May 10, 1966 E. L. GIVEN 3,251,050

ROOM STATUS INDICATOR

Filed Oct. 2, 1963 2 Sheets-Sheet 1

fig. 1

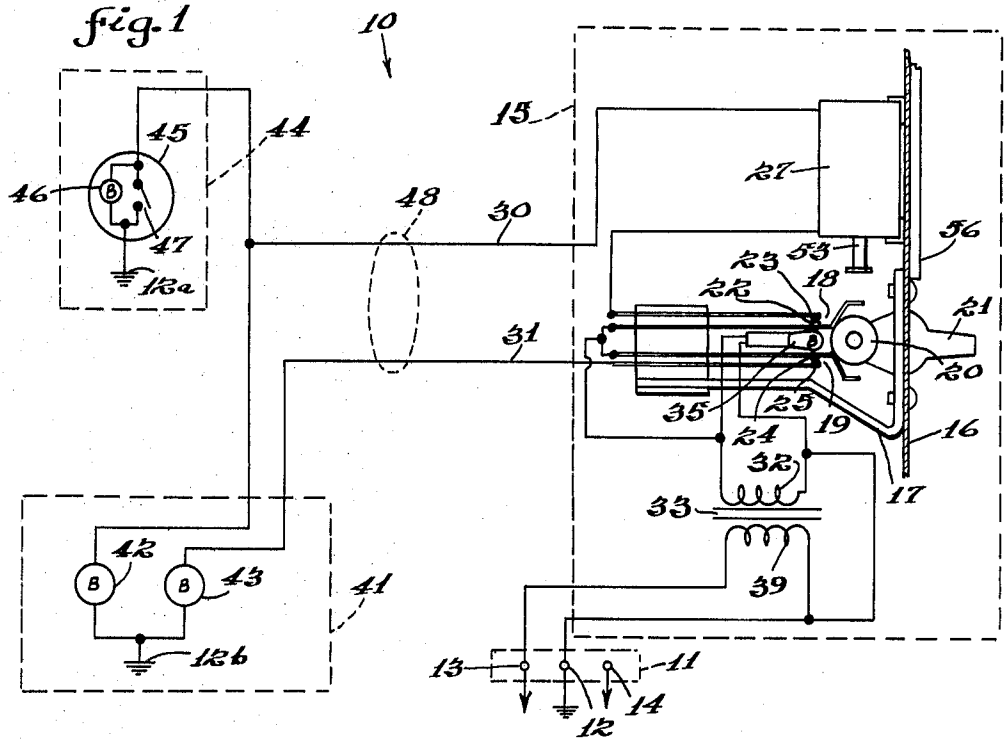
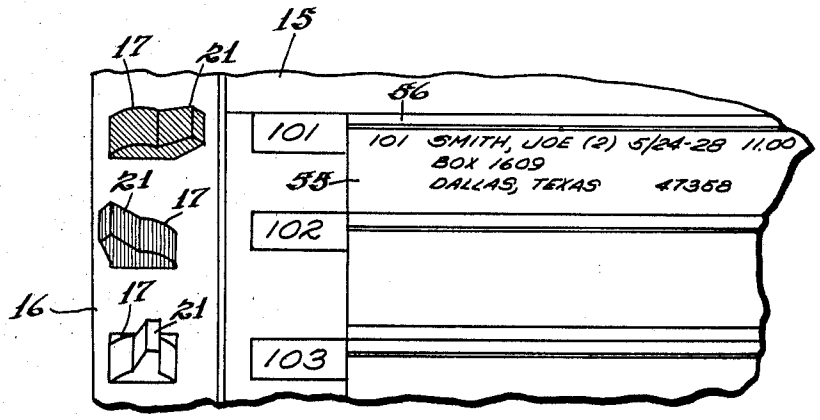


fig. 2



INVENTOR.
Edmund Lionel Given
BY
Hill, Sherman, Meroni, Gross & Simpson ATTORNEYS

