Sept. 30, 1947. O. DORFMAN 2,428,110

INTERCHANGEABLE INSERTION TYPE WIRING DEVICE

Filed May 8, 1944

Fig. 1.

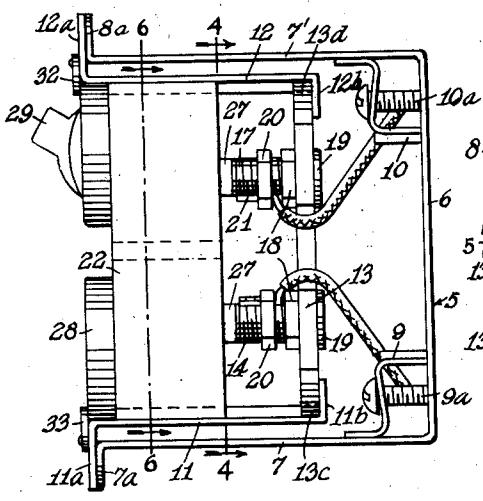


Fig. 2.

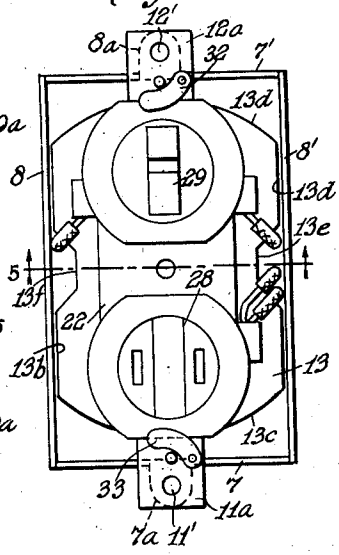


Fig. 3.

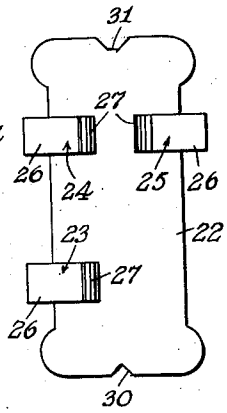


Fig. 4.

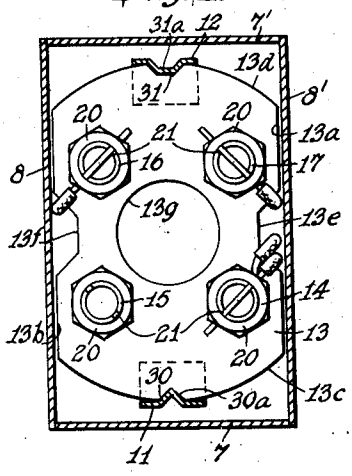


Fig. 5.

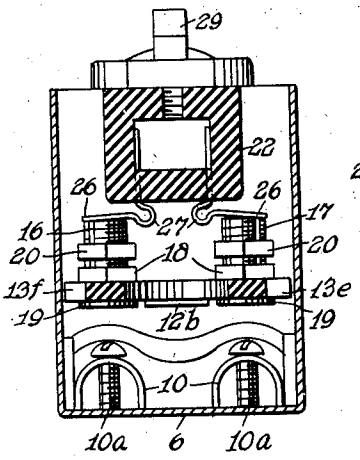
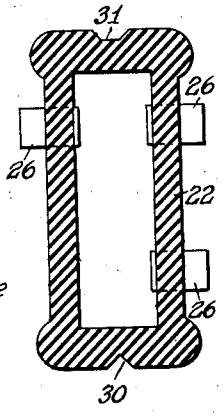


Fig. 6.



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INTERCHANGEABLE INSERTION TYPE WIRING DEVICE

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4 Claims. (Cl. 174—52)

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This invention relates to means for mounting an electrical wiring device in proper relation to the circuit wires of an outlet box, so that the average person, or even a housewife, an intelligent child, tenant, handyman, or other person, may safely remove a defective electrical wiring device and place a new electrical wiring device in correct position with relation to the circuit wires of the outlet box, without disturbing the connections of these wires or causing the person who does this work to be exposed to dangerous electrical wires or connections.

