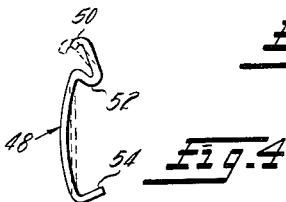


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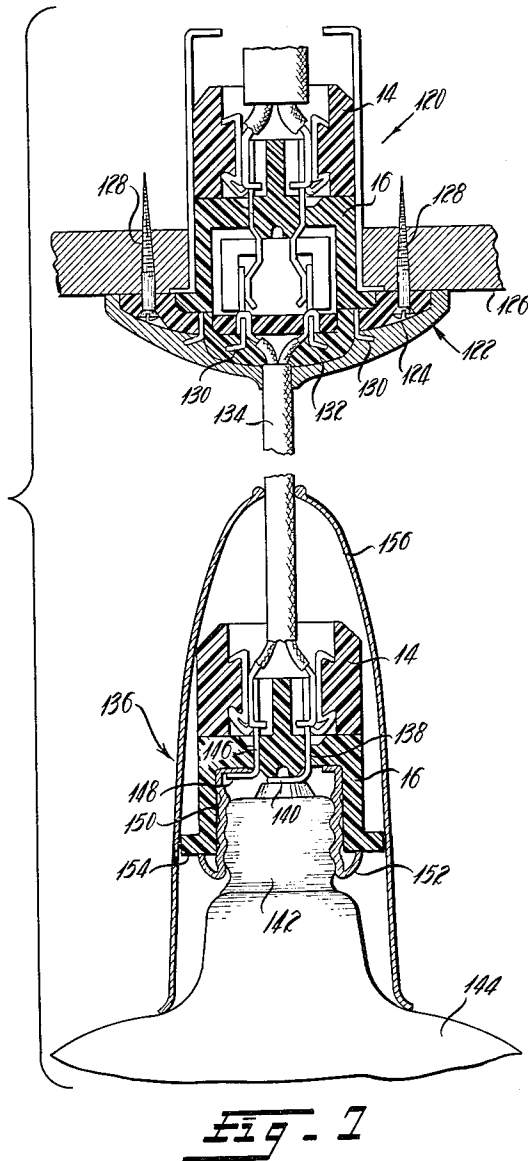
June 4, 1963

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ELECTRICAL OUTLET AND SWITCH

3,092,698

Filed March 4, 1960

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ELECTRICAL OUTLET AND SWITCH

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Filed Mar. 4, 1960, Ser. No. 12,790

14 Claims. (Cl. 200-67)

This invention relates to electrical fittings to be used as both outlets and switches.

An object of the present invention is to provide an improved electrical fitting device which does not require fitted connection boxes and eliminates the need for certain rough-in work and which may be quickly and easily installed.

Another object of this invention is to provide a novel electrical fitting device which is small, made basically of two castings to be of simple and inexpensive construction and is adapted to use interchangeably various types of fittings for plugs, switches and light bulbs.

Still another object of this invention is to provide a novel electrical fitting device which has very few parts and no internal screw type connections.

A further object is to provide an improved switch construction having a minimum number of moving parts and no internal screw type connections. The switch arm is actuated on one end directly by the control knob and the other end of the switch arm is fixed to thereby provide a simplified switch construction.

FIGURE 1 is a plan view of an electrical outlet fitting embodying my present invention;

FIGURE 2 is an elevation view in section taken along lines 2-2 of the outlet of FIGURE 1;

FIGURE 3 is a plan view in section taken along lines 3-3 of FIGURE 2;

FIGURE 4 is a side view in elevation showing in solid lines the spring clip in unloaded position and showing in dotted lines the spring clip in its assembled or loaded position;

FIGURE 5 is an elevation view in section showing a novel electrical switch in my fitting device;

FIGURE 6 is a pictorial view of the switch actuating knob and escutcheon plate of the switch shown in FIGURE 5; and

FIGURE 7 is an elevation view in section of a complete ceiling fixture installation.

