Dec. 12, 1933. C. A. GOOD 1,939,259

AUTOMATIC CONTACT PLUG

Original Filed Oct. 16, 1929

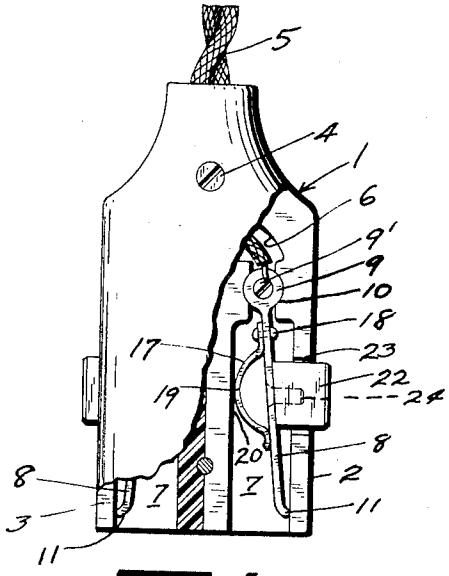


Fig. 1.

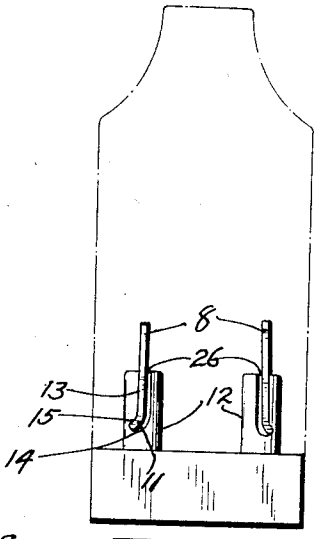


Fig. 2.

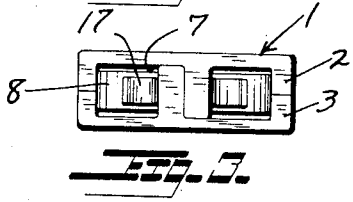


Fig. 3.

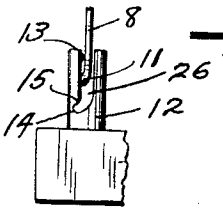


Fig. 4.

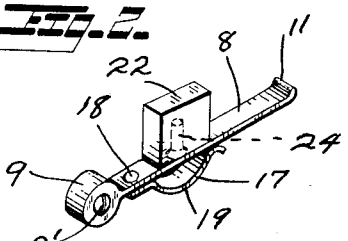


Fig. 5.

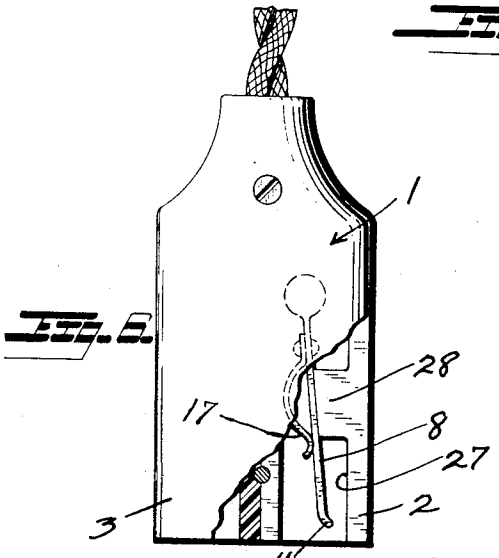


Fig. 6.

Fig. 7.

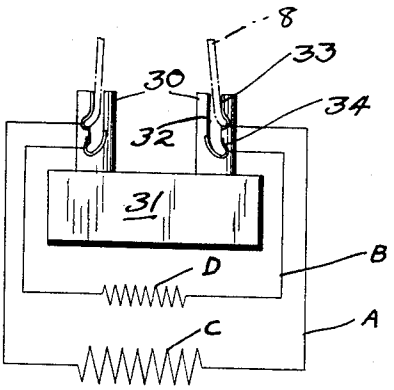


Fig. 8.

INVENTOR.
CHARLES A. GOOD.
BY Joseph B. Gardner
ATTORNEY.

