

March 6, 1934.

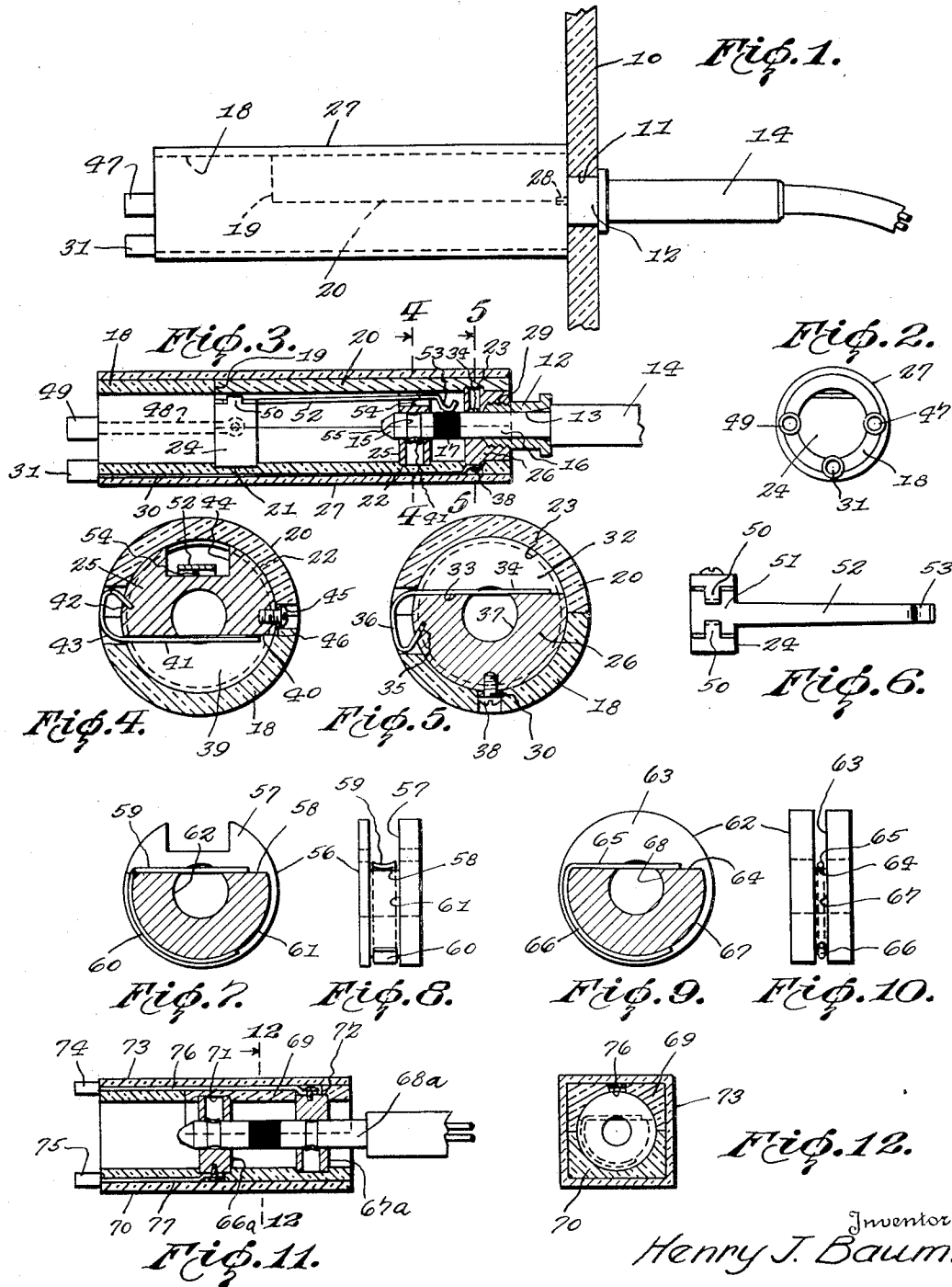
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CONNECTER FOR ELECTRICAL APPLIANCES

