

[72] Inventor **William J. Head**
 West Hill, Ontario, Canada
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 [73] Assignee **Electro Tech Appliance Service Limited**
 Toronto, Ontario, Canada

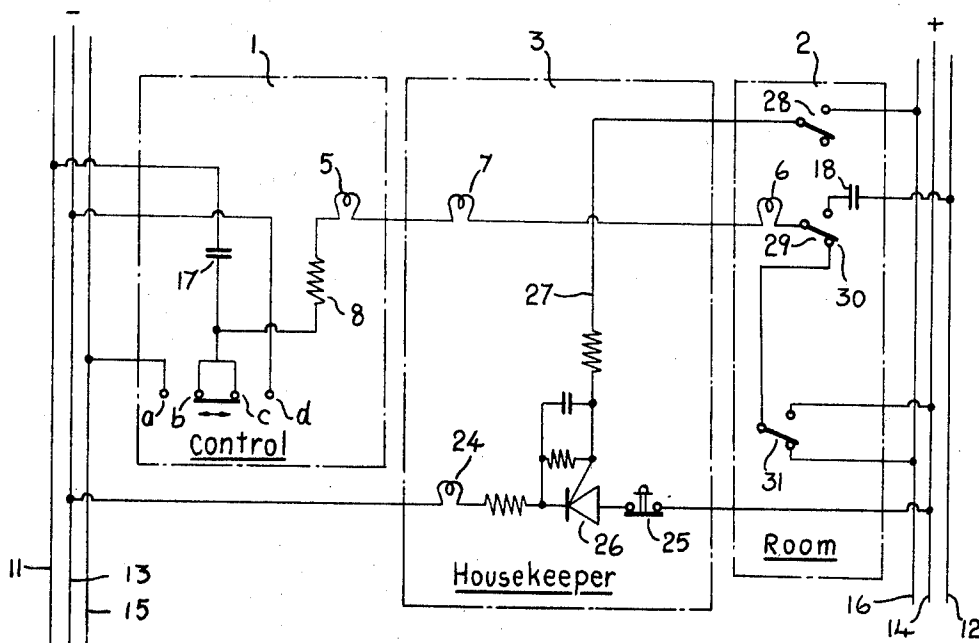
[56] **References Cited**
UNITED STATES PATENTS
 3,051,944 8/1962 Smith 340/384
 3,124,793 3/1964 Foster 340/213.2
 3,214,747 10/1965 Lurie 340/286
 3,228,020 1/1966 Gassenheimer et al. 340/286

Primary Examiner—John W. Caldwell
Assistant Examiner—Michael Slobasky
Attorney—Maybee & Legris

[54] **STATUS SIGNALLING SYSTEM**
6 Claims, 4 Drawing Figs.

[52] U.S. Cl. **340/286,**
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 [51] Int. Cl. **H04n 7/00**
 [50] Field of Search 340/330,
 286, 287, 309.4, 309.5, 384 (E), 129, 288, 313,
 311,

ABSTRACT: In a room status signalling system a separate signalling circuit is provided for each room, each signalling circuit including a plurality of indicator lamps in series and being selectively connectable to alternative supply terminals by manually operable switches at the room and at a central control desk. The alternative electrical supplies energize the lamps to provide a steady signal, a slow flashing signal, and a fast flashing signal.



