Oct. 26, 1965 E. M. LURIE 3,214,747

SIGNALING SYSTEM

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FIG. 1

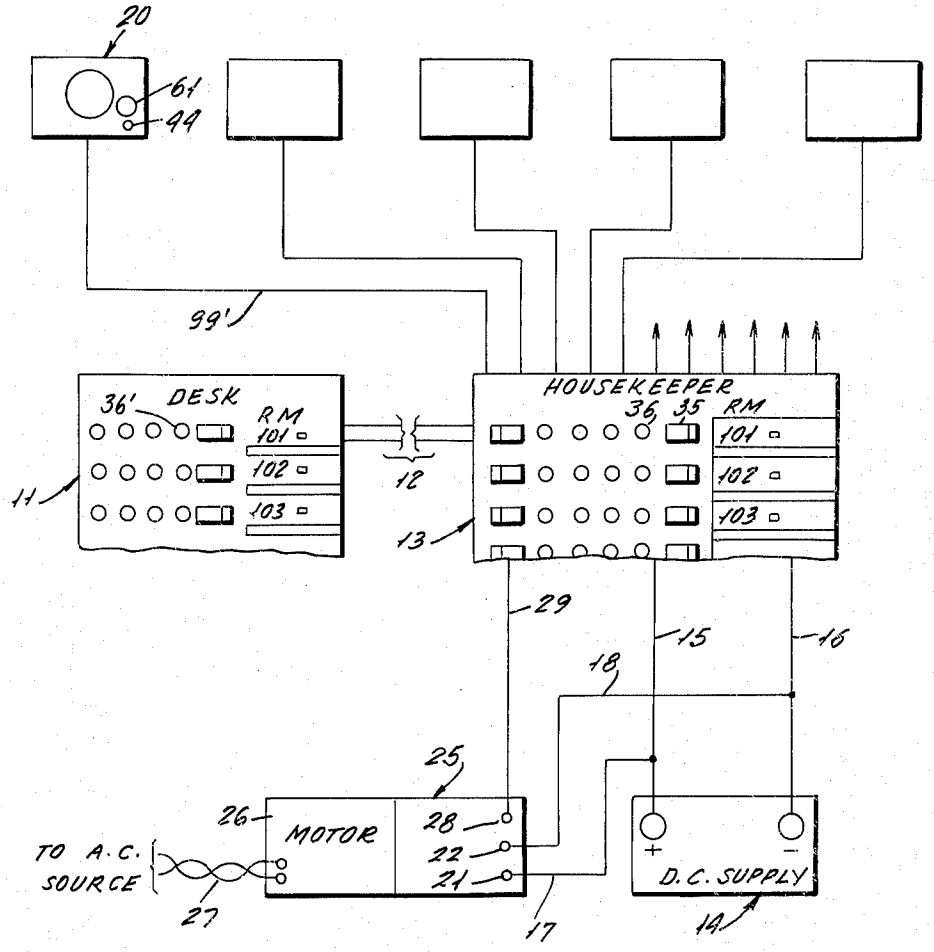


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FIG. 2

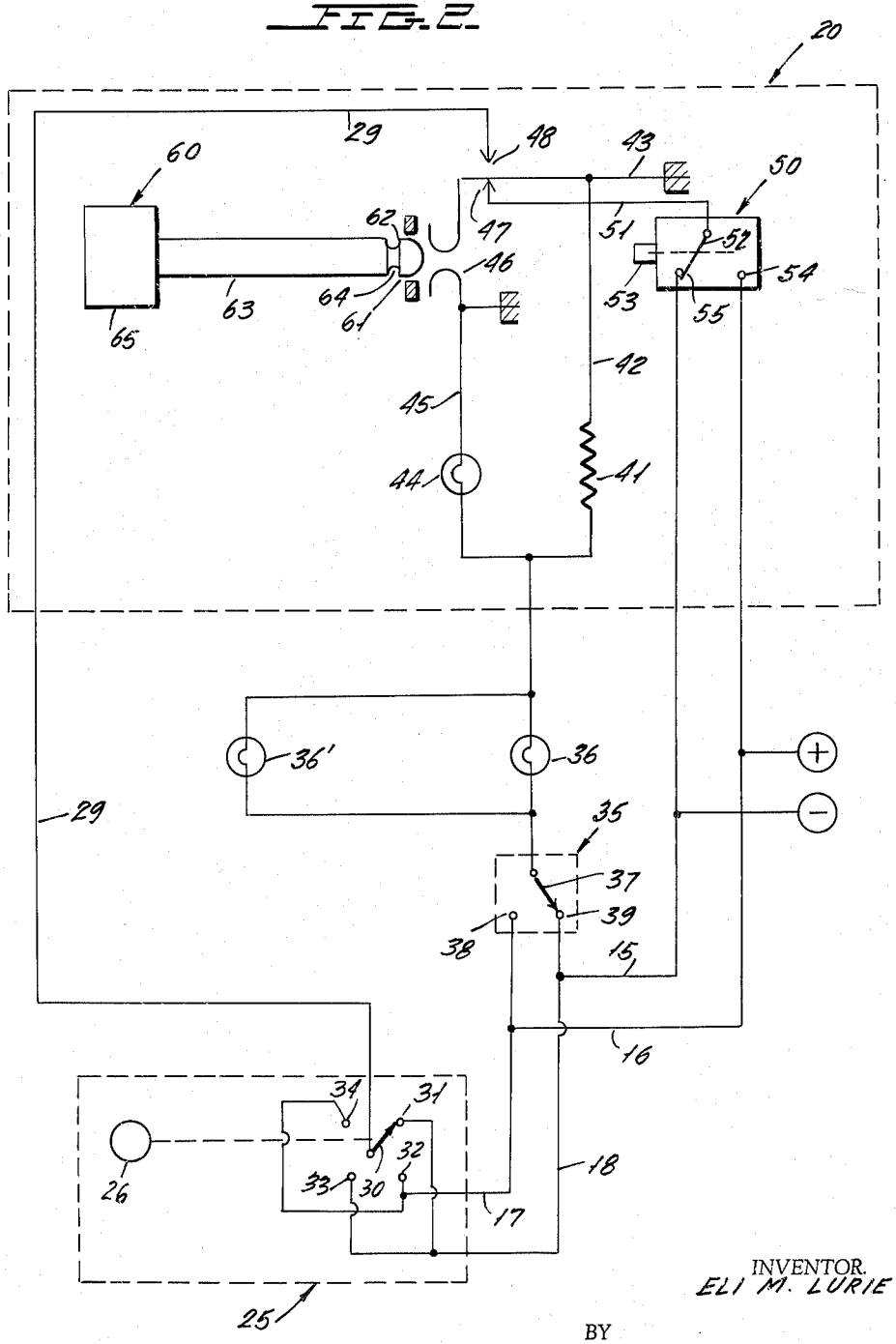


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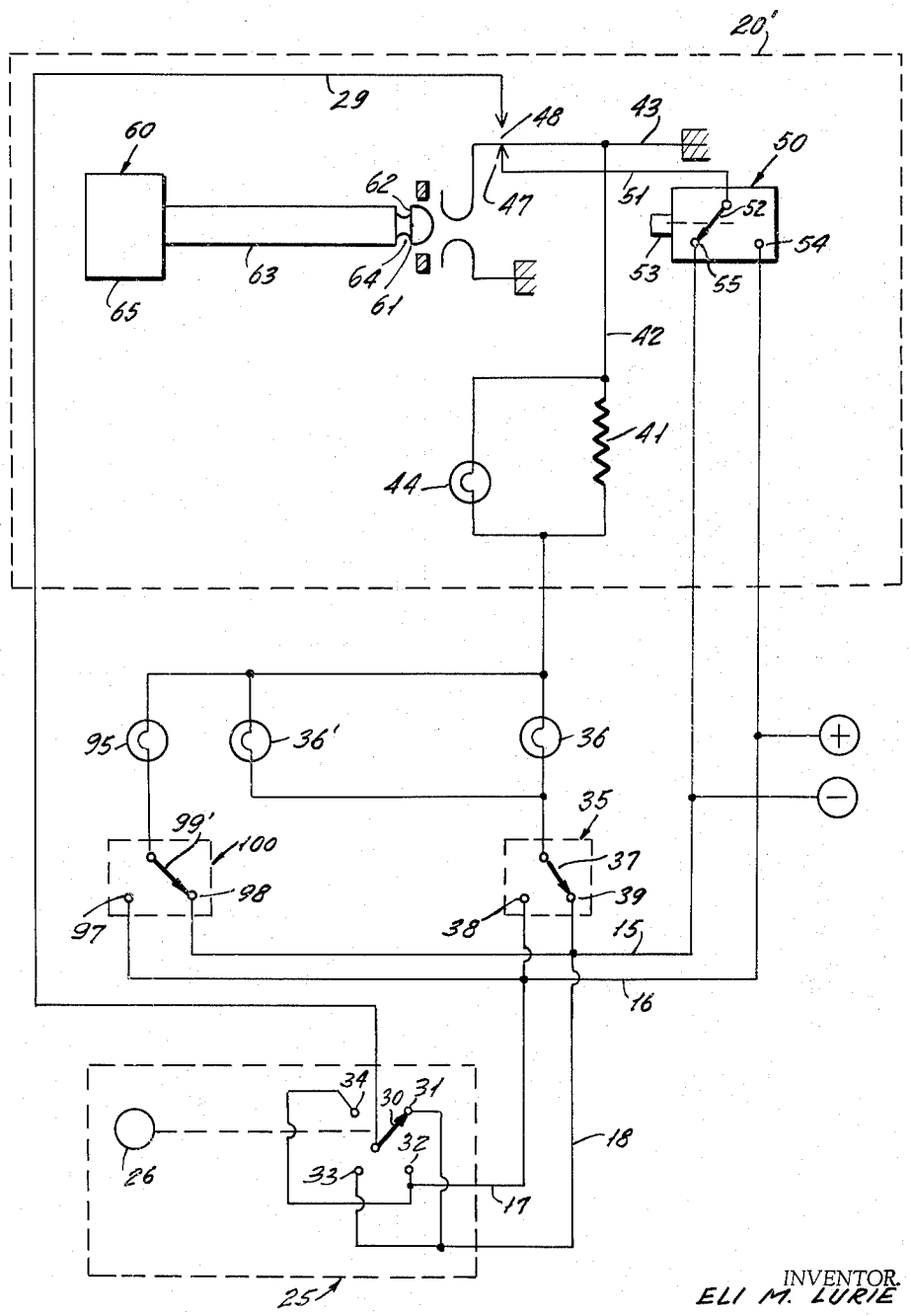
FIG. 3

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# SIGNALING SYSTEM

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15 Claims. (Cl. 340—286)

This invention relates to signaling systems in general and has particular application in the housekeeping and maintenance departments of hotels and the like.

Ever since the advent of hotels having accommodations for many hundreds of people there has been a problem in supervising housekeeping and maintenance personnel. For instance, a head housekeeper may have twenty or more housekeepers engaged in making up hotel rooms. At any given time these housekeepers are usually widely scattered throughout the hotel. It is often necessary to make up a particular room on short notice and it is often required that the head housekeeper and the front desk be notified immediately after the room is ready for occupancy.

Accordingly, it is a primary object of this invention to provide a novel signaling system whereby the head housekeeper and front desk may readily determine which rooms are in the process of being made up and which rooms are ready for occupancy.

This is accomplished by providing a central control panel for the head housekeeper with this control panel having an indicator lamp and a switch for each room in the hotel. Suitable circuitry connects each indicator lamp and associated switch to switching and indicating means of the room in question.

