April 9, 1940. T. K. LAURSEN 2,196,313

ELECTRIC CIRCUIT COUPLING

Filed July 13, 1938

Fig. 2.

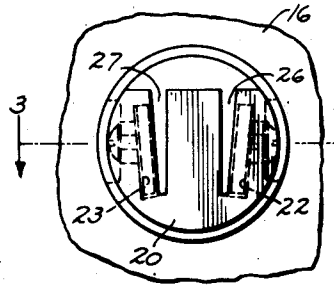


Fig. 1.

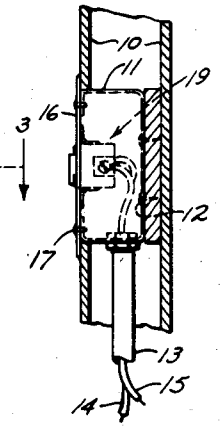


Fig. 4.

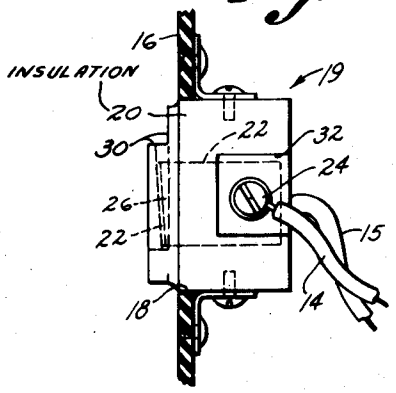


Fig. 5.

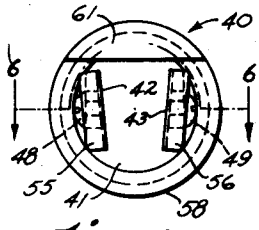


Fig. 10.

Fig. 6.

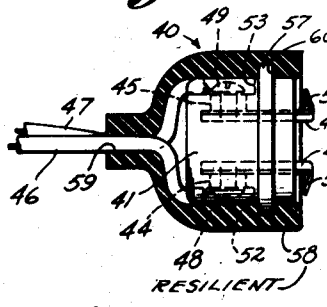


Fig. 3.

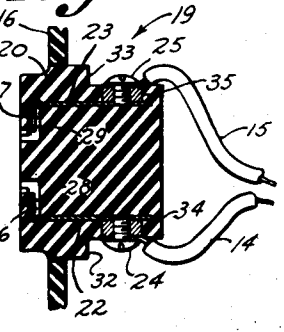
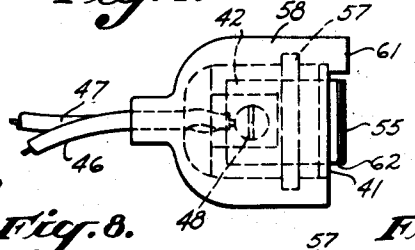


Fig. 7.



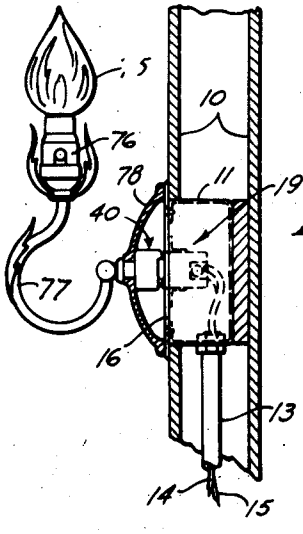


Fig. 8.

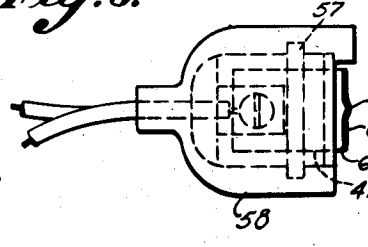
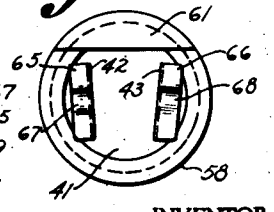


Fig. 9.



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UNITED STATES PATENT OFFICE

2,196,313

ELECTRIC CIRCUIT COUPLING

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Application July 13, 1938, Serial No. 218,975

7 Claims. (Cl. 173—330)

My invention relates to an easily attachable coupling for an electric circuit, by which an electrically conducting connection may conveniently be made to an electric circuit.