One of the objects of the invention is the provision of a construction for this general purpose, which will permit of the use of any switch, attachment receptacle or combination, and permit of a slip or sliding insertion of the device in working position, in such manner that incorrect mounting is prevented, and the wiring device may then be locked in its working position in the outlet box, so that complete circuit connection is established and maintained with the electrical connections of the outlet box.

A still further object of the invention is the construction of a combination for these general purposes, which will permit of the saving of a considerable amount of wire in making the required installation, by shortening the leads of the wires to the terminals or binding posts of the unit, and to utilize these binding posts or terminals for making contact with the detachable wiring device.

With the above and other objects in view the invention consists in certain new and useful constructions, combinations, and arrangements of parts, clearly described in the following specification, as an example of one particular instance of an electrical wiring device, and fully illustrated in the accompanying drawings, in which:

Fig. 1 is a vertical sectional view through an outlet box, showing the detachable combination of a single pole switch and receptacle in place therein.

Fig. 2 is a front elevation thereof, the usual finishing plate being removed.

Fig. 3 is a rear elevation of insertable unit.

Fig. 4 is a vertical sectional view, taken on line 4—4 of Fig. 1, looking in the direction of the arrows, showing the insulating plate, which carries the terminals or binding posts.

Fig. 5 is a horizontal sectional view, taken on line 5—5 of Fig. 2, looking in the direction of the arrows.

Fig. 6 is a detail sectional view of the insertable unit shown in Fig. 3.

Referring to the drawings, which illustrate one embodiment of my invention, 5 designates a metal outlet box, which includes the bottom 6, and the side walls 7, 7', 8 and 8'. This outlet box may be equipped with the usual conductor clamps 9

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and 10, which are held in place by means of the screws 9a and 10a.

Bracket members 11 and 12 are arranged within the outlet box 5, and the bracket member 11 is formed with a holding flange 11a, which engages the marginal flange 7a of the side wall, and is further formed with a seat flange 11b. The flange 7a is connected to the flange 11a by means of the usual assembly machine screw.

The bracket 12 is formed with a holding flange 12a which is connected to the flange 8a of the side wall 8, by means of the usual assembly machine screw, and is further formed with a seat flange 12b, which is spaced from the conductor clamp 10 and the side wall 8. The seat flanges 11b and 12b are disposed in the same plane and in spaced relation to each other.

An insulating plate 13, of any suitable insulating material, is snugly fitted on the seat flanges 11b and 12b, and thus wholly supported within the outlet box by the brackets 11 and 12. This insulating plate is formed with curved or convex edges 13c and 13d, and with two straight edges 13a and 13b, which are constructed with notches or openings 13e and 13f, to receive the electrical conductors that enter the outlet box. Due to its shape the insulating plate is adapted to be inserted in either a standard round outlet box or a standard rectangular outlet box. The center of the insulating plate is formed with an opening 13g to receive the stud of an electrical fixture.

On the insulating plate 13 the terminals or binding posts 14, 15, 16 and 17 are mounted, through holes formed in said plate, and these posts or terminals are clamped to the plate by means of the nuts 18 and the heads 19, the latter being formed on the posts or terminals.

The free ends of the binding posts or terminals are disposed in the same general plane. In this showing four binding posts are shown, but only two or three of these may be utilized by the wiring device, which is mounted in the outlet box, and the inactive terminal or binding post will in no way interfere with the connections of the other terminals or binding posts with the wire connecting device.

The detachable wiring device includes a housing 22, in which any standard electrical connecting mechanism may be arranged. This housing or body is provided with a plurality of metal strips 23, 24 and 25. In this case three of such strips are shown, but the number required or used may equal the number of terminals or binding posts used. Two or more of such conductor strips may be thus employed.

Each conductor strip is formed with a lateral contact terminal or spring finger 26, tension being maintained on this finger by means of the spring loop 27. The finger of each strip is disposed outside of the housing 22, and the other end of the

strip is enclosed by the housing, and suitably connected with the wiring device parts. This housing is shown to be provided with the usual plug-in element or receptacle **28**, and the toggle lever or switch element **29**.

The body or housing **22** is formed with grooves **30** and **31**, located in the opposite ends thereof. The groove **30** is made narrower than the groove **31**. These grooves receive the guides or keys **30***a* and **31***a* of the bracket members.

