

[54] ELECTRICAL SWITCH SYSTEM FOR A
HOUSE OR THE LIKE

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[58] Field of Search 340/147 R; 317/154, 137;
307/114, 140, 142

[56]

References Cited

UNITED STATES PATENTS

3,514,626	5/1970	Platzer, Jr.	307/114
3,558,902	1/1971	Casey	307/140 X
3,629,608	12/1971	Trindle	317/154

OTHER PUBLICATIONS

J. Pitts, Jr. "Relays and Their Operation" Electronics,
March 1951, pgs. 53,54.

G. E. Publication Manual, "Remote Control Wiring
System" pgs. 1-6, 10-16, 22-25, 09-01-1958.

Square D Manual, "Low Voltage Control" pgs. 5-12,
05-05-1949.

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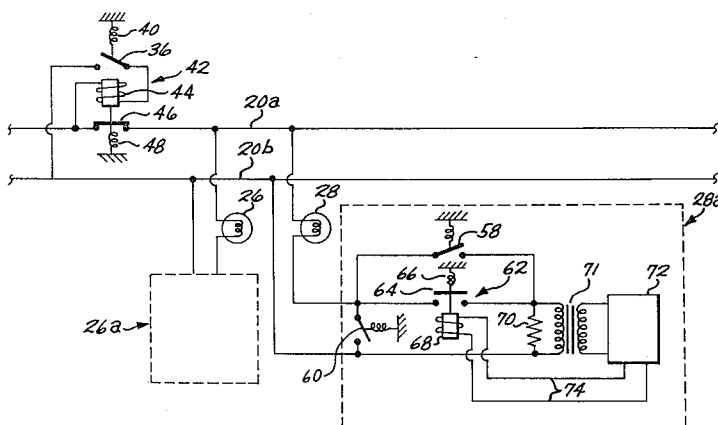
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[57]

ABSTRACT

An electrical power system for a house or the like, where there is a master switch by which outlets throughout the house may be turned off, without interfering with the subsequent activation of the outlets through individual local switch assemblies for the various outlets. Operation of the master switch causes a momentary interruption of current in the electrical distribution lines in the house. Each of the outlets or groups of outlets is provided with a respective switch assembly comprising a relay switch that is held in a closed position by activation of a holding circuit, which in turn is supplied with power through the relay switch. Thus the momentary interruption of current by the master switch causes momentary deactivation of the holding circuits of the switch assemblies of these various outlets to cause them to move to their off position and thus de-energize these outlets throughout the house. The various outlets can be later individually turned on and off by means of an on-off switch means in the individual switch assemblies.

