United States Patent [19]

Hulshizer

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[45] **Aug. 6, 1974**

[54] **SWITCH WITH RECEPTACLE AND SWITCH SHUNT MEANS**

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[52] **U.S. Cl.** ..... **317/112,** 200/51 R, 317/99

[51] **Int. Cl.** **H02b 1/04**

[58] **Field of Search** ..... 200/51 R, 51.1, 38 FA, 200/38 FB; 338/200; 323/22 SC, 24; 307/141; 315/205, 291, 320; 317/99, 112, 120

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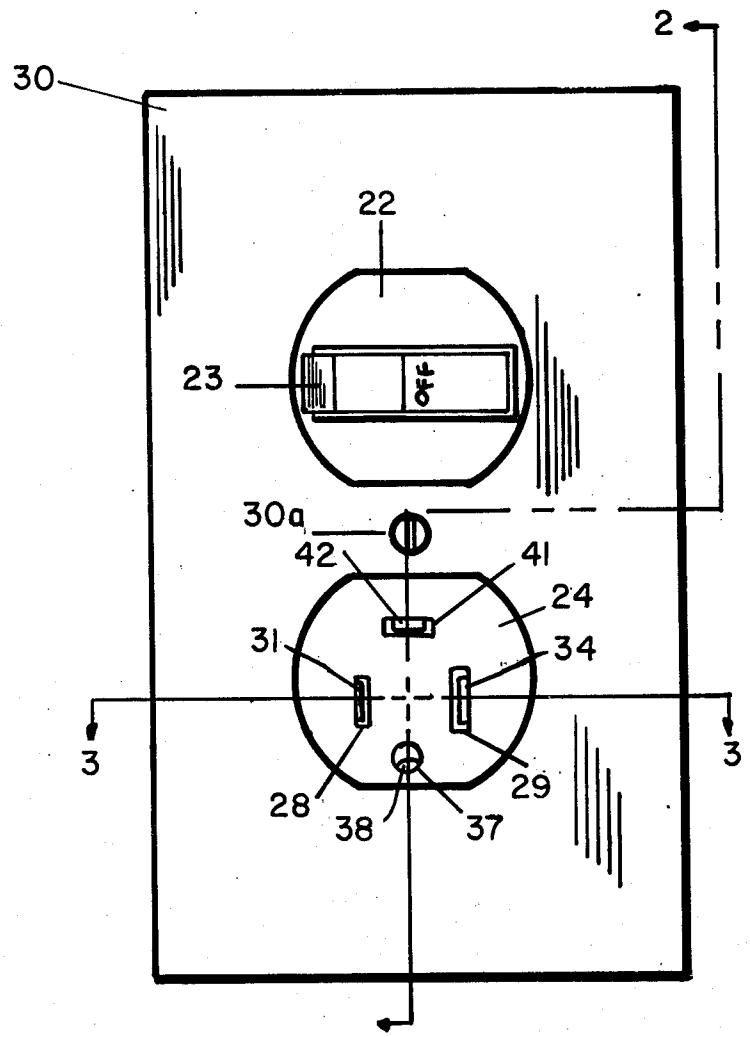
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Primary Examiner—James R. Scott
Assistant Examiner—Gerald P. Tolin

[57] **ABSTRACT**

An electrical unit, system or circuit includes a conventional switch and a novel outlet receptacle having, in addition to the usual pair of slots with contacts, a third slot with a contact which is electrically connected to a switch contact whereby an external connection from the latter slot and one of the pair of slots will complete the circuit as though the switch had been closed. Novel electrical devices are designed to establish this external connection.

