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E. F. REIHMAN ET AL
MASTER SELECTOR SWITCH

2,991,337

Filed Sept. 2, 1958

FIG. 1.

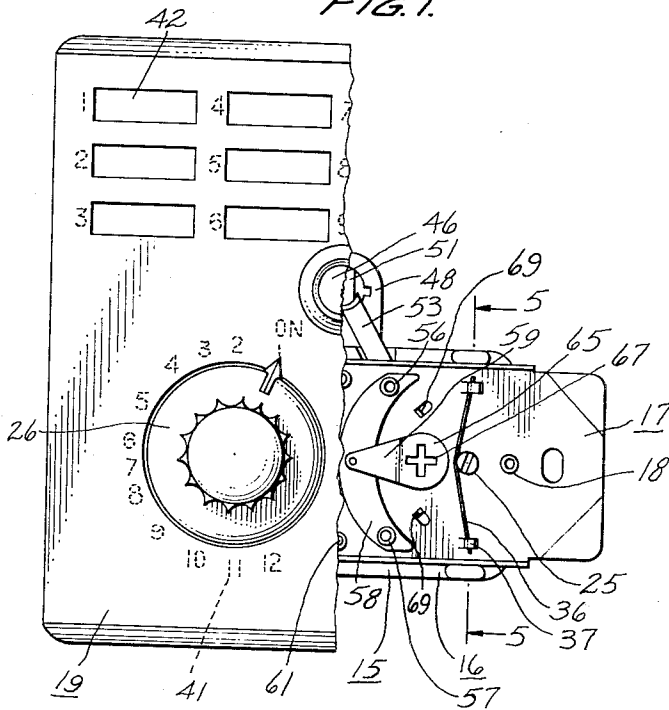


FIG. 2.

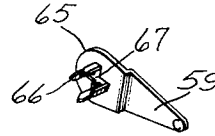


FIG. 3.

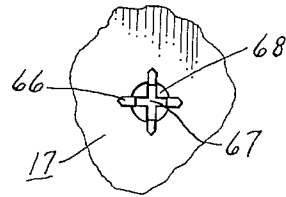


FIG. 4.

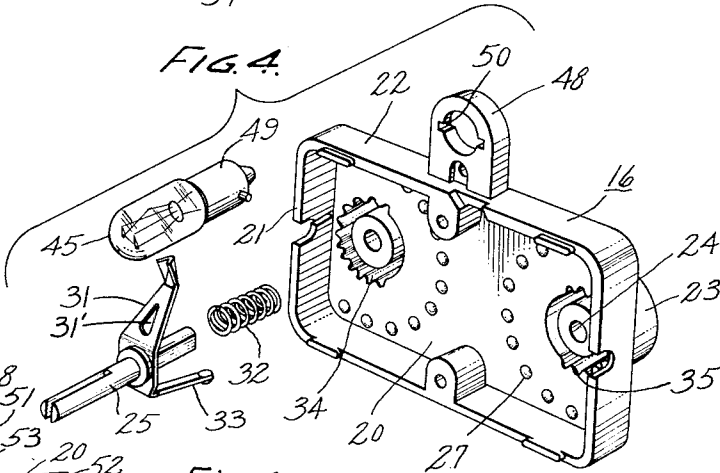


FIG. 5.

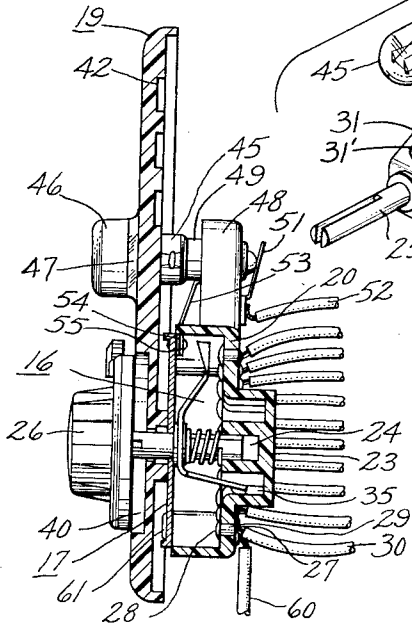
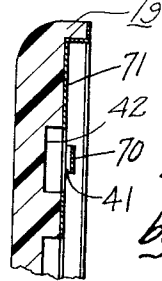


FIG. 6.



