Jan. 1, 1952 J. R. JOYCE 2,581,024

ELECTRICAL DEVICE AND TERMINAL THEREFOR

Filed Feb. 17, 1948 2 SHEETS—SHEET 1

Fig. 1.

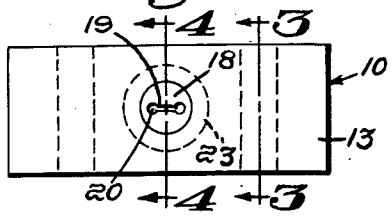


Fig. 2.

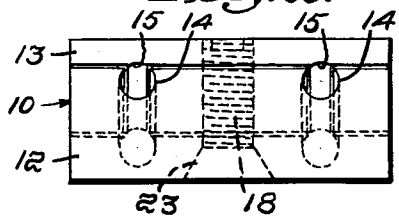


Fig. 3.

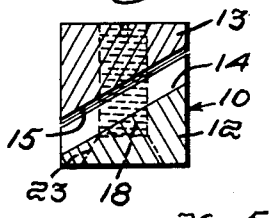


Fig. 4.

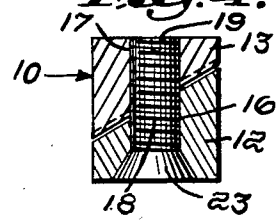


Fig. 5.

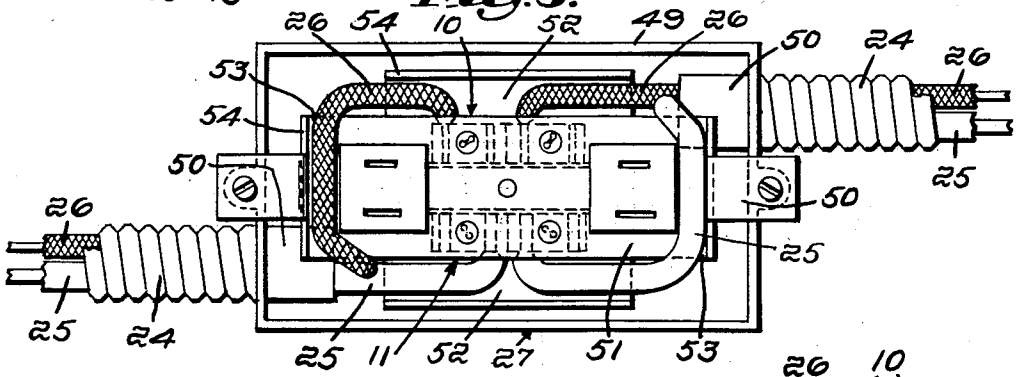
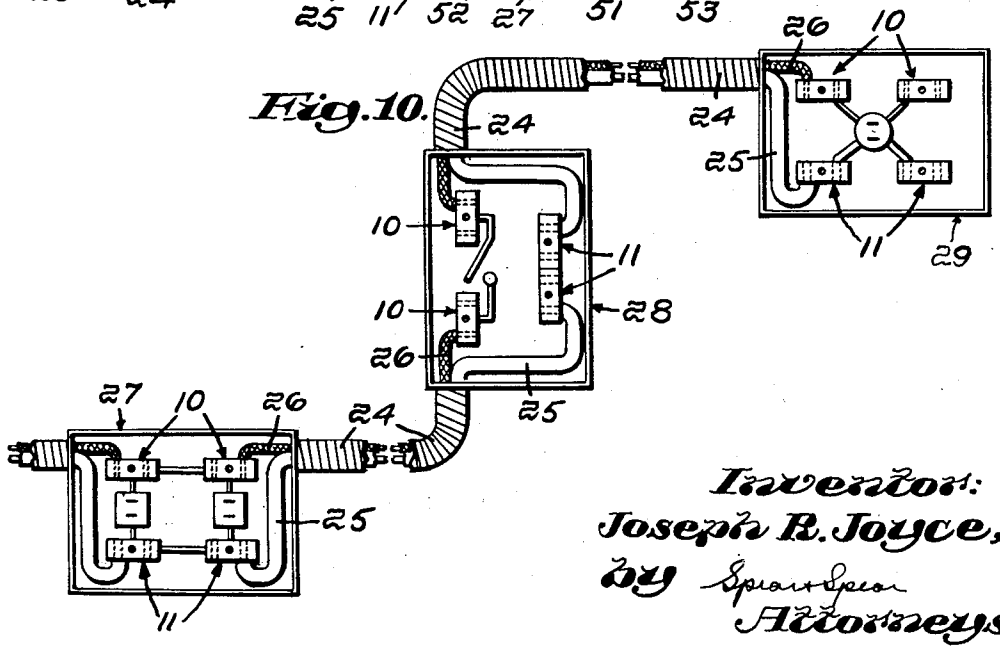