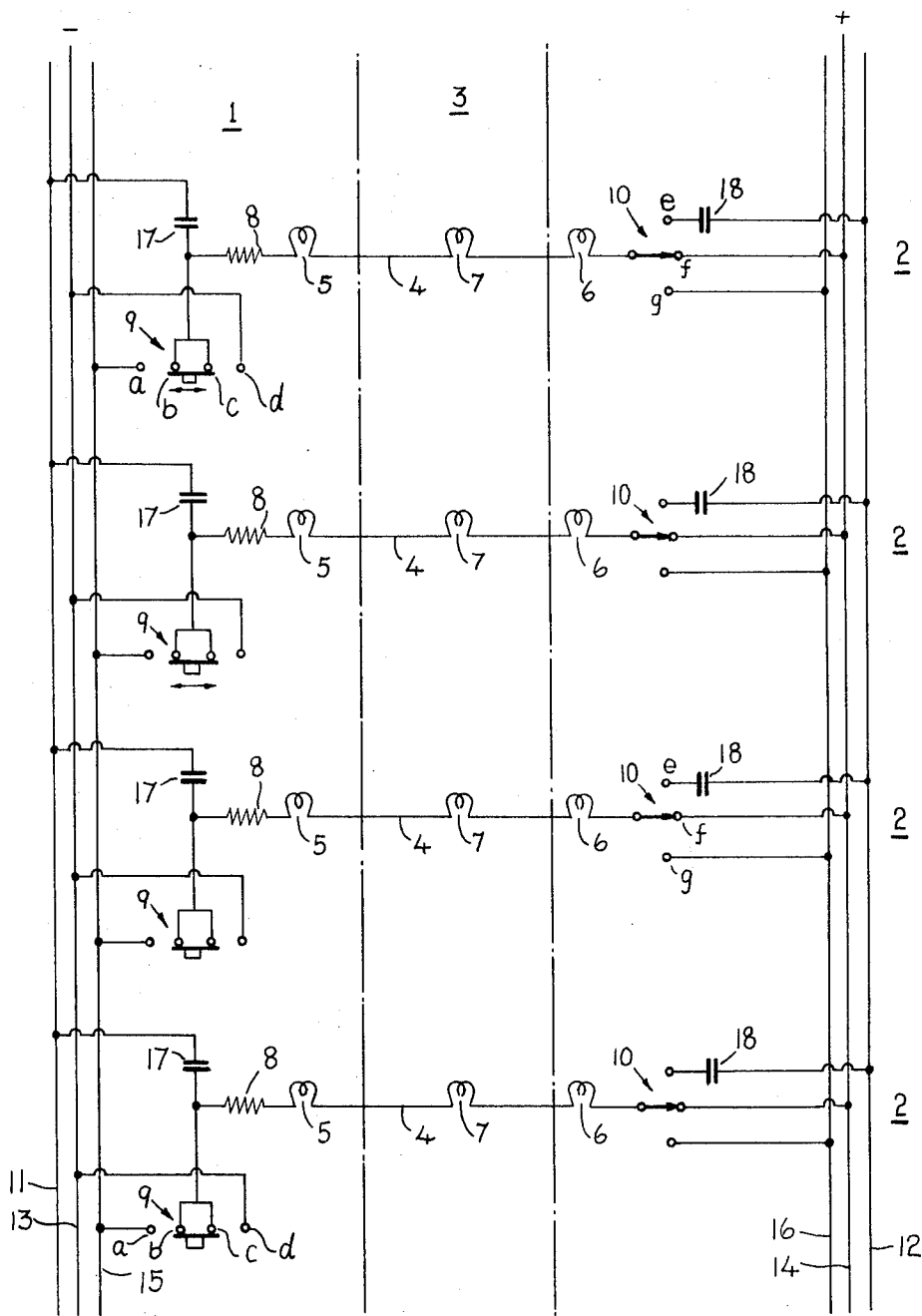


Fig. 1.