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2 Sheets-Sheet 1



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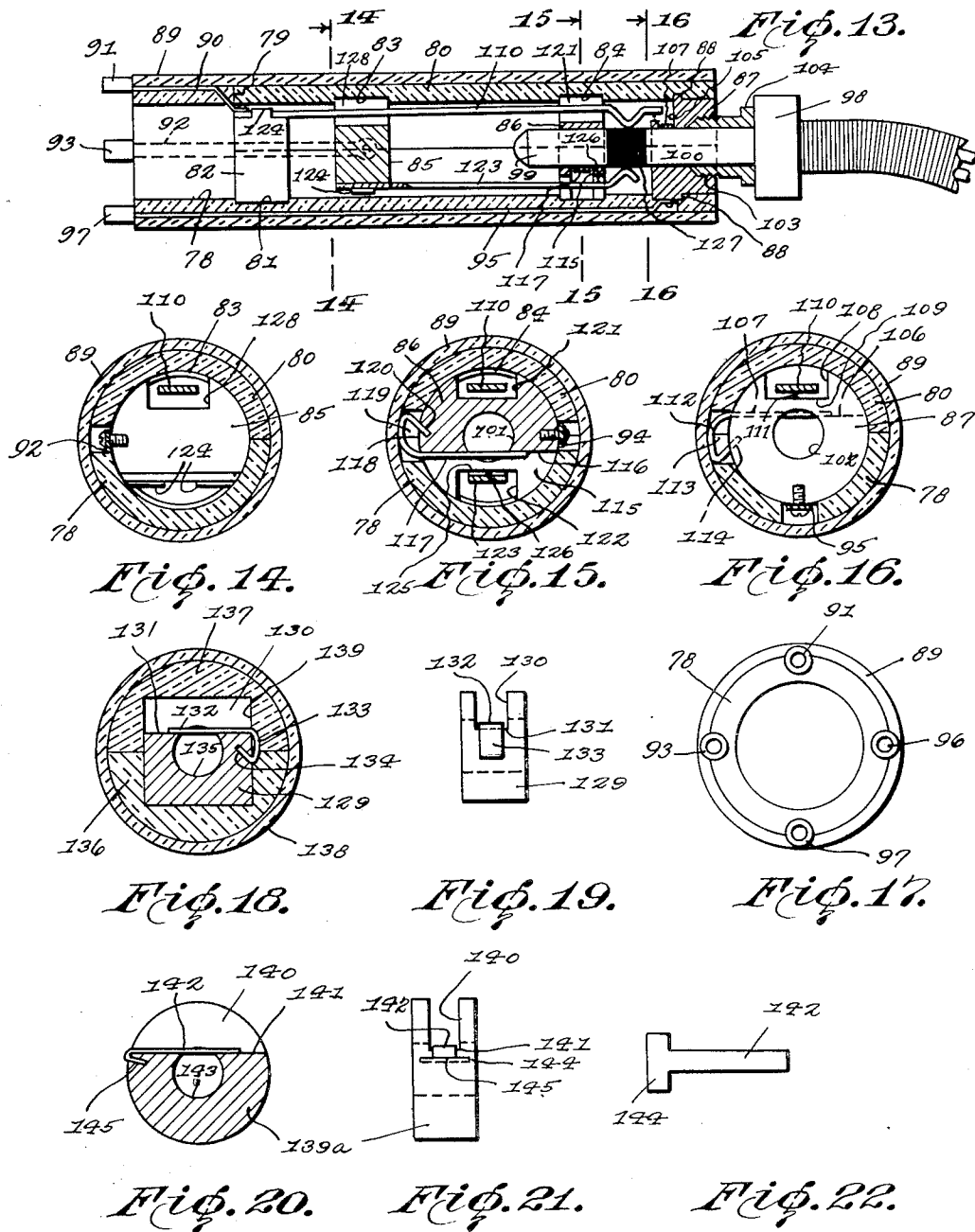
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UNITED STATES PATENT OFFICE

1,950,215

CONNECTER FOR ELECTRICAL APPLIANCES

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Application March 1, 1933, Serial No. 659,165

3 Claims. (Cl. 200—51)

The subject-matter of the present invention relates generally to conductors and the improvements are directed to a unique form of connector or jack adapted for use in connection with telephone switchboards, radio receiving instruments, electric illuminating means of various kinds, electrical appliances and electric drills, or the like.