When the housekeeper enters a room that is to be made up she inserts a plug into a receptacle found in the room and in so doing operates a switch means which causes the lamp at the housekeeper's panel and another lamp in the room to be energized. However, this energization is intermittent so that both the lamp at the housekeeper's control board and the lamp in the room flash on and off. The flashing light on the control board indicates that the room is in the process of being made up while the flashing light in the room shows the housekeeper in the room that the head housekeeper's panel indicates that the room is in the process of preparation.

When the room is ready for occupancy the housekeeper pushes the plug all the way into the receptacle and thereafter removes the plug completely. Upon removal of the plug the lamp at the head housekeeper's panel glows continously indicating that the room is ready for occupancy. The housekeeper may check to determine whether the lamp at the head housekeeper's panel is lighted merely by inserting the plug a short distance past the entrance of the receptacle. If the lamp at the head housekeeper's panel is energized at this time the lamp in the room will glow continuously so long as the plug is held at the entrance to the receptacle.

In the instant invention flashing of the indicator lamp is achieved by utilizing a single polarity changing device for the whole system rather than an individual switching means for each room. More particularly, the signaling system is energized from a D.C. source. The switch at the head housekeeper's panel upon successive operations alternatively connects one side of the indicator lamp to the negative and then to the positive terminal of the D.C. source. When the housekeeper enters a room and inserts a plug into the receptacle this connects the other side of the indicator lamp to a bus which is alternately connected to the negative and positive terminals of this same D.C. supply. When the opposite sides of the bulb are connected to different polarities the bulb will light but when the opposite sides of the bulb are connected to the same polarity the bulb is extinguished.



The polarity changing device in question is a motor driven device which is in continuance operation. The motor operates a switch arm continuously between contacts connected to the negative and positive terminals of the D.C. source.

While the signaling system as hereinbefore outlined achieves many desirable results the circuitry involved is simplified to the point where only four leads are required in an ungrounded system to connect each room to the head housekeeper's control panel.

Accordingly another primary object of this invention is to provide a signaling system, for hotels and the like, of novel construction so as to be reliable in operation and simplify operating and servicing procedures.

Another object is to provide a signaling system of this type having novel means to indicate when a room is in the process of being made up and to indicate when the room is ready for occupancy.

Still another object is to provide a signaling system of this type in which a single polarity changing device is utilized for a plurality of signaling units.

A further object is to provide a signaling system of this type having provisions whereby the housekeeper in a room may readily determine whether the control panel at the head housekeeper's station is appropriately energized.

These as well as further objects of this invention shall become readily apparent after reading the following description of the accompanying drawings in which:

FIGURE 1 is a schematic representation of a signaling system constructed in accordance with the teachings of the instant invention.

FIGURE 2 is a combined electrical and mechanical schematic which illustrates the operation of applicant's device.

FIGURE 3 is a schematic similar to FIGURE 2 illustrating another embodiment of this invention.

Now referring to the figures. The system of the instant invention comprises control panel **11** at the front desk connected by multi-conductor cable **12** to control panel **13** located at the head housekeeper's station. Each of the panels **11** and **13** is provided with a plurality of indicator lamps arranged in a horizontal row opposite a card indicating a room number. These rows of lamps are arranged one below the other so that the lamps are aligned in columns. As will be fully explained hereinafter, the lamps in the right-most column of each panel **11**, **13** are used for signaling to indicate when a room is in the process of being prepared for occupancy and when this room is ready for occupancy.

As indicated schematically in FIGURE 1 a plurality of multi-conductor cables extend from the top of housekeeper's panel **13** with each of these cables extending to a room panel **20**, there being an individual room panel **20** for each room in the hotel. The energization of the lamps in the right-most columns of panels **11** and **13** is accomplished through D.C. supply **14**.