Referring now to the drawings, the electrical fitting of the present invention is adapted to be connected to the usual house wiring cable 10, though it may be used advantageously for other types of electrical wiring systems such, for example, as television or radio because of its small size. In the drawings, a metallic connection box 12 having a cylindrical wall, as shown in FIGURE 3, may be used where specified in building codes. However, the electrical fitting of my present invention is totally independent of a fitted metallic box 12. Thus, where television, radio or other low power electrical signals are transmitted to the electrical fitting of this invention, metallic connection box 12 would not be used.

The electrical fitting per se consists essentially of a lower sleeve 14 and an upper core member 16. Core member 16 contains a central cavity 18 in which is placed the desired fitting, such as outlet terminals 20 as shown in FIGURE 2, the switch as shown in FIGURE 5, or the light bulb socket as shown in FIGURE 7. Lower sleeve 14 is common to all three types of fitting. Thus, the core member casting 16 and lower sleeve casting 14 may be interchangeably used in all fittings.

Lower sleeve 14 is formed of an insulating material, such as plastic, and provided with a hollow center surrounded by interior walls 24 having a pair of projections 22 and 23 on opposite sides. The exterior wall 26 is preferably cylindrical, though other shapes may be used if

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desired. The lower surface may be provided with a chamfered edge surface 28 to aid in the installation of the fitting.

On interior wall surface 30 of lower sleeve 14 as shown in FIGURE 3, a slot 32 is provided to serve as a keyway. On the wall opposite interior wall 30, provisions may be made for a third conductor which may include a projection similar to projections 22 and 23. Lower sleeve 14 is readily adapted to be made as a casting as no undercuts or extra machining would be required.

The upper core member 16 is cup shaped and is provided with an upper flange 34 that is adapted to properly position the fitting in a hole provided in the wall or ceiling. The lower base section 36 has extending from the bottom surface thereof, a projecting portion 38 which is adapted to fit into the hollow interior of sleeve member 14. The lower projecting portion 38 is provided with a central rib 40 which serves to prevent the ends 43 of the conductors of cable 10 from contacting one another and thereby eliminates possible short circuiting. A key 42 is provided on one surface of projecting portion 38 of core 16 to cooperate with keyway slot 32 in sleeve 14.

On the wall opposite key 42 on projecting portion 38 of core member 16, provision may be made for a third conductor as illustrated in FIGURE 3; or where only two conductors are required, both this surface and the corresponding interior wall surface of sleeve 14 may be made flat or otherwise constructed to have conforming configurations which serve as pilot surfaces to permit easy assembly of core member 16 into sleeve 14.

Apertures are provided in the bottom section 36 of core member 16 on each side of rib 40 for permitting easy insertion of the lower ends of the electrical bus bars which serve as terminals 20 in FIGURE 2. Terminals 20 are adapted to be slid through the apertures of bottom section 36 into the position illustrated where the bent sections 21 abut the adjacent shoulder surfaces on base section 36. Terminals 20 are provided at their lower portion with holes into which the bent ends 43 of the conductors from cable 10 are inserted as shown in FIGURES 2 and 5. Cutout portions on opposite sides of rib 40 in the lower projecting portion 38 of the stem 16 serve as a space into which the ends 43 of the conductors from cable 10 extend.

At the center of the upper surface of bottom section 36, a socket 44 is provided which is not used for the electrical outlet fixture of FIGURE 2, but which is used in the electrical switch embodiment as illustrated in FIGURE 5. Since socket 44 does not interfere with the assembly of the electrical outlet of FIGURE 2, the same core member 16 is used in both the outlet of FIGURE 2 and the switch of FIGURE 5 where socket 44 performs a special function which will be described below.