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MASTER SELECTOR SWITCH

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2 Claims. (Cl. 200—11)

The present invention relates to an electrical switch and particularly a master switch for controlling a plurality of circuits with two separate On and Off knobs that permit one-hand operation.

This switch has been designed especially for a remote-control wiring system where the switching of the power circuits is accomplished by means of low voltage control circuits using relays installed directly in the outlet box of the circuit that is being controlled or alternately grouped in special gang boxes to obtain zoned installation near the service entrance box. These relays are actuated by a 24 volt circuit supplied by means of a special energy-limiting transformer and controlled by low voltage switches which are single pole, double throw, momentary contact, normally open type switches. Since these switches are of the momentary contact type, any number can be placed in parallel for multipoint control. This eliminates the need for special switches such as three-way and four-way switches as required in the ordinary wiring system.

The master selector switch of this invention as presently used is a twelve position selector switch having both an On and an Off knob whereby any one of the twelve circuits may either be individually controlled or operated in unison with a sweep of the knob or knobs. Both knobs act in a similar manner. The On knob, for example, may be turned to register with a specific numbered position indicated on the faceplate of the switch. The knob is then depressed to energize the lighting fixture of that particular circuit. Alternatively, the knob may be depressed and then turned to sweep the fixed contacts of the switch and energize the circuits in unison.

This master selector switch replaces a combination switch having a rotary switch and a rocker type switch, where the rotary switch selects the circuit or circuits and the rocker type switch either energizes or de-energizes these particular circuits. However, this former type switch required the use of both hands; one hand for operating each switch. This invention has simplified the operation of a master selector switch by requiring the use of only one hand in accomplishing the switching operation.

The principal object of this invention is to provide a rotary selector switch with a novel indexing arrangement that operates in both the extended and depressed positions of the switch knob.

A further object of this invention is to provide a master selector switch for controlling a plurality of circuits by utilizing two similar rotary switches in a single housing where the circuits may either be controlled individually or in unison.

A further object of this invention is to provide a master selector switch with an illuminated faceplate having several windows provided in the faceplate so that the circuits may be identified by printed slips of paper mounted in the windows, thereby furnishing a directory for the wiring system.

A still further object of this invention is to provide an illuminated faceplate with a light dimmer control that permits adjusting the light in a limited range of brightness.

The preferred embodiment of this invention includes a switch housing formed by a recessed base member and a metal cover plate. The base has a series of fixed con-

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tacts arcuately arranged around the longitudinal axis of the shaft of the knob or handle of the switch. This shaft is mounted for sliding movement within the base and extends through the metal cover plate for receiving a knob. It will be understood that this master selector switch incorporates two similar switches, although for the sake of brevity only one will be discussed in detail. Fixedly mounted on the shaft is a movable contact blade. One end of the contact blade includes a detent arm that extends into a well within the base and is adapted to engage a series of notches formed in the side walls of the well for indexing the contact blade into positions overlying the fixed contacts of the switch. Spring means are provided to hold the shaft and, hence, the contact blade normally in an extended position where the contact blade will be out of engagement with the fixed contacts. The switch knob may be depressed to compress the spring and close the circuit between the movable and fixed contacts. This may be done to activate a single circuit or the knob may be turned while it is depressed to sweep the fixed contacts and energize all of the circuits in unison.

The faceplate of this selector switch incorporates printed tabs which are selected to identify the circuit for each numbered position of the knobs. Accordingly, the operator is aware of the exact identification of each circuit so that pin-point control can be effected with accuracy. Moreover, the faceplate has been illuminated in a novel manner by incorporating a transparent plate with an opaque finish on its back side and inserting a light source into a small dome-shaped formation visible on the front side of the plate. A small lamp is inserted into the dome through the back of the plate to light up the face of the plate. Also, a portion of the light rays travels in the plane of the plate and is emitted at several strategic locations adjacent the indicia on the plate as well as the directory for identifying the various circuits.