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AUTOMATIC CONTACT PLUG

Charles A. Good, Oakland, Calif.

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Renewed April 3, 1933

8 Claims. (Cl. 173—332)

This invention relates to improvements in contact plugs such as employed to connect electrical appliances with a source of electricity and in its present embodiment provides for automatically locking the plug against accidental displacement while at the same time permitting of a quick, willful displacement of the plug when desired.

An object of the invention is to provide a plug of the character described in which the contact members thereof are urged into proper and locking engagement with associated contact members by a novel spring means which insures a positive and reliable contact of said members in a particularly efficient manner.

Another object is to provide a plug of the character described in which the contact members are movable into position for alignment and cooperation with their associated contacts and also movable out of locking engagement with said contacts by a comparatively simple push button means arranged to be readily operated as desired to facilitate the insertion and removal of the plug.

Still another object of the invention is to provide in a plug of the character described an improved form of completely assembled contact unit wherein the means for movably or pivotally anchoring the contact member in the plug body, the spring actuating means for said contact member, the interlocking means at the free end of said contact member, and a push button for moving the contact member, are carried by and entirely supported on the contact member and form said complete unit, which greatly facilitates the assembling and disassembling and simplifies the construction of the plug.

A further object is to provide a plug of the character described in which the contact members and other parts, although of comparatively simple and inexpensive form, render the plug safe, durable and answerable to all requirements of the law and insurance companies.

The invention possesses other objects and features of advantage, some of which, with the foregoing, will be set forth in the following description of the preferred form of the invention which is illustrated in the drawing accompanying and forming part of the specification. It is to be understood, however, that variations in the showing made by the said drawing and description may be adopted within the scope of the invention as set forth in the claims.

Referring to the drawing,

Figure 1 represents a fragmentary top plan view of a plug constructed in accordance with my invention.

Figure 2 represents a side elevation of one type of associated contact members showing in dotted lines the plug as when in operative position.

Figure 3 is an end elevation of the plug shown in Figure 1.

Figure 4 is a fragmentary side elevation of the contacts showing how electrical contact is maintained while pulling the contacts apart.

Figure 5 is a perspective view of one of the complete contact units.

Figure 6 is a fragmentary top plan view of a modified form of the plug, wherein the push buttons are omitted.

Figure 7 is a fragmentary side elevation of the type of associated contact to be used with the plug shown in Figure 6.

Figure 8 is a side elevation of a multiple type contact device which provides for connection of a plurality of circuits with the plug contact device of Figs. 1 and 6.

The present embodiment of the invention as shown in detail in the accompanying drawing comprises a plug body 1 formed of like halves 2 and 3 held together by suitable fastenings 4 and having the usual electrical conductors 5 disposed in grooves 6 which are arranged to receive the strains on the connections of said conductors with the contacts.

Arranged in openings 7 formed by the halves of the plug are two contact units which are preferably completely assembled in that all the parts thereof are self contained. As here shown each unit includes an elongated flat resilient metal contact member 8 having at its inner end an enlarged rounded portion 9 carrying a binding post 9', the portion 9 fitting in a socket 10 in the plug body in such manner as to provide a pivotal anchorage for the contact member. Thus the lower end of said member is free to be moved laterally but the contact is prevented from longitudinal displacement. On the outer end of the contact there is provided an outwardly laterally bent slightly rounded terminal 11 which will interlock with the associated contacts 12, each of which latter is provided with a long contact surface 13 terminating in an offset inner terminal 14 providing a locking shoulder 15.

Spring means is preferably provided for urging the plug contacts 8 into close and interlocking engagement with the associated contacts and as here shown are carried by the contacts themselves, in the form of bowed leaf springs 17 se-

cured as at 18 at certain ends to said contacts. The convex portions 19 of said leaf springs slidably contact with the opposed walls 20 of the openings in the plug body, whereas the free ends of the springs likewise engage to opposed faces of the contacts 8.

