ABSTRACT

A system of multiple apparatuses for a signalling-and indicating function of a hotel, each apparatus embodying a transmitter possessing an indicator key, a receiver possessing a signal lamp and connection terminals for the infeed of power. According to important aspects of this invention, the transmitter possesses a coding mechanism controllable by the indicator key for simultaneously producing a control signal and at least two address signals, and wherein the receiver possesses a decoding mechanism for actuating a storage. At the output of the receiver there is connected the signal lamp.

10 Claims, 8 Drawing Figures
HOTEL SIGNALLING SYSTEM

BACKGROUND OF THE INVENTION

The present invention relates to a new and improved apparatus for a signalling- and indicating system or installation of the type embodying a transmitter possessing an indicator key, a receiver possessing a signal lamp, and connection terminals for the infeed of power.

A signalling- and indicating installation is already known in the art, by means of which it is possible from a first location to switch-in for instance three signal lamps, one of which is provided at the first location and both of the others of which are provided at a second and third location. These three signal lamps can again be extinguished at the second and/or third location. Installations of this type are advantageously employed in the environment of a hotel wherein a guest signifies to a desk clerk or attendant at the reception or hotel area his intention to depart. Thereafter, such desk clerk or attendant activates a key associated with the room which the guest has occupied. Owing to activation of such key is coordinated with the guest's room, the intention of the guest to depart from the hotel is conveyed to the cashier area and to the area where there is located the supervisory control for the chamber maids. This is accomplished in that a respective lamp associated with the aforementioned room of the guest illuminates at the location of the hotel desk clerk or attendant, at the cashier's area and at the control area for the chamber maids. This indication or signalling causes the cashier to prepare the bill for the guest's room and the maid supervisor to disseminate suitable instructions to the chamber maids. Now when the guest has paid his bill at the cashier's desk or area, the cashier actuates a key associated with the relevant illuminated lamp. As a result, the respective lamps at the cashier's area, at the reception or hotel area and at the control area are extinguished. Extinguishment of the lamp at the maid control or supervisory area is an indication that now the guest's room which has become free can be prepared for a new guest.

Prior art illustrations of this type possess a centrally situated apparatus which embodies a number of relays corresponding to the number of rooms. Each relay possesses a respective work contact and a self-holding contact. Three connection lines or wires are provided for each indicator or signalling key associated with each room and the signal lamps located at the attendant's or desk clerk's area. Three connection wires are similarly provided for the indicator keys and the signal lamps at the cashier's area and a connection wire is necessary for the signal lamps at the maid supervisory area. Additionally, a common supply line must be wires at all three locations for the indicator keys and the signal lamps. Hence for each room there is present an installation totalling seven connection wires and additionally one common supply line or wire. Hence, for a hotel having for instance 50 rooms this results in 350 connection wires or lines and the common supply line which must be drawn from the centrally located apparatus to the aforementioned three locations.

SUMMARY OF THE INVENTION

Accordingly, from what has been explained above, it should be apparent that a need still exists in the art for apparatus for a signalling- and indicating installation of the mentioned type which is simpler in construction and design than the heretofore considered prior art construction. It is a primary objective of the present invention to fulfill this need existent in the art.

Another more specific object of the present invention relates to the provision of a new and improved apparatus by means of which it is possible to produce a signalling- and indicating system, the installation of which is simpler and less expensive because considerably fewer connection lines or wires are necessary.

Now, in order to implement these and still further objects of the invention, which will become more readily apparent as the description proceeds, the invention contemplates that the transmitter possesses a coding mechanism controllable by means of the indicator key for simultaneously producing a control signal and at least two address signals, and wherein the receiver possesses a decoding mechanism for actuating a storage, at the output of which storage there is connected the signal lamp of the receiver.

BRIEF DESCRIPTION OF THE DRAWINGS

The invention will be better understood and objects other than those set forth above, will become apparent when consideration is given to the following detailed description thereof. Such description makes reference to the annexed drawings wherein:

FIG. 1 is a block circuit diagram of a signalling- and indicating installation equipped with six inventive apparatuses which, for instance, are sub-divided into three groups, each containing two such respective apparatuses;

FIG. 2 is a circuit diagram of the transmitter of the inventive apparatus depicted in FIG. 1;

FIG. 3 is a circuit diagram of the receiver of the inventive apparatus depicted in FIG. 1;

FIG. 4 is a detailed circuit diagram of an apparatus of the type depicted in FIG. 1;

FIG. 5 is a circuit diagram of a modified construction of inventive apparatus used in the installation of FIG. 1;