Conductors **15** and **16** connect the positive and negative terminals respectively of supply **14** to housekeeper's panel **13** while jumpers **17** and **18** connect the positive and negative terminals respectively to input terminals **20**, **22** of polarity changer **25**. The motor section **26** of polarity changer **25** is connected through cable **27** to a suitable source of alternating current. Output terminal **28** of polarity changer **25** is connected to housekeeper's panel **13** by conductor **29**.

Polarity changer **25** is a cyclically operating circuit interrupting device including a rotor or switch arm **30** which is continuously operated by the output shaft of motor **26** so that the free end of switch arm **30** engages contacts **31** through **34** for each revolution of switch arm **30**. Termi-

nals 31 and 33 are connected to lead 18 which in turn is connected to the negative terminal of D.C. power supply 14 while terminals 32 and 34 are connected to lead 17 which is connected to the positive terminal of D.C. supply 14. Thus, as switch arm 30 is rotated it is connected to one terminal of supply 14 and then to the other thereof so that the polarity on conductor 29 is alternately changing from positive to negative. Accordingly, conductor 29 is designated as a flasher bus.

The operation of applicant's signaling system will now be described in detail by reference to the hook-up for a single room 101, it being understood that similar operations take place for each of the other rooms. Particular attention is directed to FIGURE 2.

Switch 35 and signaling lamp 36 are located on the face of housekeeper's panel 13 in the horizontal line opposite the sign indicating room 101. Switch 35 is a manually operated single pole double throw unit comprising switch arm 37 which is operable into engagement with contacts 38 and 39 connected to the positive and negative terminals, respectively, of D.C. supply 14. One side of lamp 36 is connected directly to switch arm 37 while the other side of lamp 36 is connected through resistor 41 and jumper 42 to another switch arm 43. Room lamp 44 is connected through jumper 45 to flexible arm 46 which is aligned with and in close proximity to the free end of switch arm 43. Switch arm 43 is self-biased into engagement with contact 47 as will be more fully explained hereinafter. Arm 43 is separable from contact 47 and operable into engagement with contact 48. Flasher bus 29 is conected to contact 48.

Jumper 51 connects contact 47 to switch arm 52 of single pole double throw switch 50 which is of the push-push type in which switching occurs upon release of operating element 53. Upon successive operations of element 53, switch arm 52 is operable between contacts 54 and 55 which are connected to the positive and negative terminals, respectively, of D.C. supply 14. Indicator lamp 36', on the face of desk panel 11 and opposite the sign for room 101, is connected in parallel with lamp 36.

When a housekeeper is sent to a room which is to be made up, immediately upon entering this room she inserts her plug 60 into receptacle 61 of unit 20 until room lamp 44 begins to flash. Plug 60 remains in this position all during the time that the housekeeper is preparing the room in question.

Plug 60 is of a conventional type in which tip 62 is separated from shank 63 by an insulating portion 64. However, it is noted that internally of handle 65 there is a jumper electrically connecting tip 62 to shank 63. As plug 60 is inserted into receptacle 61 switch arm 43 is moved from contact 47 into engagement with contact 48. This establishes a circuit from flasher bus 29 through plug 60, room lamp 44, and the parallel combination of lamps 36 and 36' to switch contact 39 which is connected to the negative terminal of D.C. power supply 22. Thus, during the intervals that flasher bus 29 is positive lamps 36, 36' and 44 will be energized and during the intervals when flasher bus 29 is negative lamps 36, 36' and 44 will not be lighted. It is noted that if switch arm 37 were engaged with contact 38, flashing of lamps 36, 36' and 44 would still occur except that these lamps would be lighted when flasher bus 29 was at a negative potential.

When the housekeeper is finished with room 101, if she has not already done so, she forces plug 60 into receptacle 61 as far as it will go. This insures that upon removal of plug 60 switch 50 will operate. With the elements as shown operation of switch 50 causes switch arm 52 to engage contact 54. This completes a circuit from the positive terminal of D.C. supply 14, through switch arm 52, jumper 51, jumper 42, resistor 41, the parallel connection of lamps 36, 36', through switch 35 to the negative terminal of power supply 14. Thus, lamps 36 and 36' are energized and glow continuously. If plug 60 is withdrawn without operating switch 50 then the same polarity will be present on both sides of lamps 36, 36' and they will not light. In order for the housekeeper to check that this is occurring she merely inserts plug 60 into receptacle 61 until tip 62 engages arms 43 and 46. This now connects lamp 44 in parallel with resistor 41 so that lamp 44 will be lighted and remain lighted until plug 60 is withdrawn.