May 10, 1966 E. L. GIVEN 3,251,050

ROOM STATUS INDICATOR

Filed Oct. 2, 1963 2 Sheets-Sheet 2

Fig. 4

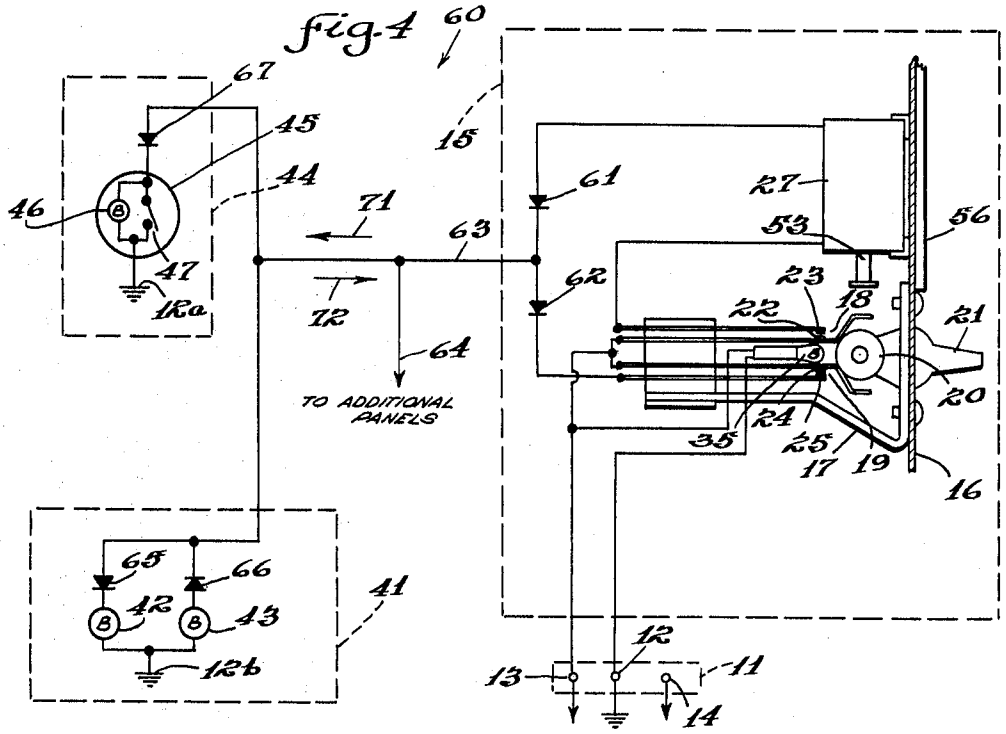
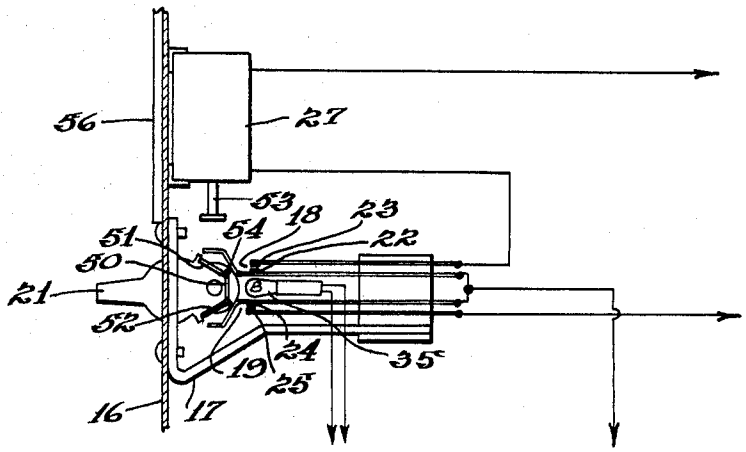


Fig. 3



INVENTOR.

Edmund Lionel Given

BY

Hill, Sherman, Meroni, Gross & Simpson ATTORNEYS

United States Patent Office 3,251,050 Patented May 10, 1966

3,251,050

ROOM STATUS INDICATOR

Edmund L. Given, 5011 Vista Del Monte, El Paso, Tex.

Filed Oct. 2, 1963, Ser. No. 313,268
2 Claims. (Cl. 340—286)

This invention relates to a status indicating system and more particularly to a system for giving a visual indication of the status of an object capable of having two or more states to an observer who may be at some distance from the object.

