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3,018,461

WIRING DEVICE

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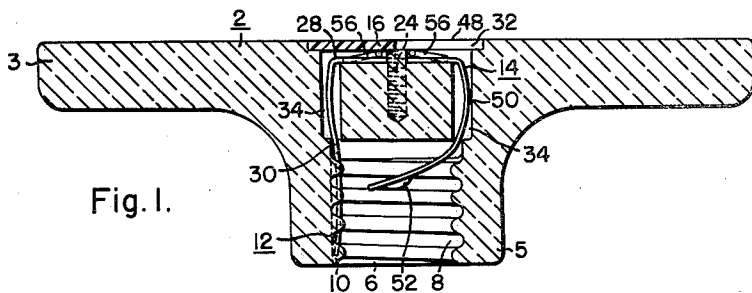


Fig. 1.

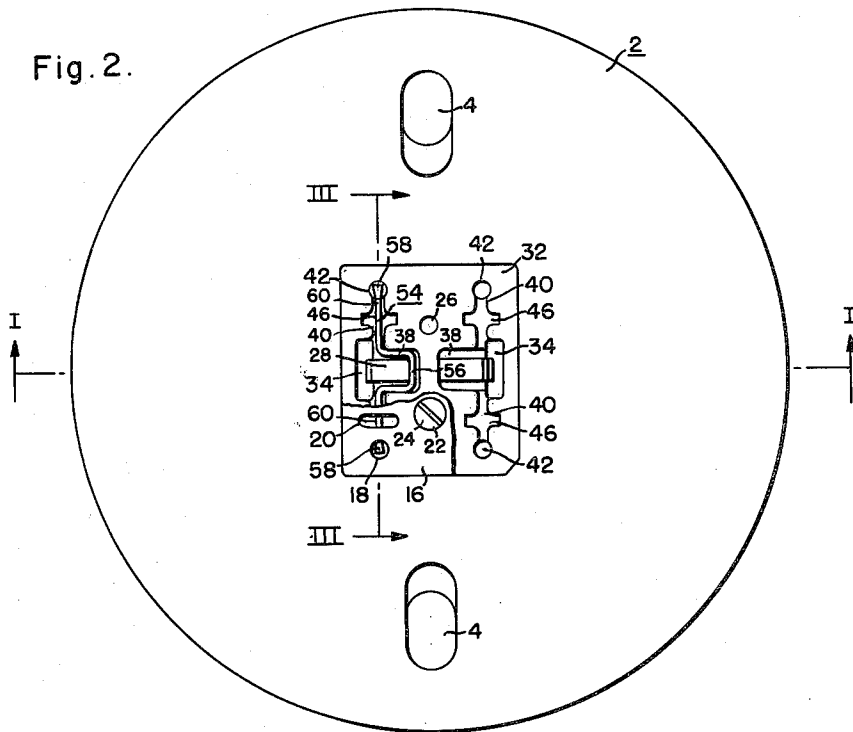


Fig. 2.

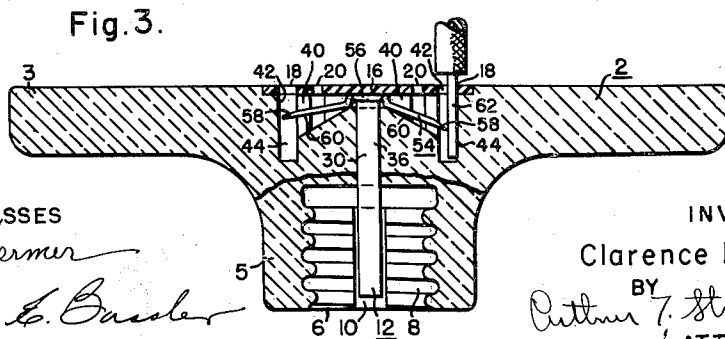


Fig. 3.

WITNESSES
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3,018,461 WIRING DEVICE

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11 Claims. (Cl. 339-95)

This invention relates to wiring devices such as plug receptacles, switches, lamp holders, and the like, and more particularly to the electrical connecting and conducting means therein.

In the past, such wiring devices have been constructed with screwless terminal connections in which the electric circuits thereof comprised pieces complex in form leading to high production costs and difficulty in assembly. The screwless terminal devices which form my invention are quite simple in structure and necessitate a minimum of parts for the electrical conducting circuits therein. All such parts of the electrical circuit are simple in design and thereby necessitate a minimum of manufacturing steps for their fabrication and are correspondingly easily assembled.