11 Claims, 3 Drawing Figures



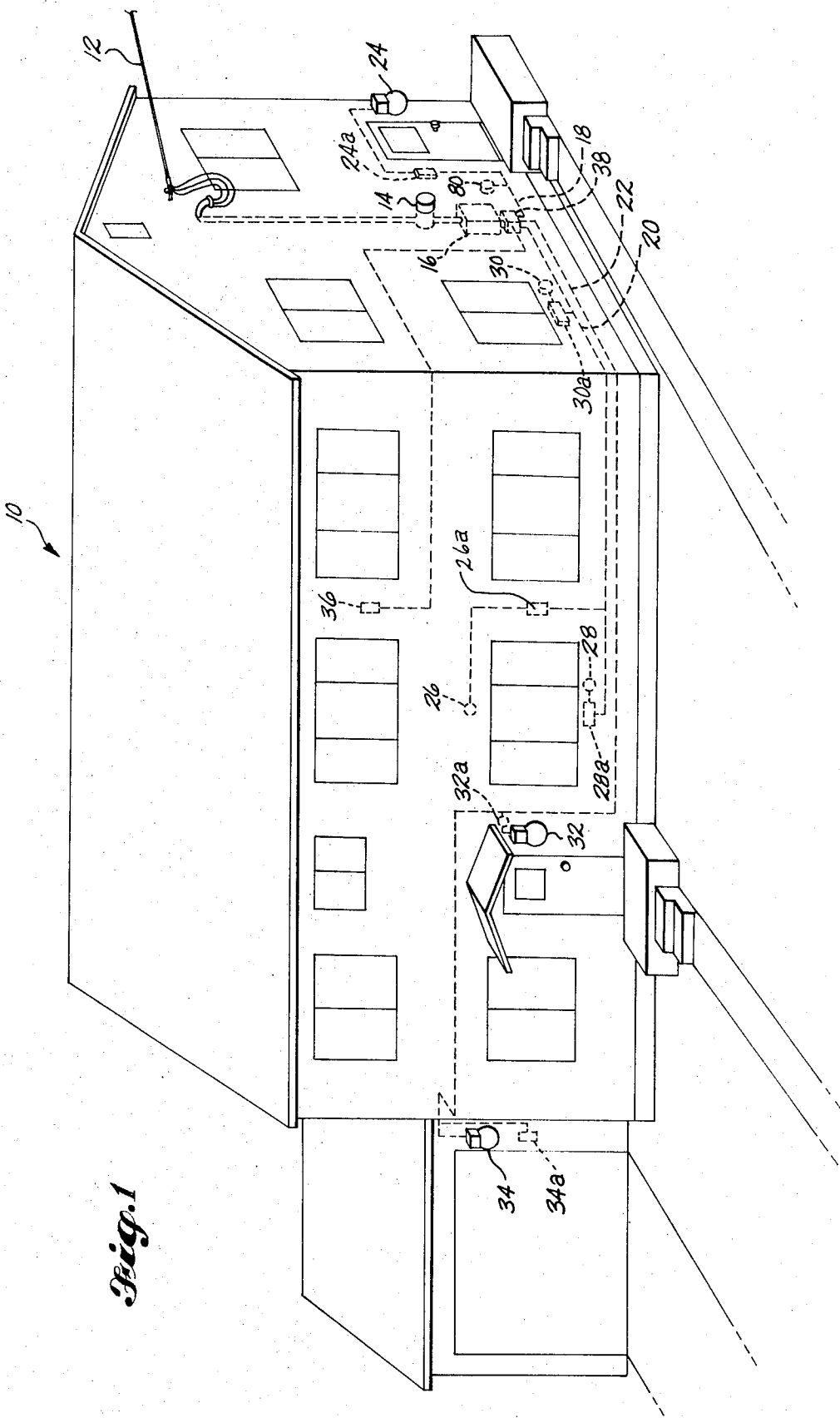


Fig. 2

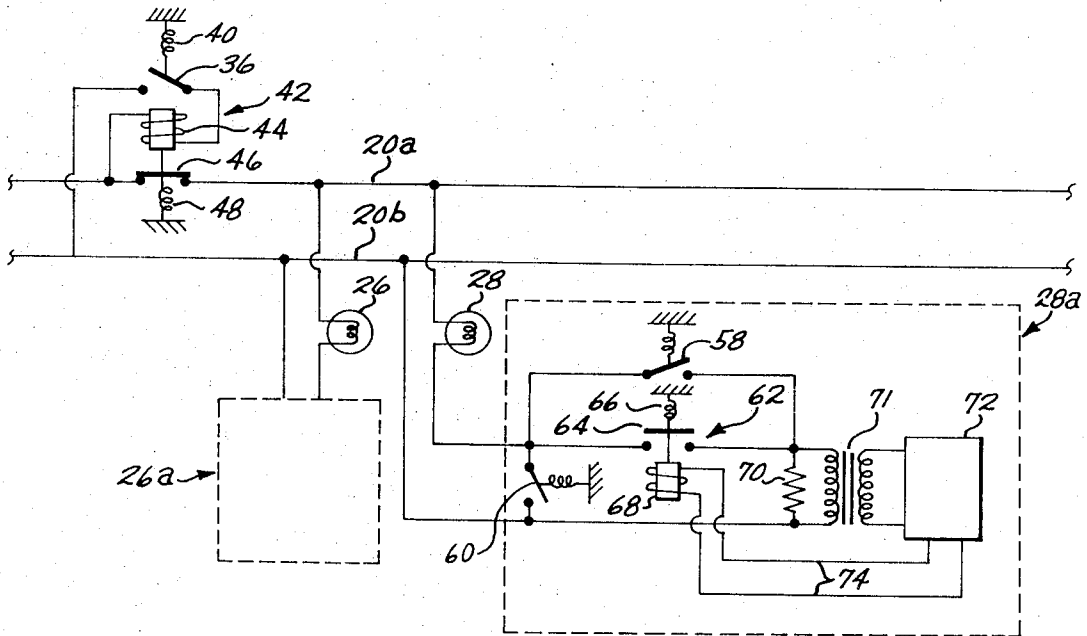
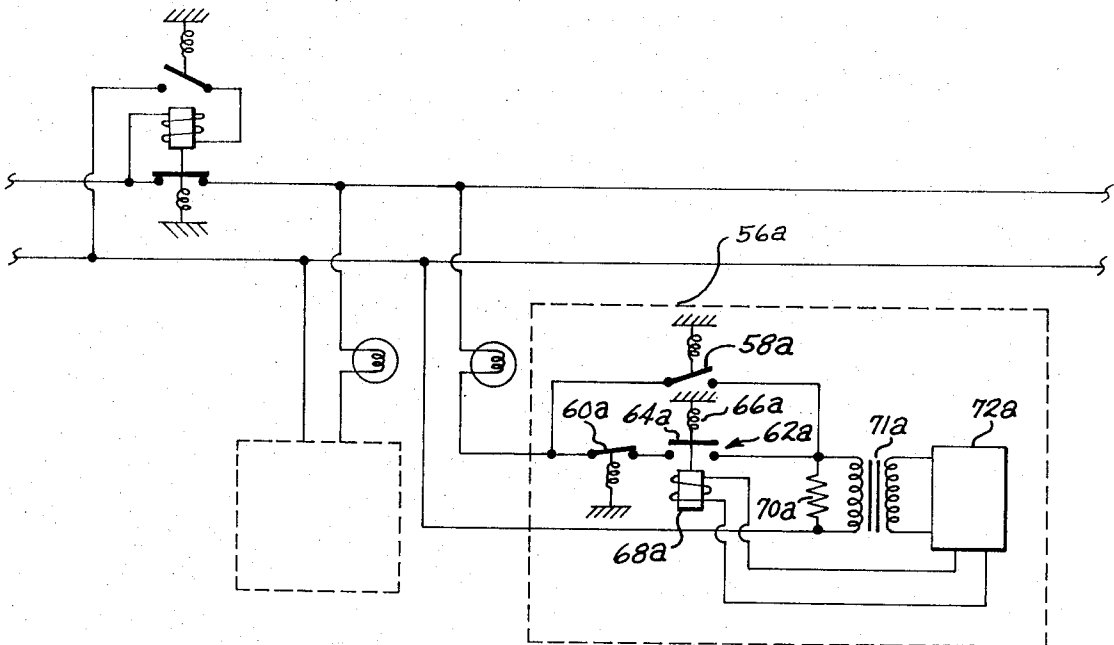


Fig. 3



ELECTRICAL SWITCH SYSTEM FOR A HOUSE OR THE LIKE

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates generally to electrical power distribution systems for houses, and more particularly to a switch control system for the same.

2. Description of the Prior Art

In present day electrical power wiring systems for houses and the like, there is generally an outside power line leading to the house and connecting to a distribution box in the house (i.e., fuse box or circuit breaker box). From the distribution box, a plurality of distribution lines lead to various parts of the house, with a plurality of power outlets usually being connected to each such distribution line. Operation of the various outlets is usually accomplished by related individual switches in approximately the same area as its outlet or outlets.

With these conventional present day wiring systems, there is the common problem of a person in the household having to travel through the house with almost daily frequency to turn off the various lights that have been left burning. However, in spite of the existence of this inconvenience for so many people for such an extended period of time, to the best knowledge of the applicant herein, there has been no solution to this problem of a sufficiently practical nature to generate any widespread commercial acceptance of the same. Thus there still exists the problem of how to provide a more convenient operating system for the electrical power system of a house.

While a search of the prior art in the form of United States patents did not disclose any patents directed to the same subject matter as the present invention, the following patents are cited by way of background information: Hull, U.S. Pat. No. 2,507,976; Spinelli et al., U.S. Pat. No. 3,172,020; Ree, U.S. Pat. No. 3,376,467; Dunn et al., U.S. Pat. No. 3,486,068; Lindroth, U.S. Pat. No. 3,501,645; and Newman, U.S. Pat. No. 3,581,276.

It is an object of the present invention to provide an electrical power system for a house or the like which in a practical and effective manner provides for remote deactivation of various predetermined outlets, without otherwise interfering with their normal operation.

