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WALL OUTLET AND PLUG SWITCH

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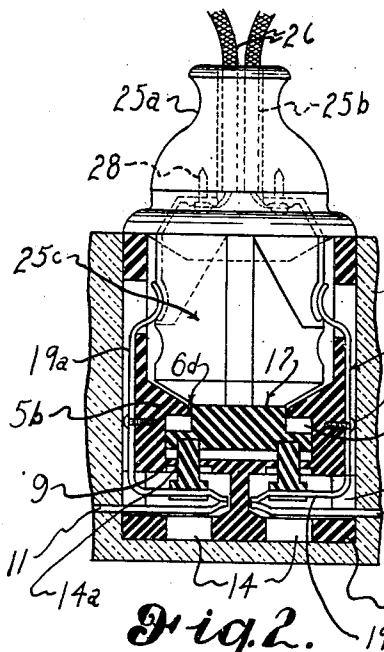


Fig. 2.

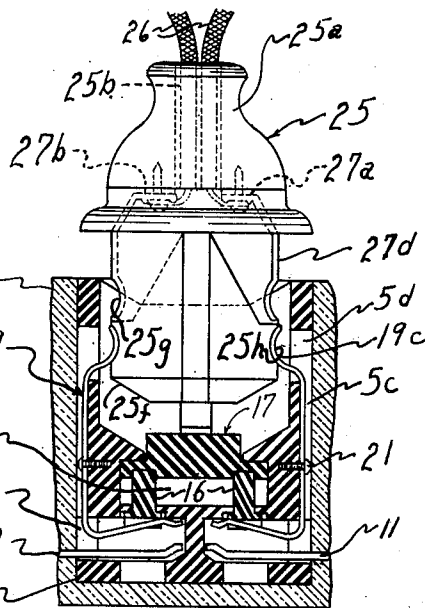


Fig. 3.

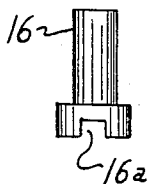


Fig. 5.

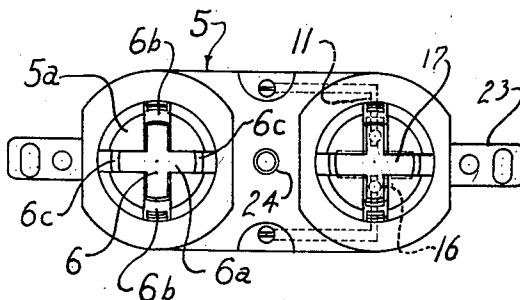
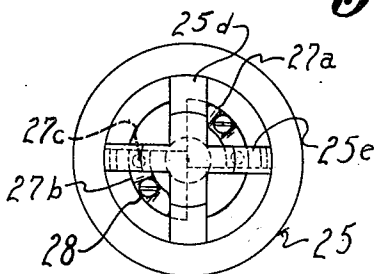


Fig. 1.



UNITED STATES PATENT OFFICE

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WALL OUTLET AND PLUG SWITCH

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2 Claims. (Cl. 200—51)

This invention relates to wall outlets or receptacles and their complementary plugs as commonly used in electrical installations in buildings of any kind, and the primary object of the invention is to provide in a simple, efficient and practical form a combination of receptacle and plug wherein certain advantages are included looking to the convenience of the assembly in use and to safety as against accidental short circuiting through the unwarranted insertion of foreign objects in the receptacle.

Another object is to provide a receptacle for connecting to the bus or service lines of an electrical supply system as installed within a building, the said receptacle being made of suitable insulation material and having a cruciform socket for the reception of a complementary plug, the outer and opposite walls of the socket being channeled longitudinally to engage short contact wires or conductors, the outer extremities of which wires are looped through apertures cut through the walls at the outer ends of the channels and disposed inwardly of the socket and thus adapted to releasably engage and hold the plug when inserted in the socket, the said plug being formed with cruciform webs to pass into the socket and there being notches or recesses formed upon opposite webs of the plug adapted to engage the inwardly turned loops of the contact wires, with terminals mounted oppositely on the plug and having their inner ends disposed at the said notches so as to contact the said wire contacts of the receptacle when the plug is inserted in the receptacle, there being means at the inner end of the socket designed to be actuated by the inner end of the inserted plug, for contacting the inner ends of the said contact wires of the receptacle with feeder or tap wires extended from the bus or main lines of the building, whereby the circuit is closed through service lines connected with the plug terminals.