The head housekeeper extinguishes lamps 36 and 36' by operating switch 35. In this case operation of switch 35 causes switch arm 37 to engage contact 38 connected to the positive terminal of D.C. supply 14. Now both ends of lamp 36 are connected to the same polarity and the lamp will not light.

The next time the housekeeper enters room 101 she again inserts plug 60 as previously explained and energizes lamps 36, 36' and 44 through flasher bus 29 in combination with positive bus 16. After the housekeeper is finished she operates switch 50 and in so doing moves switch arm 52 back to contact 55 thereby connecting the opposite sides of the lamps 36, 36' to different polarities so that they glow continuously to indicate that the room is ready for occupancy.

It is noted that in the ungrounded system hereinbefore described cable 99, connecting room unit 20 to housekeeper's panel 13, requires only four conductors. Two of these conductors connect to the terminals of D.C. supply 14, one conductor connects to flasher bus 29, and the fourth conductor connects the plug operated switching means of unit 20 to indicator lamp 36.

FIGURE 3 illustrates another embodiment of my invention in which the manual control switches are located at the desk rather than at the housekeeper's station. Since the embodiments of FIGURES 2 and 3 are so similar only the differences will be noted.

In the embodiment of FIGURE 3 room lamp 44 is connected in parallel with resistor 41 and is no longer connected to plug prong 46. The embodiment of FIGURE 3 is provided with a green indicating lamp 95, one end of which is connected to the junction of lamps 36, 36' remote from switch 35. The other end of lamp 95 is connected to arm 99 of single pole double throw switch 100. Stationary contact 97 of switch 100 is directly connected to positive bus 17 while stationary contact 98 is directly connected to negative bus 18.

It is noted that lamp 95 is green while the other three lamps are white. In the embodiment of FIGURE 3 lamps 95 and 36' and switches 35 and 100 are all located at the desk while lamp 36 is located at the housekeeper's station and lamp 44 is located in the room. Suitable values for these elements of FIGURE 3 are listed below.

Resistor 41 is 200 ohms.
Lamp 44 is rated to glow at 100 mils and 2 volts.
Lamp 36 is rated to glow at 50 mils and 24 volts.
Lamp 36' is rated to glow at 50 mils and 24 volts.
Lamp 95 is rated to glow at 50 mils and 24 volts.

With the switches of FIGURE 3 in the positions illustrated each of the switch arms is directly connected through jumpers to negative bus 15 so that the same polarities exist on both sides of all lamps and none of the lamps glow. This is the condition which should prevail when a room is occupied.

When there is a checkout, switch 35 is operated so that switch arm 37 is directly connected to positive bus 16. Resistor 41 and the resistances of all of the lamps are so proportioned that under these circumstances only white lamps 36, 36' and 44 will glow. Even though there is current flowing through lamp 95, the current magnitude is below that required to cause illumination. The steady glow of the white lamps 36, 36' and 44 indicates that there has been a check-out and that a room is to be made up.

When the maid then enters the room and inserts plug 60 into receptacle 61, as described in relation to the embodiment of FIGURE 2, this moves arm 43 into engage-

ment with contact **48** thereby connecting flasher bus **29** to the end of the resistor lamp combination **41**, **44** remote from the other lamps **36**, **36'** and **95**. Now all of the white lamps **35**, **35'**, **44** will glow whenever flasher bus **29** is connected to positive bus **16** and all of these white lamps will be extinguished whenever flasher bus **29** is connected to negative bus **15**. During this period current flowing through green lamp **95** is not of sufficient magnitude for lamp **95** to glow.