Inventor
William John Head

By *Maybee & Legris*
Attorney

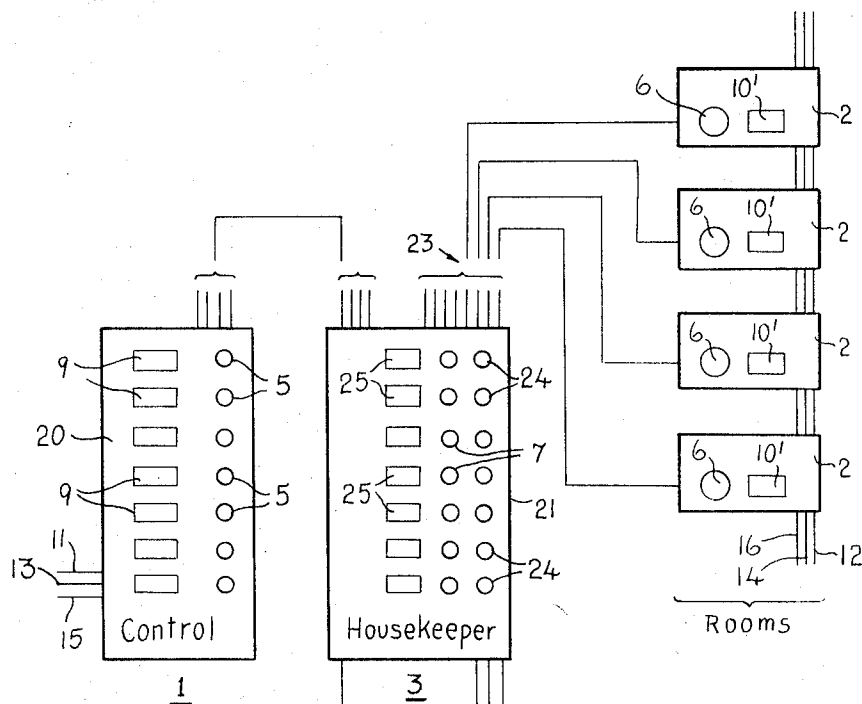


Fig. 2.

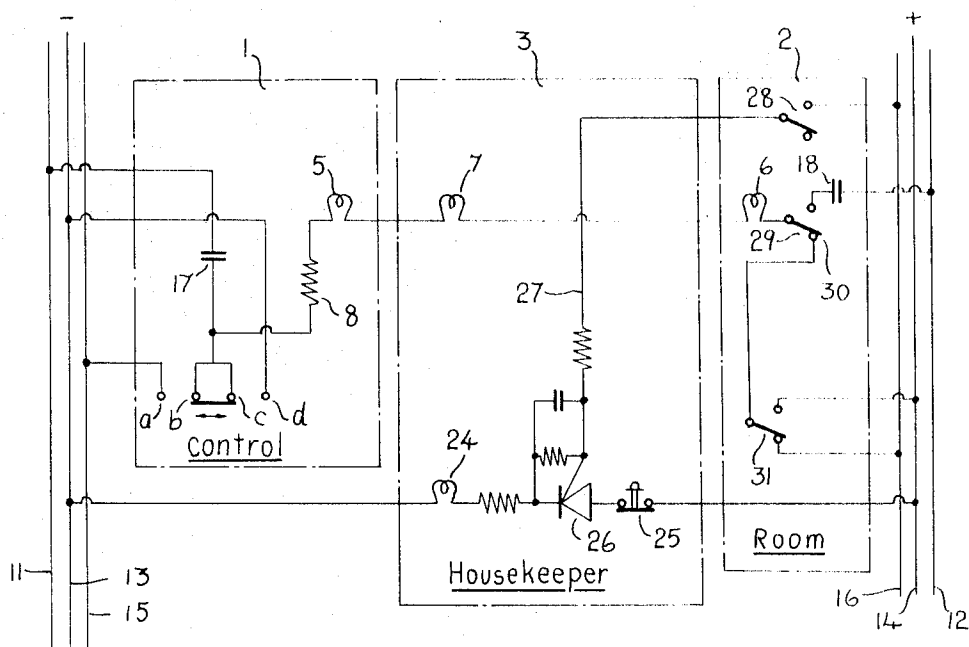


Fig. 3.