FIG. 6 schematically illustrates the principles of the apparatus of FIG. 1, partly in section, wherein only a few individual components have been depicted for purposes of clarity in illustration;

FIG. 7 is a side view of a portion of a frame having a cross-bar arrangement, at which frame there are introduced a number of slide-in units of the type used in the arrangement of FIG. 1; and

FIG. 8 is a front view of a portion of the frame depicted in FIG. 7.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now to the drawings, it is to be understood that the inventive apparatus which is suitable for the construction of a signalling- and indicating installation or system will be described, by way of illustration and not limitation, hereinafter in conjunction with an installation destined to be used in the environment of a hotel. Turning therefore now to FIG. 1, it will be seen that there are illustrated by way of example six such inventive apparatuses or modules, which even though all identical to one another, have been designated by reference characters A1, A2, B1, B2, C1, and C2. These six apparatuses are divided into three groups I, II, and III, with two such apparatuses being associated with
each such group. Hence, group I containing the appara-
tuses A1, A2 may be assumed to be located at the area
of the room attendant or desk clerk, group II, contain-
ing the apparatuses B1 and B2, at the cashier’s area, and
group III, containing the apparatuses C1 and C2, at the
maid supervisory area of the hotel. Of course, in
reality, there would be provided for each such group
the same number of apparatuses as there are monitored
guest rooms in the hotel. Apart from the supply lines
1 and 2 for the delivery of the supply voltage or power
to the individual apparatuses, there are also provided two
signal lines 3 and 4 and three address lines 5, 6 and 7,
all of these lines commonly being associated with the
apparatuses. The illustrated number of three address
lines permits two apparatuses to be associated with
each group. If, for instance, there are provided eleven
address lines, then, it would be possible to use 55 appa-
ratuses for each group.

From the number \( n \) of address lines it is possible
to calculate the maximum possible number of apparatuses
per group from the following equation:

\[
[n \times (n-1)] / 2 = \text{No. of apparatuses/group}
\]

The number of control lines always remains the
same. The number of groups likewise can be enlarged
to more than 10 without thereby requiring a greater
number of lines or wires. In particular, it should be ob-
served that with the set-up arrangement or configura-
tion of the groups I, II and III illustrated by way of ex-
ample in FIG. 1, there are only required the supply
lines or wires 1 and 2, the signal lines or wires 3 and 4
and the three address lines or wires 5, 6 and 7. If there
were employed the prior art installation discussed at
the outset, then there would be already required for only
two rooms an installation having fourteen connection
wires or lines.

Each of the identical apparatuses A1, A2, B1, B2,
C1, C2, is equipped with a transmitter 8 possessing an
indicator or signalling key 9 and a receiver 10 equipped
with a signalling lamp 11. Each apparatus is electrically
coupled with the supply lines 1 and 2. The connection
lines 12 between the transmitter 8 and the associated
receiver 10 only serve for the connection of the trans-
mitter 8 with the supply line 1 which is coupled with the
receiver 10 and for the connection of the receiver 10
with the supply line 2 which is coupled with the trans-
mitter 8.

If the indicator or signalling key 9 of the apparatus
A1 is depressed, then, the transmitter 8 of such appara-
tus simultaneously delivers a respective pulse via all
three of its outputs 13, 14 and 15 which are delivered
to the address lines 6 and 7 and the signal line 4. All
receivers 10 of the apparatuses A1, B1 and C1 receive
both of the pulses which have been delivered to the ad-
dress lines 6 and 7. Only those receivers 8 which simul-
taneously receive two pulses via the address lines re-
spond to the pulse appearing at the signal line 4. By
means of this pulse received via the signal line 4, a stor-
age at the receiver 10 is set, this storage to be described
more fully hereinafter, and the signal lamps 11 of the
receivers A1, B1 and C1 light-up.

If the indicator key 9 of the apparatus B1 is de-
pressed, then, again a respective pulse arrives at the ad-
dress lines 6 and 7 and a pulse at the signal line 3. All
receivers 10 of the apparatuses A1, B1 and C1 con-
ected with both address lines 6 and 7 therefore re-
ceive such pulse appearing at the signal line 3. Conse-
quently, the information contained in the aforemen-
tioned storage is erased and the signal lamps of the appa-
ratuses are switched-out.

The transmitters 8 of the apparatuses C1 and C2 are
not electrically coupled with the address lines 6 and 7,
only the signal lines 3 and 4 are connected, because at
the location of group III the information is only indi-
cated, however not altered.