Primarily, the object of the invention is to provide a device of the above-mentioned character wherein a positive electrical contact may be secured and wherein all metal parts included in the article are insulated from one another and held in a vice-like grip to secure the aforesaid contact and to prevent loosening or disassembling of the parts of said device.

Another object resides in the production of a jack or connector comprising but a few simple parts, inexpensive to manufacture and which may be readily assembled or disassembled as desired.

Still another object of the invention is to provide a device wherein the entire article may be made in various sizes and shapes, and wherein the contact members embedded therein may be circular or angular, as desired.

A further object is to provide a novel form of contact member including a plurality of resilient or spring elements uniquely fashioned to assure a positive and firm contact with the negative and positive portions of a plug.

A still further object is to produce a jack or connector having a plurality of terminals adapted to serve as attaching means with a series of electrical conductors.

With these objects in view, together with others which will appear as the description proceeds, the invention resides in the novel formation, combination and arrangement of parts, all as will be described more fully hereinafter, illustrated in the drawings, and particularly pointed out in the claims.

In said drawings:

Figure 1 is a side elevation of my improved jack with a plug inserted therein, a portion of a switchboard panel being shown in section.

Fig. 2 is an elevation of said jack as viewed from the left of Fig. 1, to show the three terminals.

Fig. 3 is a central longitudinal vertical sectional view of the jack removed from the switchboard.

Fig. 4 is a transverse section, taken on line 4—4, of Fig. 3, and slightly enlarged, with the outer sleeve removed.

Fig. 5 is a similar view, taken on the line 5—5 of Fig. 3.

Fig. 6 is a plan view of a parallel spring and the ring supporting the same, removed from the casing.

Fig. 7 is a sectional view of a contact member showing one form of spring contact.

Fig. 8 is a side elevation thereof.

Fig. 9 is a view like unto Fig. 7, but showing another form of spring contact.

Fig. 10 is a side elevation thereof.

Fig. 11 is a central longitudinal sectional view of a connector employing two contact members. Fig. 12 is a transverse sectional view taken on line 12—12 of Fig. 11.

Fig. 13 is a central longitudinal vertical sectional view of a jack including four end terminals.

Fig. 14 is a transverse sectional view, slightly enlarged and taken on the line 14—14 of Fig. 13.

Fig. 15 is a similar view but taken on the line 15—15 of Fig. 13.

Fig. 16 is a transverse sectional view taken on line 16—16 of Fig. 13.

Fig. 17 is an end elevation of Fig. 13 as viewed from the left to show the four terminals.

Fig. 18 is a sectional view showing the use of an angular contact member.

Fig. 19 is an elevation of the contact member removed from Fig. 18.

Fig. 20 is a sectional view of a contact member embodying a slightly modified form of spring contact.

Fig. 21 is an end elevation of the same.

Fig. 22 is a plan view of the spring contact removed from the contact member shown in Figs. 20 and 21.

Referring now more in detail to the accompanying drawings, wherein like characters of reference denote similar parts throughout the several views, let 10 indicate a portion of a panel of a switchboard, said board being adapted to support the usual buzzer and door, (not shown), the latter elements being operable in the usual manner in said telephone switchboard. Said switchboard panel 10 is provided with an aperture 11 for the reception of a bushing 12, the latter being provided with a bore 13 for the insertion of the end of a plug 14, the latter including positive and negative portions 15 and 16, (see Fig. 3), with a block of insulation 17 therebetween, and as will presently appear said portions 15 and 16 are adapted to be electrically connected with certain contact members situated within a casing about to be described.

