

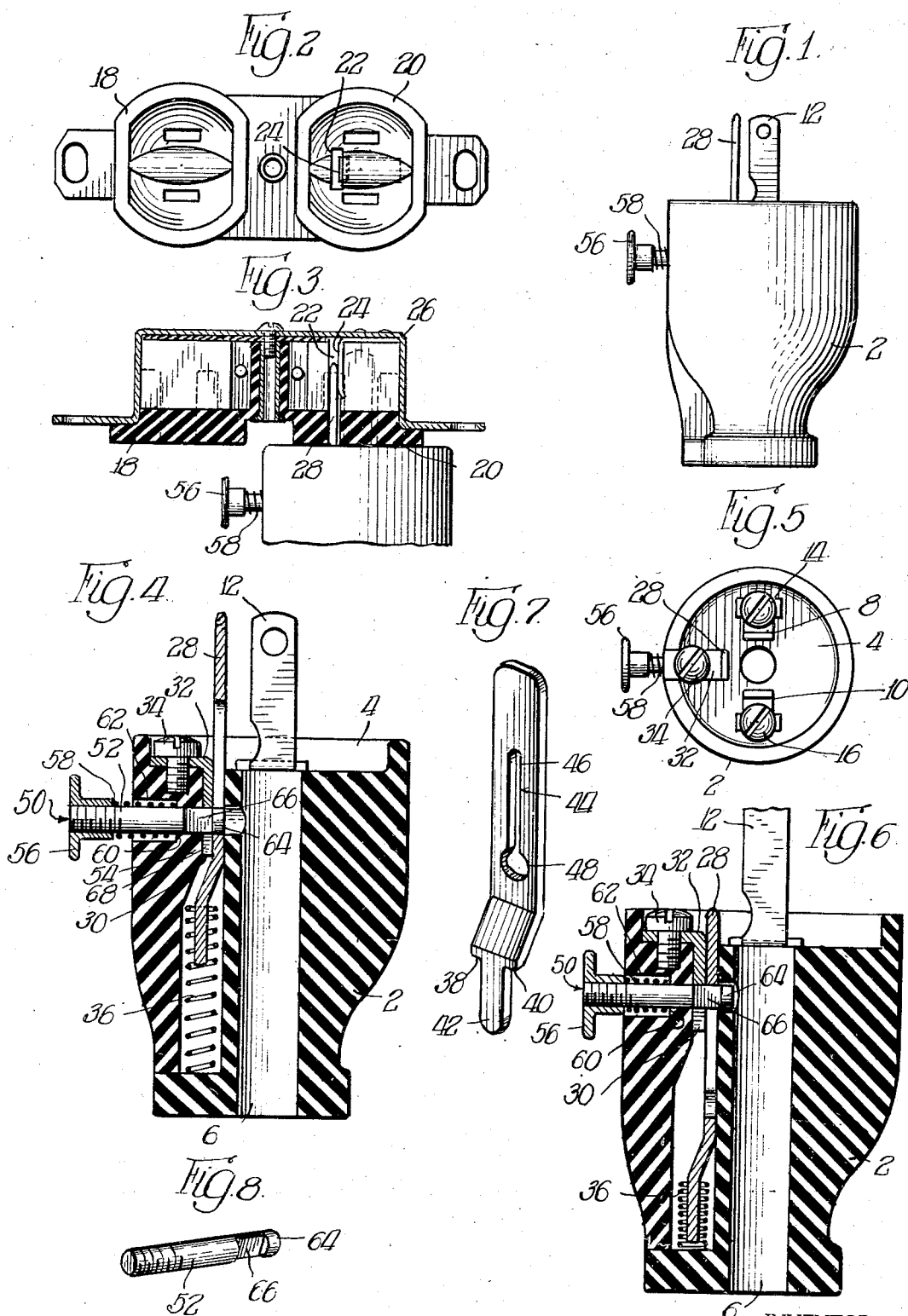
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ATTACHMENT PLUG

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ATTACHMENT PLUG

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1 Claim. (Cl. 173—361)

The present invention relates to electrical devices, and more in particular to attachment plugs of the adapter type which can be used with the more conventional two-wire receptacles or with the more desirable three-wire receptacles to provide for a ground connection.

At the present time a large part of the electrical equipment and apparatus used in the household and elsewhere, and particularly those apparatuses which are portable and transportable from place to place, have exposed metal framework which may become charged in the event that the conductors used in connection therewith come in contact with the said metal framework of the equipment or apparatus which may occur in a number of ways, such as ineffective insulation or wear occurring on the covering for the said conductors. This possibility presents a hazard not only in respect to fire but also in respect to the operator of such equipment, because, should this charged metal framework be contacted, the full charge of electricity in the conductors would be transmitted to the operator and, if a ground connection is established at this time, may result in electrocution of the operator.