14 Claims, 18 Drawing Figures



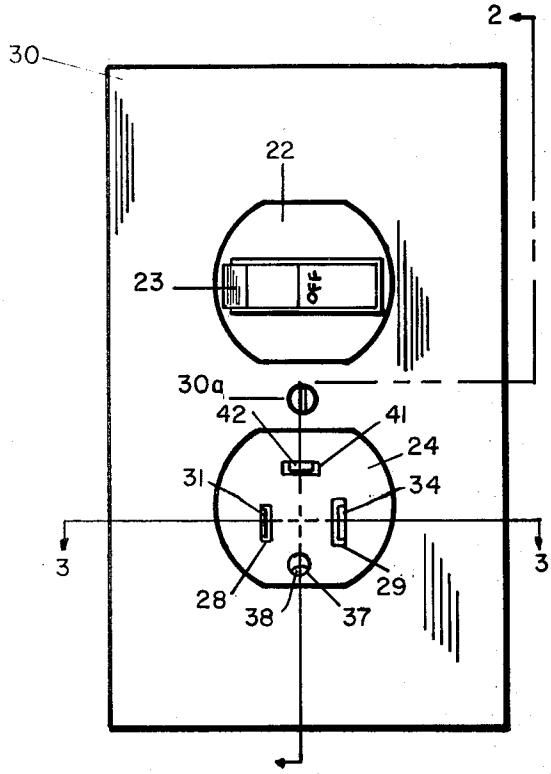


FIG. 1

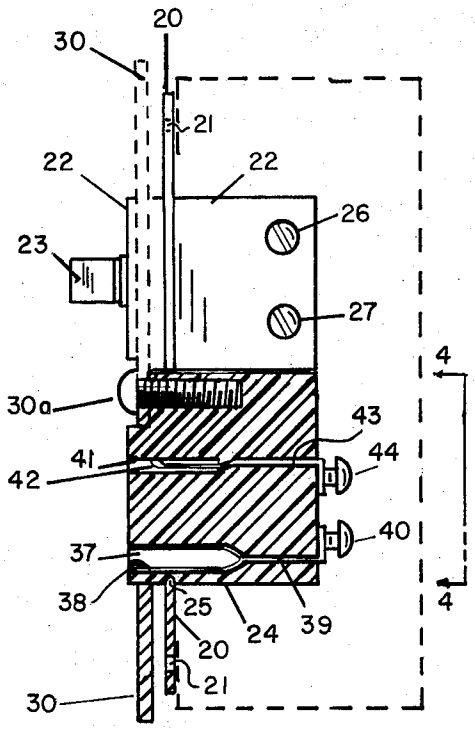


FIG. 2

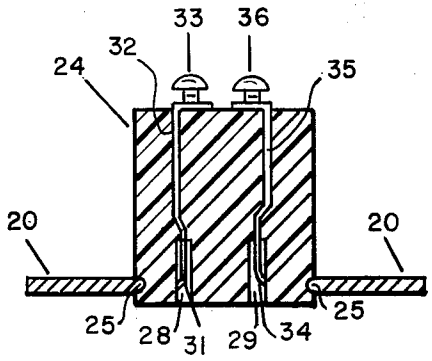


FIG. 3

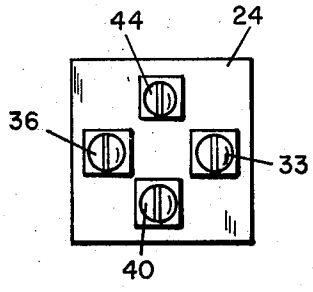


FIG. 4

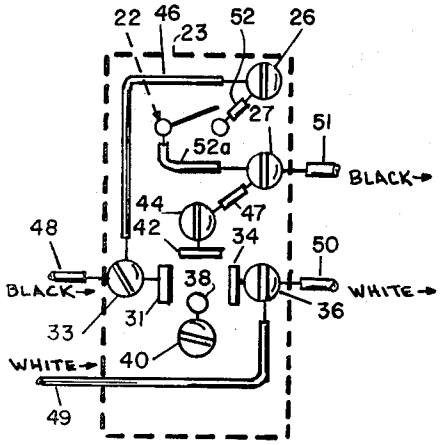


FIG. 5

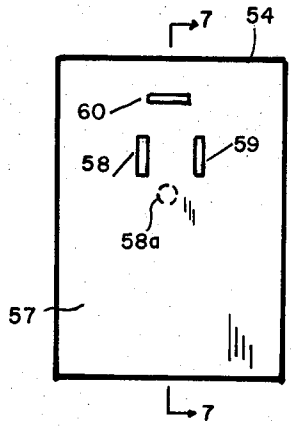


FIG. 6

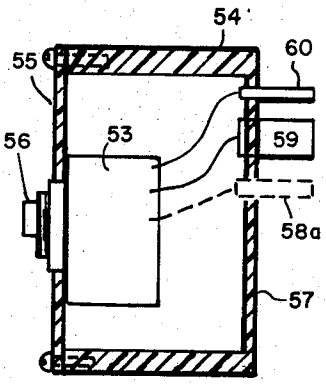


FIG. 7

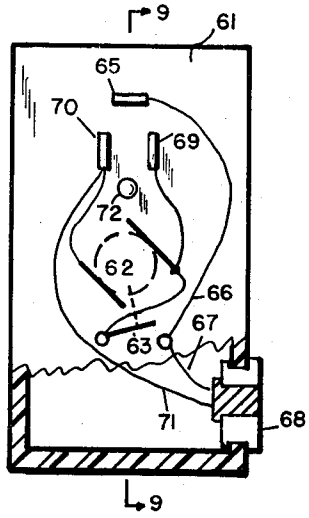


FIG. 8

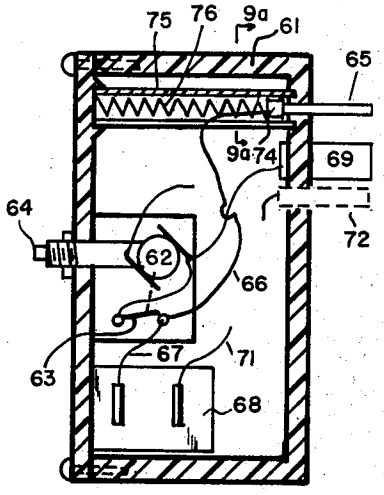


FIG. 9

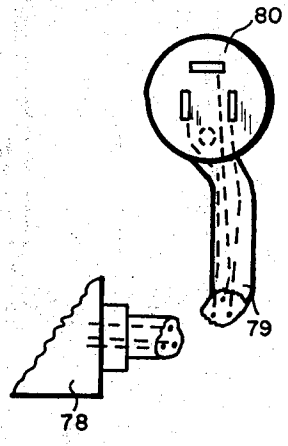


FIG. 10

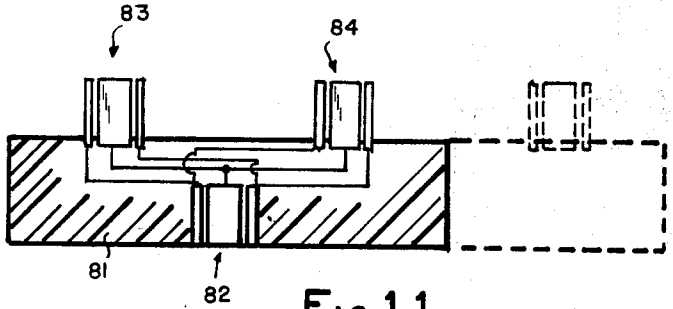


FIG. 11

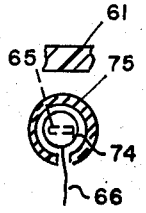


FIG. 9a

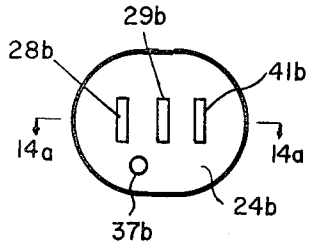


FIG. 14

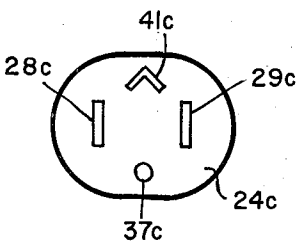


FIG. 15

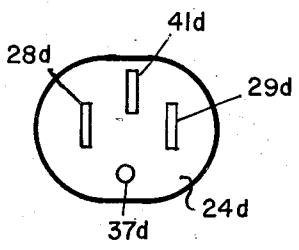


FIG. 16

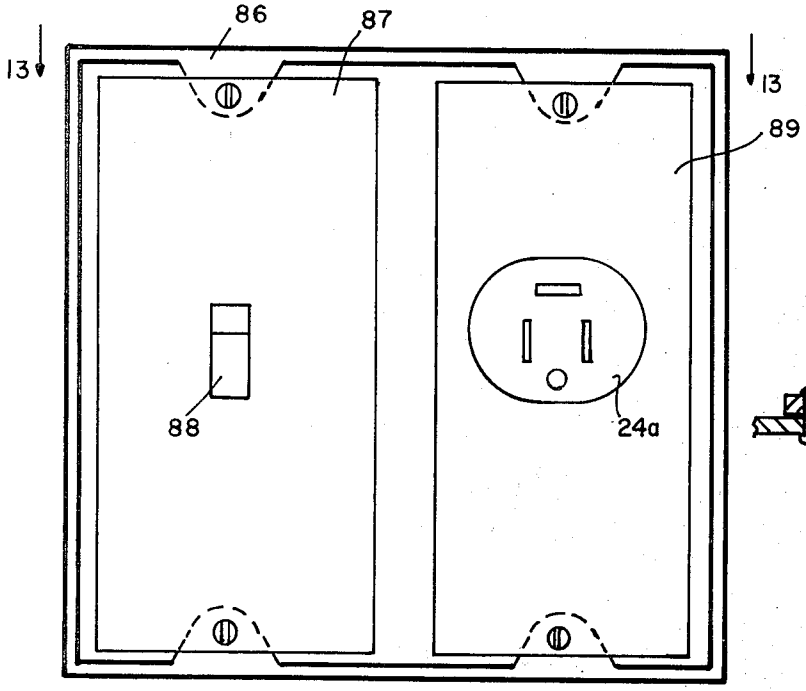


FIG. 12

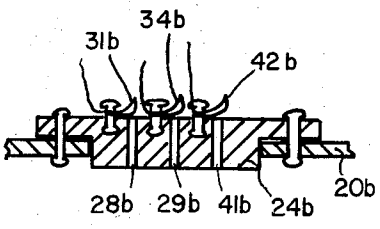


FIG. 14a

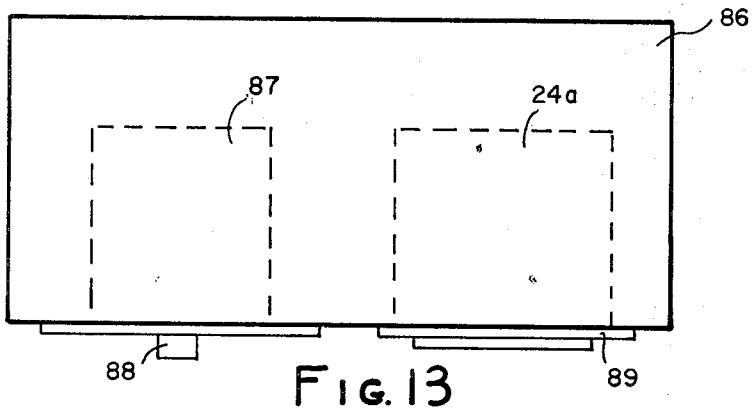


FIG. 13

SWITCH WITH RECEPTACLE AND SWITCH SHUNT MEANS

This invention relates to electrical circuitry and to apparatus and articles which are or can be connected as a system into the circuitry. More particularly, the invention is concerned with household circuits used for lighting and appliances.

All modern homes have more or less extensive wiring circuits which include wall switches and also wall receptacles into which floor lamps and a wide variety of appliances may be plugged to receive electrical energy. The wall switches usually supply electricity to ceiling lights, basement lights, outdoor