SUMMARY OF THE INVENTION

The present invention is especially adapted for installation in a house or the like, where there are a plurality of power outlets at various locations. In the present invention, there is provided a master switch means which momentarily interrupts power to the outlets and their related individual switch assemblies. In the preferred form, the master switch means comprises a normally closed relay or relays connected in series with the power distribution line or lines of the house and a master switch at a predetermined operating location arranged to energize the relay to cause it to open momentarily.

Each of the individual switch assemblies comprises a first normally open switch connected to its related outlet and having a closed position where it delivers power to the outlet. A holding circuit is arranged to hold said first switch in its closed position, and this holding circuit is in turn connected to the first switch so as to be energized thereby when the first switch is in its closed

position. Each switch assembly is also provided with individual on-off means to selectively close or open the first switch means independently of the operation of the master switch. In the preferred form, the on-off switch comprises an "on" switch connected in parallel with the first switch, and an "off" switch which in one embodiment is in parallel with the holding circuit so as to be able to short circuit the same, and in a second embodiment is in series with the holding circuit.

Other features of the present invention will become apparent from the following detailed description.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is an isometric view of a house illustrating schematically the switch system of the present invention;

FIG. 2 is a circuit diagram of a first embodiment of the present invention; and

FIG. 3 is a circuit diagram of a second embodiment of the present invention.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

The present invention is especially adapted for application to the electrical power system of a conventional house or the like, either as part of the original electrical system installation, or as a retrofit into a house with an existing electrical system. In the following description, first the usual components which exist in a conventional house electrical system will be briefly disclosed, after which the over all system of the present invention will be described.

In FIG. 1, the control system of the present invention is shown in a typical installation in a home. There is a house structure 10 having electrical power lines 12 coming into the house and connecting through a meter 14 to a distribution box 16 (i.e., a fuse box or circuit breaker box). From the box 16, a plurality of lines lead to different areas of the house, three such lines being indicated at 18, 20 and 22. The line 18 provides power for the left rear portion of the house 10, one of the power outlets for the line 18 being indicated as a rear side door light 24. The line 20 provides power for the front left portion of the house, with three outlets being shown, namely an overhead light 26, a lower wall socket 28 and another lower wall socket 30. The third line 22 supplies power to a pair of outside lights 32 and 34.

As indicated previously herein, the system of the present invention is so arranged that a predetermined group of power outlets of the house 10 can be switched off from a master location, without interfering with the subsequent normal operation of the operating switches proximate these various power outlets. Thus, with reference to FIG. 1, in accordance with the present invention, there is a master switch 36, which is shown herein as being located at an upstairs location of the house 10 (for example, in the master bedroom of the house). Each of the power outlets 24-34 has a related operating switch assembly, given the same numerical designation as its related switch, with an *a* suffix identifying the switch. Thus, the light 24 has an associated switch assembly 24a, the overhead lamp 26 has its associated switch assembly 26a, etc. As will be disclosed more fully hereinafter, operation of the master switch 36 causes the outlets 24-34 to become de-energized, with each of the power outlets 24-34 being capable of being

energized again simply by operation of its related one of the switch assemblies 24a-34a.

Each of the lines 18, 20 and 22 is connected to the distribution box 16 through an associated relay which is normally closed. For convenience of illustration, in FIG. 1 the relays are not shown individually but their location is indicated as being positioned in a suitable container 38 below the distribution box 16.

In FIG. 2, there is shown a circuit diagram for line 20, it being understood that the circuitry for the other lines 18 and 22 is substantially the same as shown in FIG. 2. The line 20 comprises a "hot" line 20a and a "ground" line 20b. There is the master switch 36, which is normally open, this function being indicated schematically in the form of a tension spring 40 holding the switch 36 in its open position. The switch 36 is connected to a relay 42 (located at 38, as illustrated in FIG. 1) in a manner to energize the solenoid 44 of the relay 42 to move the relay switch 46 to its open position. The relay switch 46 is connected in series with the hot line 20a and is normally closed, this being indicated schematically by the tension spring 48 urging the switch 46 to its closed position.

A plurality of power outlets are connected in series with the relay switch 46, as at 26 and 28, each outlet having an associated switch assembly 26a and 28a, respectively. The various switch assemblies, as at 26a and 28a, are all substantially identical, so only the one at 28a has the details of its circuitry illustrated.