With the foregoing objects and advantages in view, as well as such other objects as may be developed in the following specification, reference is made to the accompanying drawing as illustrating a preferred embodiment of the invention, and wherein

Figure 1 is a plan view of a double receptacle constructed in accordance with the invention, the cover plate being omitted.

Figure 2 is a longitudinal section through a receptacle constructed in accordance with the invention, showing in full lines a switch plug inserted fully in the receptacle as in operative position for closing the circuit, the plug also being

constructed in accordance with the invention. There is shown in section a porcelain casing for the receptacle.

Figure 3 is a view similar to that of Figure 2, except that the switch plug is here partially withdrawn from the receptacle so as to open the circuit.

Figure 4 is a bottom end view of the switch plug as constructed in accordance with this invention.

Figure 5 is an enlarged detail of one of the operating tappets.

Figure 6 is an enlarged detail of the plunger block or follower block reciprocally mounted in the inner end of the receptacle.

Figure 7 is a fragmentary detail of a portion of the inner end of the receptacle with plunger block mounted therein, and showing a method of eliminating the operating tappets through bending up the inner ends of the tap or feeder wires to directly meet the plunger block.

In practising this invention I provide a wall outlet or receptacle represented generally at 5, and which may be either in the double form as here shown in Figure 1, comprising a pair of receptacles integrally connected, or may consist of only a single receptacle.

The receptacle 5 whether in single or double form, is made of any suitable insulation material, such as Bakelite, and is formed with a deep socket 6 which is cruciform on a transverse section as clearly shown in Figure 1, and thus includes a central aperture 6a from which branch out and are extended along the opposite inner walls two pairs of slots or grooves represented at 6b—6c. One of the pairs of slots, as 6b, is wider than the other pair 6c, while on the other hand the narrow slots 6c are longer than the wider slots 6b. These slots are of course defined by the solid, inwardly projecting corners 5a of the material of the receptacle. These defining corners 5a are connected at their inner ends by the tapered or beveled slot closure portions 5b which partially but not wholly close the lower or inner ends of the slots or grooves 6b—6c, whereby a reduced cruciform opening or guideway 6d is formed at the inner end of the receptacle, which leads into a flat recess 7 extending laterally under the portions 5b. It is to be noted that the closures 5b at the inner ends of the wider slots 6b—6c, by virtue of their beveled structure act as centering elements for the tapered switch plug later to be described, as the latter is inserted into the receptacle.

Outwardly of the recess 7 passages 8 are extended laterally, being separated from the recess 7 by a partition 9, and ducts 10 lead laterally out from the passages or chambers 8 for the insertion of tap or feeder lines 11 as extended from the main lines (not shown). The chambers 8 are enclosed by the end walls 12. The structure as defined is preferably formed integrally of insulation material, and spaced tappet holes or apertures 14 are formed through the end walls 12 in alignment with one pair of the socket slots, as 6b, and aligned holes 14a of slightly reduced diameter are formed through the partition 9, the outer mouths of the holes 14a being reamed or rabbeted around their margins to engage the heads of tappets 16 which may be inserted through the holes 14—14a, remaining reciprocally seated in the latter. The heads of the tappets 16 are slotted transversely on their outer faces for a purpose to be described, these slots being indicated at 16a.