Referring now to FIGURE 4, the spring clip 48 is shown in full lines in its unloaded position and in dotted lines in the position that it assumes when mounted on ribs 22 or 23 of sleeve 14 as shown in FIGURES 2 and 5. Spring 48 has an upper hooked end 50 which is adapted to be seated against the bent adjacent end 43 of the conductor from cable 10 and against the adjacent surface of terminal 20. An upper lateral portion 52 and lower lateral portion 54 are provided for locking against the upper and lower ends of ribs 22 or 23 in sleeve 14. The central body portion 56 is arched outwardly in the unloaded position, and of such length that it provides sufficient lateral force to assure contact between the adjacent conductor from cable 10 and the lower bus bar portion of terminal 20.

By virtue of spring clips 48 pressing against the wires from cable 10 and forcing them toward the bus bar extensions on the lower ends of terminals 20, the bent ends

of the wires are firmly held in the holes in the terminals. This makes it virtually impossible to pull the wires out of the fitting, thus constituting a very simple, effective wire clamping system.

Spring clips 48 also lock sleeve 14 to core 16 since the upper ends 50 of the spring clips are bent in such a way that as sleeve 14 is pushed into place over the lower projecting portion 38 of the stem and conductors from cable 10, the hooked or bent end 50 can advance without hindrance. And, when the central body portion 56 of the spring clip flattens into place along the stem and wires, the clip straightens out, changing the angle of the hooked end which snaps into place against the lower bus bar portion of terminal 20. The hook formed by upper end 50 of clip 48 pressing against the bend near the terminal end 43 of the conductor from cable 10 thus securely locks and holds sleeve 14 and core member 16 together. Sleeve 14 and core member 16 can only be pulled apart by use of considerable force, which is determined by the stiffness of spring clip 48. When the fitting is installed, the stiffness of spring clips 48 prevent the assembly from pulling apart, and together with key 42 and slot 32 and other mating parts, the assembly cannot vibrate, turn, twist or jar loose.

Core member 16 and sleeve 14 may, if desired, be encased within connection box 12 such as shown in the drawings. As the free ends of the wires in cable 10 have been secured in the terminal holes by spring clips 48, and as sleeve 14 extends back over cable 10 far enough to effectively shield the bare wires, use of connection box 12 is obviously optional.

Referring now to FIGURE 5, a novel switch fitting is shown mounted in core member 16 in lieu of the outlet fitting shown in FIGURE 2. To assemble the switch, terminals 20 of FIGURE 2 are not used and instead a first flat strip bus bar 70 having a bent contact socket 72 at the upper end thereof positioned in socket 44 of bottom section 36 and semi-rigid second bar 74 having a contact member 76 at the upper end thereof are used. A flexible, resilient arm 78 with contact member 80 intermediate its ends has a ball like rounded end portion 82 which may be adapted to slidably rotate or rock in contact socket 72. The lower ends of the bus bars 70 and 74, spring clips 48, sleeve 14, and the manner in which these elements are held together and engage the leads from cable 10 are all the same as shown and described in connection with FIGURE 2.

The entire switch is held in position in the wall under face plate 84 which is secured to the wall by fasteners 86. In the center of face plate 84, a slotted aperture is provided which has side walls 88 and 89 and end walls 90 and 91. Between end wall 90 and surface 92 of face plate 84, an arcuately shaped guide surface 96 is provided. Guide surface 98 on the other side of face plate 84 is similar to surface 96, and as illustrated in FIGURE 6, may have the legend OFF applied thereto. Both guide surfaces 96 and 98 have arcuate surface contours and a common center for the arcs at 100 which is directly beneath the center of socket 72. Where arm 78 has a length of 1 inch and center 100 is about 1/4 inch from the center of socket 72, the switching may be effected by a 15° movement of the free end of arm 78 on either side of a center vertical position.

A hand actuated knob member 102 is provided with lower arcuate surfaces adapted to slide over guide surfaces 96 and 98. Secured to knob member 102 is a lower sliding member 104 which carries the free end 106 of contact carrying arm 78. End walls 90 and 91 serve as stops to determine the two extreme positions for knob 102.