This situation has been clearly recognized as a fire hazard and as a very definite hazard to life, and in certain instances the exposed framework of the equipment or appliance is connected electrically with the earth through a ground connection embodied in the receiver with which the attachment plug for the equipment is in electrical association. When this is done, the connection to ground reduces the voltage to which the user of the equipment would be subjected in the event such operator came in contact with the metal framework under the conditions as set forth above, thus avoiding the danger of electrocution and also the fire hazard which would be present because of the full and maximum voltage. This ground connection, furthermore, has the advantage of producing a short circuit which would automatically cause an operation of the overcurrent devices protecting the circuit, thus cutting off the current and further rendering the frame of such equipment harmless.

Considerable research has been undertaken in connection with this recognized hazard in the use of such equipment, but nothing tangible has resulted because of the fact that so much standard equipment in the form of two-wire receptacles is installed in houses, office buildings and other establishments, that it would be economically impracticable to replace these receptacles

by improved receptacles containing a ground connection for use with an attachment plug having a contact electrically connected by a conductor to the metal frame of the equipment or apparatus to be used. In certain instances, such electrical equipment or apparatus has been supplied with attachment plugs having a contact adapted to connect the metal frame of such equipment to ground through the ground connection provided in a receptacle for said plug. The provision of such attachment plugs as standard equipment for such electrical devices presents a further hazard, however, in the event that such equipment is to be used with the conventional type of two-wire receptacles for the reason that the operator must replace the plug with a two-wire plug, and in the event the two-wire plug has one of its contact elements connected to the conductor leading to the metal frame, use of the equipment under such conditions will immediately expose the operator to the live frame of the equipment or apparatus. The practicability of providing three-wire attachment plugs as standard equipment for such electrical apparatus is obtainable only where the said attachment plugs are adapted for use either with the conventional two-wire receptacle or with a three-wire receptacle providing for a ground connection.

It is one of the objects of the present invention to provide an attachment plug of such design and in which the elements are so constructed and arranged and operable with respect to one another that said plug is adapted for use either with two-wire or three-wire receptacles.

Another object of the present invention is to provide a novel attachment plug having a contact element providing for a ground connection to the metal frame of the apparatus with which the same is to be used and which contact member is adapted to be disposed in position for use in connection with a three-wire receptacle, but which can be readily retracted into a position so as not to interfere with the operation of the plug when the same is to be used in connection with a two-wire receptacle.

The present invention has a further object the provision of a contact element normally locked in position for use in a three-wire receptacle to provide for a ground connection to the metal frame of the apparatus with which the same is to be used, but which may be manually released when the plug is to be used with a two-wire receptacle, whereby said contact element is moved into an inoperative position during the time

when the attachment plug is moved into operative association with said two-wire receptacle.

As a further object of the present invention, said contact element is normally urged into its extended position through the medium of a spring which has a capacity slightly in excess of that required to overcome the friction between the contact member and its mounting in the plug, this novel feature of construction being provided to prevent the attachment plug from being forced out of its cooperative relation with a two-wire receptacle, which would otherwise occur were the spring of greater capacity.

As a still further object of the present invention, the attachment plug herein contemplated embodies in its construction a manually controlled plunger normally spring-pressed into a position to interlock with the movable contact member for holding the same in its extended position, and which plunger can be readily manipulated to release the contact member and to permit its retraction where the attachment plug is to be used with the conventional two-wire receptacle.

Other objects, features, capabilities and advantages are comprehended by the invention, as will later appear and as are inherently possessed thereby.

Referring to the drawing:

Figure 1 is a view in elevation of an attachment plug made in accordance with the present invention;

Figure 2 is a plan view of a receptacle which may be used with the attachment plug as shown in Figure 1 of the drawing;

Figure 3 is a view partly in section and partly in plan showing the attachment plug of Figure 1 disposed in its cooperative relation with the receptacle as shown in Figure 2 of the drawing;

Figure 4 is an enlarged sectional view of the attachment plug shown in Figure 1 of the drawing;

Figure 5 is a top plan view of the attachment plug shown in Figures 1 and 4 of the drawing;

Figure 6 is an enlarged fragmentary view in section similar to Figure 4 of the drawing, but showing the movable contact element in its retracted position;

Figure 7 is a view in perspective of the movable contact element made in accordance with the present invention; and

Figure 8 is a view in perspective of the plunger pin which cooperates with the contact blade for controlling its operation.

Referring now more in detail to the drawing, an attachment plug embodying the improvements made in accordance with the present invention is shown as comprising a body member 2 having a recess 4 at one end thereof and a centrally disposed opening 6 therethrough to receive conductors for electrical equipment or apparatus with which the said attachment plug is to be used. Mounted in the recess 4 are the spaced contact elements 8 and 10 formed with blades such as 12 and which are provided with binding posts 14 and 16, respectively, to which the terminal ends of the conductors may be connected in a conventional manner. These contact elements 8 and 10 are fixed in relation to the body member with the blades 12 thereof in substantial parallel relation and may be used in a conventional manner with a two-wire receptacle such as 18 shown at the left in Figure 2 of the drawing.