The switch assembly 28a comprises a normally open "on" switch 58 to energize the power outlet 28, and a normally open "off" switch 60 to de-energize the outlet 28. There is a relay 62 comprising a switch 64 which is urged to its open position by suitable means, shown schematically herein as a tension spring 66. A solenoid 68 of the relay 62 when activated moves the relay switch 64 to its closed position and holds it there so long as the solenoid 68 remains energized. The "on" switch 58 and the relay switch 64 are connected in parallel to one another, with the two switches 58 and 64 being in series with the outlet 54 and also in series with a resistor 70.

The resistor 70 is connected in parallel with the input side of a transformer 71, with the output of the transformer 71 being directed into a rectifier 72 to supply a DC voltage. The DC output of the rectifier 72 is directed by means of leads 74 to the solenoid 68 to energize the same.

To describe the operation of the circuitry illustrated in FIG. 2, the relay switch 64 is shown in FIG. 2 in its open position so that the outlet 28 (i.e., a lamp) is de-energized. In this condition no current is flowing through the lamp 28 nor through the switch assembly 28a. To turn on the light 28, the "on" switch 58 is closed momentarily to send current through the lamp 28 and resistor 70. Since there is a voltage drop across the resistor 70, the transformer 71 is energized to cause the rectifier 72 to provide a DC output to energize in turn the solenoid 68 of the relay 62. The immediate effect is to close the relay switch 64 which thus forms a power connection through the resistor 68. Thus, when the "on" switch 58 is released, power continues to be delivered to the transformer 71 through the closed switch 64, so that the relay solenoid 68 remains activated to hold the relay switch 64 closed. Thus the resistor 70, transformer 71, rectifier 72 and solenoid 68 per-

form a "holding" function to keep the outlet 28 energized so long as power is supplied thereto.

When it is desired to turn off the light 28 locally, the "off" switch 60 is closed momentarily. This switch 60 is in parallel with the rest of the components of the switch assembly 28a, so that closure of the switch 60 effectively shorts out these other components so that substantially no power is supplied thereto. With power thus being cut off to the transformer 71 and thus also being cut off to the relay solenoid 68, the relay switch 64 moves to its open position and remains there until subsequent closure of the "on" switch 58.

To proceed to the description of the over all system of the present invention, reference is now made to FIG. 1. Let it be assumed that a number of the switching assemblies 24a-34a in their closed positions and that their associated outlets are thus energized. (In other words, let it be assumed that a number of lights have been left on throughout the house 10.) When the master switch 36 is pushed to its closed position, the several line relays (one being relay 42) in the box 38 are energized to briefly interrupt the flow of current to the lines 18, 20 and 22. As soon as current is even momentarily interrupted to any of the switch assemblies 24a-34a, each such switch assembly automatically goes to its "off" position, in the manner described above with reference to FIG. 2. That is to say, the holding solenoid 68 of the relay 64 in its respective switch assembly is de-energized, which permits its associated relay switch 64 to move to its open position, where it remains until its related "on" switch 58 is momentarily closed.

In electrical power distribution systems, it is desirable to have certain outlets remain "on," regardless of the operation of the master switch 36. Thus, there is shown in FIG. 1 an outlet 80 (which may be a wall socket) not provided with a switch assembly such as that shown at 28a. It may be that this outlet 80 is used, for example, to operate a refrigerator, air conditioner or other appliance which is not intended to be shut off. When the master switch 36 is closed momentarily, there is only a momentary interruption of current to the lines 18 through 22, and as soon as the master switch 36 is released, power is restored to the outlet 80. Also one or more of the power distribution lines (e.g., perhaps one which supplies power to the furnace of the house) may be made completely independent of the master switch, simply by not providing such line with a line relay, such as relay 42. Thus, operation of the master switch 36 would have no effect on that line.