Fig. 10.



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Fig. 6.

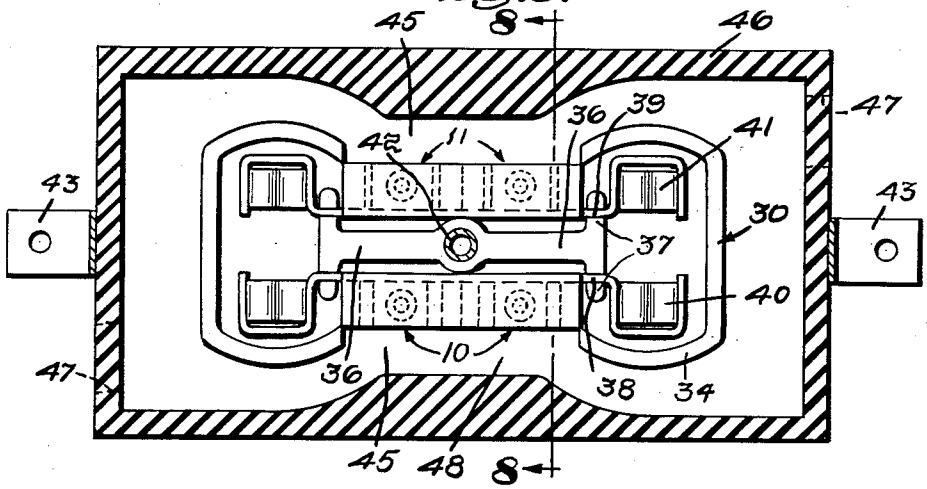


Fig. 7.

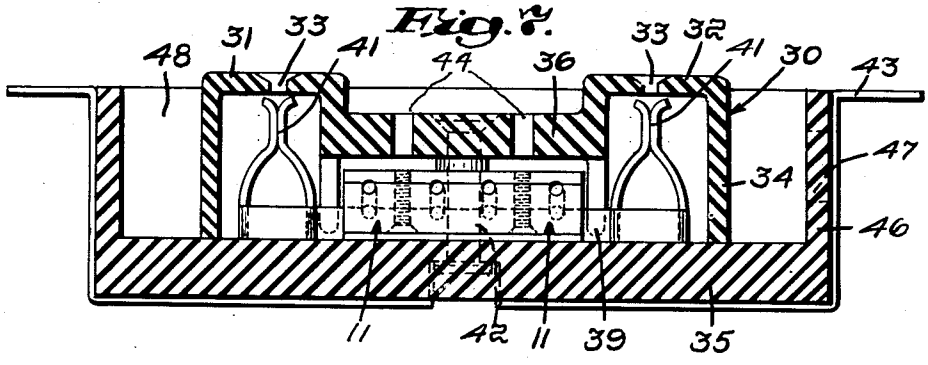


Fig. 8.

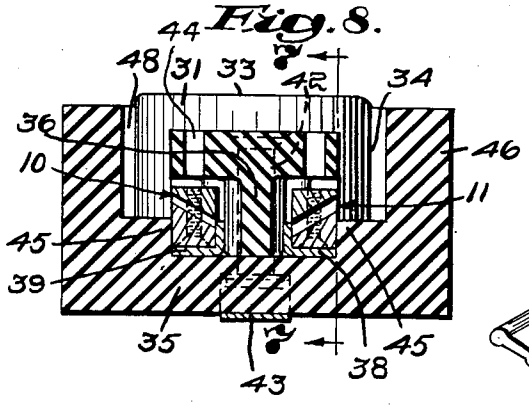
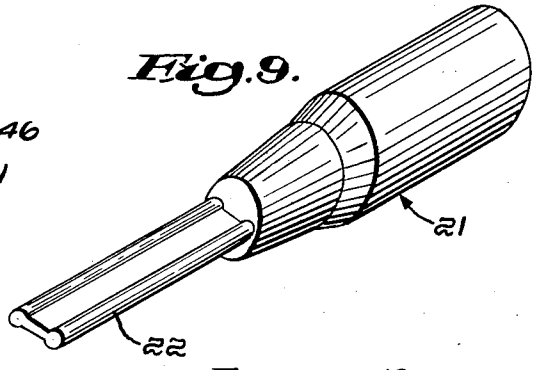