Said casing 18 is of tubular formation and is provided with a cut-out 19 for the reception of a cover element 20, (see dotted lines in Fig. 1) and annular grooves 21, 22 and 23 are provided for the reception of the ring-block 24, and contact members 25 and 26, respectively. From the foregoing it is manifest that when the block 24, and the contact members 25 and 26 are placed in their respective grooves, and the cover 20 applied, the parts are held in position as indicated in Fig. 3, and when the sleeve 27 is telescopically applied over said casing 18 and its cover 20, the aforesaid parts are held in a secure position. As

shown in Fig. 3, the casing 18, its cover 20, and the sleeve 27 are composed of insulated material. If desired, said sleeve 27 may be composed of metal and a thin sheet of insulated paper inserted between the casing and said sleeve. As shown in Fig. 1, said panel 10 may be provided with pins 28 which are insertible between the casing 18 and the cover 20 to prevent turning of the jack during the insertion or removal of the plug 14.

The contact member 26 is provided with a threaded bore 29 to receive one end of the bushing 12, as shown in Fig. 3, and is further connected with the conductor 30, which extends longitudinally of the jack to the terminal 31, (see Fig. 3). The upper portion of said contact member 26 is provided with a groove 32 to define a ledge 33, the latter supporting a spring 34 having one end inserted in a slot 35 formed in said contact member. It will be noted in Fig. 5 that said spring 34 is bowed at 36, the casing 18 and cover 20 being cut-out for this purpose. Also said contact member 26 is provided with a central opening 37 to receive the end of plug 14. Fig. 5 also clearly indicates the use of a set screw 38 for securing said conductor 30 to said contact member 26.

The contact member 25 is provided with a groove 39 to define a ledge 40 which is normally contacted by spring 41 having one end anchored in slot 42 of said contact member. Said spring 41 is bowed at 43 and said bowed portion seats in slots formed in the casing 18 and cover 20, (see Fig. 4). The upper portion of said contact member 25 is cut-out at 44 and a set-screw 45 secures a conductor 46 to said contact member, the latter extending to terminal 47, (see Fig. 2).

The ring-block 24 is connected to a conductor 48 leading to terminal 49, (see Figs. 2 and 3), the top of said ring-block 24 being flattened and presenting lugs 50 to engage the H-shaped head 51 of the spring 52, (see Fig. 6), the inner end of said spring 52 being somewhat hooked-shaped, as indicated at 53, (see Fig. 3).

The buzzer circuit in a switchboard will be connected to terminals 47 and 49 and when the plug 14 is removed the spring arm 52 contacts said contact member 25, thus closing the circuit, and in this connection it will be noted in Figs. 3 and 4 that platinum points 54 will be provided on the spring arm 52 and the contact member 25 to assure a positive contact. Other wires will be attached to terminals 31 and 47 and when the plug 14 is inserted in the jack the positive and negative portions 15 and 16 contact with the members 25 and 26 to complete the circuit. The insertion of said plug 14 elevates the hooked end 53 of said spring 52 and breaks the contact between said spring and the contact member 25 thus interrupting the buzzer. In this connection it will be noted that said hooked end 53 rests on the insulation 17 of said plug. Springs 34 and 41 are slightly elevated during the insertion of the plug and assure a positive electrical contact. Said springs 34 and 41 may be flat or arcuate in cross-section and in Fig. 3 it will be noted that said spring 41 is arcuate to fit into an annular groove 55 in said plug 14. Obviously, this spring may be of the flat type and the spring 34 may be arcuate and in this instance the portion 16 of said plug will be provided with a groove like unto groove 55. Both springs may be flat and thus no grooves will be formed in said plug.

In Figs. 7 and 8 the contact member 56 is slotted at 57 to provide a ledge 58 to support a spring 59, the latter being provided with an arc-

uate portion 60 to fit into the annular groove 61 formed in the periphery of said contact member 56. Said spring 59 is shown as being arcuate in cross-section, (see Fig. 8), though it will be appreciated that said spring 59, that is the portion above the opening 62, may be flat if desired.