Because of its utility and simplicity, this invention can be used in any environment with many modifications. For the purposes of this disclosure so that other persons skilled in the art can learn my invention I shall describe a preferred embodiment suited for determining the status of rooms in a motel or hotel.

In order to economically manage a motel, the status of each of the rooms must be immediately known by the operating personnel. In a typical motel these people would be the desk clerk, the housekeeper and the maid. The desk clerk must know which rooms are occupied, which rooms which have been occupied need cleaning and which rooms are ready to rent. The housekeeper and the maid must know which rooms are occupied and which rooms are in need of cleaning. The maid must be able to signal when she has placed a room in readiness for renting.

Accordingly, it is an object of the present invention to provide a simple means of transmitting and displaying information on the status of a changeable item, such as for example a motel room, to one or more observers located at different distant points.

Devices for determining room status are not new; however, all of the previous designs have one or more of the following disadvantages: large numbers of moving parts, complicated circuitry, need for special power supplies, difficulty of operation by non-technically trained personnel, low reliability requiring the need for test circuits, special signalling devices which must be carried by the maid so that she can signal from a room, large numbers of wires interconnecting a room with the various control panels, limitations on the number of control panels, a limitation on the number of rooms, a limitation on the capacity to expand the system, a design requiring specially fabricated parts, difficulty in service and repair unless maintained by technically trained people with special equipment, subject to being tampered with by guests, large size, and high costs.

In contrast, the system of my invention has only two moving parts, simple circuitry and can use electric power supplied for lighting, such as 115 volt-60 cycle alternating current, without transformation, rectification or filtering. Its method of use is obvious to the unskilled and it does not require the use of special signalling devices or keys as tampering by guests does not affect the system. Its high reliability and self-monitoring circuitry obviate the need for test circuits. By using a common ground such as that connected to the electric power sockets in each of the rooms only one wire need be run to each room and to each panel from each room. Several indicating panels can be connected to the system for such persons as the telephone operator, the manager and the cashier without affecting the operation of the system. The system can be expanded without limit by adding additional components which can be of modular design so as to be easily plugged together when a larger capacity is desired. The system uses components which are readily available so as to facilitate repair or expansion. The invention can be used to replace other systems already in use without the need for re-wiring.

According to this invention, the desk clerk is provided with a control panel which contains a number of lever switches each of which is correspondingly numbered to a room. Each switch has a transparent lever designed to be lighted from an electric bulb behind the panel. The lever has colored chips fixed to it which act as optical filters so that the color of the transmitted light is a function of the position of the lever. Thus the lever may be placed in any one of three positions at which time it will appear to be white, green or red. When a room is ready to be rented, the lever of the switch is in its center position and its appears white. When a guest is registered, the desk clerk pushed the lever to the right which caused it to turn green. A green light is also lighted on the housekeeper's panel informing her that a room has been rented. When a guest checks out, the desk clerk pushes the lever on the switch past the center to the left, which causes it to turn red. The green light on the housekeeper's panel goes off and a red light is lighted informing her that the room should be readied for renting. A red light incorporated in the button of a pushbutton switch located within the room is also lighted. After the maid has finished preparing the room, she pushes the button which causes a solenoid, mounted in the desk clerk's control panel, to return the lever of the desk clerk's switch to the center position. The lever appears white; indicating that the room is ready for renting. The red light on the housekeeper's panel is extinguished. Since both the red and the green lights are off on the housekeeper's panel, this indicates to her that the room is empty and requires no attention. The light in the room is also turned out.

These and other objects, features and advantages of my invention will become more fully apparent from the following detailed description taken in conjunction with the accompanying drawings which illustrate a preferred embodiment and in which:

FIGURE 1 is a schematic electrical diagram of one arrangement for a circuit connecting one of the rooms with the various operating panels in a manner requiring two signal-wires per room and an illustration of the switch and solenoid on the desk clerk's panel as viewed from the top with the switch in the "ready for renting" position.

FIGURE 2 is a view of the front of the desk clerk's panel;

FIGURE 3 is an illustration of the switch and solenoid on the desk clerk's panel, as viewed from the bottom with the switch in the "checkout" position; and

FIGURE 4 is a schematic electrical diagram of a second arrangement for a circuit connecting one of the rooms with the various operating panels in a manner requiring only one signal-wire per room.