A cruciform plunger block or follower block 17 is provided, the same corresponding in plan in a general way with the cross-sectional design of the opening or guide-way 6d, being however slightly less in size so as to fit freely therein. This element includes pairs of projections or legs 17b—17c, the former being somewhat wider and shorter than the latter. The wider projections 17b are rabbeted out along their predetermined upper or outer parallel corners, but not on their end corners, as shown at 17d, so that the reduced upper portions of these legs will freely slide within the relatively narrow slots 6c of the receptacle when turned into alignment therewith, and the narrow projections or legs 17c are rabbeted out on their end corners at the same side of the element as shown at 17e, so that the shortened upper portions thereof will freely slide within the shorter slots 6b. Small sockets 17f are formed in the under faces of the projections 17c in spaced relation and adapted to engage the ends of the tappets 16. Thus the block 17 may be slid down through the socket 6 into the cruciform guide-way 6d into the recess 7, and then rotated a quarter turn to bring the reduced upper portions of the projections 17b—17c into alignment with the slots 6c—6b respectively, where they will be held against movement outwardly therethrough by virtue of the wider rabbeted margins of the projections 17b and the longer rabbeted ends of the projections 17c, these margins abutting from the under side the inner margins of the slots 6c—6b respectively. When this is done the tappets 16 may be inserted through the holes 14 to their seats in the inner holes 14a and their ends seated in the sockets 17f, whereby the elements are retained in operative alignment. Each receptacle is grooved laterally and longitudinally on outer and opposite sides as shown at 5c, in alignment with the narrow slots 6c, and at their outer or upper ends these grooves or slots are cut clear through the walls of the receptacle forming apertures 5d leading into the slots 6c. Angular contact leads or wires 19, including the relatively long stems 19a and the shorter and perpendicularly turned stems 19b, are provided, and the ends of the stems 19a are hooked or looped as shown at 19c. The stems 19a are laid within the grooves 5c with the loops 19c projected through the apertures 5d and disposed in the slots 6c, while the stems 19b are turned into the passages 8 and the ends thereof seated within the slots 16a of the headed tappets 16. The contact wires 19 are of spring material and pref-

erably flat, and they are so spring set that the intumed stems 19b at the heads of the tappets will normally act to urge the tappets outwardly carrying of course the block 17 upon their ends. The contact wires 19 are secured in place upon the walls of the receptacles by means of screws 21 passed through them into the receptacles. The inner ends of the stems 19b at the tappets are disposed immediately over and in direct operative alignment with the slightly spaced inner ends of the feeder lines 11, so that when the block 17 is pushed inwardly the tappets 16 force the stems 19b into electrical contact with the feeder lines 11 for closing the circuit.

The receptacle is inclosed in a porcelain shell 22, or may be insulated from the wall on which it is to be mounted in any other conventional manner, being secured in place upon the wall (not shown) by means of apertured tabs 23 through which screws (not shown) are passed into the wall. A conventional form of cover plate (not shown) is secured to the receptacle by a screw (not shown) passed through the plate into the screw hole 24 of the receptacle.

A plug switch represented generally at 25 is provided, the same comprising a head 25a apertured centrally at 25b for the passing of service wires 26, and having a plug 25c, cruciform in cross section, extended from the head and adapted to freely slide into the socket 6 of the receptacle. This plug includes oppositely disposed pairs of webs or ribs represented at 25d—25e, the former being wider to conform with the wider slots 6b and the latter being narrower for conforming with the narrower slots 6c. Thus in operation it is impossible to insert the plug into the socket in an inoperative manner, since the wider ribs would not enter the narrow slots. The end of the plug is also tapered as shown at 25f to facilitate the entering of the plug into the socket.

The narrow webs or ribs 25e are formed with round notches 25g—25h near their outer or upper ends, the outermost notches 25g being service notches and the innermost 25h being merely retaining notches, the function of both to be later pointed out. Both sets of these notches are alined transversely to register with and engage the spring loops 19c of the contact wires 19, as the plug is pushed into the socket.

Angular contact plates 27a—27b are riveted at 27c to the inner side of the head 25a, at opposite sides of the plug 25c, these plates having legs 27d extended down the sides of the narrow webs 25e, into and across the service notches thereof 25g, and are thus adapted to electrically engage the loops 19c of the spring contacts 19 for completing the circuit, when the plug is pushed fully into the socket. The service lines 26 are secured to the upper or outer ends of the plates 27a—27b by means of binding screws 28, whereby a circuit is closed through any electrical device or implement connected between the ends of the lines, such implement not being shown here however.