An object of my invention is to provide a coupling for electric circuits which is convenient and safe in its operation.

In those couplings now in common use comprising a plug with two prongs and a convenience outlet provided with holes for insertion of the prongs and members connecting with the prongs when the prongs are installed in the holes, it is a common and very annoying experience to inadvertently pull on the cord attached to the plug and have the plug pull out of the outlet and disconnect the circuit. This is generally recognized as a serious defect in this type of coupling.

Accordingly, another object of this invention is to provide a coupling which cannot be disconnected by pulling apart the two cooperating members thereof.

It is also a matter of common experience that in the use of prong type couplings, as above described, one must orient the plug in the proper direction and exactly locate the holes in the outlet before the plug can be inserted, and this is a very difficult operation to perform without visual aid, as must be done when the plug is to be inserted in darkness. It is an object of my invention, therefore, to provide a coupling which is easy to connect without visual aid and which can readily be connected in the dark.

Another object of the invention is to provide a coupling that will support a vertical load without disconnection. This adapts my coupling to use in the combined support and electrical connection of fixtures and electrical appliances, and it is an object of my invention to provide for such use.

Still another object of my invention is to provide a coupling for electric circuits comprising members that are easily and cheaply constructed, which are of long life, but are easily replaced.

These and other apparent objects I attain in a manner that will be clear from consideration of the following description taken in connection with the accompanying drawing, of which:

Fig. 1 is a sectional view through a wall in which the female member of my coupling is installed.

Fig. 2 is a front view of the member of my coupling shown in Fig. 1.

Fig. 3 is a sectional view of the member of my coupling shown in Fig. 2 taken along the line 3—3 as indicated.

Fig. 4 is a side view of the female member of my coupling.

Fig. 5 is an end view of the male member of my coupling.

Fig. 6 is a sectional view of the member shown in Fig. 5, taken along the line 6—6 as indicated.

Fig. 7 is a side view of the male member of my coupling.

Fig. 8 is a side view of an alternative form of the male member of my coupling.

Fig. 9 is an end view of the male member of my coupling shown in Fig. 8.

Fig. 10 is a sectional view through a wall on which one form of my coupling is employed to support and electrically connect a lamp.

My invention is illustrated as applied to a wall outlet, the wall being designated by the numeral 10. The outlet box 11 is secured in the wall 10 by suitable means such as screws 12 and has a conduit 13 connected thereto through which pass the live conductors 14 and 15 for supplying electric power to the outlet. The outlet box 11 is preferably mounted flush with the surface of wall 10 and is covered by a cover plate 16 secured thereto by screws 17 and provided with a hole 18. Attached to the cover plate 16 within the box 11 and projecting out through the hole 18 is the female member 19 of my coupling.

The member 19 comprises a body 20 preferably molded in one piece of electrical insulating material, such as synthetic resin or rubber, with molded inserts in the form of contact elements 22 and 23 to which conductors 14 and 15 are connected by screws 24 and 25, respectively. The front part of member 19 which projects through the plate 16 is preferably formed with two right-angular slots 26 and 27 preferably extending in a general vertical direction and which are closed at the bottom but open at the top and at the front face. At the front face the outer sides of the slots are preferably disposed angularly relative to one another so as to approach one another as they proceed from top to bottom, while the inner sides of the slots are preferably parallel to one another. The contact elements 22 and 23 are preferably flat metal strips angularly disposed so as to be closer together at the bottom than at the top and which are bent at right angles to form contact surfaces 28 and 29 preferably lying closely along the forward walls of slots 26 and 27, respectively, approximately parallel to the face of member 19. The outer walls of slots 26 and 27 are preferably formed by the

contact elements 22 and 23 and are angularly disposed as above described. Slots 26 and 27 are tapered from top to bottom, as seen best in Fig. 4, so that the distance between the contact surfaces 28 and 29 and the backs of the slots is less at the bottom than at the top of the slots. The front face of body 20 is preferably cut back along a horizontal line to the backs of slots 26 and 27, as indicated at 30, and the sides of body 20 are recessed at 32 and 33 to accommodate the conductors 14 and 15, and screws 24 and 25. The screws 24 and 25 are threaded into terminal blocks 34 and 35 which are joined, as by welding, to contact elements 22 and 23.