The room status indicator electrical circuit of FIGURE 1 generally designated by the reference numeral **10** is powered by electricity obtained from a source such as a lighting circuit **11**. In this embodiment a 220 volt, grounded 60 cycle alternating current power line of a type commonly used to electrify motels is shown but other types of alternating current or direct current sources can also be used. A conductor **12** is connected to a ground which is common throughout the motel and to which ground is usually found connected ground terminals such as **12***a* and **12***b* of electric power sockets located throughout the motel. A potential of 115 volts appears between the conductor **12** and each of conductors **13** and **14**. A potential of 220 volts appears between the conductors **13** and **14**.

The desk clerk is provided with a control panel **15** having a front plate **16** upon which is mounted one three-position lever actuated switch **17** for each room (FIGURES 1 and 2). By way of illustration in FIGURES

1 and 3, and not limitation, the switch 17 of this embodiment has a pair of normally open contact sets 18 and 19 actuated by a roller 20 fixed to a lever 21. Contact set 18 is composed of a movable contact 22 and a fixed contact 23. Similarly, contact set 19 has a movable contact 24 and a fixed contact 25. Contact 22 is connected to the contact 24. Contact 23 is connected to one terminal of a solenoid 27. The other terminal of the solenoid 27 is connected to one end of a conductor 30. The contact 25 is connected to one end of a conductor 31. The contacts 24 and 25 are connected to one end of a secondary winding 32 of a transformer 33 used to reduce potentials applied to the components in the circuit. The other end of the secondary winding 32 is connected to the ground conductor 12. One such transformer 33 is sufficient for the entire installation regardless of the number of units and may even be eliminated.

A bulb 35 is fixed to the switch 17 in a manner such that its light shines through the lever 21 which is made of a transparent material. The bulb is connected to the secondary winding 32 of the transformer 33. A primary winding 39 of the transformer 33 is connected in parallel to the conductors 12 and 13 of the power line 11.

A housekeeper's panel 41 is provided with a pair of lights 42 and 43 which are designated so as to correspond to a room 44 to which they are connected. When lighted, the light 42 appears red and the light 43 appears green.

The room 44 is provided with an illuminated pushbutton switch 45. When illuminated by a bulb 46 within the switch 45, the pushbutton on the switch 45 appears red. The pushbutton switch has a normally open, single pole-single throw switch contact 47 connected in parallel with the bulb in the button so as to short circuit the bulb when the button is depressed. The conductors 30 and 31 may be cabled together in a cable 48 which connects the desk clerk's panel 15 with each of the rooms 44, the housekeeper's panel 41 and such other panels as may be desired. Conductor 30 is connected to one terminal of the pushbutton switch 45 and to one terminal of the bulb 42. The other terminal of the pushbutton switch 45 is connected to the ground 12*a*, which is connected to the room 44. The conductor 31 is connected to one terminal of the bulb 43. The other terminals of the bulbs 42 and 43 are connected to the ground 12*b* which is connected to the housekeeper's panel 41.

The switch 17 is constructed in the manner shown in FIGURE 3. The lever 21 is made of transparent material to enable it to transmit light from the bulb 35 positioned behind it. Fixed to the back of the lever 21, are a white transparent filter 50, a green transparent filter 51, and a red transparent filter 52. As the filters are positioned between the bulb 35 and the lever 21, the lever 21 will appear to be of the same color as the filter which filters the light coming from the bulb 35. The filters 50, 51 and 52 are so arranged that when the lever 21 is in its center position and both contact sets 18 and 19 are open, the lever is white and appears as the switch for room 103 as shown in FIGURE 2. This is the position the switch is in when a room is ready to rent. Similarly, when the lever 21 is moved to the right, and contact set 19 is closed, the lever becomes green and appears as the switch for room 101. This is the position the switch is in when the room is rented. Likewise, when the lever is moved to the left, and contact set 18 is closed, the lever turns red and appears as the switch for room 102. This is the position the switch is in when the guest has checked out.