The switch has snap action resulting from bending arm 78 under compression. The only moving part is switch knob 102 which controls the position of the free end of arm 78 carrying contact 80. The upper end of arm 78 is confined to an arcuate path, the center 100 of which lies beyond the turning axis of socket 72. The length

of arm 78 is chosen so that it is always even at its limit positions, under slight compression which forces it into a curve and provides the force necessary to hold knob 102 into one of its two positions. As the knob 102 approaches a mid-position, i.e., along the radial line from center 100 which passes through socket 72, of its normal path, the arm 78 is further compressed so that a double curvature as shown in dotted lines 110 begins to appear and then arm 78 snaps to reverse its curvature.

In operation, knob 102 starts from one end as shown in FIGURE 5 with arm 78 having a slight curvature and its convex side out, or facing away from the center of the switch. In opening contacts 76 and 80, knob 102 slides along arcuate surfaces 96 and 98 and moves closer to contact socket 72, thereby increasing the deflection of arm 78 to the point where arm 78 "pops" into a simple curve like that from which it started at the other end of its movement, but with its curvature reversed. The compression and popping action at the center of the swing causes contacts 76 and 80 to engage and disengage quickly, thereby minimizing arcing. The firmness and speed of this action may be controlled by varying the radius of curvature of the arcuate surface on face plate 84 and knob 102, the length of arm 78 and/or the distance between socket 74 and the center 100 of radius for the arcuate surfaces.

Referring now to FIGURE 7, the outlet fitting 120 is nearly identical with the outlet fitting shown in FIGURE 2, excepting for the use of a bayonet mounted escutcheon 122 with a mounting plate 124 which is secured to the finished ceiling 126 as by fasteners 128. Escutcheon 122 is secured to mounting plate 124 by fasteners 130 which also hold male plug 132 in the socket provided by outlet fitting 120.

Cable 134 extends downwardly to support an overhead light fixture 136 which basically comprises an inner sleeve 14 and core member 16 as described above in detail. In this form of the fitting, one bus bar 138 has an end 140 extending over socket 44 to serve as the central contact for the base 142 of decorative light bulb 144. The other bus bar 146 has free end 148 electrically connected to a conventional female threaded socket sleeve 150 into which base 142 of light bulb 144 is threaded. The outer end 152 of socket sleeve 150 is bent over and supported against surface 154 of core member 16 to provide a tight resilient connection with base 142 of bulb 144. The entire fixture 136 may be conveniently encased in an ornamental escutcheon 156 to hide inner sleeve 14 and core member 16.

The fittings of the present invention may be installed in a panelled wall or ceiling without backing, in between studs in a dry wall with backing or lag bolts, or drilled directly into a stud. The process is to drill a hole into the wall where the fitting is desired and pull out the wire a foot or two. This is the only cutting required unless the fitting is to be mounted directly in a stud. In that case, it is also necessary to drill one hole from the larger hole up the side of the stud to admit the wire. Since the housing of my device can be made comparatively small, as for example having a 1 1/4" outer diameter, the drilling of such holes provides a marked advantage over the cutting required to install the conventional rectangular boxes presently in wide use.

After the hole is drilled, the fitting of either the outlet or the switch is disassembled and switch connection box 12 and sleeve 14 are then slipped onto sheathed cable 10, closed ends first. Insulation on the conductors is then stripped, and the bare ends 43 of the conductors are bent and inserted into the holes in the bus bars extending through the bottom section 36 of core member 16. Sleeve 14 is next slipped onto the stem, and is easily aligned by slot 32 on sleeve 14 and key 42 on core member 16. This places the upper ends 50 of spring clips 48 on the bare wire ends and as sleeve 14 is pushed up to bottom section 36 of core member 16, a slight click will indicate that the upper hooked ends 50 of spring clips 48 have snapped

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into their illustrated locking position. The connection is then completed. All that now remains is to pull connection box 16 (where one is used) up over the fitting, place the assembled fitting back in the wall opening, and secure the cover plate into position by driving mounting screws 62 into the wall.

The assembly of this fitting is done out in the open with the parts resting comfortably in the hand. This is especially rewarding if the location for the outlet is in a cramped or confined position where it would be hard to get a conventional fixed connection box.