Fig. 9.



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ELECTRICAL DEVICE AND TERMINAL THEREFOR

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Application February 17, 1948, Serial No. 8,896

8 Claims. (Cl. 174—53)

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My present invention relates to equipment for use in a wiring system and particularly to terminals which will require different sized ground and live wires thereby to polarize the system.

It is widely known that a large number of fires and accidents are caused by defective wiring. The defects of such wiring systems may be due to faulty equipment or they may be attributable to improper installation or service by unqualified persons.

Attempts have been made to ensure that wiring may be installed or repaired without error and the practice of employing live and ground wires of different colors is widespread. A major objection to color polarizing wiring systems is that it is possible to connect a wire to the wrong terminal with the result that, altogether too commonly, the wires are swapped to clear a ground in the live wire, for example.

In accordance with my invention, I provide terminals which require the use of a ground wire of a different size than the live wire. Each terminal accepts only a correctly sized wire and makes impossible its use with a wire of smaller or larger size.

Each terminal comprises first and second sections having faces disposable in mutual contact when they are assembled to establish the terminal. Each face preferably has two channels so disposed that on assembly the channels of one section register with the channels of the other section to provide passages extending from end to end of the terminal. The passages of each terminal are both dimensioned to receive a wire of predetermined size so that a smaller wire inserted into a passage can not be clamped between the sections and one of the channels that establishes each passage of the terminal is of such cross-sectional size and shape that it embraces the major portion of the periphery of wire of that predetermined size thereby to make it impossible to insert therein a wire of larger size.

The equipment used in a circuit includes by way of example, but not by way of limitation, a switch, receptacle, or outlet devices and in accordance with my invention, the terminals for both the live and ground wires are so incorporated in such devices that tampering with them is impossible. To accomplish this result, I form each of the sections of each terminal with a connecting passage extending from top to bottom thereof and so disposed that the connecting passages register in the assembled terminal. A connecting element extends freely through the connecting passage of the first section and is

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threaded into the connecting passage of the second section and has its exposed extremity formed with a kerf to enable the element to be rotated to cause the terminal to clamp or unclamp wires of the correct size between the sections.

In accordance with my invention, I mount the terminals in any one of the devices so that while the extremities of their connecting elements are exposed to enable them to be rotated sufficiently to clamp the sections together or to enable them to be unclamped, the sections may be separated only to a limited extent. While the mounting of the terminals may be accomplished in any desired manner, I prefer that they be so incorporated in the various devices that they cannot be transposed without so damaging the devices that they cannot be used.

In accordance with my invention, I am able to provide many advantages among which may be noted that it enables a circuit to be easily inspected and ensures that it is properly polarized and in the accompanying drawings I have shown illustrative embodiments of it from which these and other of its novel features and advantages will be readily apparent.

In the drawings:

Fig. 1 is a top plan view of a terminal in accordance with my invention.

Fig. 2 shows the terminal of Fig. 1 in front end view.

Figs. 3 and 4 are sections along the lines 3—3, and 4—4, respectively, of Fig. 1.

Fig. 5 is a top plan view of a duplex receptacle mounted in a wall box.

Fig. 6 is a horizontal section looking upwardly through another duplex receptacle in accordance with my invention.

Fig. 7 is a section along the lines 7—7 of Fig. 8.

Fig. 8 is a section along the lines 8—8 of Fig. 6.

Fig. 9 is a view, in perspective, of a screw driver for use in clamping the terminal sections together or in unclamping them, and

Fig. 10 is a schematic view of an electric circuit including various electrical devices in accordance with my invention.