The solenoid 27 is fastened to the front panel 16 in close proximity to the switch 17. Each switch for each room has an accompanying solenoid and contains means fixed to the lever 21 for receiving the mechanical force from the solenoid. In this embodiment the solenoid 27 has an armature 53 and is so designed and positioned that when actuated by the required magnitude of current the armature 53 pushes against a raised edge 54 on the lever 21 in a manner such that the lever is moved from its left position to its center position.

The invention is operated in the following manner. When a room is ready to rent, the lever 21 is in its center, white position and appears as the switch corresponding to the room 103 as shown in FIG. 2, contact sets 18 and 19 are open. No current flows through the wires in the cable 48 and therefore none of the lights 42, 43 and 46 are lit.

When a room is rented, the desk clerk may place an information card 55 in a holder 56 which is located next to the lever 21 corresponding to the room which was rented. The desk clerk then places the lever 21 of the switch for the corresponding room in its right, green position so that it appears as the switch for room 101. This causes contact set 19 to close and current flows through the contact set 19, the conductor 31, and bulb 43, causing it to light, to the ground 12*b*. The housekeeper is now informed that the room is occupied.

When the guest checks out, the lever 21 is placed in its left, red position and appears as the switch for room 102. Contact set 19 opens and contact set 18 closes. Current now flows through the contact set 18, the solenoid 27 the conductor 30, the bulb 46 in the pushbutton switch 45 and the bulb 42 to the grounds 12*a* and 12*b*. The current causes the bulb 42 to light informing the housekeeper that the guest has checked out. The current also causes bulb 46 to light. Both the bulb 46 in the pushbutton switch 45 and the bulb 42 are chosen so as to have a high resistance. The current which flows through these bulbs also flows through the solenoid 27 but the magnitude of the current is well below the minimum current needed to actuate the solenoid; hence, the solenoid armature 53 does not move.

When the maid has prepared the room for renting, she pushes the button of the switch 45 which causes the contact set 47 within the switch to close, forming a short-circuited path between the conductor 30 and the ground 12*a*. The magnitude of the current is now limited only by the resistance of the windings of the solenoid 27 and is well above the minimum level need to actuate the solenoid. This causes the armature 53 to move in the manner described above so as to return the lever 21 to its center position. The red light 42 on the housekeeper's panel 41 and the red light in the pushbutton of the switch 45 in the room are both extinguished. This indicates to the housekeeper that the room is prepared and empty. The lever 21 serves as a visual indication, by way of its position and color, to the desk clerk that the room is ready to rent.

The above described embodiment of my invention is well suited for moderately sized installations which do not have substantially long distances between the panels 15 and 41 and each of the rooms represented by the typical room 44.

Where a large number of units are to be monitored or where great distances are involved an embodiment using one one signal-wire per room instead of two is preferred. Such an embodiment is illustrated in FIGURE 4 and is generally designated by the reference numeral 60. This latter embodiment is operated by the personnel in the same manner as the embodiment illustrated in FIGURE 1 and provides the same visual displays. In describing the circuit shown in FIGURE 4, I use the same reference numerals as used in FIGURE 1 when referring to components common to both circuits.

The room status indicator electrical circuit of FIGURE 4 generally designated by the reference numeral 60 is powered by electricity obtained from a source such as the lighting circuit 11 described above but other types of alternating current or direct current sources can also be used. The conductor 12 is connected to the ground which is common throughout the motel and to which ground is

usually found connected to the ground terminals 12*a* and 12*b* of the electric power sockets as described above. A potential of 115 volts appears between the conductor 12 and each of conductors 13 and 14. A potential of 220 volts appears between conductors 13 and 14.

As before, the desk clerk is provided with a control panel 15 having a front plate 16 upon which is mounted one three-position lever actuated switch 17 for each room (FIGURES 2 and 4). By way of illustration in FIGURE 4, and not limitation, the switch 17 of this embodiment has a pair of normally open contact sets 18 and 19 connected in a single pole double throw configuration and actuated by the roller 20 fixed to the lever 21. The contact set 18 is composed of the movable contact 22 and the fixed contact 23. Similarly, contact set 19 contains the movable contact 24 and the fixed contact 25. Contacts 22 and 24 are connected together with the conductor 13. The conductor 13 is also connected to one terminal of the bulb 35 located behind the lever 21 in a manner such that its light shines through the lever 21 which is made of transparent material. The other terminal of the bulb is connected to the ground 12. The contact 23 is connected to one terminal of the solenoid 27 located in close proximity to its corresponding switch 17. The other terminal of the solenoid 27 is connected to the anode of a semi-conductor rectifier 61. The cathode of the rectifier 61 is connected to the anode of a semi-conductor rectifier 62. The cathode of the rectifier 62 is connected to the contact 25. The cathode of rectifier 61 and the anode of rectifier 62 are connected to a wire 63 which connects the desk clerk's panel 15 to a typical room 44 and to the housekeeper's panel 41. Wires, such as a wire 64, leading to additional panels for such persons as the telephone operator and the cashier can be connected to the wire 30.