The foregoing electrical fitting device is easily adjusted after installation, requires no sawing or chiseling, involves little risk of mis-measuring or sloping cutting that would make an opening bigger than the face plate to necessitate patching.

The device is of small size and its simplicity of manufacture and assembly is evident from the facts that both sleeve 14 and core member 16 may be cast without undercuts or special machining and are interchangeable for all fittings, and that assembly is rapid as the wire locking assembly is completed without screws and the spring claps 48 lock the fitting and cable together.

This invention may be embodied in other specific forms without departing from the spirit or essential characteristics thereof. The present embodiments are therefore to be considered in all respects as illustrative and not restrictive, the scope of the invention being indicated by the appended claims rather than by the foregoing description, and all changes which come within the meaning and range of equivalency of the claims are therefore intended to be embraced therein.

What is claimed and desired to be secured by United States Letters Patent is:

1. In a snap acting switch of the type comprising a stationary contact; a flexible arm to be actuated having a fixed end and free end portion; and a contact carried by said arm which is movable into and from engagement with said stationary contact; said flexible arm being formed from a strip of resilient material; a cover plate for said switch having an arcuate surface; and a knob mounted for movement along said arcuate surface, the free end of said arm being secured to said knob, the radius of said arcuate surface being slightly longer than said arm and the center of curvature of said arcuate surface being located to cause slight curvature of said arm when the knob is at either extreme position and maximum compression of said arm at a central position of said knob to effect reversal of the curvature of said arm and instantaneous opening or closing of said contacts.

2. An electrical fitting device adapted to be mounted on a wall, ceiling, or the like comprising a core member having a cavity therein and slots at one end thereof, bus bars extending through said slots, and a hollow sleeve extending over one end of said bus bars, said core member and sleeve each being formed of insulating material having outer cylindrical surfaces of substantially the same diameter, said core having a pilot surface extending into and engaging a complementarily formed surface on the interior of said sleeve to prevent rotation between the sleeve and core member, and a rib separating the ends of said bus bars which extend into said sleeve, and means for securing the free ends of the conductors from an electrical source supply wire to said bus bars and holding said core member and sleeve in an end-to-end relationship.

3. An electrical fitting device comprising: a sleeve member and a core member of insulating material mounted in an end-to-end relationship with a portion of the core member extending inside one end of said sleeve, there being spaced apertures in said core member; bus bars in said apertures having apertures in a portion extending into said sleeve; and spring clip means having laterally bent portions secured to projecting surfaces on interior walls of said sleeve to secure said sleeve to said core member and engaging electrical source supply wires positioned along

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said bus bars, the ends of said supply wires being bent at substantially right angles and extending into the apertures in said bus bars.

4. An electrical fitting device comprising: a sleeve member, a cup shaped core member having a central cavity closed on one side by a bottom section; said sleeve and said core member being formed of an insulating material and mounted in an end-to-end relationship with a portion of said core member having spaced apertures and a rib between said apertures extending from the side of said bottom section opposite the cavity into said sleeve; bus bars in said apertures having free end portions extending on one end into said cavity and on the other end along opposite sides of said rib an into said sleeve member; the one end of said bus bars being bent to extend along a surface of said bottom section in said central cavity; and spring clip means on opposite inner walls of said sleeve member for securing said sleeve member to said core member when electrical source supply wires are attached to said bus bars.

5. The electrical fitting device as defined in claim 4 wherein outlet terminals are provided in said cavity as extensions on said one ends of said bus bars.

6. The electrical fitting device as defined in claim 4 further having an electric light bulb socket receiving sleeve mounted inside said central cavity with said one end of one of said bus bars connected to said socket receiving sleeve and another of said bus bars having a free end extending into a central position in said cavity to provide a contact for a central terminal on a light bulb socket.