Inventor
William John Head
By *Maybee & Legris*
Attorneys

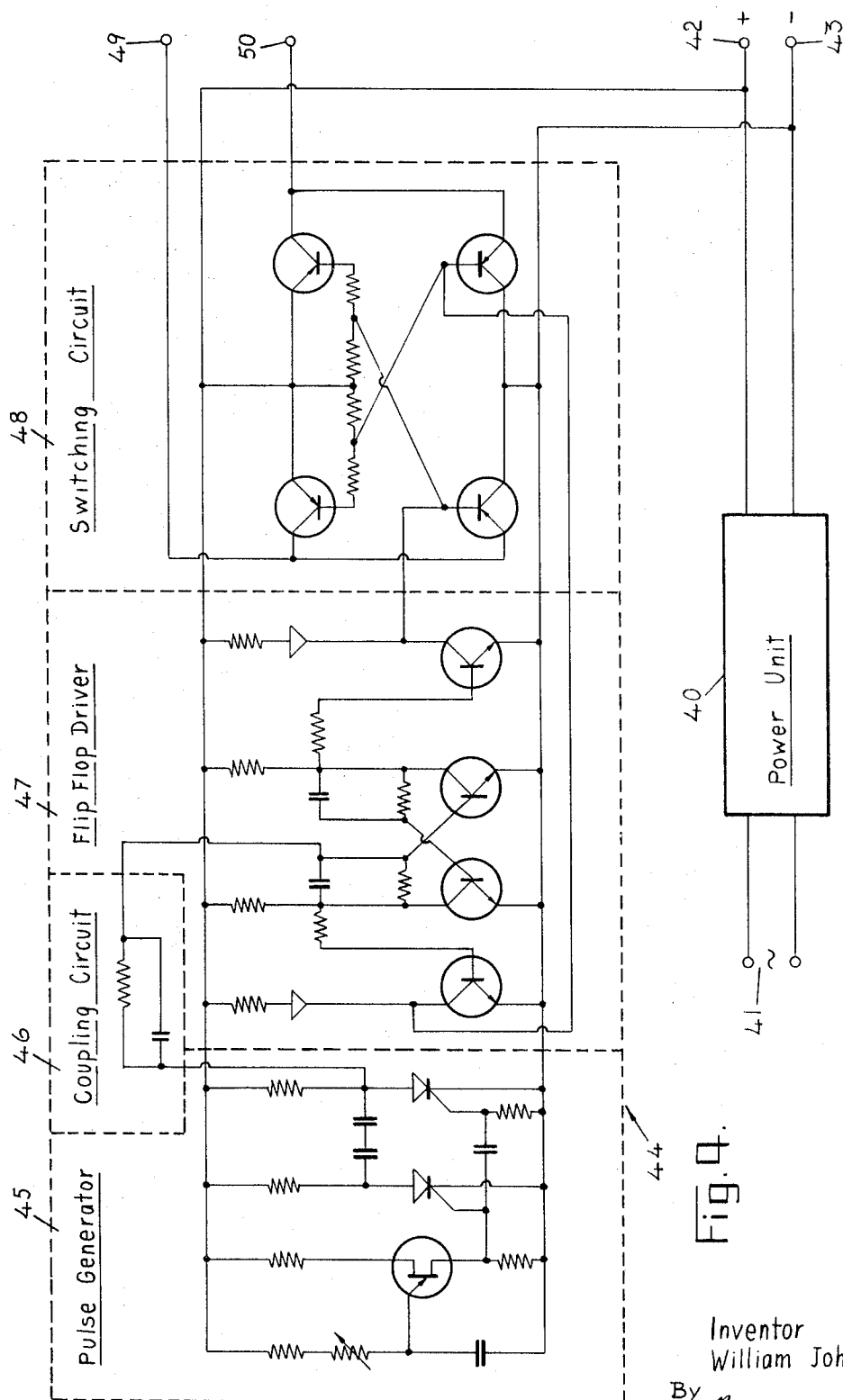


Fig. 4.

Inventor
William John Head
By *Maybee & Legris*
Attorneys

STATUS SIGNALLING SYSTEM

BACKGROUND OF THE INVENTION

This invention relates to status signalling systems in general, and is applicable for example to room status signalling systems of the kind used in hotels, clubs and the like to enable signals to be given at different points in accordance with the status or condition of different rooms.

The invention is generally applicable to business and industrial situations in which personnel have to be notified of the conditions obtaining at different places, or of the status of operations to be performed in sequence. In a large hotel, for example, it is generally necessary to signal to different personnel the status of rooms to be prepared for occupancy or being prepared for occupancy. In a hotel it is usual to provide at a front desk an array of indicator lamps which display information appertaining to the status of different rooms. Each of the lamps is connected in a signalling circuit associated with a respective room unit, and each signalling circuit may include indicator lamps at a housekeeper's panel and in a respective room. When a room is to be made up for occupancy, the desk clerk operates an appropriate switch at the desk panel and this conditions the respective room signalling circuit whereby a characteristic status signal appears at the housekeeper's panel. In response to this signal, a maid is sent to the room where she actuates another switch, thereby transmitting a different characteristic signal to the front desk indicating that the room is being made up. When the room has been made ready for occupancy, the maid actuates the room switch again, thus signalling to the front desk that the room is ready.