Preferably carried by the contacts 8 between the ends thereof are push buttons 22 which extend outward through lateral openings 23 in the sides of the plug body, and constitute means for moving the contacts against the action of the springs 17 into position to be aligned and lockingly engaged with the contacts 12; also for moving the contacts 8 out of locked engagement with the contacts 12. These push buttons may be secured to the contacts 8 by the fastenings 24 or in any other suitable manner fixed to said contacts. It will now be clear that the contacts 8 with the rounded ends 9, springs 17, ends 11, and push buttons 22 comprise completely assembled units which may be much more easily, accurately, and in less time properly positioned or assembled in the plug than would be possible where separate parts are employed.

With the plug and associated contact shown in Figures 1 and 2, to "plug in" the plug, the operator depresses the push buttons 22 and thereby moves the contacts 8 inward so as to align them with the slots 26 in the contact 12. The contacts 8 are then inserted in the slots 26 and are held in engagement with the contact surfaces 13 while being thus inserted, until the ends 11 interlock with the shoulders 15. Thus engaged, the contacts 8 will be locked against accidental displacement but when the plug is forcibly and willfully moved outward the contact will release but while being drawn apart will, as shown in Figure 4, remain in engagement until the ends 11 are moved clear of the slots 26. Thus arcing is minimized and a proper contact will be insured although the operator fails to push the plug as far inward as is required to "interlock" the contacts or fails to pull it all the way outward.

It will be seen that although the shoulders 15 and ends 11 effectively interlock the contacts in such manner that release may be effected when the plug is forcibly withdrawn, the release by the push button is preferable. When the push buttons are depressed the contacts 8 are moved laterally clear of interlocked engagement with the shoulder 15, this being permitted by the width of the slots 26, but an electrical contact is maintained as hereinbefore stated. Thus, the release of the plug through operation of the push buttons may be quickly and conveniently effected when desired.

As shown in Figure 6 the plug may be constructed without the push button release. Instead, the contacts 8 are held slightly spaced from the walls of the opening 27 in the plug by the lugs 28, and said contacts are at all times in position to be inserted in the slots of or otherwise engaged with the contacts, one of which is designated 16 and shown in Figure 7. The entrance end of the slot of this contact is flared or enlarged and provides a beveled face 29 which guides the ends of the contacts 8 into the slots. Otherwise these contacts are the same as the contacts 12 and cause the contacts 8 to be interlocked against accidental removal therefrom, but will permit of release and withdrawal of the plug contacts when the plug is forcibly, willfully withdrawn.

In this connection it is important to note that with plugs of the types shown in both Figs. 1 and 6, an appreciable safety and good contact factor is provided, owing to the long contact surfaces 13 of the shoulders 15, the ends 11 and the spring urging the contacts into close engagement. For example, should the plug be accidentally pulled or gripped with sufficient force to move the ends 11 of the contacts 8 out of interlocking engagement, but not with sufficient force to entirely withdraw the contacts 8, the electrical connection will not have been broken and will remain effective. With the contact in the position shown in Figure 4, for example, a reliable electrical connection is still provided and will be maintained due to the spring means urging the contacts into close engagement with one another.

Another point of advantage is that the inherent resiliency of the contacts 8 is brought into play when said contacts are in operative position and this with the force of the springs insure a good contact of the parts at all times.

As shown in Figure 8, I may employ a multiple form of associated contact device for the plugs shown in Figs. 1 and 6. This multiple contact device comprises body members 30 of insulation material, carried by a base 31. Each member 30 is provided with a slot 32 for reception of one of the plug contact members 8. At spaced points in the slot are contacts 33 and 34 each having a socket portion 35 for interlocking engagement with the ends 11 of the contacts 8. When the contacts 8 are pushed all the way into the slots 32 the ends 11 will engage the contacts 34 and the contacts 8 will be clear of the contacts 33. On pulling the plug outward slightly the ends 11 of the contacts 8 will be moved clear of the contacts 34 and into engagement with the contacts 33. It will be noted that in both instances the contacts 33 and 34 will interlock with the ends 11 of the contacts 8 in the same manner as provided by the contacts 12. Thus the multiple contact device shown in Figure 8 will provide for the independent connection of a plurality of circuits. For example, as shown in Figure 8, A and B indicate two heating element circuits including heating elements C and D of different sizes or capacities. These two elements may be embodied in an electric iron or in any similar electrical appliance. When the plug contacts 8 are in engagement with the contacts 34 the larger element C is connected for operation, but on pulling out the plug until the contacts 8 snap into engagement with the contacts 33, then the smaller element D will be energized. In this way the heat may be regulated and controlled with the simple contact means of this invention, but I wish it understood that the multiple contacts may be put to uses other than here described.