The present invention is concerned primarily with the provision of an adapter attachment plug

which may be used interchangeably either with a two-wire receptacle such as 18 or a three-wire receptacle such as shown at 20 to the right in Figure 2, which receptacle is provided with an additional opening 22 communicating with a contact or terminal 24 connected through the metal bracket 26 to ground. In order to provide for this additional connection, the attachment plug according to the present invention is formed with an additional contact blade or element 28 movably mounted within an axially disposed recess provided in the body member 2 and in electrical contacting relation with a metal bracket 32 having a binding post 34 to which the terminal end of an additional conductor may be connected. This additional conductor is connected to the metal frame of the apparatus with which this attachment plug is to be used, so that in the event the metal frame becomes charged because of its coming into contact with either one of the conductors connected to the contact elements 8 and 10, this charge may be grounded through the terminal or contact element 24 with which the contact element 28 is in association when the said attachment plug is used with a three-wire receptacle such as 20.

The contact element 28, as shown in the drawing, is urged outwardly by a coil spring 36 mounted in the recess or opening 30 with one end thereof in abutting relation to the end of the said opening and the other end in abutting relation to the shoulders 38 and 40 disposed on opposite sides of the projection 42 which is embraced by the said coil spring. In order that the attachment plug may be effectively used in making a connection with a three-wire receptacle, it is desirable to have the contact element 28 locked in respect to the body member 2 to permit movement of the contact elements into contacting relation with the contacts of the receptacle 20. However, it is also highly desirable, because of the many two-wire receptacles which are now in use, to make this attachment plug adapted for use in connection with such two-wire receptacles. Under these conditions, the contact element 28 cannot be used, and it is necessary to provide for its retraction to permit the contact elements 8 and 10 to be moved into cooperative relation with contacts or terminals of the conventional two-wire receptacle, such as shown at 18.

In order to provide for the use of the attachment plug as above contemplated, the contact element 28 is formed with an axially disposed slot 44 having a relatively narrow part 46 which terminates in an enlarged circular part 48 at one end thereof. Cooperating with this slot is a plunger 50 having a pin 52 disposed transversely with respect to the body member 2 and operable within an opening 54 provided therefor and which communicates with the longitudinal bore or opening 6 of the said body member. This pin 52 is provided with a knob or cap 56 disposed exteriorly of the body member 2, and the said pin is normally urged outwardly by means of a coil spring 58 abutting the knob 56 at one end and the end 60 of the enlarged recess 62. The pin 52 is further formed with an enlarged end 64 which is normally disposed within the enlarged part 48 of the slot 44 to lock the contact element 28 in its extended position with respect to the body member 2. This interlocking relation between the pin and contact element 28 is clearly shown in Figure 4 of the drawing, and when the elements are in cooperative relation as shown in this figure, the attachment plug may be readily

used to effect a connection between the apparatus to which the same is connected and a three-wire receptacle such as 20. This interlocking relation of the contact element 28 and the pin 52 is such as to force the contact member 28 into electrical contacting relation to the terminal 24 when the attachment plug is inserted in operative relation to said receptacle.

On the other hand, where the attachment plug is to be used with a two-wire receptacle such as 18, it is necessary that the contact element 28 be retracted which, in the present illustration of the invention, can be effected by manual manipulation of the plunger 50. By pressing on the knob or cap 56, the pin 52 is moved inwardly to a position whereby a part 66 which is located inwardly and adjacent the enlarged head 64 and which is of less thickness than the enlarged head 64, is disposed in alignment with the slot 46 which permits the contact element 28 to move axially and inwardly into the recess 30 of the body member. This movement will occur automatically when the plunger 50 is pressed upon moving the attachment plug into operative relation with respect to the two-wire receptacle 18.

In order to prevent disengagement of the pin 52 from the body member 2, the bracket 32 is provided with a slot 38 which accommodates the part 66 of reduced thickness, yet serves as an abutment for the enlarged head 64 preventing outward movement of the pin 52.

As another feature of the present invention, the coil spring 36, used for the purpose of urging the contact element 28 outwardly with respect to the body member 2, is of a capacity slightly greater than is required to overcome the frictional resistance of the mounting for the contact element 28 so that there is no force sufficient to cause

a disengagement of the attachment plug when the same is used with a two-wire receptacle such as 18.

While I have herein described and upon the drawing shown an illustrative embodiment of the invention, it is to be understood that the invention is not limited thereto but may comprehend other constructions, arrangements of parts, details and features without departing from the spirit of the invention.

I claim:

1. An electrical attachment plug comprising a body member, spaced contact elements mounted on said body member and adapted for engagement with terminal members of a receptacle to complete an electrical circuit, a contact element movably mounted with respect to said body member adapted for engagement with a terminal member of a receptacle, manually operable means for locking said last-named contact member in position with respect to said body, and a spring normally urging said last-named contact element into extended relation to said body member, said spring being characterized as having a capacity slightly greater than required to overcome the friction between said last-named contact element and its mounting in said body member but insufficient to force the said last-named contact element into operative relation to a terminal member of a receptacle provided therefor, thereby preventing the said attachment being forced out of cooperative relation with a receptacle in which a loose or faulty connection exists between said first-named contact members and their cooperating terminal members for a receptacle.

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