Inside the housekeeper's panel 41, the wire 63 is connected to the anode of a semi-conductor rectifier 65 and the cathode of a semi-conductor rectifier 66. The cathode of rectifier 65 is connected to one terminal of the red bulb 42 and the anode of the other rectifier 66 is connected to one terminal of the green bulb 43. The remaining terminals of the bulbs 42 and 43 are connected to the ground terminal 12*b* associated with panel 41.

Inside the room 44, to which the switch 17 corresponds, the wire 63 is connected to the anode of a semi-conductor rectifier 67. The cathode of the rectifier is connected to one terminal of the pushbutton switch 45 described above. The other terminal of the pushbutton switch 45 is connected to the ground 12*a*.

The system 60 is operated in the following manner. When a room is ready to rent, the lever 21 of the switch 17 is in its center position as shown in FIGURE 4. It appears to the desk clerk as the switch corresponding to room 103 on his panel 15 as shown in FIGURE 2. Both contact sets 18 and 19 are open and therefore no current flows in the system other than that for the bulb 35. When a room is rented, the desk clerk pushes the lever 21 to the right so that it appears as the switch shown corresponding to room 101 on the panel shown in FIGURE 2. Contact set 18 remains open but contact set 19 closes. Current flows in the direction indicated by arrow 70 in FIGURE 4 through the circuit from ground 12*b* through the green bulb 43 causing it to light, rectifier 66, conductor 63, rectifier 62 and contact set 19 to the conductor 13 of the power line 11. No current flows through the red bulbs 42 and 46 because rectifiers 65 and 67 are back biased so as to be in their high resistance state.

When the guest check out, the lever 21 of the switch 17 is pushed to the left and appears as the switch for room 102 is illustrated in FIGURE 2. Contact set 19 opens and contact set 18 closes. Current now flows in the circuit in the direction shown by arrow 71 of FIGURE 4 from the power line conductor 13 through the contact set 18, the solenoid 27, the rectifier 61 and the wire 63 through the rectifiers 65 and 67. The current flows through the rectifier 65 and red bulb 42, which causes it to light, to the ground 12*b*. The current also flows through the rectifier 67 and the red bulb 46, which causes it to light, to the ground 12*a*. The red bulbs 42 and 46 are chosen so as to have a relatively high resistance and thus limit the current flow to a low value which is insufficient to actuate the solenoid 27.

When the maid has prepared the room for renting, she pushes the button of the pushbutton switch 45 so as to close contacts 47. This causes a high current to flow in the circuit, limited only by the resistance of the solenoid windings, such that the solenoid 27 is actuated in a manner which causes its armature 53 to push against the raised edge 54, shown in FIGURE 3, on lever 21 so as to push the lever into its center position causing contact set 18 to open. The lever 21 of switch 17 now appears as the switch for room 103 as illustrated in FIGURE 2.

With respect to the circuits of both of the embodiments of FIGURES 1 and 4, it should be noted that in addition to being highly reliable my invention is both self monitoring, and tamper-proof. For example, if for some reason the solenoid 27 does not return the lever 21 to its center position contact set 18 will remain closed and the red bulb 46 will re-light when the maid releases the pushbutton of the switch 45. Because the maid cannot cause the bulb 46 to go out, she will notify the desk clerk of a malfunction.

Since contact set 18 is always open when a guest is in the room, tampering with or an accidental pushing of the pushbutton switch 45 by a guest will not affect the system as the pushbutton switch 45 is effectively out of the circuit when the contact set 19 is closed.