In the illustrative embodiments of my invention shown in the drawings, I have indicated the terminals generally at 10 and 11. As the terminals 10 and 11 are substantially identical in construction, reference is made to Figs. 1–4 in which I have detailed the construction of the terminal 10.

In Figs. 1–4, I have shown a terminal consisting of a first section 12 and a second section 13 with their faces that are disposed in mutual con-

tact on the assembly of the terminal being preferably inclined downwardly with reference to the bottom surface of the section 12 and the upper surface of the section 13 toward the rear end of the terminal.

The inclined face of the section 12 is shown as having a pair of channels 14 disposed so that each may register with one of the channels 15 in the inclined face of the section 13 thereby to establish on the assembly of the sections a pair of downwardly and rearwardly inclined passages extending from end to end of the terminal. Both of the thus established passages of such a terminal are dimensioned to receive a wire of a predetermined size so that it may be securely locked therein when the terminal sections are clamped together. A wire of smaller size, in either of those passages, obviously cannot be clamped between the sections and I have shown (see Fig. 2) the channels 14 of the section 12 as being of such cross sectional size and shape that they embrace a major portion of the periphery of a wire of the right size thereby to prevent a wire of larger size from being inserted therein.

In order that the sections 12 and 13 may be clamped together or unclamped, I provide them with connecting passages 16 and 17, respectively, extending from top to bottom thereof and located between the channels. The passages 16 and 17 are disposed to register with each other when the sections are assembled thereby to receive the connecting element which is preferably in the form of a bolt 18 which extends upwardly freely through the connecting passage 16 of the first section 12 and is threaded into the connecting passage 17 of the second section 13. The extremity of the bolt 18 has a kerf 19 to enable it to be rotated in one direction or the other to enable a wire or wires of the right size to be clamped between the sections of that terminal or released therefrom.

In practice, I prefer that the kerf 19 be enlarged at each of its extremities as at 20 (see Fig. 1) and to use a screw driver 21 (see Fig. 9), the blade 22 of which is of the same cross sectional size and shape as the kerf for a substantial length as this minimizes the possibility of the kerf becoming "chewed up" and provides a screw driver that may be easily and accurately dressed.

I also prefer that the head 23 of the bolt 18 be formed without a kerf and that the threaded connection between the bolt 18 and the second section 13 be left-handed as considered from the head end of the bolt so that from its exposed extremity the bolt 18 may be operated as a conventional right hand thread.

The terminals 10 and 11 are identical except that the passages of the terminal 10 are smaller than those of the terminal 11 so that in order that both may be used, the live wire of a circuit must be of a different size than the ground wire, and, in practice, I prefer that the ground wire be the larger thereby to provide a greater margin of safety against accidental parting of the grounded wire. As illustrative of such an electric conductor, I have shown a BX cable 24 with the ground or neutral wire being indicated at 25 and the live wire indicated at 26.

Terminals in accordance with my invention may be employed anywhere in a wiring system, the ground and live wires of which are of different sizes, where corresponding ends of such wires are to be connected together or to the contacts of various electrical devices and I have shown in Fig. 10, by way of illustration, a circuit including a receptacle generally indicated at 27, a switch generally indicated at 28, and an outlet generally indicated at 29. These are shown as including terminals 10 in which live wires 26 are clamped and terminals 11 in which ground wires 25 are clamped.

As illustrative of these devices, I have shown in Figs. 5–8, duplex receptacles in accordance with my invention. Such a receptacle is detailed in Figs. 6–8 and it will be noted that the novel features and advantages that my invention affords may be readily incorporated in a receptacle without departing from manufacturing procedures followed in the manufacture of conventional receptacles.