lights, or wall receptacles. Most wall receptalces are permanently connected to the incoming electrical supply with the intention that the light, radio, television, etc., have its own switch. Into these "live" receptacles may also be plugged small appliances such as toasters, small ovens, percolators, and the like.

There is now available a so-called "dimmer switch" which replaces the ordinary on-off switch in a wall switch box. As this dimmer switch is permanently installed in its wall box, it can be used only to dim the ceiling light connected to it, or, if the dimmer switch is connected to a wall receptacle, it will control only a floor light plugged into that particular receptacle.

Also, there is now available a timer-switch which has prongs that directly plug into a wall receptacle or has an extension cord that is to be plugged into a wall receptacle. In this way, it receives electricity to run an enclosed clock and operate an enclosed switch which can be pre-set for a timed on-and-off interval. This switch is connected to an outlet receptacle which is a part of the timer casing or it is connected to an electrical wire which terminates in a socket into which a floor light, for example, may be plugged.

These past circuits and units have lacked the versatility of application which many persons have wanted. For instance, many persons have wished that they had a set-up which would make it possible to turn on and off an outside light at present times. The present day, permanent wiring in a house, makes it impossible to insert a timer in its outside light circuit unless an extensive and expensive rewiring job is done. This is true, also, of ceiling lights as they are always permanently wired to a wall switch and to cut into the circuit to insert a timer would involve a radical and expensive wiring rearrangement.

This same complexity applies to the installation of a dimmer switch in a ceiling light circuit as the present day permanent wiring requires that the light switch box be entered so that the ordinary switch can be removed and be replaced with a dimmer switch. Once this changeover is made, it is hardly likely that the dimmer switch will be removed if it is desired that that dimmer switch be installed in the circuit for another light.

The present invention involves a combination switch and outlet receptacle unit or system which can be installed in the ordinary wall box as a replacement for the usual switch in that same box. The installation is a simple one as the same incoming black and white wires are used and the same outgoing black and white wires are used. The switch of the novel combination switch and outlet receptacle functions in the same manner as that of the switch it replaces. The outlet receptacle of this novel combination unit can be utilized as a power source in the usual manner such as to operate a radio or clock. The important feature of this novel combination unit or system is that a portable timer switch or a portable dimmer switch can be plugged into it to selectively supply electricity to the wires leading out of the wall box.