The key **30***a* is made narrower than the key **31***a*, so that it will fit slidably in the narrow groove or keyway **30**, and the key **31***a* is adapted to fit only in the groove **31**. In order to insert the housing of the wiring device in the outlet box it is therefore necessary that the housing be positioned so that the keyway **30** is in registration with the key **30***a*, and the keyway **31** is in registration with the key **31***a*.

By properly inserting the housing of the wiring device, the spring contact members or terminals **26** will be forced into electrical engagement with the contact terminals or binding posts of the insulating plate, as indicated in Fig. 5, when the spring terminals will be placed under tension, so that the contact will be properly maintained.

The housing or body **22** is retained in working position by means of the latch button **32**, pivoted to the holding flange **12***a* of the bracket **12**, and by means of the latch button **33**, which is pivoted to the holding flange **11***a* of the bracket **11**, and this button **33** is shown to be larger than the button **32**. The holding flanges of the brackets are formed with tapped holes **11'** and **12'**, to receive machine screws for connecting the usual finishing plate.

When it becomes necessary to replace the wiring device, due to excessive wear or breakdown, all that is necessary is to remove the usual finishing plate, not shown, release the latch buttons, and then pull the housing out of the outlet box, without even contacting the electrical wires or their terminals. Due to the fool-proof assembly construction it is impossible to insert a new wiring device unless the housing is correctly positioned with reference to the outlet box, so that the keys of the brackets will easily enter the proper keyways of the housing.

In this operation the housewife, tenant, landlord, or other person, is not required to have any sound electrical knowledge of the circuit connections, or have skill to select and to connect the electrical wires, and does not have to expose the fingers to the electrical terminals or binding posts. Once the electrical wires have been properly connected in position they may remain without further change or interference. The danger of false and loose connections being made by inexperienced persons is thus dispensed with, and fire and other hazards reduced. The risk of blowing a fuse or breaking the meter connection is avoided. Service interferences may be corrected safely by the occupant.

Due to the fact that electrical wires which terminate in the outlet box are connected to the binding posts or contacts of the insulating plate, less wire is required than in the common practice, when the wires are extended and directly connected to the wiring device. Experience shows that a saving of from two feet or more of wire for each installation is made, as against the prevailing practice.

Having described my invention I claim:

1. The combination with an outlet box, a wiring device, the outlet box having internal supports engaged by the wiring device and keyed to the wiring device to permit of coupling between the wiring device and the outlet box in only one position, an insulating plate in the outlet box, contacts carried by the said plate and adapted to be wired to conductors terminating in the outlet box, and spring contact members carried by the wiring device and adapted to have electrical contact with the contacts of the plate when the wiring device is coupled to the outlet box, and adapted to be broken when the wiring device is uncoupled, without breaking the connections between the conductor wires and the contacts of the plate.

2. The combination of an outlet box, bracket members mounted in the box and provided with flange seats arranged in opposition to each other, a plate of non-conductive material mounted on said flange seats, said brackets having keys of different widths, contact members on said plate adapted to be wired directly to conductor wires terminating in the outlet box, and a wiring device having a housing provided with keyways to receive the keys of the brackets, said keyways being of corresponding width to the keys to permit of coupling in only one position, the housing of the wiring device being provided with spring contacts adapted to engage the contact members of the plate.

3. In combination, an outlet box, bracket members attached to the outer edge of the outlet box and having lateral lugs disposed in a common plane, a plate of insulating material mounted on the lugs, electrical wire binding posts carried by the insulating plate and disposed in spaced relation from each other, and a service electrical circuit coupling device insertable in the box between said brackets and provided with spring contact members on the inner end thereof adapted to have electrical contact with the ends of the binding posts, said bracket members having keys of different size and the insulating plate and coupling device having corresponding keys engaged therewith.

4. In combination, an outlet box having opposing internal supports spaced from the sides of the box, an insulation plate mounted on said supports and provided with a plurality of wire clamping binding posts secured thereto and adapted to be individually connected with electrical circuit wires, said supports having keys of different shapes and said insulation plate having keyways to engage the keys of the supports, and a wire device having a body formed with keyways adapted to have matching engagement with the keys of the supports slidably engaging said supports and having spring contact members adapted to have electrical contact with the outer ends of the binding posts.

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