminal.

3. A device of the type described, comprising in combination a member in the form of a box open at one face, a member in the form of a plate loosely mounted on the box at said open face portion, terminals in said box in spaced relation to each other, a conductor element carried by said plate and movable therewith into releasable engagement with said terminals, and hook members at the lower end portion of said box adapted by operative engagement with said plate member and connected parts to support the plate member therefrom with said plate member held in slightly angular position from the vertical by engagement with the box member below said hook members.

4. A device of the type described, comprising in combination a member in the form of a box open at one face, a member in the form of a plate loosely mounted on the box at said open face portion, terminals in said box in spaced relation to each other, a conductor element carried by said plate and movable therewith into releasable engagement with said terminals, and interengaging lugs carried by said plate and one of said terminals for movably supporting said plate member in slightly angular position with respect to its final operative position, with said conductor element in engagement with one of said terminals and out of engagement with the other terminal, and adapted positively to limit outward swinging movement of the lid on the box.

5. A device of the type described, comprising in combination a member in the form of a box open at one face, a lid member in the form of a plate loosely mounted on the box for closing said face, terminals carried by said lid member on its inner face in spaced relation to each other, a conductor element connecting said terminals, line terminals in said box in spaced relation to each other and each including spaced resilient fingers adapted to receive and grip one of said first named

terminals, and means carried by the lower line terminal for movably supporting said lid member at a slight angle with respect to its final operative position with the lid member held against swinging to greater angularity by engagement with the lower end portion of the box member.

6. A device of the type described, comprising in combination a member in the form of a box open at one face, a lid member in the form of a plate loosely mounted on the box for closing said face, terminals carried by said lid member on its inner face in spaced relation to each other, a conductor element connecting said terminals, line terminals in said box in spaced relation to each other and each including spaced resilient fingers adapted to receive and grip one of said first named terminals, and means carried by the fingers of the lower line terminal for movably supporting said lid member at a slight angle with respect to its final operative position with the lid member held against swinging to greater angularity by engagement with the lower end portion of the box member.

7. A device of the type described, comprising in combination a member in the form of a box open at one face, a lid member in the form of a plate loosely mounted on the box for closing said face, terminals carried by said lid member on its inner face in spaced relation to each other, a conductor element connecting said terminals, line terminals in said box in spaced relation to each other and each including spaced resilient fingers adapted to receive and grip one of said first named terminals, outwardly extending lugs carried by the lower one of said first named terminals, and means carried by the lower line terminal adapted by engagement with said lugs to movably support said lid member at a slight angle with respect to its final operative position with the lid member held against swinging to greater angularity with respect to the box by engagement with the lower end portion of the box.

8. A device of the type described, comprising in combination a member in the form of a box open at one face, a lid member in the form of a plate loosely mounted on the box for closing said face, terminals carried by said lid member on its inner face in spaced relation to each other, a conductor element connecting said terminals, line terminals in said box in spaced relation to each other and each including spaced resilient fingers adapted to receive and grip one of said first named terminals, and hooks carried by the fingers of the lower line terminal adapted by engagement with the lower one of said first named terminals to movably support said lid member at a slight angle with respect to its final operative position with the lid member held against swinging to greater angularity by engagement with the box member below said hooks.

9. A device of the type described, comprising in combination a member in the form of a box open at one face, a lid member in the form of a plate loosely mounted on the box for closing said face, terminals carried by said lid member on its inner face in spaced relation to each other, a conductor element connecting said terminals, line terminals in said box in spaced relation to each other and each including spaced resilient fingers adapted to receive and grip one of said first named terminals, outwardly extending lugs carried by the lower one of said first named terminals, and hooks carried by the fingers of the lower line terminal adapted by engagement with said lugs to movably support said lid member at a slight angle with respect to its final operative position with the lid member held against swinging to greater angularity by engagement with the lower end portion of the box member.

10. A device of the type described, comprising in combination a member in the form of a box open at one face, a member in the form of a plate loosely mounted on the box at said open face portion, terminals in said box in spaced relation to each other, a conductor structure carried by said plate and movable therewith into releasable engagement with said terminals, upwardly extending lugs carried by the lower terminal in said box member, and outwardly extending lugs carried by the lower end portion of said conductor structure adapted by engagement with said upwardly extending lugs to hold said plate member swung outwardly to a slight angle with respect to the box member, with the plate member held from swinging to greater angularity with respect to the box by engagement of the lower end of the plate member with the lower end of the box member.

11. A device of the type described, comprising in combination a member in the form of a box open at one face, a member in the form of a plate loosely mounted on the box at said open face portion, terminals in said box in spaced relation to each other, a conductor structure carried by said plate and movable therewith into releasable engagement with said terminals, and means for swingingly supporting said plate member from its lower end adapted to permit free upward movement of the plate member with respect to the box member but adapted when the lower end of the plate member is brought into operative engagement with the box member to hold the member swung outwardly to a slight angle from the vertical.

12. A device of the type described, comprising in combination a member in the form of a box open at one face, a lid member in the form of a plate loosely mounted on the box

for closing said face, terminals carried by said lid member on its inner face in spaced relation to each other, a conductor element connecting said terminals, line terminals in said box in spaced relation to each other and each including spaced resilient fingers adapted to receive and grip one of said first named terminals, upwardly extending lugs carried by the fingers of the lower line terminal, and outwardly extending lugs carried by the lower one of said first named terminals adapted by engagement with said upwardly extending lugs to hold said lid member swung outwardly to a slight angle with respect to the box member, with the lid member held from swinging to greater angularity with respect to the box member by engagement of the lower end of the lid member with the lower end of the box member.

13. A device of the type described, comprising in combination a member in the form of a box open at one face, a lid member in the form of a plate loosely mounted on the box for closing said face, terminals in said box in spaced relation to each other, a conductor element carried by said plate and movable therewith into releasable engagement with said terminals, and inwardly extending guide pins carried by the lid member on its inner face normally standing clear of the box when the lid is in open position but adapted by engagement with guides on said box member when the lid is moved toward the box to assist in directing the lid member to operative closing position.

14. A device of the type described, comprising in combination a member in the form of a box open at one face, a lid member in the form of a plate loosely mounted on the box for closing said face, terminals in said box in spaced relation to each other, a conductor element carried by said plate and movable therewith into releasable engagement with said terminals, and guide pins carried by the lid member on its inner face and having beveled inner ends normally standing clear of the box when the lid is in open position but adapted by a cam engagement with guides on said box member when the lid is moved towards the box to assist in directing the lid member to operative closing position.

15. A device of the type described, comprising in combination a member in the form of a box open at one face, a lid member in the form of a plate loosely mounted on the box for closing said face, terminals in said box in spaced relation to each other, a conductor element carried by said plate and movable therewith into releasable engagement with said terminals, and cam means carried by the lid member adapted by engagement with a part of the box member to raise the lid member to its normal elevation as the lid member moves to its closing position.

JOHN F. DOHRWARDT.