The contact member 62 shown in Figs. 9 and 10 is also slotted at 63 to provide a ledge 64 to support the spring 65, said spring having an arcuate portion 66 fitting into groove 67 to maintain the same in position with its ledge-engaging portion above the opening 68 in said member 62. In this instance, (see Fig. 10), the spring is circular in cross-section. It will be appreciated that said contact members 56 and 62 may be mounted in the jack shown in Fig. 1 and that the springs 59 and 65 will be encountered by the inserted end of the plug 14 to assure a perfect electrical connection.

Figs. 11 and 12 show a type of connector adapted to be used in conjunction with electrical appliances; also lamps, radios, etc. In this connection it will be noted that the contact members 66a and 67a are similar to the contact members hereinbefore described in detail and the types of springs employed may be arcuate in cross-section, circular or flat, and the particular type of spring employed will determine whether the end of the plug 68a is to be provided with annular grooves or not. This form includes a casing angular in cross-section, (see Fig. 12) and embodies parts 69 and 70 having internal annular grooves 71 and 72 to receive said contact members 67a and 66a. In view of this arrangement the contact members 66a and 67a are maintained in proper spaced relation and after the cover member or envelop 73 is applied the connector is complete. Terminals 74 and 75 are connected by conductors 76 and 77 to contact members 67a and 66a respectively. The idea of providing a square, or angular casing may be transferred to the jack shown in Fig. 1 and in arranging them in a series behind a switchboard panel they may be superimposed and juxtaposed and in contact with one another to prevent their rotation behind the board.

The jack shown in Fig. 13 includes a casing 78 having a cut-out portion 79 to receive a cover 80, said casing and cover being provided with a groove 81 to receive the block 82, while the cover 80 is also grooved at 83 and 84 to receive the contact members 85 and 86, while the end contact member 87 seats in groove 88 formed in both the casing and cover. When the block 82 and the contact members just described have been placed in position and the cover 80 applied, the sleeve 89 is telescopically affixed and thus the parts are maintained in position in a vice-like manner. The block 82 is connected to a conductor 90 leading to terminal 91, whilst the member 85 is connected to a conductor 92 leading to a terminal 93. The contact members 86 and 87 are provided with conductors 94 and 95, (see Figs. 15 and 16) which extend to terminals 96 and 97, respectively, the arrangement of the aforesaid terminals being shown in Fig. 17. The plug 98, embodying positive and negative portions 99 and 100, is insertible within the central openings 101 and 102 of said contact members 86 and 87, thus closing the circuit between the terminals 96 and 97, and this insertion of said plug operates to open a circuit connected to terminals 91 and 93, as will presently appear. Upon inspection of Fig. 13 it will be noted that a threaded bore 103 is provided for the reception

of bushing 104 which extends outwardly from said contact member 87 and serves to connect said jack with a switchboard panel or the like. Said contact member 87 is slotted as indicated at 105 to define a ledge 106 to support spring 107, the upper portion of said member 87 being slotted as shown at 108, (see Fig. 16) to present a base portion 109, the latter being contacted by the end of the spring 110 when the plug is removed from the contact members 86 and 87. Platinum points 111 are provided on the bottom end of said spring arm 110 and also on the base portion 109, as shown in Figs. 13 and 16, thus assuring a positive connection and adding to the life of this particular point of contact.

The spring 107, hereinbefore referred to, is provided with a bowed portion 112, seating in a slot 113 formed in said casing 78 and cover 80, whilst the end of said spring 107 is clamped in a slit 114 in said contact member 87, (see Fig. 16).

The contact member 86 is provided with a slot 115 to present a ledge 116 to support a spring 117, said spring presenting a bowed or hooked portion 118, seating in slot 119 formed in the casing 78 and cover 80, its inner end being affixed in a slot 120 in said contact member, (see Fig. 15). The upper portion of said contact member 86 is provided with a cut-out 121 to permit the passage of the spring arm 110, (see Fig. 13), and its lower portion is similarly cut away, as indicated at 122, to permit the passage of a spring arm 123 borne by said block 85. It will be noted that said spring arm 110 is borne by block 82, each of said blocks being provided with lugs 124 to anchor the H-shaped head of said spring arms in position. The provision of the cutaway portion 122 provides a contact point 125 on said contact member 86 which is engaged by said spring arm 123, platinum points 126 being applied to the surfaces, as pointed out hereinbefore. When the plug 98 is removed, said spring arm 110 contacts the member 87 and said spring arm 123 contacts said contact member 86, thus closing the circuit between the terminals 91—97 and the circuit between terminals 93—96. However, when the plug 98 is inserted within said contact members 86 and 87, the spring arms 110 and 123 are lifted off their contacts thus opening the circuits closed heretofore and closing the circuit between terminals 96—97. Upon inspection of Fig. 13 it will be noted that the hooked portions of said springs arms 110 and 123 are encountered by the inserted plug 98, thus elevating said arms which rest on the insulation 127 of said plug.