In certain cases where only low grade labour is available, it may be necessary for a room to be inspected by a supervisor after it has been made up, the supervisor being solely responsible for signalling the final status of the room to the front desk. This will in general necessitate additional signalling facilities between each room and the housekeeper's panel at a monitoring station, and between the monitoring station and the front desk.

Numerous arrangements of this general kind have been proposed in the past, but all such arrangements have been very expensive to install on account of the extensive wiring involved, and frequently on account of the elaborate equipment for providing the different characteristic signals in each of the signalling circuits. In general several signalling circuits for each room have been required and each signalling circuit has required a number of call wires.

It is an object of the present invention to provide a status signalling system in which each signalling circuit involves a minimum amount of wiring and yet is itself capable of displaying a number of different status signals as required.

SUMMARY OF THE INVENTION

Basically, a status signalling system according to the present invention includes a number of signalling circuits each associated with a respective remote unit (e.g. a room unit), each signalling circuit including a first indicator at a central unit, a second indicator at the respective remote unit, and preferably a third indicator at a monitoring unit such as a housekeeper's panel. The signalling circuits are individually energized from an intermittent alternating current supply, a continuous direct current supply, and a symmetrical square wave current supply providing complementary square waveforms, in accordance with the settings of manually operable switches at the central unit and at the respective room units. In this way signals which may be described as "continuous," "slow flash" and "fast flash" are made available automatically in the required sequence. Preferably, the manually operable switches are so arranged with respect to the supply terminals as to provide transfer status.

In order to provide additional signalling facilities to and from a supervisory station, each manually operable switch at a remote unit may comprise a first two-way switch which is operable by the maid and interconnected with a supervisor's

indicator, and a second two-way switch which is operable only by the supervisor to transmit an appropriate signal to the front desk.

BRIEF DESCRIPTION OF THE DRAWINGS

In the drawings:

FIG. 1 is a wiring diagram of a basic room status signalling system according to the invention;

FIG. 2 is a diagrammatic representation of a modified room status signalling system having additional supervisory signalling facilities;

FIG. 3 is a wiring diagram of part of the system shown in FIG. 2, the diagram illustrating a single signalling circuit; and

FIG. 4 is a schematic wiring diagram of supply circuit providing a symmetrical square wave output.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring to FIG. 1, the basic room status signalling system comprises a central station 1 including a central control panel, a plurality of remote units 2 representing room units, and a monitoring or housekeeper's station 3 including a monitoring panel. Associated with each remote unit 2 is signalling circuit 4. Each signalling circuit 4 comprises a first indicator lamp 5 mounted on the central control panel, a second indicator lamp 6 located at a respective remote unit, and in the present example, a third indicator lamp 7 mounted on the monitoring panel. The three lamps of each signalling circuit are in series with one another and with a limiting resistor 8.

The signalling circuits 4 are each energized from a selected one of three electrical supplies in accordance with the settings of a first, manually operable slide switch 9 mounted on the central control panel, and a second, manually operable, key-actuated switch 10 located at a remote unit 2. The slide switches 9 have four switch terminals, referenced *a, b, c* and *d*, providing three switch positions. The key-actuated switches 10 are single-pole, three-way switches having switch terminals *e, f* and *g*. The first electrical supply is an intermittent alternating current mains supply having first and second terminal bus bars 11, 12. The intermittence frequency of the supply is relatively fast so that the indicator lamps of any signalling circuit flash rapidly when energized from this supply. The second supply is a continuous direct current supply having third and fourth terminal bus bars 13, 14 of opposite polarity. The third supply is an intermittent direct current supply having fifth and sixth terminals 15, 16 providing complementary square wave potentials; the intermittence frequency of this supply is different from, and in the present example less than, the intermittence frequency of the alternating current supply. The bus bars 11, 13 and 15 provide supply terminals at the central control panel, and the bus bars 12, 14 and 16 provide supply terminals at all the remote units.