Our invention will be better understood from the following description taken in connection with the accompanying drawing and its scope will be pointed out in the appended claims.

FIGURE 1 is a front view of a master selector switch embodying the present invention with the right half of the faceplate removed for observing the adjusting means for the dimmer control of the light source of the faceplate.

FIGURE 2 is an isometric view of the dimmer control arm of FIGURE 1.

FIGURE 3 is a detailed showing of the fastening means for the dimmer arm on the metal cover plate of the switch.

FIGURE 4 is an exploded view of a portion of the switch showing the interior of the recessed base, the shaft of the switch handle having a movable contact blade mounted thereon for cooperation with a coiled spring that normally holds the shaft in an extended position.

FIGURE 5 is a cross-sectional side elevational view taken on the line 5—5 of FIGURE 1 through the shaft of the right-hand knob of the switch.

FIGURE 6 is an enlarged cross-sectional view of the transparent faceplate showing a layer of opaque paint on its back surface.

Referring in detail to FIGURES 1 and 5 of the drawing, numeral 15 identifies a switch housing formed by a recessed base member 16 and a metal cover plate 17. A tapped opening 18 is provided at each side of the cover plate 17 for receiving a fastening screw (not shown) that extends through a decorative faceplate 19 for holding the faceplate over the switch housing.

Turning first to a consideration of the switch mechanism, reference will be made to FIGURES 4 and 5 of the drawing. In FIGURE 4, the recessed base member

16 is shown in isometric view. The base is a molded insulating part of box-like construction with a bottom wall 20 and opposite pairs of side walls 21 and 22. The side opposite the bottom wall 20 is open for receiving the switch parts therethrough. As mentioned previously, the master selector switch of this invention incorporates two similar switch structures. One switch controls the On coils of a group of relays while the second switch controls the Off coils of the same group of relays. Because of the duplication of the switch elements, only one switch construction will be described in detail, although it should be recognized that when speaking of one switch, the other switch is also included.

As best seen in FIGURE 5, the bottom wall 20 of the switch base has an enlargement 23 extending rearwardly therefrom. The center of this enlargement contains a cylindrical cavity 24 for receiving the innermost end of a shaft 25 for the switch handle 26. Centered around the bore 24 are a group of twelve fixed contacts 27. As seen in FIGURE 5, each contact 27 is in the shape of a pin having a rounded head 28 and a shank portion 29 that extends through the bottom wall 20 of the base and has soldered to its end a flexible lead wire 30. A spring contact blade 31 is staked onto the mid-portion of the shaft 25. When the innermost end of the shaft 25 is positioned in the bore 24 of the base, the spring blade 31 represents the movable contact of the switch and is capable of making electrical connection between each of the fixed contacts 27 and the grounded plate 17. A good electrical connection is made between the shaft 25 and cover plate 17 by a straight wire spring 36 as seen in FIGURE 1. This spring is confined at its ends by a pair of lanchings 37 struck from the plate 17 so that the mid-portion of the spring is tensioned against one side of the shaft.

A coiled spring 32 is assembled over the innermost end of the shaft 25 and is seated on the bottom wall 20 of the switch base. This spring normally holds the shaft in an extended position outwardly from the switch housing. In this position the movable contact blade 31 is out of engagement with the fixed contact 27, as seen in FIGURE 5. The circuit or circuits may be closed by first dialing the handle 26 until a desired circuit position is obtained and then pushing against the handle against the action of the spring 32 to slide the shaft inwardly and close the contacts. Alternatively, the handle may be first depressed and then turned to sweep the movable contact blade over the fixed contacts so that all of the circuits will be closed in unison. The depth of the bore 24 is such that the shaft 25 will bottom in the bore as the handle is depressed. This prevents undue stress being exerted on the spring contact arm 31.