The male member of my coupling, designated generally by numeral 40, has a body portion 41 preferably molded in one piece of electrical insulating material such as synthetic resin material or rubber with metal inserts 42 and 43 forming contact elements extending from the body 41 in an axial direction. The contact elements 42 and 43 have joined to them, as by welding, terminal blocks 44 and 45, respectively, and conductors 46 and 47 are connected to the terminals 44 and 45 by screws 48 and 49, respectively, which are threaded therein. The body 41 is recessed at 52 and 53 to accommodate the screws 48 and 49, and conductors 46 and 47, respectively. The contact elements 42 and 43 are preferably flat strips of resilient metal such as bronze which are preferably although not necessarily disposed angularly relative to one another at the same angles as contact elements 22 and 23, being closer at the bottom than at the top, as seen best in Fig. 4. At their ends the contact elements 42 and 43 are preferably bent through somewhat more than a right angle to form contact flanges 55 and 56 directed outwardly and slightly back toward the body of the member 40. The shape and dimensions of contact elements 42 and 43 are such that they may be inserted in the slots 26 and 27 of member 19 and when so inserted the flanges 55 and 56 rest in spring contact with the contact surfaces 28 and 29 and with the backs of slots 26 and 27. The outer edges of flanges 55 and 56 are preferably angularly disposed relative to one another at angles corresponding to the outer walls of the slots, in engagement with which they preferably rest in the coupled relation of members 40 and 19. The lower edges of flanges 55 and 56 are preferably rounded as at 62 to permit the easy insertion of the flanges into the slots of member 19. The body 40 is preferably formed with an annular protuberance 57 near its forward end. Enclosing the body 41 of the member 40 is the housing 58 preferably of rubber or other resilient electrical insulating material. The housing 58 has a hole 59 at one end to permit the conductors 46 and 47 to pass through, snugly fits the exterior surface of body 41, has an annular groove 60 adapted to accommodate the annular protuberance 57, and projects beyond the face of body 41 a sufficient distance to result in the housing 58 engaging the face of body 20 of member 19 when members 40 and 19 are coupled. The housing 58 at its top and forward edge, at 61, projects beyond the flanges 55 and 56 a sufficient distance to fill the space left at 30 in the body 20 when the members 40 and 19 are coupled, thus completely covering the connecting contact elements. The conductors 46 and 47 are attached to the contact elements before housing 58 is installed on member 40. The resilient housing 58 may then be slipped over the protuberance 57 and over the forward edge of the body 41 into the position shown in the drawing.

In bringing the members of my coupling into coupled relation, the member 40 is positioned facing member 19, but above it, with the projecting portion 61 at the top, the contact elements 42 and 43 are led into the open tops of slots 26 and 27, and member 40 is forced downward as far as it will go. In this position the angularly disposed side edges of flanges 55 and 56 preferably abut the outer walls of the slots which in this case are formed by the contact elements 22 and 23, and the member 40 lies directly opposite the member 19. Since flanges 55 and 56 engage both the contact surfaces 28 and 29, respectively, and the backs of slots 26 and 27, respectively, the flanges 55 and 56 will be deflected as they are pushed downward in the tapering slots 26 and 27 and will be forced into close resilient contact with the contact surfaces 28 and 29, thus assuring good electrical connections between the conductors 14 and 15 and conductors 46 and 47, respectively. The tightness with which the flanges 55 and 56 press against the adjacent surfaces results in a great frictional force which tends to prevent accidental removal of the member 40, and also assures an efficient wiping and cleaning action on the contact elements during coupling and uncoupling.

It will be observed that there are several circumstances which make it easy to insert member 40 into member 19 without visual aid. The fact that the body 20 of the member 19 projects slightly from the surface of plate 16 makes it easy to locate. The presence of projecting portion 61 on member 40 makes it easy to find the top of this member. Finally, since the flanges 55 and 56 are of considerable extent and the tops of the slots are relatively wide, it is easy to hook these flanges into the slots in member 19 and guide the member 40 into coupled position.