Accordingly, a principal object of this invention is to provide a wiring device having an improved screwless terminal connector structure in which a minimum number of easily formed parts are utilized.

Another object of this invention is to provide a wiring device having a casing, or cover member, a terminal structure and a contact structure in which the terminal structure is held in electrical engagement with the contact structure by merely inserting them into the casing and attaching the cover member to the casing.

Another object of this invention is to provide a wiring device having an improved connector structure in which lead wires are electrically connected to the wiring device and thereby located in place automatically in a novel manner by simply inserting the bared end of the lead wire into an opening in the housing of the device.

A more particular object of this invention is to provide a new and improved lamp holder for holding a screw-base electric lamp which has screwless terminals in which a minimum number of easily formed parts are utilized to form the electric circuit thereof.

Still another object of this invention is to provide a lamp holder for holding screw-base electric lamps having screwless terminals utilizing a minimum number of parts for the electric circuit thereof and in which the clamping means that locks the lead wires into place serves both as a conductor and as a means for securing the lamp holder contacts in position.

These and other objects of this invention will become more apparent upon consideration of the following detailed description of a wiring device constructed in accordance with the principles of this invention, when taken in conjunction with the attached drawing, in which:

FIGURE 1 is a sectional view of a lamp holder constructed in accordance with the principles of this invention and taken substantially along the line I—I of FIG. 2.

FIG. 2 is a top plan view of the lamp holder as shown in FIG. 1 with a portion of the cover removed to show the internal contact structure thereof; and

FIG. 3 is another sectional view of the lamp holder as shown in FIG. 1 and taken substantially along the line III—III of FIG. 2 and having a portion of the cover removed.

Referring to the drawing, the illustrative form of the invention shown is a lamp holder, constructed according to the principles of this invention, comprising a one-piece formed housing 2 of any suitable insulating material having sufficient structural strength. The housing 2 is preferably

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erably formed from a molded insulated material, such as porcelain or plastic, which may readily be provided with the necessary structure as hereinafter described. The housing 2 of the lamp holder when viewed cross-sectionally is T-shaped. The base portion 3 is circular in form and has a flat top mounting surface which is provided with oppositely spaced openings 4 therein, with the distance between the openings 4 being greater than the diameter of the smaller cylinder portion 5 of the housing 2. The openings 4 are so located that the lamp holder may be easily secured to some supporting structure by appropriate means, such as screws, passing therethrough.

As is known, the lamp holder shown in this illustration is used to hold a conventional screw-base electric lamp, which is well-known in the art, and does not form a part of this invention. A cylindrical recess 6, having its center line coincident with the center line of the cylinder portion 5 of the housing, and the periphery of the recess 6 is constructed with threads 8 of such size as to threadedly engage the base of a conventional screw-base electric lamp. The threads 8 are interrupted by a rectangular slot 10 which extends longitudinally of the recess 6 and in which the ground contact 12 of the lamp holder (to be described later) can be located. The center lamp contact 14 of the lamp holder is located in the center of the upper end of the recess 6.

The uppermost surface of the housing 2 has a centrally located essentially square recess 32 therein of a depth equivalent to the thickness of the cover plate 16 which can be located therein. The cover plate 16 is comprised of an insulating material, such as fiber or a molded material. Spaced openings 22 are located along the vertical line passing through the center of the cover plate 16, as viewed in FIG. 2, and are so shaped that the head of a screw 24 can be placed therein flush with the upper surface of the cover plate 16. Threaded openings 26 are located in the recess 32 so that they are aligned with the openings 22 of the cover plate 16 to secure the cover plate 16 to the housing 2 by means of screws 24. Two rectangular passages 34 extend downwardly from the lower surface of the recess 32 and are so spaced that the inner ends thereof extend to and open into the upper end of the cylindrical recess 6 at opposite sides thereof. One of the passages 34 is aligned with the slot 10 in the recess 6. An essentially square contact recess 38 in the lower surface of the recess 32 extends inwardly from the inner side of each of the passages 34 but terminates short of the center of the lamp holder, so that the two recesses 38 have their inner ends spaced from each other. The width of the contact recesses 38 is slightly less than the width of the rectangular passages 34, and the outer ends of the contact recesses 38 (FIGS. 1 and 2) open into the passages 34, respectively. Essentially cruciform-shaped terminal recesses 40 extend perpendicularly from opposite sides of each of the contact recesses 38 at the outer ends thereof, and the bottom walls of the terminal recesses 40 are inclined inwardly of the housing 2 (FIG. 3) to permit vertical motion of the terminal legs 60, to be described. The remote ends 42 of the cruciform-shaped terminal recesses 40 are circularly shaped and have downward cylindrical extensions 44 extending below the lowest edge of the terminal recess 40.