In Figs. 6–8, I have indicated a molded body 30 having adjacent its ends raised portions 31 and 32 each of which has a pair of slots 33 disposed to receive the contact engaging prongs of a conventional plug, not shown. Except for the zone intermediate such end portions, the body 30 has side walls 34 engageable with the upper surface of the base 35 and in that zone the body is formed with a partition 36 having adjacent its ends, ribs 37 formed to provide pockets for the conductor strips 38 and 39, which may conveniently be L-shaped in cross section. The strips 38 and 39 have at each of their ends, contacts 40 and 41, respectively, adapted to be frictionally engaged by the prongs of a seated plug. The strips and their contacts are properly positioned when seated in the pockets of the ribs 37 and the body 30 and base 35 are locked together as by a rivet 42 or the like which preferably is interiorly threaded to receive the usual screw by which the cover plate of the receptacle is attached. As these are conventional, neither the cover plate nor its attaching screw is shown in the drawings. Where the receptacle is to be mounted in a wall box, it is provided with a carriage 43 and this may conveniently also be locked to the base 35 by the rivet 42.

The zone between the end portions 31 and 32 is dimensioned to receive, in the illustrative embodiment of Figs. 6–8, a pair of terminals on each side of the partition 36 and these are secured in any suitable way to the conductor strips so that on the assembly of the device, the terminals become an unremovable part thereof. As will be apparent from Fig. 7, the distance between the base 35 and the body 30 in its intermediate zone is slightly greater than the height of the terminals when clamped together and each terminal is disposed with the upper end of its connecting element 18 accessible through a hole 44 in the body 30. By this construction, the upper terminal section can be raised to a limited extent only without breaking the body 30.

The base 35 is preferably of larger area than the body 30 and has side portions 45 extending upwardly substantially to the exposed outer ends of the passages of the terminals as may be best seen in Fig. 8. The base 35 has a marginal wall 46 extending upwardly to intersect the axes of such passages thereby to make it impossible to ream them out without breaking the base 35. The base wall 46 has at least one aperture 47 in each end to receive the cable 24 and it defines with the body 30 channels 48 for the cable wires.

In Fig. 5, the duplex receptacle 27 follows, in general, the construction of the receptacle of Figs. 6–8. In Fig. 5, however, I have shown the receptacle as mounted in a wall box 49 having cable clamps 50. While the box 49 is conventional in construction, I prefer that it and the

receptacle or other device to be mounted therein be proportioned so that a receptacle which does not compel accurate polarization cannot be used therein. The body of the receptacle of Fig. 5 is indicated at 51 and its base is shown as having side projections 52 and end projections 53 each of which terminates in a wall 54, which walls define with the body 51 channels for the ground and live wires. Preferably, the side projections serve as a retaining wall for the terminals in the same manner as the portions 45 of the receptacle of Figs. 6–8 and the walls 54 are of sufficient height to prevent the reaming out of the terminal passages.

From the foregoing, it will be apparent that my invention makes possible the polarizing of electrical circuits having ground and live wires of different sizes by making it impossible to connect the wrong wires to the terminals of devices in such circuits and, at the same time, provides electrical devices which cannot be tampered with while enabling the terminal sections to be easily and inexpensively incorporated therein.

What I therefore claim and desire to secure by Letters Patent is:

1. An electrical device for use in an electric circuit having ground and live wires, one of which is of greater cross sectional area than the other, said device comprising a pair of conductor strips each of which has at least one contact, at least one terminal for each of said strips, each of said terminals comprising a first section secured to a strip and a second section, said sections having faces disposable in mutual contact, one of said faces having at least one channel disposed to establish a passage through the terminal when said sections are assembled, the channels being of such cross sectional size and shape as to embrace a major portion of the periphery of a predetermined one of said wires thereby to exclude the larger wire if the predetermined wire is the smaller of the two and to receive the smaller wire loosely if the predetermined wire is the larger of the two, and the other section having a clamping engagement with the exposed portion of said predetermined wire when the terminal sections are assembled and clamped together, and said sections each having a connecting passage extending from top to bottom thereof, said connecting passages registering when the terminal is assembled, and a headed element extending freely through the passage in the first section of the terminal and being threaded into the connecting passage of the second section thereof and having a kerf in its upper end, and an electrically insulated casing housing and supporting each contact strip and its terminal in spaced relation to the other strip and its terminal with the wire receiving passages of the terminals laterally exposed, said casing including a portion spaced slightly above the top of each second terminal section to hold said terminals therein and apertured to permit access to the kerfed end of each connecting element.

2. The device of claim 1 in which the casing includes a base and side portions which constitute retaining walls for the first sections of the terminals.