The invention will be clarified by reference to the drawings in which:

FIG. **1** is a front view of the combination switch and outlet receptacle unit and an attached cover plate,

FIG. **2** is a side view of FIG. **1** on the line **2—2** so that the upper portion is in elevation and the lower portion is in section, the outline of a conventional wall box being indicated in dotted lines,

FIG. **3** is a cross-sectional view on the line **3—3** of FIG. **1**, the cover plate being omitted,

FIG. **4** is a rear side view of FIG. **2** as indicated by the line **4—4**,

FIG. **5** is a schematic wiring diagram showing how the combination unit of the invention is connected into a home electrical circuit,

FIG. **6** is a rear view of a dimmer switch,

FIG. **7** is a sectional view on the line **7—7** of FIG. **6**,

FIG. **8** is a rear view of a timer switch, a lower portion being broken away to show the integral outlet receptacle, and internal elements shown in symbolic form,

FIG. **9** is sectional view on the line **9—9** of FIG. **8**, elements therein also being shown in symbolic form,

FIG. **9***a* is a fractional view on the line **9***a***—9***a* of FIG. **9**,

FIG. **10** is a detailed view of an alternative wiring for the devices of FIGS. **6**, **7**, **8**, and **9**,

FIG. **11** is a longitudinal sectional view of a duplex adapter,

FIG. **12** is a front elevational view of an alternative arrangement of the switch and outlet receptacle of the invention,

FIG. **13** is a plan view of FIG. **12**,

FIGS. **14**, **15**, and **16** are illustrative showings of alternative slot openings in the outlet receptacle, and

FIG. **14***a* is a sectional view on the line **14***a***—14***a* of FIG. **14**.

Referring first to FIG. **1**, the metal plate **20** is of the usual conformation of switch plates or receptacle plates and it has the holes **21** therein to receive screws (not shown) for attaching the plate to a conventional wall box (shown in dotted lines in FIG. **2**). Firmly attached to the upper portion of plate **20** is a conventional switch block **22**, the internal switch being manually moved to off and on positions by the finger piece **23**. Firmly attached to the lower portion of plate **20** is an outlet receptacle block **24** which embodies the invention.

The blocks **22** and **24** may be attached to plate **20** by imbedding them therein in the manufacturing process as is indicated at **25**. As the blocks will ordinarily be made of plastic, insulating material which is moulded under heat, this attachment is readily made possible. The blocks **22** and **24** may, of course, be otherwise attached to plate **20** as by screws passing through the plate **20** and entering screw holes in the blocks. Or, the blocks **22** and **24** may be one integral molded piece, but they are shown here as two pieces to clarify the invention.

The plate **20**, as stated above, will be attached to the conventional wall box by screws passing through holes

21 in the plate 20. A cover plate 30 will be fastened to the block 24 (or block 22 if preferred) by screw 30*a*.

The switch block 22 has two screw terminals 26 and 27 on its side for connection to wires in the usual manner. When the switch within 22 is in closed position, the terminals 26 and 27 are internally connected together to establish a closed circuit. The terminals are shown on one side of the block for convenience of illustration, but they may be on any side or sides (other than the front side). If desired, instead of the screw terminals, short lengths of wire may come outwardly of the block 22, for attachment (as by screw nuts) to the external wires which would be connected to terminals 26 and 27. Such wires or the screw terminals may be considered as contact points of the switch.

The outlet receptacle block 24 has the usual parallel, pair of spaced slots 28 and 29 therein. They are spaced and shaped to receive the usual pair of power prongs of a plug which, for example, leads to a radio, floor light, or small utility article. To establish an electrical connection in slot 28 a spring leaf 31 is located therein, and it is connected by the conductor lead 32 to a screw terminal 33 on the rear of the block 24. This spring leaf 31, lead 32, and the base of the screw terminal may be all of one piece and be held in place by being imbedded in the plastic. In like manner, to establish an electrical connection in slot 29 a spring leaf 34 is located therein, and it is connected by the conductor lead 35 to a screw terminal 36 on the rear of block 24.

The block 24 is shown as having the round slot 37 therein to establish a ground connection. It has a leaf spring 38 therein connected by a leaf 39 to the external screw terminal 40. This grounding slot 37 and its electrical connections may be entirely eliminated if this safety feature is to be disregarded.

The novel feature of the invention is the provision of the horizontal slot 41. This is shown as being located on the side of the slots 28 and 29 which is opposite from the grounding slot 37. However, as will be explained later, slot 41 may be located in nearly any place relative to slots 28 and 29 so long as it is asymmetrically positioned relative to them so that the plug prongs can enter in only one oriented position. The slot 41 is here shown as horizontal to illustrate one arrangement of the invention so that the circuit can be explained.

Within the horizontal slot 41 is a leaf spring 42 to make an electrical connection with the prong to be inserted in slot 41. The leaf 42 is connected by lead 43 to screw terminal 44. The screw terminals are all shown as being located on the rear face of block 24, but they may be located on another face or on separate, different faces. They should be individually identified by appropriate markings or by colors. Also, the four leaf springs may be connected to separate wires which emerge from block 24 so that electrical connections may be made as with screw nuts instead of using the screw terminals shown on the block 24.