It is apparent that when the members 40 and 19 are coupled no direct outward pull on the conductors 46 and 47 or on the member 40 can separate the two members but that they can only be separated by an upward pull on member 40. This is a feature of great merit which adapts my coupling to various uses not permissible with the prong type coupling.

In Figs. 8 and 9 are illustrated an alternative form of my member 40 which differs from the form shown in Figs. 5, 6, and 7 only in the shape of the contact flanges of the elements 42 and 43. In this form the contact elements 42 and 43 are preferably bent outward at right angles to form contact flanges 65 and 66 which are adapted to fit into slots 26 and 27 of member 19. In order to assure tight contact of flanges 65 and 66 with contact surfaces 28 and 29, I form a transverse wave in each of the flanges 65 and 66 to result in portions 67 and 68 projecting forwardly beyond the plane of the flanges. The lower edges of flanges 65 and 66 are preferably rounded as at 69 to permit easy insertion into the slots of member 19. It is evident that when this form of the member 40 is coupled with the member 19, the projecting portions 67 and 68 engage the backs of slots 26 and 27, respectively, and result in tight resilient contact of the flanges 65 and 66 with the contact surfaces 28 and 29.

Since my coupling is not disconnected by an outward pull and is capable of supporting a vertical load, I may employ it, as illustrated in Fig. 10, to support and connect an electric fixture or an electrical appliance. In Fig. 10, I show a lamp 75

in a socket 76 supported on a tubular bracket 77 which is secured to the male member 40 of my coupling. An artistic base element 78 may be attached to the combined structure to cover the coupling and outlet box and to provide additional support against bending, and for this purpose it is preferable that the base 78 be so dimensioned as to lie flat against the cover plate 16 or against the surface of the wall 10. The conductors connecting with the contact elements 42 and 43 pass through the tubular bracket 77 and connect wtih the socket 76. By use of such a structure as that illustrated, it is easy to install or remove a fixture without connecting or disconnecting any conductors as this function is performed by the coupling; and it is not necessary to place or remove any screws or other devices for attaching the fixture to the wall, as this function is also performed by the coupling. Thus, it becomes very simple to install or remove a fixture and, indeed, fixtures may be changed as easily as light bulbs.

Other electrically operated devices may also be so connected and supported by means of my coupling. For example, clocks, fans, radios, or other appliances may be attached to one member of my coupling and be supported and connected to an electric circuit by coupling this member to a companion member, as shown. My coupling also may advantageously be applied to couple electrically conducting cords and cables, having the advantage that the coupling cannot be separated by pulling on the cords.

It is understood that various changes and modifications in design and construction from the embodiments disclosed herein may be made by those skilled in the art without departing from the spirit and scope of the appended claims.

I claim as my invention:

1. An electric circuit coupling comprising: a member having two slots disposed transversely to the axis of said coupling and on opposite sides of said axis, said slots being open at one end and closed at the other end and extending in the same general linear direction from open to closed ends; two contact elements in said member, each of said contact elements providing a contact surface forming a wall of one of said slots which approaches the opposite wall as it proceeds from the open end of said slot toward the closed end thereof in such manner as to provide a wedge shape to each of said slots; a second coupling member; two contact elements extending in an axial direction from said second member and flanged transversely to provide contact flanges, said contact flanges being adapted to enter the open ends of said slots and, upon bringing said members into coupled relation, to be wedged between said contact surfaces and the opposite walls of said slots.

2. An electric circuit coupling comprising: a member having two slots disposed transversely to the axis of said coupling, said slots being open at one end; a contact element in each of said slots forming the outer and forward walls thereof, those portions of said contact elements forming said outer walls being disposed angularly relative to one another so as to lie farther apart at the open end of said slots; a second coupling member; two contact elements extending in an axial direction from said second member and carrying outwardly directed contact flanges having outer edges angularly disposed relative to one another at substantially the same angles as said portions of said contact elements of said first member forming said outer walls of said slots; said contact flanges being adapted to enter the open ends of said slots and, when said members are in coupled relation, to lie in said slots in contact with said contact elements of said first member at both the outer and forward walls of said slots, in such manner that engagement of said contact flanges with said outer walls limits the travel of said contact flanges into said slots and prevents relative rotation of said members.