7. The electrical fitting device as defined in claim 4 wherein a pair of electrical switch contacts are connected electrically to said bus bars and positioned in said cavity; a cover member for said core member on the side opposite said bottom section; knob means mounted for sliding movement on said cover; and a resilient, flexible arm having one end mounted for pivotal movement on said bottom section and the other end secured to said knob for selectively opening and closing said switch contacts.

8. The electrical fitting device as defined in claim 7 wherein one of said bus bars is formed with a socket on the cavity side of said bottom section and said one end of said arm is mounted in said socket.

9. The electrical fitting device as defined in claim 8 wherein said cover member is formed with an arcuate surface and said knob is confined to arcuate movement along said surface, the radius of said arcuate surface being longer than said resilient arm whereby the resilient arm provides a force holding the knob in either of its alternate positions.

10. An electrical fitting device adapted to be mounted on a wall, ceiling or the like comprising: a core member of cylindrical exterior shape with one end closed, a cup-shaped opening in the other end, a longitudinal projection smaller than the core exterior extending from the closed end, and slots through the closed end of the core extending from the cup-shaped opening to different sides of the longitudinal projection; bus bars extending from the cup-shaped opening through the slot to different sides of said longitudinal projection, a portion of the bus bar positioned in said cup-shaped opening being formed to permit removal of the bus bar from the cup-shaped opening and to prevent removal of the bus bar from the other end of the core member; a hollow sleeve member enclosing said longitudinal projection and the bus bar extending over the sides thereof; said core member and sleeve member each being formed of insulating material; and means for securing the free ends of wires from an electrical supply source to the ends of said bus bars along said longitudinal projection and also holding said core member and sleeve member in an end-to-end-relationship.

11. The electrical fitting device as defined in claim 10 wherein said last mentioned means comprises a pair of resilient clip members having laterally bent portions secured to projecting surfaces on interior walls of said

sleeve member and a hooked end portion abutting against the adjacent bus bar, the body of said clip members holding a section of said wires against said bus bars.

12. The electrical fitting device as defined in claim 11 wherein the end portions of the bus bars along said longitudinal projection contain an aperture, the ends of the electrical supply wires being bent to extend into said apertures, and the hooked end portion on said resilient clip member snapping over the bent end of the supply wire to abut both said wire and said bus bar thereby locking the core and sleeve members together.

13. An electrical fitting device adapted to be mounted in a cylindrical hole in a wall, ceiling or the like comprising: a core member having a cylindrical exterior wall with one end closed, a cup-shaped opening in the other end, flange means on the exterior walls surrounding the cup-shaped opening to engage the surface around the hole in which the fitting is mounted; a cover plate engaging the core member and secured to the surface around said hole to prevent removal of said fitting from said hole; a longitudinal projection smaller than the core exterior extending from the closed end of said core member, there being slots extending through the closed end of the core from the cup-shaped opening to different sides of said longitudinal projection; bus bars extending from the cup-shaped opening through the slots over different sides of said longitudinal projection; a hollow sleeve member enclosing said longitudinal projection and the portions of the bus bars extending over the sides of said longitudinal projection; said core member and sleeve member each being formed of insulating material; and means for securing the free ends of the wires from an electrical power source supply to the ends of said bus bars along said longitudinal projection and also holding said core member and sleeve member in an end-to-end relationship.

14. An electrical fitting device adapted to be mounted on a wall, ceiling or the like comprising: a core member of cylindrical exterior shape with one end closed, a cup-shaped opening in the other end, a longitudinal projection smaller than the core exterior extending from the closed end, and slots through the closed end of the core extending from the cup-shaped opening to different sides of the longitudinal projection; bus bars extending from the cup-shaped opening through the slot to different sides of said longitudinal projection; means on the ends of the bus bars in the cup-shaped opening to connect with and be disconnected from an external electrically powered device; a hollow sleeve member enclosing said longitudinal projection and the bus bars extending over the sides thereof; said core member and sleeve member each being formed of insulating material; and means for securing the free ends of wires from an electrical supply source to the ends of said bus bars along said longitudinal projection and also holding said core member and sleeve member in an end-to-end relationship.

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