The plug 25c is of the exact length necessary so that when pushed fully into the socket 6, the inner tapered end of the plug will contact with and operate to push the plunger block 17 inwardly and cause the tappets 16 in turn to push the contiguous ends of the wire stems 19b into electrical contact with the ends of the feeder wires 11, while simultaneously the service notches 25g of the plug engage the spring loops 19c of the contact leads 19, whereby the circuit is closed

through the plates 27a—27b which overlie these said notches. On the other hand as the plug is withdrawn from the socket, the circuit is broken both at the inner end of the assembly through the operation of the spring set ends of the stems 19b as already pointed out, and also through the withdrawal of the loops 19c from the service notches 25g of the plug. As the plug is thus withdrawn for the purpose of opening the circuit, the inwardly disposed notches 25h automatically engage the loops 19c, but no circuit is closed thereby as the plates 27a—27b do not extend to these notches, and the plug may thus be left inoperatively in position and ready for full insertion at any moment for closing the circuit. This arrangement obviates the need of completely removing the plug from the socket and is a great convenience.

Obviously additional notches (not here shown) similar to the notches 25g—25h may be formed on the other ribs 25d of the plug, and additional spring loops (not here shown) similar to the loops 19c may be seated within the other slots 6c of the socket to coact with such notches, the same having no electrical significance but being provided for the sake of a firmer seating of the plug in either its operative or inoperative position. Obviously too, the invention may be applied to and incorporated upon a separable screw socket (not here shown) designed for insertion in a conventional screw or threaded receptacle.

In Figure 7 is shown a method of dispensing with the tappets 16 by merely bending the extremities of the stems 19b of the contact leads or wires 19 perpendicularly up through the holes 14a of the partition 9 and seating these ends within the small sockets 17f of the block 17. Then as the block 17 is pushed downward in manner described, the contact would be made with the feeders 11. The plug 25, block 17 and tappets 16 are to be made of suitable insulation material, although if preferred for any reason the block and tappets might be of metal.

It is thought that the invention described presents a very simple, efficient and practical form of receptacle and plug, with features of safety and convenience that are unique. Owing to the variation in width of the slots of the receptacle and the webs of the plug, as pointed out, it is impossible to make the connection in an improper manner. Owing to the beveled end of the plug the same is readily centered into the receptacle, after which a straight push upon the plug completes the connection. On withdrawal of the plug it may be left suspended inoperative in the end of the socket, ready again for immediate use.

While I have here shown and described certain specific structural features of the invention, it is understood that I may vary the same in minor details so as to provide a more perfect device for the purpose, not departing however from the essence of the invention as defined in the appended claims.

I claim:

1. In a device of the kind described, a receptacle and switch for receiving an interfitted polarized plug to operate the switch, the receptacle having a cruciform socket and a flat recess spaced from the inner end of the socket and communicating therewith through a reduced central cruciform opening, and there being line passages extending laterally through the inner end of the receptacle and spaced from the said recess, with tappet holes connecting the recess and line passages, a cruciform plunger block reciprocally seated in the cruciform opening connecting the socket and flat recess, tappets reciprocally seated through the tappet holes connecting the flat recess and line passages in contact with the plunger block, spring contact wires installed through the walls of the receptacle with their inner ends turned beneath the tappets, and tap lines extended into the line passages of the receptacle in opposed spaced relation to the ends of the contact wires, whereby insertion of the complemental switch plug forces the plunger block and tappets inwardly and the ends of the contact wires against the tap lines for closing the circuit.

2. In a device of the kind described a receptacle and switch for receiving an interfitted polarized plug to operate the switch, the receptacle including an elongate socket, a recess spaced longitudinally from the inner end of the socket and communicating therewith through a central plunger opening, and line passages spaced from the said recess and communicating therewith through spaced tappet holes, spring contact wires extended through the receptacle with their ends disposed in the said recess opposite the tappet holes, tap lines extending into the said line passages in opposed spaced relation to the ends of the spring contact wires, tappets reciprocally mounted through the tappet holes and bearing at their ends upon the ends of the spring contact wires, and a plunger block reciprocally mounted through the plunger opening and bearing upon the tappets, whereby insertion of the complemental switch plug moves the plunger block and tappets and the latter the ends of the spring contact wires against the tap lines for closing the circuit.

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