3. An electric circuit coupling comprising: a member having two contact elements extending in an axial direction and flanged transversely to provide two contact flanges extending in directions opposite to one another, said contact elements providing plane surfaces angularly disposed relative to one another; a second member having two open ended slots to receive said contact flanges, said slots extending in the same general direction from their open ends and providing walls disposed at substantially the same angles as said angularly disposed plane surfaces and acting by engagement with said surfaces to limit the travel of said contact flanges into said slots and to prevent relative rotation of said members; and contact elements in said slots adapted to contact with said contact flanges in the coupled relation of said members.

4. An electric circuit coupling comprising: a member having two slots disposed transversely to the axis of said coupling and in communication with the face of said member, said slots being open at one end and closed at the other end and extending in the same general direction from open to closed ends; a contact element in each of said slots providing a contact surface forming a wall of said slots which approaches the opposite wall as it proceeds from the open end of said slot toward the closed end thereof; a second coupling member adapted, when said members are in coupled relation, to lie adjacent said face of said first member; and two contact elements extending from said second member and flanged transversely to provide contact flanges, said contact elements of said second member providing surfaces angularly disposed relative to one another; said contact flanges being adapted, when said members are in coupled relation, to lie in said slots wedged between said contact surfaces and the opposite walls of said slots; said slots providing walls disposed at substantially the same angles as said angularly disposed surfaces and acting by engagement with said angularly disposed surfaces to limit the travel of said contact flanges into said slots and to prevent relative rotation of said members.

5. An electric circuit coupling comprising: a member having two slots disposed transversely to the axis of said coupling on opposite sides of said axis and in communication with the face of said member, said slots being open at one end and closed at the other end and extending in the same general linear direction from open to closed ends; a contact element in each of said slots providing a contact surface forming a wall of said slot which approaches the opposite wall as it proceeds from the open end of said slot toward the closed end thereof; a second coupling member adapted, when said members are in coupled relation, to lie adjacent said face of said first member; and two contact elements of resilient metal extending from said second member and flanged transversely to provide contact flanges; each of said contact flanges being

adapted, when said members are in coupled relation, to lie in one of said slots and each being deformed in an axial direction into such a shape that in bringing said members into coupled relation a portion of each of said contact flanges engages the contact surface in its respective slot and another portion of said contact flange engages the opposite wall of said slot and said contact flanges are deflected by reason of said engagement and are thereby held in resilient contact with said contact surfaces.

6. An electric circuit coupling comprising: a member adapted to be mounted in a wall and having two slots therein, said slots being disposed in a general vertical direction and being open at the top; a contact element in each of said slots providing a contact surface forming a wall of said slot which approaches the opposite wall as it proceeds from top to bottom; a second coupling member adapted, when said members are in coupled relation, to lie adjacent to the face of said first member; two contact elements of resilient metal extending from said second member and flanged transversely to provide contact flanges, said contact elements of said second member providing plane surfaces angularly disposed relative to one another; each of said contact flanges being adapted, when said members are in coupled relation, to lie in one of said slots and each being so shaped as to have a portion engaging the contact surface within said slot and another portion engaging the opposite wall of said slot, whereby said contact flanges are deflected by reason of said engagement and are thereby held in resilient contact with said contact surfaces; said slots providing walls acting by engagement with said angularly disposed surfaces to limit the travel of said contact flanges into said slots and thereby support said second member non-rotatably on said first member in the coupled relation of said members.

7. An electric circuit coupling comprising: a member having two flat strips extending in an axial direction and flanged transversely to provide contact flanges, said strips being disposed at an angle relative to one another so as to lie closer to one another at the bottom than at the top; a second member having two slots open at their tops to receive said contact flanges, said slots extending in the same general direction from their open ends and providing side walls disposed at substantially the same angles as said strips so as to lie closer to one another at the bottom than at the top, said walls being adapted to engage the outer sides of said strips to limit the travel of said contact flanges into said slots in the operative relation of said members; and contact elements in said slots adapted to contact with said contact flanges in the operative relation of said members.

THORVALD K. LAURSEN.