When the maid is about to leave the room after having completed the make-up procedure, plug **60** is inserted all the way into receptacle **61** and then withdrawn thereby operating back switch **50**. Now switch arm **52** is connected to positive bus **16**, switch arm **37** is connected to positive bus **16**, and switch arm **99'** is connected to negative bus **15**. Under these circumstances current flowing through green lamp **95** divides through the other three lamps **36**, **36'** and **44** as well as through resistor **41** so that green lamp **95** glows and all of the other lamps do not glow. This indicates that a room is ready for occupancy.

At the time the room is rented, switch **100** is operated. This connects switch arm **99** directly to positive bus **16**. Now the switch arms of all three switches **35**, **15** and **100** are connected to positive bus **16** and all of the lamps are extinguished indicating that the room is occupied.

During the next cycle of check-out, make-up and check-in, switches **35**, **50** and **100** are operated in sequence back to their positions illustrated in FIGURE 3 with the indicating lamps being lighted and extinguished as previously described.

While the circuits constituting the instant invention have hereinbefore been described as being energized by a D.C. source, it will be apparent to those skilled in the art that an A.C. source may be utilized equally as well with one terminal of the A.C. source connected to bus **15** and the other terminal connected to bus **16**. It is noted that in the embodiment of FIGURE 3, just as in the embodiment of FIGURE 2, only a four conductor cable is required to connect room unit **20'** external of the room. It is also noted that the embodiment of FIGURE 3 provides a green lamp **95** at the desk to indicate that a room is ready for occupancy.

Thus, this invention provides simplified means usable by the housekeeping and maintenance departments of hotels and the like to readily determine conditions at a given location and also to determine where their personnel are located.

Although there has been described a preferred embodiment of this novel invention, many variations and modifications will now be apparent to those skilled in the art. Therefore, this invention is to be limited, not by the specific disclosure herein, but only by the appending claims.

The embodiments of the invention in which an exclusive privilege or property is claimed are defined as follows:

**1.** A signaling arrangement of the class described comprising a control panel, a plurality of locations remote from said panel; for each of said locations an individual switching device, an individual indicator, and an individual switch means associated with one another; all of said indicators and switch means located at said panel; a first bus at a first potential; a second bus at a second potential; a flasher bus; means alternately connecting said flasher bus to said first and said second buses, circuit means connecting each of said switching devices in circuit with its associated indicator and switch; each of said indicators having a first and a second side; each of said switch means operable to connect said first side of its associated indicator to either said first or said second buses; each of said switching devices including an element operable from a first to a second position and when in said second position connecting said second side of its associated indicator to said flasher bus whereby said indicator operates intermittently.



**2.** The arrangement of claim **1** in which each of said switching devices also includes a switch unit operable to a first and a second position, said switch unit when in its said first and said second positions and said element of its switch device is in its said first position connecting the second side of its associated indicator to said first and said second buses respectively; said indicator being continuously ON when the respective sides thereof are connected to different ones of said first and second buses and said indicator is OFF when both sides thereof are connected to the same one of said first and second buses.

**3.** The arrangement of claim **2** also comprising at each of said locations another indicator associated with the previously recited elements at such location, additional means connecting said another indicators to said circuit means and said flasher bus in a manner such that each of said another indicators operates intermittently whenever its associated indicator operates intermittently.

**4.** A signaling arrangement of the class described comprising a control panel; a plurality of locations remote from said panel, a switching device at each of said locations; for each of said locations and operatively associated with one another, a first indicator, a second indicator, a first switch means and a second switch means all located at said panel; a first bus at a first potential and a second bus at a second potential; a flasher line; means alternately connecting said line to said first and said second buses; means connecting each of said switching devices in circuit with its associated first indicator, second indicator, first switch means and second switch means; each of said switching devices including a third switch means and an element operable from a first to a second position and when in said second position connecting a first side of said first and second indicators through said third indicator to said flasher line; said first switch upon successive operations thereof alternately connecting a second side of said first switch means to one then the other of said buses; said second switch means upon successive operations thereof alternately connecting a second side of said second switch means to one then the other of said buses; said third switch means upon successive operations thereof alternately connecting said first side of said third indicator to one then the other of said buses when said element is in said first position; said indicators, said first, second and third switch means, and said element being connected in circuit such that said second and said third indicators operate intermittently when said element is in said second position, said second side of said second switch means is connected to one of said buses, and said second side of said first switch means is connected to the other of said buses.