A schematic of the wiring for this combination switch and outlet receptacle system is shown in FIG. 5. The symbolic representation of the switch within block 22 is indicated at 22 in FIG. 5, by a dotted lead line. An insulated wire 46 is connected between terminals 26 and 33. An insulated wire 47 is connected between the terminals 27 and 44. These wires may be installed by the purchaser or they may be installed by the manufacturer so that they are not removable. In fact, if blocks 22 and 24 are of one integral material, the wires 46 and 47 may be imbedded therein so it is not visible.

The black wire 48 from the power source is connected to screw terminal 33 (or to screw terminal 26 since they are connected by the lead 46). The white wire 49 from the power source is connected to the terminal 36. The white wire 50 going to the, e.g., ceiling or other light (not shown), is also connected to the terminal 36. The black wire 51 going to the same ceiling (or other) light is connected to screw terminal 27. It does not matter whether terminal 26 or 27 is connected to the internal moving element of the switch within block 22; these internal wires within the switch block are shown at 52 and 52*a*.

It is important to note that the contacts 31 and 34 are always connected to the external power source so that if a conventional plug is inserted in the slots 28 and 29, its prongs will receive energy in the usual manner. If the plug has a grounding prong, it will enter the slot 37 and be grounded. The external grounding wire which is ordinarily connected to terminal 40 is not shown. Thus, a floor light, radio, clock, or any other unit which is ordinarily connected to an outlet receptacle may be plugged into block 24.

Also, it should be noted that the switch at 22 may be moved to an on or off position as with ordinary switches, to supply electrical energy to the outgoing wire 51 leading, e.g., to a ceiling or other light. At this point it should be noted that if an external connection is made between leaf springs 31 and 42, (see FIG. 5) there will be established an electrical connection between the lead-in black wire 48 and the outgoing black wire 51, as if the switch at 22 had been closed. The invention contemplates a dimmer switch and a timer switch of novel designs which will establish such an external connection between leaf springs 31 and 42. If such an external connection is not made, the slot 41 and its leaf spring contact 42 is not used and does not interfere with the insertion of an ordinary plug.

If it is desired to progressively dim or brighten the light (e.g.) connected to wires 50 and 51, a special dimmer switch of this invention is plugged into the receptacle block 24. The dimmer switch per se would be the usual commercially available one which contains either a rheostat or a triavac. This switch 53 is secured in a casing or box 54 with a screw affixed cover plate 55; or, the cover plate 55 may be molded integrally with the box 54. The manually rotatable stem 56 projects through this cover plate 55. Affixed to the rear wall 57 of the casing or box 54 are two parallel prongs 58 and 59 which are of the conventional shape of the usual pair of prongs and which are spaced to enter the slots 28 and 29. Also affixed to the rear wall 57 is a horizontal prong 60 which is located so it will enter the horizontal slot 41. There may or may not be a grounding prong (shown in dotted lines at 58*a*) to enter the grounding slot 37. These prongs are affixed in the rear wall in any suitable manner as by being imbedded in its material. As will be explained later, these prongs may be on a separate plug assembly which is wired to this dimmer box.

The horizontal prong 60 is wired to one terminal or contact point of the dimmer switch 53. The vertical prong 59 is wired to the other terminal or contact point of the dimmer switch 53, and it is important that this be prong 59 as it is the one which makes contact with the leaf spring 31. As FIG. 6 is a rear view and FIG. 5

is a front view, the prong **59** and spring **31** are in mirror image positions. The prong **58** serves as a dummy as it merely orients the dimmer box and helps to hold it in place; it may in fact be omitted, but it would be better if either **58** or **58***a* is present to help orient the dimmer switch and hold it in place. It will be noted that the dimmer prongs **59** and **60** and the dimmer switch **53** serve to establish an external connection between leaf springs **31** and **42** so that the dimmer switch **53** varies the electricity supplied to the wire **51** and thereby to return wire **50** through the light.

An important feature of this invention is that if every wall switch box in a house has in it the combination unit of FIG. **1**, the same portable dimmer switch of FIGS. **6** and **7** can be plugged in the selected one to control the connected light. As has been mentioned above, the switch box may be connected by out-going wires **50** and **51** to a wall outlet (instead of a ceiling light) into which a floor light is to be plugged.

FIGS. **8** and **9** show a timer switch which incorporates the features of the invention whereby it may be plugged into the switch-receptacle unit or system of FIG. **1** to connect leaf springs **31** and **42** together. The invention contemplates the use of a conventional timer box or casing **61** having two prongs i.e., a pair, (and a possible third prong to make a grounding connection) to enter the two slots in a standard outlet receptacle. As this timer box and its internal parts are standard articles, its elements are only shown symbolically or schematically in FIGS. **8** and **9.** Generally considered, it includes a synchronous clock motor **62** which operates a switch **63.** The motor mechanism includes a stem **64** which projects out of the timer box so that the clock can be set to the correct time, and the moments to turn on and turn off the switch **63** can be preset. As there is no present novelty in this mechanism, only a generalized illustration of it is made here.