The cover plate 16 is provided with four circular openings 18 aligned with the remote circular ends 42 of the terminal recesses 40. The cover plate 16 is also provided with spaced essentially rectangular openings 20 which are aligned with each of the crossbar portions 46 of the terminal recesses 40, respectively. It is to be noted that each of the aforementioned recesses and openings are molded as integral portions of the housing 2 so that all are easily provided by a single operation.

The ground contact 12 is constructed out of a material

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having both good electrical conductance and good resiliency, such as a copper alloy, and is essentially L-shaped having a base 28 and a stem 30. The stem 30 is located in the slot 10 and is slightly bowed inwardly so as to provide good contact with the shell of a lamp engaging the recess 6. The base 28 of the ground contact 12 rests on the bottom of one of the contact recesses 38 and has its stem 30 extending downwardly through the adjacent rectangular passage 34 and into recess 6 and the slot 10.

It is to be noted that since the passage 34 on the left-hand side of FIG. 1 is aligned with the slot 10 in the threaded portion of the recess 6, the ground contact 12 will not interfere with the threads 8. The slight bowing of the stem 30 of the ground contact 12 does, however, cause some friction to exist between it and the shell contact of the lamp bulb, thereby providing good electrical contact.

The essentially U-shaped center contact 14 is constructed out of the same material as the contact 12, and is provided with a base 48 which rests on the bottom of the other contact recess 38. The bight 50 of the center contact 14 extends downwardly into the recess 6 through the other passage 34 in the same manner as the ground contact 12. The center contact, however, is then bent toward the upper end of the recess 6. The end of the contact 14 located in recess 6 is provided with a struck-out rounded projection 52 which becomes substantially aligned with the center line passing vertically through the recess 6 when a lamp bulb is threadedly inserted into the recess 6, and it is thereby aligned with and engaged by the center contact of the lamp bulb. The resiliency of the center contact 14 provides a force exerting contact pressure on the center contact of a lamp bulb, and thereby insures good electrical contact between them.

Wire clamps 54 are each preferably formed from a single piece of wire which is formed so that opposite ends thereof form aligned elongated resilient legs 60 extending along and at a slight angle towards the bases of the two opposite terminal recesses 40 located adjacent to each of the contact recesses 38. The wire clamps 54 are also provided with an essentially U-shaped resilient offset portion 56 connecting the legs 60 which can be located on the lower surface of a contact recess 38. The wire clamps 54 are constructed of material having both resilient properties and good electrical conductance, such as a spring tempered copper alloy. The tips 58 of the legs 60 are flattened so as to provide a sharp edge thereon, and the legs 60 are of such length that the flattened tips 58 thereof extend into the circular openings 42 at the extremes of terminal recesses 40. With reference to FIG. 2, it should be noted that only one of the wire clamps 54 is shown, however, this is done for purposes of clarity, and it is apparent that when the structures are assembled two clamps are placed in the lamp holder.

The lamp holder is assembled by placing the contact strips 12 and 14 in the passages 34 in the manner previously described. The offset portion 56 of each of the wire clamps 54 is then placed over the base of each of the contacts 12 and 14, respectively, so that the legs 60 of the wire clamps 54 are located in the terminal recesses 40, and the offset portion 56 is non-rotatively located in the contact recess 38. The cover plate 16 is then placed in the recess 32 and secured thereto by means of screws 24.