It will be noted that one end of each signalling circuit is connected to the bus bar 11 through a blocking condenser 17, and is selectively connectable to bus bars 13 and 15 by the appropriate slide switch 9. The other end of each signalling circuit is selectively connectable by means of the three-way switch 10 to the bus bar 12, via a blocking condenser 18, or to the bus bar 14 or 16. The nature and polarities of the potentials at the six bus bars will best be appreciated from Table 1, which indicates the conditions of any signalling circuit for different settings of the switches 9 and 10.

TABLE I

Switch 9	Switch 10	Effective Busbars	Circuit Condition
Position 1 (<i>b, c</i>)	Position 1 (terminal <i>e</i>)	11, 12	Fast Flash.
Position 2 (<i>a, b</i>)	do	11, 12	Do.
Position 3 (<i>c, d</i>)	do	11, 12	Do.
Position 1 (<i>b, c</i>)	Position 2 (terminal <i>f</i>)	11, 14	Off.
Position 2 (<i>a, b</i>)	do	15, 14	Slow Flash.
Position 3 (<i>c, d</i>)	do	13, 14	Steady.
Position 1 (<i>b, c</i>)	Position 3 (terminal <i>g</i>)	11, 16	Off.
Position 2 (<i>a, b</i>)	do	15, 16	Steady.
Position 3 (<i>c, d</i>)	do	13, 16	Slow Flash.

A characteristic feature of the system that will be noted is that the lamps will give a steady light when the signalling circuit is connected between bus bars 13 and 14 or bus bars 15 and 16, but will give a slow flash when the signalling circuit is connected between the bus bars 14 and 15, or 13 and 16.

In operation of the system, the normal condition of the indicator lamps in a signalling circuit is OFF, the slide switch 9 being at position 1 (as shown in FIG. 1) and the key-actuated switch being at position 2. When a room is to be made up, the desk clerk operates the slide switch appropriate to the room, moving it to position 2; this connects the room signalling circuit effectively between bus bars 15 and 14 causing the indicator lamps 5, 6 and 7 to signal with a slow flashing light. The housekeeper or supervisor observes the "slow flash" signal on the monitoring panel and arranges for a maid to make up the room. On entering the room, the maid inserts a key into the switch 10, changing the switch to position 1 and placing the indicator lamps in a condition of "fast flash." This signal indicates to the desk clerk and the housekeeper that the maid is in the room. After preparing the room, the maid changes switch 10 to position 3, thus changing the signal to a "steady light" condition and signalling that the room has been made up. The desk clerk subsequently restores the signalling circuit to the OFF condition by returning the switch 9 to position 1. It will be appreciated that a number of permutations of switch positions is possible with this system, and the actual sequence of signals in any case will depend upon the method adopted by the hotel. If the maid has left the key-actuated switch at position 3, then in order to obtain a "slow flash" signal at a subsequent time the desk clerk must move slide switch 9 to position 3 rather than 2, and the maid must later move the key switch 10 to position 2 rather than 3 in order to signal that the room has been made up. Thus, in order to obtain the required signal the switches 9 and 10 must each be moved in a direction depending on the setting of the other one; the switch operator will see from his own indicator lamp whether the correct signal has been given.

The second status signalling system of FIGS. 2 and 3 provides additional signalling facilities for use by a supervisor. The system is basically the same as that of FIG. 1, and parts of the system which are structurally and functionally the same as parts of the first system are denoted by the same reference numerals and will not be described again in detail. FIG. 2 shows a central control panel 20 located at the front desk 1, a housekeeper's panel 21 at a monitoring station 3, and a number of room units 2. The signalling circuits which are associated with the respective room units are denoted by the general reference 23. As in the first system, the signalling circuits are selectively energized from intermittent alternating current, continuous direct current, and symmetrical square wave current supplies which provide "fast flash," "steady light," and "slow flash" signals; these supplies are indicated by the terminal bus bars 11, 12, 13 and 14, and 15 and 16, respectively. Mounted on the control panel 20 are a plurality of manually operable slide switches 9 and a plurality of indicator lamps 5. An indicator lamp 6 and a key-actuated switch assembly 10' are located at each room unit, and on the housekeeper's panel are a series of indicator lamps 7, a series of additional indicator lamps 24, and a series of pushbutton switches 25.