It is necessary to provide means for indexing the movable contact blade so that it may be positioned accurately over each fixed contact 27, and likewise to provide a certain amount of snap action as the movable blade is shifted from one position to another. This important element of the invention is represented by a detent arm 33 that is an integral part of the movable blade 31 and extends at substantially a right angle thereto. A deep well 34 is formed in the enlargement 23 of the base concentrically with the bore 24. This well is for accommodating the detent arm 33. A series of notches or flutes 35 are arranged on the side walls of the well 34 and are engageable by the free end of the detent arm 33. These notches or flutes 35 are elongated so that the detent arm will be in contact therewith in either the extended or depressed positions of the switch handle. The detent arm 33 must be relatively stiff for the best performance. Since the contact arm 31 is made of the same sheet stock as the detent arm, the contact arm is made resilient by forming a hole 31 in its mid-portion.

As mentioned previously, the switch includes a face-

plate 19 of transparent plastic material which is assembled behind the two switch handles 26 and over the switch housing 15. The front surface of the plate 19 is recessed as at 40 directly behind the switch handles to accommodate the sliding movement of the handle inwardly toward a circuit closing position. When the handle is in its extended position, its back side will be substantially flush with the front surface of the plate 19, as seen in FIGURE 5. Suitable indicia 41 are provided on the plate around the periphery of each switch handle so that the various circuit positions of the switch may be identified. For instance, twelve numerals are shown, indicating that the switch is a 12-position switch. The numerals and other desired indicia are molded in relief on the back side of the faceplate 19. The indicia are first covered with a dark paint 70 such as brown. Then a lighter tone of ivory colored paint 71, shown in FIGURE 6, is applied over the back surface which gives the plate a glass-like appearance with a good contrasting coloring. The wall plate 19 also includes a directory at the top portion of the plate comprising a series of transparent unpainted windows 42, one for each circuit, so that small printed tabs may be pasted in the windows for identifying the different circuits as to the location of the lighting fixtures, outlets, etc. that may be controlled by this master selector switch. Each window 42 is marked with a numeral corresponding with the numerals centered around the switch handles.

Since this master selector switch serves as the control means for a plurality of individual circuits, it is necessary that the operator be able to read the directory at the top of the faceplate as well as to distinguish between the numerals 41 around each switch handle. Accordingly, the faceplate has been illuminated by a small lamp 45 that extends through the back of the plate into a hollow dome-like formation 46 that projects from the front equidistant from the two handles and raised slightly above them. The lamp is a 37½ volt lamp that will be used in a circuit delivering a maximum of 30 volts which should increase the life of the lamp to a point where it should never have to be replaced. The major portion of the inner surface of the dome 46 is also covered with an opaque paint, but a transparent ring 47 near the base of the dome is left free of paint so that the light emitted by the lamp 45 may shine over the entire front surface of the plate. The light waves will also travel in the plane of the plate 19 and be emitted out along the edges of the recesses 40 and the windows 42, as seen in FIGURE 5.

As seen in FIGURE 5, the lamp 45 is supported in a bayonet socket 48 that is molded integrally with the side wall 22 of the base. The lamp 45 has a bayonet base 49 which is received in the socket 48 with its two bayonet slots 50, as seen in FIGURE 4. The center contact of the lamp socket is represented by a spring blade 51 that is fastened at one end to the back side of the socket while its opposite end overlies the opening in the socket for making engagement with the center contact of the lamp. A lead wire 52 is soldered or otherwise fastened to the contact strip 51 for connecting the lamp in an operating circuit. The side grounding contact of the lamp socket 48 is in the form of a very thin metal strip 53 that is fastened at one end to the metal mounting strap 17, as at 54 in FIGURE 5. This side contact 53 is carried by the metal strap and is of very thin sheet stock so that the free end of the strip may be loosely inserted into the lamp socket 48. Then when the lamp 45 is inserted into the socket, the strip will be shaped to conform to the side walls of the socket. At the same time the strip will have enough spring action that it will make good electrical contact with the lamp base. The end 54 of the side contact 53 is insulated from the metal strap 17 by a fiber bushing 55. A metal eyelet holds the side contact 53 onto the strap 17 but the eyelet is also insulated from