The bared ends of the lead wires, such as wire 62, are then placed through the opening 18 in the cover plate 16, and are forced into the circular recesses 42 and into the recess extensions 44. The adjacent tip 58 of the wire clamp 54 is forced downward by the inserted wire until the wire slips past the tip and when the wire is pulled outwardly, the sharp edge at the tips 58 of the wire clamps 54 frictionally engages the relatively soft lead wire 62 with a wedging or biting action to prevent removal of the latter from the lamp holder. It is apparent that when the tips 58 are forced downward by the inserted lead, the spring arms 60 undergo longitudinal

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bending and the arms of the offset portion 56 undergo a torsional force. To remove the wire from the lamp holder, a small instrument, such as a screwdriver blade edge, is placed through an opening 20 of the cover plate 16 and is pushed downwardly into the cross-portion 46 of the adjacent cruciform terminal recess 40 to force the leg 60 of the wire clamp 54 downward, thereby releasing the lead wire 62 from the tip 58 of the wire clamp 54. When the instrument is removed from the opening 20, the resilient leg 60 of the wire clamp 54 returns to its original position. It should be noted that lead wire connections can be made to each of the lamp holder contacts 14 and 16 in two different places. It is also apparent that the legs 60 of the wire clamp 54 normally extend downwardly towards the base of terminal recesses 40, respectively, so that the tips 58 of the wire clamp 54 do not grab the lead wire deflecting the tip until removal of the lead wire is attempted.

The square offset portion 56 of the wire clamp 54 also serves to secure the base of the lamp holder contacts in position by the pressure exerted by the cover plate 16 on the offset portion 56 of the wire clamp 54. The depth of the contact recesses 38 is, therefore, made so as to provide a tight fit between the offset portion 56 of the wire clamp 54 and the cover plate 16 so that when the cover plate 16 is assembled a force is exerted on the bases of the contacts 12 and 14 by the portions of the wire clamps 54, respectively, resting upon the contacts and thereby insuring good electrical contact between the aforementioned members.

Having described one embodiment of this invention, it is desired that the invention not be limited to the particular form specifically illustrated herein, as it will be readily apparent to persons skilled in the art that various changes and modifications may be made in the particular construction shown without departing from the spirit and scope of this invention. Accordingly, it is desired that the invention be given a broad scope and that it be limited only as required by the prior art.

I claim as my invention:

1. A wiring device comprising a support of insulating material, at least one contact member mounted on said support, a plurality of openings in said support each adapted for the insertion of a lead wire, said support having a plurality of walls each located adjacent to one of said openings a separate solid wire spring terminal having a centrally located offset portion engaging said contact, a pair of wire engaging legs of said terminal extending from opposite sides of said offset portion and each of said wire engaging legs extending across at least a portion of one of said openings to a point adjacent the associated wall so that said lead wire when extended through said one opening beyond said wire engaging leg deflects said wire engaging leg and becomes lodged between said wire engaging leg and said wall and thus so that when removal of said lead wire is attempted said wire engaging leg frictionally engages said lead wire holding said lead wire in firm engagement therewith.

2. In a wiring device, a hollow housing of insulating material comprising a base member and a cover member, a contact supported in said housing, at least one opening in said housing adapted for the insertion of a lead wire, at least one wall located on said base member adjacent to said opening, a solid wire spring terminal having a centrally located offset portion in engagement with said contact, said cover member secured to said base member and located to engage said offset portion to maintain the latter in engagement with said contact member, a pair of spaced wire engaging legs on said terminal extending from opposite sides of said offset portion and each leg extending across at least a portion of one of said openings to a point adjacent the respective wall, so that said lead wire when extended through said opening beyond said wire engaging leg deflects said wire engaging leg and becomes lodged between said wire engaging leg

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and said wall and thus so that when removal of said lead wire is attempted said wire engaging leg frictionally engages said lead wire holding said lead wire in firm engagement therewith.

3. A wiring device comprising a support of insulating material, at least one contact member mounted on said support, at least one opening in said support adapted for the insertion of a lead wire, said support having a wall adjacent to said opening, at least one spring terminal connected to said contact member, an elongated portion of said spring terminal held fixed relative to said support, an elongated intermediate portion of said spring terminal extending angularly from said fixed portion, and an elongated wire engaging portion extending from said intermediate portion in generally parallel relation with said fixed portion across at least a portion of said opening to a point adjacent said wall so that a lead wire, when extended through said opening beyond said elongated wire engaging portion, deflects said elongated wire engaging portion partially by longitudinally bending said last mentioned portion and partially by exerting a torsional force on said fixed portion so that said lead wire becomes lodged between said elongated wire engaging portion and said wall and thus so that when removal of said lead wire is attempted said elongated wire engaging portion frictionally engages said wire holding said lead wire in firm engagement therewith.