As shown in Figs. 13 and 14, said block 85 is provided with a slot 128 to permit the passage of said spring arm 110. All the slots or cutaways provided for the passage of said spring arms 110 and 123 are of sufficient dimensions to obviate any danger of contact between said arms and the particular block or contact member.

In Figs. 18 and 19 there is shown a modified form of contact member which is angular instead of circular as described hereinbefore. Said block 129 is slotted at 130 to provide a ledge 131 for the spring 132, having a loop portion 133 and an extremity seated in slit 134 in said block 129, the latter being provided with an aperture 135 to receive a plug and it will be noted that the casing includes parts 136 and 137, of insulated material and an envelop 138 to bind said parts in position. The parts comprising the casing will be provided with grooves 139 to receive the proper number of contact members 129, in the manner pointed out hereinbefore. The spring 132 may be flat or

arcuate in cross-section and this is equally true of the springs 107 and 117 shown in Fig. 13. In the event the springs are to be arcuate in cross-section then certain annular grooves will be cut into the insertible end of a plug to be used.

The contact member 139, shown in Figs. 20 and 21, is slotted at 140 to provide a ledge 141 to seat the spring 142, which rests above the opening 143 in said member 139. This spring 142 is somewhat T-shaped having a head 144 seated in a slit 145 in the periphery of said member 139. This type of contact member and its spring may be substituted in the jacks and connectors described in detail hereinbefore.

It will be understood that the contact member shown in Figs. 18 and 19 may be substituted for the contact members 66a and 67a by slightly altering the grooves 71 and 72 shown in Fig. 11, and, if desired, all the contact members and springs hereinbefore described in detail may be transferred to the connector described and claimed in my Patent No. 1,894,751, dated Jan. 17, 1933.

Various slight changes might be made in the general form and arrangement of the parts described without departing from the invention, and hence I do not limit myself to the precise details set forth, but consider myself at liberty to make such changes and alterations as fairly fall within the spirit and scope of the appended claims.

I claim:

1. A device of the character described comprising a casing having a cutaway portion and a series of spaced internal grooves, a cover fitting into said cutaway portion, a pair of contact members seating in spaced relation in said grooves, a block seating in one of said grooves, a spring arm leading from said block and normally making electrical contact with one of said contact members and a plug adapted to electrically connect said contact members and to open the circuit between said block and one of said contact members.

2. A device of the character described comprising a casing having a cutaway portion and a series of spaced internal grooves, a cover fitting into said cutaway portion, an insulated sleeve enveloping said casing, a pair of contact members seating in spaced relation in said grooves, conductors connected to each of said contact members, a block seating in one of said grooves, a spring arm leading from said block and normally making electrical contact with one of said contact members and a two-pole plug adapted to electrically connect said contact members to close the circuit and to open the circuit between said block and one of said contact members.

3. A device of the character described comprising a casing having a cutaway portion, a cover seating within said cutaway portion, a series of aligned internal grooves arranged in said casing, an insulated sleeve embracing said casing and cover, a pair of contact members seating in spaced relation in said grooves, conductors connected to each of said members, a block seated in one of said grooves, a spring arm connected to said block and normally in electrical connection with one of said contact members, a second block mounted in one of the grooves, a spring arm connected thereto and normally in electrical contact with the other of said contact members and a plug adapted to place said contact members in circuit and to interrupt the electrical connection between said spring arms and the respective contact members.

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