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the strap by the bushing. This eyelet is shown as element 56 in FIGURE 1 and it cooperates with an uninsulated eyelet 57 in holding a thin resistor strip 58 onto the front side of the strap 17. This resistor strip is insulated from the strap but it is electrically connected to the two metal eyelets 56 and 57. The purpose of this resistor strip 58 is to provide a dimming control for the lamp 45 by means of an adjustable dimmer arm 59 that is pivotally connected to the strap 17. Stop members 69 are formed on the strap 17 to limit the extent of turning of the dimmer arm. Finally, the metal strap 17 is joined as a part of the circuit of the switch by attaching a lead wire 60 to a metal eyelet 61 that fastens the strap 17 to the base 16. Accordingly, the several circuits through the switch are carried by the lead wires 30 through the fixed contacts 27 and movable contact blade 31, through the shaft 25 and wiping spring 36 to the strap 17 and then through the neutral wire 60. As for the lighting circuit for the switch, there is the lead wire 52 for the lamp socket 48 with its center contact 51 and side grounding contact 53 joined to the variable resistor strip 58 and through the dimmer arm 59 to the metal strap 17 and from there to the neutral wire 60.

The adjustable dimmer arm 59 is provided with a novel pivotal end 65 that may be engaged by a screwdriver for turning the arm to obtain a desired degree of brilliance. Looking at FIGURES 1-3, the pivotal end 65 of the dimmer arm is provided with four radially-spaced lancings 66 which are raised on the underside of the arm and establish a cross-shaped slot 67 in the arm, as best seen in FIGURE 1. These lancings 66 are adapted to extend through a circular opening 68 in the strap 17 and be formed outwardly to engage the back side of the strap and prevent the separation of the arm from the strap. These lancings provide a fastening means between the arm and the strap and likewise establish a cross-shaped slot 67 for receiving the blade of a screwdriver for ease in adjusting the position of the arm on the resistor strip 58. A suitable circular opening (not shown) is provided in the faceplate 19 under the right-hand switch handle 26 so that a screwdriver may extend therethrough and engage in the slot 67, as previously mentioned.

Having described above our invention of a novel master selector switch with an illuminated faceplate, it will be readily apparent to those skilled in this art that we have facilitated the ease of controlling a plurality of circuits in such systems as a low voltage remote control wiring system, and that we have provided a switch mechanism with a reliable detent mechanism for all positions of the switch handle. The faceplate has been illuminated in a novel manner, making it easy to view the positions

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of the switch handles as well as providing a directory at the top portion of the faceplate.

Modifications of this invention will occur to those skilled in this art and it is to be understood, therefore, that this invention is not limited to the particular embodiments disclosed but that it is intended to cover all modifications within the true spirit and scope of this invention as claimed.

What we claim as new and desire to secure by Letters Patent of the United States is:

1. A master selector switch comprising a switch housing formed by a recessed base member of insulating material and a metal cover plate, the plate being connected to the grounded side of the switch circuit, a shaft in said housing capable of turning movement about its longitudinal axis extending through an opening in said cover plate and being slidably supported by said base, a spring normally holding said shaft in an extended position, a series of fixed contacts arranged in the housing and centered around the shaft, a movable contact blade of spring material fixed on said shaft and having two opposite arms, one arm being a contact arm for engagement with the fixed contacts and the other arm being a detent arm, the said contact arm being out of engagement with the fixed contacts when the shaft is in its extended position, the housing including a well for receiving the said detent arm, the side walls of the well having a series of notches that are engaged by the detent arm of the contact blade as the shaft is turned, and a spring member supported by the said plate and bearing against the side of said shaft for maintaining good electrical connection between said shaft and said plate.

2. A master selector switch as recited in claim 1 wherein the said spring member is a bowed spring that is held at its ends and tensioned at its mid-portion against one side of said shaft.

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