4. A wiring device comprising a support of insulating material having a cover member, at least one contact strip member mounted on said support, at least one opening in said support adapted for the insertion of a lead wire, said support having a wall adjacent said opening, at least one separate wire spring terminal having a contact portion engaging said strip member, said cover member secured to said support and located to maintain said wire terminal contact portion in engagement with said strip member, a wire engaging portion of said spring terminal extending from said contact portion across at least a portion of said opening to a point adjacent said wall so that said lead wire when extended through said opening beyond said wire engaging portion deflects said wire engaging portion and becomes lodged between said wire engaging portion and said wall and thus so that when removal of said lead wire is attempted said wire engaging portion frictionally engages said lead wire holding said lead wire in firm engagement therewith.

5. In a wiring device, a hollow housing of insulating material comprising a base member and a cover member, a plurality of openings in said housing adapted for the insertion of a lead wire, said base member having a plurality of walls each located adjacent to each of said plurality of openings, respectively, a pair of solid wire spring terminals each having a centrally located offset portion in engagement with said contacts, respectively, said cover member secured to said base member and located to maintain said offset portions in engagement with said contact members, a pair of spaced wire-engaging legs extending from opposite sides of each of said offset portions and each leg extending across at least a portion of one of said openings to a point adjacent each of said walls, respectively, so that said lead wire when extended through said opening beyond said wire engaging leg deflects said wire engaging leg and becomes lodged between said wire engaging leg and said wall and thus so that when removal of said lead wire is attempted said wire engaging leg frictionally engages said lead wire holding said lead wire in firm engagement therewith.

6. A lampholder comprising a molded housing having a lamp base receiving opening integral with and extending from the front face thereof, molded lamp engaging threads in said lamp base receiving opening having a longitudinal slot therethrough, a large recess in the back face of the base opposite said lamp base receiving opening, spaced passages through said housing from the bot-

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tom of said lamp base receiving opening to said recess, one of said passages forming an extension of said slot, separate terminal extensions of said recess adjacent to and communicating with each of said passages, a pair of spaced contacts extending through said passages, respectively, from said lamp base receiving opening to said recess and each having portions in engagement with the lower surface of said recess, a pair of separate solid wire spring terminals engaging said last-mentioned contact portions, respectively, a cover member closing said recess secured to said base and engaging said terminals to hold them in engagement with said portions of said contact members, wire engaging legs on each of said spring terminals extending through said terminal extensions and terminating adjacent to the remote wall created by said terminal extensions, respectively, lead openings in said cover member adjacent to said remote walls, respectively, so that a lead wire when extended through one of said lead openings into said terminal recess extension adjacent to said remote wall deflects said wire engaging leg and becomes lodged between said wire engaging leg and said wall and thus so that when removal of said lead wire is attempted said wire engaging leg frictionally engages said lead wire holding said lead wire in firm engagement therewith.

7. A lampholder comprising a molded housing having a lamp base receiving opening integral with and extending from the front face thereof, molded lamp engaging threads in said lamp base receiving opening having a longitudinal slot therethrough, a large recess in the back face of the base opposite said lamp base receiving opening, spaced passages through said housing from the bottom of said lamp base receiving opening to said recess, one of said passages forming an extension of said slot, separate terminal extensions of said recess adjacent to and communicating with each of said passages, a pair of spaced contacts extending through said passages, respectively, from said lamp base receiving opening to said recess and each having portions in contact with the lower surface of said recess, a pair of spaced solid wire spring terminals each having a centrally located offset portion engaging each of said contact portions, respectively, a cover member closing said recess secured to said base and engaging said offset portions of said terminal to hold them in engagement with said portions of said contact members, a pair of spaced wire engaging legs extending from opposite sides of each of said offset portions and each leg extending through one of said terminal extensions and terminating adjacent to the remote wall created by said one terminal extension, respectively, lead openings in said cover member adjacent to said remote walls, respectively, so that a lead wire when extended through one of said lead openings into said terminal extension adjacent to said remote wall deflects said wire engaging leg and becomes lodged between said wire engaging leg and said wall and thus so that when removal of said lead wire is attempted said wire engaging leg frictionally engages said lead wire holding said lead wire in firm engagement therewith.