The feature of the invention involves the addition to the back wall of a horizontal prong **65** which corresponds to the prong **60** in FIGS. **6** and **7.** (This prong **65** is shown as spring biased for a purpose which will be explained). This prong **65** is connected to the switch **63** by wire **66** so that it receives electrical energy through the switch from the (black wire side) prong **69.** Another lead **67** is connected from this same side of the switch to one of the outlet slots of the usual outlet **68** which is a part of the timer switch. Consequently, when the switch **63** is closed, electricity is supplied from prong **69** to both the horizontal prong **65** and to the contact means in one of the outlet slots in the outlet **68.** The other prong **70** (the white wire connection) is wired to the motor **62** to make it function, and by wire **71** to the other slot of outlet **68**; this connection is not fully shown in the drawings because of the sectional views, but it is a conventional connection.

The timer of FIGS. **8** and **9** is to be plugged into the outlet receptacle of FIG. **1** and the prongs **69** and **70** will receive energy and operate the clock mechanism. When the clock mechanism closes the switch **63,** electricity will be supplied to the outlet **68** in a normal manner and electricity will also be supplied to prong **65.** From prong **65,** electricity flows to contact means **42** and then through wire **51** to the ceiling light, porch light, outdoor light, or whatever wire **51** (and wire **50**) is connected to.

This same timer-switch unit may be plugged into the selected one of the combination switch-outlet units or systems of the invention (FIG. **1**), because of the universal applicability and portability of the timer-switch unit. Obviously, this feature of inserting the same timer-switch, (or dimmer switch) in any selected outlet of FIG. **1** offers a considerable money saving over locating a separate timer-switch or dimmer-switch at every location. The outlet **68** may be used in the conventional manner to receive the plug of a floor light, radio, toaster, etc. The grounding plug **72** is shown in dotted lines as it may or may not be present.

In FIG. **9,** the horizontal prong **65** is shown as spring loaded so that it can be moved to a retracted position if there is no slot opening **41** to receive it. The prong **65** is shown as having a head **74** which can move back and forth in a non-metallic guide tube **75** secured within the box **61.** A spring **76** presses on the head **74** and urges the prong **65** to an outer position, but allows the prong **65** to move inwardly within the guide tube **75** if there is no slot for it in the receptacle. The wire **66** can freely move back and forth in the lengthwise slot of tube **75** as is shown in FIG. **9a.** Because of this moveability of prong **65** the unit can be plugged into any conventional outlet without being arrested as it would be by a solid prong, so that receptacle **68** will be activated for use.

FIG. **10** shows a generalized representation of the use of a lead wire which makes it possible to eliminate the prongs on either or both of the dimmer-switch of FIGS. **6** and **7** or the timer-switch of FIGS. **8** and **9.** The box or casing of either one of these switches is indicated at **78** and from it leads a wire **79** to a plug assembly **80.** The plug assembly **80** carries or supports a set of prongs spaced to enter the slots in block **24,** and they are connected by wires within **79** to the appropriate elements within the boxes, as explained above.

FIG. **11** shows an adapter which makes it possible to use a single dimmer-switch (or timer-switch) to control two outlet blocks **24** which are side by side. This includes an insulating block **81** which has slots at **82** in its forward face corresponding to the slots in block **24.** To its rearward face is attached two separate prong sets **83** and **84**; each set corresponding to those shown on the rear of the box of FIG. **8,** for example. The prong sets **83** and **84** would be spaced apart a distance corresponding to the conventional spacing between two separate outlet plates secured in a conventional double width wall box.

It has been stated above that switch block **22** and outlet block **24** are shown as two different blocks for convenience of illustration but that they can be united into a single integral block. Another arrangement which is contemplated by the invention is to maintain the usual switch on its own conventional attachment plate and to attach the outlet receptacle of the invention to its own separate plate. This is made possible if a conventional double width wall box, shown at **86** in FIGS. **12** and **13** is used. A conventional wall switch **87** with a finger piece **88** would be attached at one side of the box **86.** A plate **89** carrying the block **24***a*, having the structure of block **24,** would be attached to the other side of box **80.** The connecting wires **46** and **47** of FIG. **5** would electrically connect together the switch **87** and outlet receptacle **24***a*, as in FIG. **5.**

It has been mentioned above that the slot **41** in FIG. **1** may have any location which is asymmetrical to the slots **28** and **29** to assure proper orientation of the prongs. FIGS. **14, 15,** and **16** show such asymmetrical

arrangements and they have been given numberings with the subscripts *b*, *c*, and *d* corresponding to FIG. **1** to clarify the relationship. It is believed that the FIGS. **14, 15,** and **16** are self-explanatory.