A second embodiment of the present invention is shown in FIG. 3. Components of this second embodiment which correspond functionally to components in the first embodiment will be given like numerical designations with an a suffix distinguishing those of the second embodiment. Thus, there is a relay 62a, resistor 70a, transformer 71a, the transformer 71a providing a DC output from the rectifier 72a to energize the solenoid 68a of the relay 62a. The "on" switch 58a momentarily supplies power to the transformer 71a and rectifier 72a as in the first embodiment. The second embodiment differs from the first embodiment essentially in the disposition of the "off" switch 60a. This "off" switch 60a is normally closed and is arranged in series with the relay switch 64a. To turn the switch assembly to its "off" position, the switch 60a is moved momentarily to its open position to interrupt current to the solenoid 68a and cause the relay switch 64a to

spring open. As in the first embodiment, the relay switch 64a remains open until the "on" switch 68a is subsequently closed. As in the first embodiment, momentary interruption of current to the switch assembly by closing of the master switch 36a moves the switch assembly 56a to its open position.

In the event that there is an existing electrical system in a house, to convert this system to that of the present invention, first the line relays (such as relay 42) would be installed in the appropriate distribution lines. Then at each of the outlets which are to be turned off by operation of the master switch, there is installed a related switch assembly, such as shown in FIGS. 2 or 3. Thereafter the system would operate as described above.

What is claimed is:

1. In an electrical power system for a house or the like, where there are a plurality of power outlets at various locations, a system which provides for individual operation of said outlets at their related locations for both activation and deactivation of related outlets, and also for deactivation of said outlets from a master location without interference with subsequent individual activation and deactivation of said outlets, said system comprising:

a. a plurality of switch assemblies, each of which is operatively connected to at least a related one of said outlets for individual operation thereof, each switch assembly comprising:

1. a first normally open switch connected to its related outlet and having a closed position where it delivers power to said outlet and an open position where power is not delivered to said outlet,
2. holding circuit means to hold said first switch in its closed position to transmit power to its related outlet,
3. said holding circuit means being connected to said first switch to be energized by said first switch in its closed position, in a manner that closure of said first switch causes activation of said holding circuit to maintain said first switch in its closed position, and
4. other on-off means proximate the location of its related outlet and operatively connected to said first switch to move said first switch between its open and closed positions,

b. master switch means having an operating position to momentarily interrupt power to said switch assemblies whereby when said master switch means is moved to its operating position, each switch assembly has its holding circuit deactivated to cause its related first switch to return to its normally open position, whereupon operation of master switch causes deactivation of all of said switch assemblies, which remain deactivated until subsequent activation, as by its related on-off means.

2. The system as recited in claim 1, wherein said master switch means comprises relay means having a normally closed relay switch, and a master control switch having an operative position to momentarily activate

said relay means to move the relay switch to its open position.

3. The system as recited in claim 1, wherein said on-off means comprises an on switch connected in parallel with said first switch means, whereby closure of said on switch causes activation of said holding circuit to move said first switch to its closed position.

4. The system as recited in claim 1, wherein said on-off means comprises a normally open off switch connected in parallel with said holding circuit means, whereby closure of said off switch shorts out said holding circuit means to cause said first switch to move to its open position.

5. The system as recited in claim 1, wherein said on-off means comprises a normally closed off switch connected in series with said first switch, whereby opening of said off switch interrupts power to said holding circuit means to permit said first switch to open.

6. The system as recited in claim 1, wherein said first switch is a relay switch, and said holding circuit means comprises a solenoid to move said relay switch to its closed position upon activation of the solenoid.

7. The system as recited in claim 6, wherein said holding circuit comprises rectifier means to deliver direct current to said solenoid means.

8. The system as recited in claim 7, wherein said holding circuit further comprises a transformer to deliver current to said rectifier means.

9. The system as recited in claim 6, wherein said on-off means comprises an on switch connected in parallel with said first switch, whereby closure of said on switch delivers power to said holding circuit means to cause closure of said first switch.

10. The system as recited in claim 9, wherein said master switch means comprises relay means having a normally closed relay switch, and a master control switch having an operative position to momentarily activate said relay means to move the relay switch to its open position.

11. The system as recited in claim 1, wherein:

- a. said master switch means comprises relay means having a normally closed relay switch, and a master control switch having an operative position to momentarily activate said relay means to move the relay switch to its open position,
- b. said on-off means comprises an on switch connected in parallel with said first switch means, whereby closure of said on switch causes activation of said holding circuit to move said first switch to its closed position,
- c. said on-off means further comprises an off switch which has an operative position to interrupt current to said holding circuit means to cause said first switch to open, and
- d. said holding circuit means comprising relay means, with said first switch being a relay switch, and a relay solenoid which when activated causes closure of said relay switch.

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