FIG. 3 is the wiring diagram of a single signalling circuit. Each indicator lamp 24 mounted on the housekeeper's panel 21 is energized by a driver circuit including a silicon-controlled rectifier 26 and connected between the bus bars 13 and 14. The pushbutton switch 25 is in series with the driver circuit for deenergizing the latter. A trigger circuit 27 for triggering the silicon-controlled rectifier is connectable to bus bar 14 by means of an ON-OFF switch 28, which forms part of the switch assembly 10'. The switch assembly 10' comprises a single-pole double throw switch 29 which is ganged to switch 28 and is operable to connect one end of the signalling circuit either to the bus bar 12, via the blocking condenser 18, or to switch terminal 30. The switch assembly 10' also includes a second single-pole double throw switch 31, the common pole

of which is connected to switch terminal 30, and the switch terminals of which are connected to bus bars 14 and 16. Thus, the switch 29 is connected for selectively connecting the respective signalling circuit in circuit with bus bar 12 or switch 31, and the switch 31 is connected for selectively connecting the selected signalling circuit in circuit with the bus bar 14 or the bus bar 16.

The switch assembly 10' is actuated by a maid's key or a supervisor's key, and is constructed so that when the maid's key is inserted and turned, switches 28 and 29 are changed over. The switch 31 is not changed over, however, until a special supervisor's key is inserted and turned.

In operation of the system, the normal condition of the indicator lamps of the signalling circuit is OFF, the slide switch 9 being at position 1 (shown in FIG. 3) and bridging terminals b,c; the switches 28, 29 and 31 are all in the DOWN position. When a room is to be made up, the desk clerk operates the slide switch 9 by moving it in the appropriate direction for obtaining a "slow flash" signal. In this example the switch will be moved to position 3, bridging terminals c,d, to obtain the "slow flash" signal, the signalling circuit being then effectively connected between bus bars 15 and 14. (It will be appreciated that if switch 31 had been left in its UP position, it would be necessary to move slide switch 9 to position 2, bridging terminals a,b, to obtain the "slow flash" signal.) The supervisor observes the "slow flash" signal on the monitoring panel and arranges for a maid to make up the room. On entering the room, the maid inserts her key into switch assembly 10', thereby changing switches 28 and 29 to the UP position. The trigger circuit 27 is thus connected to bus bar 14, and the silicon-controlled rectifier 26 is fired to illuminate the indicator lamp 24. The signalling circuit at the same time is effectively connected between bus bars 11 and 12, thus producing the "fast flash" signal which indicates to the desk clerk and the supervisor that the maid is in the room. When the room has been made up, the maid withdraws the key and the switch 29, which preferably has a spring return, returns to the DOWN position thus producing the "slow flash" signal again. Lamp 24 remains on, which indicates to the supervisor that the room is ready for inspection. The supervisor depresses pushbutton switch 25 to switch off indicator lamp 24, and proceeds to inspect the room. If the room is satisfactory, the supervisor inserts her key into the switch assembly 40' and thereby changes switch 31 to the UP position. The signalling circuit is now effectively connected between bus bars 15 and 16, thus producing a "steady light" signal which indicates that the room is ready for occupancy. The indicator lamps are finally switched off by moving the slide switch 9 to its initial position.

It will be appreciated that the switch 25 could be located in the room unit 2 instead of at the monitoring station. In such a case the switch should preferably be a key-operated switch accessible only to the supervisor.

It has been stated that when the series-connected indicator lamps are connected between the bus bars 15,16, switch 9 being at position 2 and switch 10 being at position 3 (Table 1), a "steady" signal is obtained. In order to avoid any flicker of the indicator lamps it is important that the supply circuit providing the symmetrical square wave potentials should employ fast electronic switching. A preferred supply circuit for this purpose is illustrated diagrammatically in FIG. 4.