8. A lampholder comprising a molded housing having a lamp base receiving opening integral with and extending from the front face thereof, molded lamp engaging threads in said lamp base receiving opening having a longitudinal slot therethrough, a large recess in the back face of the base opposite said lamp base receiving opening, spaced passages through said housing from the bottom of said lamp base receiving opening to said recess, one forming an extension of said slot, separate terminal extensions of said recess adjacent to and communicating with each of said passages, a pair of spaced contacts extending through said passages, respectively, from said lamp base receiving opening to said recess and each having portions in contact with the lower surface of said recess, a pair of solid wire spring terminals engaging said last-mentioned contact portions, respectively, a cover member closing said recess secured to said base and en-

gaging said terminals to hold them in engagement with said portions of said contact members, wire engaging legs on each of said spring terminals extending through said terminal extensions, respectively, and terminating adjacent to the remote wall created by each of said terminal extensions, respectively, lead openings in said cover member adjacent to said remote walls, respectively, and said wire engaging legs terminating in flattened tips so that a lead wire when extended through one of said lead openings into said terminal extension adjacent to said remote wall deflects said wire engaging leg and becomes lodged between said tip of said wire engaging leg and said wall and thus so that when removal of said lead wire is attempted said tip of said wire engaging leg frictionally engages said lead wire holding said lead wire in firm engagement therewith.

9. A lampholder comprising a molded housing having a lamp base receiving opening integral with and extending from the front face thereof, molded lamp engaging threads in said lamp base receiving opening having a longitudinal slot therethrough, a large recess in the back face of the base opposite said lamp base receiving opening, spaced passages through said housing from the bottom of said lamp base receiving opening to said recess, one forming an extension of said slot, separate terminal extensions of said recess adjacent to and communicating with each of said passages, a pair of spaced contacts extending through said passages, respectively, from said lamp base receiving opening to said recess and each having portions in contact with the lower surface of said recess, a pair of spaced solid wire spring terminals each having a centrally located offset portion engaging said contact portions, respectively, a cover member closing said recess secured to said base and engaging said offset portions of said terminal to hold them in engagement with said portions of said contact members, a pair of spaced wire engaging legs extending from opposite sides of each of said offset portions and each leg extending through one of said terminal extensions, respectively, and terminating adjacent to the remote wall created by each of said terminal extensions, respectively, lead openings in said cover member adjacent to said remote walls, respectively, and said wire engaging legs terminating in flattened tips so that a lead wire when extended through one of said lead openings into said terminal extension adjacent to said remote wall deflects said wire engaging leg and becomes lodged between said tip of said wire engaging leg and said wall and thus so that when removal of said lead wire is attempted said tip of said wire engaging leg frictionally engages said lead wire holding said lead wire from engagement therewith.

10. A wiring device comprising a support of insulating material, at least one contact member mounted on said support, at least one opening in said support adapted for the insertion of a lead wire, said support having a wall adjacent to said opening, at least one solid wire spring terminal engaging said contact, an elongated portion of said spring terminal held fixed on said support, an elongated intermediate portion of said spring terminal extending angularly from said fixed portion, and an elongated wire engaging portion extending from said intermediate portion in generally parallel relation with said fixed portion, across at least a portion of said opening to a point adjacent said wall, said wire engaging portion exerting a torsional force on said fixed portion when deflected by a lead wire extended through said opening beyond said fixed portion so that said lead wire becomes lodged between said wire engaging portion and said wall and when removal of said lead wire is attempted, said wire engaging portion frictionally engages said lead wire, holding said lead wire in firm engagement therewith.

11. A wiring device comprising a support of insulating material having a cover member, at least one contact member mounted on said support, a terminal member formed as an element separate from said contact member and located in said support adjacently of a part of said contact member, a wire engaging portion of said terminal member extending across an opening in said support member toward a wall of said support member located adjacently of said opening so that a lead wire when inserted through said opening beyond said wire engaging portion deflects said wire engaging portion and becomes lodged between the same and said wall, and said cover member being secured to said support and having a portion bearing against said terminal to provide the necessary forces for conductively engaging the latter with said part of said contact member so that an electrical connection can be established between said lead wire and said contact.

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