The sectional view of FIG. **14a** shows that the contact means associated with each slot opening need not be within the slots, but may be to the rear of the slot in position to be contacted by the plug prongs. These contact means would be screw or rivet held, for example, at the rear face of insulating block.

The invention lends itself to the use of a polarized set of plugs, i.e. **58** and **59,** as well as **69** and **70.** To apply this, the slot **28** would be longer than slot **29** or vice versa if black and white wires are reversed and the appropriate internal rewiring is made. As the prong, i.e. **59** or **69,** would be longer in cross-section than prong **58** or **70,** these prongs would enter only the longer slot **28.** The corresponding prong of the set in the plug assembly of FIG. **10** would similarly be longer in cross section so that it resembles a standard polarized plug.

The invention has been described with particular reference to residential homes, but it is apparent that it can be used in commercial and industrial installations. In any of these installations, the slots **28** and **29** would be conventionally spaced and shaped.

I claim:

1. An electrical system for connection to two incoming wires from a power source and also for connection to two outgoing wires to a power consumer, comprising in combination a switch and electrically connected thereto an outlet receptacle having therein three asymetrically located slots each having an electrical contact means for contact with a prong when inserted in the slot, two of said slots constituting a pair and being positioned to receive a conventional electrical plug, the contact means of the third slot being electrically connected to one of the switch contacts and also having wire engaging means for an outgoing wire, the other switch contact being electrically connected to the contact means of one of said pair of slots and also having wire engaging means for an incoming wire, the other one of said pair of slots having wire engaging means for the other incoming wire and also for the other outgoing wire.

2. The system of claim **1** in which said switch is a part of one block and said receptacle is a part of another block.

3. The system of claim **2** in which both of said blocks are attached to a common fastening plate.

4. The system of claim **2** in which said receptacle is attached to its own fastening plate.

5. The system of claim **1** in which said switch and said receptacle are contained in a single integral block.

6. The system of claim **5** in which the electrical connections between the switch and the receptacle are imbedded in said block.

7. The system of claim **1** in which said receptacle includes a fourth slot with electrical contact means to establish a ground.

8. An electrical circuit comprising a switch having a first and a second contact point and in combination therewith an outlet receptacle having therein three asymmetrically located slots each having an electrical contact means thereat, two of said slots constituting a pair and being positioned to receive a conventional electrical plug, the contact means of the third slot being electrically connected to said first contact point of the switch and said second contact point of the switch being electrically connected to the contact means of one of said pair of slots, said circuit also including a pair of incoming electricity supply wires which are separately connected to the contact means of said pair of slots and additionally including two outgoing electricity delivery wires one of which is connected to said first contact point of the switch and the other of which is connected to the contact means of the other one of said pair of slots.

9. The circuit of claim **8** which includes a dimmer switch having an enclosing casing, manually variable current controlling means therein having two electrical contact points, and two plug prongs which are inserted respectively in said third slot and in said one of the pair of slots and electric wires separately connecting said contact points to said plug prongs.

10. The circuit of claim **9** in which said plug prongs are carried by a wall of said casing.

11. The circuit of claim **9** in which said plug prongs are carried by a separate prong support which is connected through said electric wires to the current controlling means.

12. The circuit of claim **8** which includes a timer switch having an enclosing casing, an electric clock motor therein and operatively connected thereto a switch to be activated and deactivated thereby at preset times, a pair of plug prongs which are inserted in said pair of slots and a third prong which is inserted in said third slot, said pair of plug prongs being electrically connected to said electric clock to continuously energize it, said third prong being electrically connected to a contact point of said switch, and the other contact point of said switch being electrically connected to that one of said pair of prongs which is inserted in said one of said pair of slots.

13. The circuit of claim **12** in which said plug prongs are carried by a wall of said casing.

14. The circuit of claim **12** in which said plug prongs are carried by a separate prong support which is connected through said electric wires to the timer switch.

* * * * *

UNITED STATES PATENT OFFICE

CERTIFICATE OF CORRECTION

Patent No. 3,828,224 Dated August 6, 1974

Inventor(s) Stephen J. Hulshizer

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

On the cover page [76] "Lansdale, Pa." should read

-- Hatfield, Pa. --.

Signed and sealed this 1st day of July 1975.

(SEAL)
Attest:

RUTH C. MASON
Attesting Officer

C. MARSHALL DANN
Commissioner of Patents
and Trademarks

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