**5.** A signaling arrangement as set forth in claim **4** in which the first indicator is operative and the other indicators are inoperative when said element is in said first position, said second side of said second indicator and said first side of said third indicator are connected to the same bus, and said second side of said first switch is connected to the other one of said buses.

**6.** A signaling arrangement of the class described comprising an indicator at a first location; a source of electrical energy having first and second terminals at different potentials; a switching device at a second location remote from said first location; said switching device including a first section and a second section; said first section including an element normally in a first position and operable to a second position; a first switch at said first location; said second section including a second switch; each of said switches being operable between a first and a second position; cyclically operating circuit interrupting means; first circuit means, including said indicator, said element in its said first position and both of said switches in their said first positions, forming a complete first series path between said terminals for continuous energization of said indicator; second circuit means, including said

indicator, said element in its said first position and both of said switches in their said second positions, forming a complete second series path between said terminals for continuous energization of said indicator; said first series path being interrupted when either of said switches is in its said second position and said second series path being interrupted when either of said switches is in its said first position; third circuit means, including said indicator, said element in its said second position and said interrupting means, forming a third series path between said terminals; said interrupting means alternately completing and interrupting said third series path causing said indicator to be energized intermittently when said element is in said second position.

7. A signaling arrangement as set forth in claim 6 further comprising a receptacle means at said second location; said receptacle means including a structure for receiving a plug and guiding same into operating engagement with both said element and said second switch.

8. A signaling arrangement as set forth in claim 7 in which said receptacle means is positioned closer to said element than to said second switch whereby a plug inserted partially into said structure may operate said element without operating said second switch.

9. A signaling arrangement as set forth in claim 7 in which the second switch includes an operating element engageable by a plug inserted into said structure, a switch arm and means connecting said operating element to said arm so that for successive operations of said operating element in the same direction said second switch will move from its said first position, to its said second position, back to its said first position, back to its said second position, and so on.

10. The arrangement of claim 9 in which the structure is positioned closer to said element than to said operating element so that a plug inserted into said structure will engage said element prior to engaging said operating element.

11. The arrangement of claim 6 in which four electrical conductors connect all portions of said arrangement at said first location with all portions of said arrangement at said second location.

12. A signaling arrangement as set forth in claim 6 in which the cyclically operating circuit interrupting means includes a contact means, a motor and a rotor forming part of said third circuit means; said contact means electrically connected to said first terminal; said motor continuously driving said rotor to alternately engage and disengage said contact means.

13. A signaling device as set forth in claim 12 in which the cyclically operating circuit interrupting means includes an additional contact means electrically connected to said second terminal; said motor driving said rotor into engagement with said additional contact means when said rotor is disengaged from said contact means.

14. A signaling arrangement as set forth in claim 6 in which each of said switches is a single pole double throw device including a movable arm; said indicator positioned between said movable arms in both said first and said second series paths.

15. A signaling arrangement as set forth in claim 6 also comprising a plurality of additional locations remote from said first location; for each of said additional locations and additional switching device substantially identical to said switching device, an additional indicator substantially identical to said indicator, and additional first switch substantially identical to said first switch, and additional first, additional second and additional third circuit means electrically connecting said additional switching device, said additional first switch and said additional indicator to said terminals and said circuit interrupting means in the same manner as said switching device, said first switch and said indicator are connected to said terminals and said circuit interrupting means; a panel having said indicator, said first switch, all of said additional indicators and all of said additional first switches mounted thereat.

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