The circuit can be modified in may ways to suit the needs of the user. The invention can be used to control other functions. For example in a motel, this invention can be connected to the telephone switchboard in a manner such that when the desk clerk places a switch in the "check-out" position the telephone in the corresponding room is automatically disconnected until the switch is placed in the "room-rented" position.

Additional lights and panels can be connected as needed. For example, the system can also include a status board in each department of the motel such as the restaurant, the bar, the beauty parlor, the barber shop, and the gift shop to indicate to the managers of those departments when a guest has checked out so that additional charges may not be made to that room.

Because of its simplicity, versatility and adaptability it will be understood that modifications and variations may be effected without departing from the spirit and scope of this invention.

I claim as my invention:

1. An electric indicating system adapted to be operated in a multiple room building, said system containing:

(a) a plurality of control switches, each corresponding with a different room, each of said switches containing

a frame,

a transparent lever movably mounted on said frame so as to be able to be manually positioned in each of at least two positions and electro-mechanically positioned in at least one of said positions,

a bulb fixedly mounted with respect to said frame so as to illuminate said transparent lever,

a contact set having a contact movable by said lever so as to make or break electrical contact with another contact, and

means, fixed to said lever, for receiving mechanical force;

(b) a plurality of solenoids equal in number to the number of said control switches and each corre-

sponding with a different switch, each containing
a winding, and
an armature movable by the magnetic force resulting from currents flowing in said winding;

(c) a control panel for mounting each control switch corresponding with one of said rooms in fixed relation to each corresponding solenoid in a manner such that each of said armatures may contact said force receiving means of a corresponding lever of a corresponding switch in a manner such as to cause said lever to assume a different position when a sufficient current is applied to the windings of a corresponding solenoid;

(d) a monitor panel having a bulb corresponding to one of said rooms;

(e) electric signal transmission means operatively connected between said bulb in said monitor panel and its corresponding control switch and solenoid in said control panel;

(f) electric switch means operatively connected to said electric signal transmission means for controlling the current in the winding of said solenoid corresponding to said switch means; and

(g) means for connecting said electric indicating system to a source of electrical energy.

2. An electric indicating system adapted to be operated in a multiple room building, said system containing:

(a) a plurality of control switches, each corresponding with a different room, each of said switches containing
a frame,
a transparent lever movably mounted on said frame so as to be able to be manually positioned in each of at least two positions and electro-mechanically positioned in at least one of said positions,
a bulb fixedly mounted with respect to said frame so as to illuminate said transparent lever,
a contact set having a contact movable by said lever so as to make or break electrical contact with another contact, and
means, fixed to said lever, for receiving a mechanical force;

(b) electro-mechanical means for developing said mechanical force;

(c) means operative to apply said mechanical force to said force receiving means fixed to said lever;

(d) control panel means for mounting said control switch means and said electro-mechanical force developing and applying means;

(e) monitor panel means having a bulb corresponding to one of said rooms;

(f) electric signal transmission means operatively connected between said bulb in said monitor panel and its corresponding control switch and electro-mechanical force developing means;

(g) electrical energy control means operatively connected to said electric signal transmission means for controlling the electrical energy applied to said electro-mechanical force developing means corresponding to said electric energy control means; and

(h) means for connecting said electric indicating system to a source of electrical energy.

References Cited by the Examiner

UNITED STATES PATENTS

716,540	12/1902	Hewlett	200—109.3
1,269,856	6/1918	Rendle	340—313
1,327,837	1/1920	Muschenheim	340—286
2,037,565	4/1936	Dozler	340—226
2,091,108	8/1937	Sengebusch	340—313 X
2,737,557	3/1956	Johnson	200—167 X
2,980,890	4/1961	Staten	340—286 X
3,087,146	4/1963	Boudouris	340—332
3,171,116	2/1965	Conigliaro	340—331 X

FOREIGN PATENTS

337,896	11/1930	Great Britain.
371,497	4/1932	Great Britain.
402,842	12/1933	Great Britain.
422,071	1/1935	Great Britain.
629,997	10/1949	Great Britain.
694,180	7/1953	Great Britain.

NEIL C. READ, *Primary Examiner.*

R. M. GOLDMAN, *Assistant Examiner.*