Referring to FIG. 4, a power unit 40 has input terminals connected to an alternating current mains supply 41 and output terminals 42,43; the power unit provides constant 24 volt positive and 24 volt negative potentials at these output terminals, which are connected to the bus bars 14,13 of FIGS. 1 and 3. The power unit 40 is a standard unit incorporating a transformer, rectifier, smoothing means, a high-voltage cut-out, overload current protection means, and a voltage regulator.

Coupled to the output of the power unit 40 is a square wave generator 44. The square wave generator 44 comprises a pulse generator 45, which is coupled by a resistance-capacitance coupling circuit 46 to a flip-flop circuit 47 constituting a

driver. The latter is connected to an electronic switch 48 formed by a symmetrical arrangement of transistors and resistors, which provides at output terminals 49 and 60 the complementary square wave potentials for energizing bus bars 15 and 16 of FIGS. 1 and 3. The square wave generator is so designed that the terminals 49 and 50 are always of opposite polarity; that is to say, when the terminal 49 is at 24 volts positive the terminal 50 is at 24 volts negative, and vice versa, the switching from one condition to the other being instantaneous for all practical purposes.

I claim:

1. A status signalling system comprising:

a. a central unit;

b. a plurality of remote units;

c. a plurality of signalling circuits each associated with a respective remote unit and including a first indicator at the central unit and a second indicator at the respective remote unit;

d. intermittent alternating current supply means including first and second terminals;

e. continuous direct current supply means including third and fourth terminals of opposite polarity;

f. symmetrical square wave current supply means including fifth and sixth terminals providing complementary square wave potentials, the frequency of said square wave current supply being different from the intermittence frequency of the alternating current supply;

g. a plurality of first, manually operable switches located at said central unit, each switch being associated with a respective signalling circuit selectively in circuit with the first, third or fifth terminals; and

h. a plurality of second, manually operable switches each located at a respective remote unit and operable for connecting the respective signalling circuit in circuit with the second, fourth or sixth terminals.

2. A status signalling system according to claim 1, including a monitoring unit and a plurality of third indicators located at said monitoring units, each of said third indicators being in series with the first and second indicators of a respective one of the signalling circuits.

3. A room status signalling system comprising:

a. a central station including a central panel;

b. a monitoring station including a monitoring panel;

c. a plurality of remote room units;

d. a plurality of signalling circuits each associated with a respective remote room unit and including a first indicator lamp mounted on the central panel, a second indica-

tor lamp mounted on the monitoring panel, and a third indicator lamp located at the respective room unit, said indicator lamps being electrically in series;

e. intermittent alternating current supply means including first and second terminals;

f. continuous direct current supply means including third and fourth terminals of opposite polarity;

g. symmetrical square wave current supply means including fifth and sixth terminals providing complementary square wave potentials; the frequency of said square wave current supply being different from the intermittence frequency of the alternating current supply;

h. a plurality of first, manually operable switches mounted on the central panel, each switch being associated with a respective signalling circuit and operable for connecting the signalling circuit selectively in circuit with the first, third or fifth terminals; and

i. a plurality of second, manually operable switches located at the room units, each switch being operable for connecting a respective signalling circuit in circuit with the second, fourth or sixth terminals.

4. A room status signalling system according to claim 3, the system further including a plurality of additional manually operable switches located at the room units, and a plurality of additional indicator lamps mounted on the monitoring panel for indicating the settings of the respective second manually operable switches, each of the second manually operable switches being a single-pole, double throw switch, each of said second switches being connected for selectively connecting a respective signalling circuit in circuit with the second terminal or a respective said additional switch, and each of said additional switches being connected for selectively connecting a selected signalling circuit in circuit with the fourth or sixth terminals.

5. A room status signalling system according to claim 4, the system further including a plurality of driver circuits for the respective additional indicator lamps, each driver circuit including an electronic switch; a plurality of trigger circuits each operable in accordance with the setting of a respective second manually operable switch to trigger one of the electronic switches; and a plurality of manual switches mounted on the monitoring panel and connected for deenergizing the driver circuits.

6. A room status signalling system according to claim 5, wherein the electronic switches are silicon-controlled rectifiers.