Although the plug contacts are here shown as contained within the plug body, I may arrange said contacts to project outward from the body in the manner commonly used in certain types of present day plugs. Furthermore, the associated contacts may be of the socket type instead of the type here shown, it being obvious that the advantages of this invention are obtainable with all of said types of plugs and contact devices.

It will now be clear that the plug of my invention, constructed and arranged as hereinbefore described and as shown in the drawing, will accomplish the purposes of the invention in a particularly efficient manner.

I claim:

1. In a contact plug, a body portion and a completely assembled contact unit carried by the body portion and comprising an elongated contact member, means carried by and at one end of the contact for pivotally anchoring the contact in said body portion, means at the other end of and carried by said contact member adapted to interlock with an associated contact, spring means carried by and between the ends of said contact member and arranged to urge the said contact member into position to engage said associated contact, and a push button carried by said contact member and extending outward of said body portion.

2. In a contact plug, a body portion having an opening therein for a contact unit and a socket contiguous with said opening, and a contact unit in said opening comprising an elongated contact member, means formed integral with said contact member at the inner end thereof for pivotally socketing the contact in said body portion, means formed integral with the other end of said contact member adapted to lockingly engage with another contact, a spring arranged to urge the contact member at all times in one direction, and a push button fixed on said contact member and disposed in accessible position on one side of said body portion.

3. In a contact plug or body portion having an opening therein for a contact unit, and a contact unit carried in said opening and comprising an elongated contact member, means for movably anchoring the contact member in said opening, a spring fixed to and carried by said contact member between the ends of and urging the contact member laterally in one direction at all times, and a push button fixed to said contact member extending outwardly of the casing in position to provide for movement of the contact member against the actions of said spring.

4. In a contact device, plug contact members, and other contact members each comprising a slotted member adapted to receive in the slot thereof one of the plug contact members and a plurality of spaced contact elements contained in the slots of said last named contact members and arranged to be selectively engaged by said plug contacts.

5. In a contact device, plug contact members and other contact members each comprising a slotted member adapted to receive in the slot thereof one of the plug contact members, a plurality of spaced contact elements contained in the slots of said last named contact members and arranged to be selectively engaged by said plug contacts, and means formed integrally with the plug contacts and with said elements for causing an interlocking engagement of the contacts and said elements.

6. In a contact device, a plurality of contact members each having a guide slot associated therewith and a plurality of spaced contact elements in each slot arranged to be selectively and independently engaged by a plug contact member when the latter is inserted into or partly withdrawn from said slot, and laterally yieldable plug contact members arranged to be inserted into said slots to selectively and independently engage said contacts, said plug contact members and said contact elements being constructed and arranged whereby disengagement thereof can only be effected upon lateral yielding of said plug contacts.

7. In a contact device, a support, a plurality of spaced contact members arranged in a row on support to be selectively and independently engaged by a plug contact member when the latter is moved axially in a path alongside said spaced contact members, a laterally yieldable plug contact member arranged to be moved into and out of engagement as aforesaid with said spaced contact members, and cooperating interengaging portions on the first and second named contacts arranged in laterally offset relation to said path of movement of the plug contact member.

8. In a connector for electrical circuits, body members arranged to be moved into and out of operative relation to one another, a plurality of spaced contact members arranged in a row on one of said body members, a contact member on the other body member arranged to be moved axially into and out of position opposite the row of contacts, spring means urging said second named contact laterally towards the contacts of the row thereof, and portions on the first and second named contacts being offset laterally in the direction of the spring urged movement of the second named contacts and arranged to releasably interlock with one another.

CHARLES A. GOOD.