3. The device of claim 1 in which the mutually contacting faces of the terminal sections are downwardly inclined towards the rear ends thereof and the casing includes sides portions extending upwardly from adjacent the bottom thereof substantially to the channels of the first terminal sections.

4. An electrical device for use in an electric circuit having ground and live wires one of which is of greater cross sectional area than the other, said device comprising a pair of conductor strips each of which has at least one contact, at least one terminal for each of said strips, each of said terminals comprising a first section secured to a strip and a second section, said sections having faces disposable in mutual contact, one of said faces having at least one channel disposed when the sections are assembled to establish a passage through the terminal the channels of said sections being of such cross sections being of such cross sectional size and shape as to embrace a major portion of the periphery of a predetermined one of said wires thereby to exclude the larger wire if the predetermined wire is the smaller of the two and to receive the smaller wire loosely if the predetermined wire is the larger of the two, and the other section having a clamping engagement with the exposed portion of said predetermined wire when the terminal sections are clamped together, and said sections each having a connecting passage extending from top to bottom thereof, said connecting passages registering when the terminal is assembled, and a headed element extending freely through the passage in the first section of the terminal and being threaded into the connecting passage of the second section thereof and having a kerf in its upper end, and an electrically insulated casing housing and supporting each contact strip and its terminal in spaced relation to the other strip and its terminal with the wire receiving passages of the terminals laterally exposed, said casing comprising a base, a top, and means interconnecting said base and top, said top being spaced slightly above the top of each second terminal section and apertured to permit access to the kerfed end of each connecting element, and said base including marginal portions extending upwardly in the zones where the terminals are exposed substantially to the channels of the first terminal sections.

5. The device of claim 4 in which the marginal portions terminate in walls extending upwardly in spaced relation to the sides of the casing to define therewith channels.

6. The device of claim 4 in which there are marginal portions adjacent each end of the base and all of the marginal portions extend upwardly in spaced relation to the casing to define channels therewith.

7. An electrical device for use in an electric circuit having ground and live wires one of which is of greater cross sectional area than the other, said device comprising a pair of conductor strips each of which has at least one contact, at least one terminal for each of said strips, each of said terminals comprising a first section secured to a strip and a second section, said sections having faces disposable in mutual contact downwardly inclined to the rear ends thereof, one of said faces having at least one channel disposed to establish a passage through the terminal when the terminals are assembled, the channels being of such cross sectional size and shape as to embrace a major portion of the periphery of a predetermined one of said wires thereby to exclude a larger wire if the predetermined wire is the smaller of the two and to receive the smaller wire loosely if the predetermined wire

is the larger of the two, and the other section having a clamping engagement with the exposed portion of said predetermined wire when the terminal sections are clamped together, and said sections each having a connecting passage extending from top to bottom thereof, said connecting passages registering when the terminal is assembled, and a headed element extending freely through the passage in the first section of the terminal and being threaded into the connecting passage of the second section thereof and having a kerf in its upper end, and an electrically insulated casing housing and supporting each contact strip and its terminal in spaced relation to the other strip and in its terminal with the wire receiving passages of the terminals laterally exposed, said casing including a base, a top connected thereto, said top being spaced slightly above the top of each second terminal section and apertured to permit access to the kerfed end of each connecting element, and said base including marginal portions extending upwardly in the zones where the terminals are exposed to block access to their first sections below their channels and the walls of said casing being of sufficient height to intersect the axes of the wire receiving passages of the terminals but being spaced therefrom to enable wires to be inserted therein.

8. A terminal for use with wiring having at least two wires, one of which is a live wire and one of which is a ground wire, one of said wires being of greater cross sectional area than the other, said terminal comprising first and second sections having faces disposable in mutual contact, and means clamping said sections together, one of said faces having a pair of channels, one of which is of such cross sectional size and shape as to embrace the major portion of the larger wire and to receive freely the smaller wire, and the other of which is of such cross sectional shape as to embrace the major portion of the smaller wire and to exclude the larger wire, the other face having a pair of channels disposed to register with said first named channel pair and each being of substantially the size and shape to embrace a minor portion of the wire in the channel of the first named pair with which it registers thereby to clamp said wire against endwise movement.

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