Turning attention now to FIG. 2, there is illustrated
therein a circuit diagram of the transmitter 8 of each
apparatus. As will now be explained the transmitter 8
embodies a coding mechanism for simultaneously gen-
erating a control signal and at least two address signals.
Thus, it will be understood that a direct-current ampli-
 fier 70 has delivered a pulse thereto by depressing the
indicator key 9, the just-mentioned pulse being tran-
mitted through the agency of a differentiation element
embodying a capacitor 20 and a discharge resistor 21.
This pulse lasts, for instance, for only 3 milliseconds.
This pulse duration time is determined by the capaci-
tance valve of the capacitor 20 and the resistance of the
resistor 21, across which the capacitor is charged. As
a function of the brief input pulse, the duration of
which is not dependent upon the duration of actuation
of the indicator key 9, there appears at the output 22
of the amplifier 79 a brief pulse. This last-mentioned
pulse is delivered via suitable semiconductor elements
i.e. diodes 23, 24 and 25 to the three outputs 13, 14 and
15 of the transmitter 8. These diodes 23, 24 and 25
serve to decouple these outputs in that, when at one of
the address lines 6 and 7 there appears a pulse, such di-
odes prevent that this pulse can arrive via other non-
participating transmitters at neighboring address lines.
The function of the discharge resistor 21 is to again dis-
charge the capacitor 20 following actuation of the indi-
cator key 9, so that the transmitter is again in a prepa-
ratory state for transmitting a new message or signal.

The duration of the generated pulses which are deliv-
ered to two of the address lines and one of the signal
lines is intentionally maintained so brief so as to prac-
tically preclude any transmission errors. Such transmis-
sion error could then arise if, for instance, the indicator
key 9 of a respective one of the apparatuses of groups
I and II were actuated. In such case the corresponding
receivers would receive a pulse via both signal lines, re-
sulting in an erroneous indication. The probability that
within a time-span of 3 milliseconds, in other words
practically simultaneously, an indicator key 9 of the
group I and an indicator key 9 of the group II will be
actuated, is extremely small. On the other hand, the
brief duration of such pulses is sufficient for the fault-
less operation of the installation constructed from such
apparatuses.

Now in FIG. 3 there is illustrated the circuit diagram
of a receiver 10. Such will be understood to comprise a
decoding mechanism embodying two AND-gates 26
and 27, the outputs of which are electrically coupled
with a storage or store 28 capable of storing a binary
0 or a binary 1 signal. Signal lamp 11 is connected with
this storage 9, lamp 11 illuminating when, for instance,
there is stored at the storage 28 the logic or binary sig-
nal 1. Each of the AND-gates 26 and 27 possesses three
inputs, two of which are parallelly connected and elec-
trically coupled with the inputs 18 and 19 of the re-
ciever 10, as shown. The inputs 18 and 19 are those
destined to be connected with two of the address lines.
As also illustrated, the remaining inputs of the AND-
gates 26 and 27 are connected with the inputs 16 and 17 respectively, destined to be connected with the control signal or signal lines 3 and 4. Now, if pulses simultaneously appear at the inputs 17, 18 and 19, then, the AND-gate 26 delivers a pulse at its output. As a result, a binary signal "1" is stored at the storage 28 which brings about illumination of the signal lamp 11. If pulses simultaneously appear at the inputs 16, 18 and 19, then the AND-gate 27 produces a pulse which erases the information contained at the storage 28 and switches-out the signal lamp 11.

FIG. 4 illustrates the circuit diagram for an apparatus of the type illustrated in FIG. 1, but in any event here with the difference that it contains two transmitters and that six address lines 29, 30, 31, 32, 33 and 34 as well as three signal lines 35, 36 and 37 are provided. The supply voltage for the transmitters and receivers are delivered via the supply lines 1 and 2, whereas the current required for the signal lamp 11 is delivered via the supply line 1 and a third supply line 38 or via a fourth supply line 39. The supply line 39 is connected with a non-illustrated direct-current or alternating-current source, whereas the supply line 39 is connected with a non-illustrated indicating devices, the alternating contacts or terminals 51a and 51b associated with the switching contact 51 are coupled with additional output terminals 60, 61 or 62 of the apparatus, whereby the output terminal 61 is decoupled by a diode 63.

If pulses simultaneously appear at the address lines 29 and 31 and at the signal line 35, then, the transistors 52, 53 and 55 conduct. As a result the winding 50 of the polarized relay 49 - 51 becomes energized and the switching contact or blade 51 returns back into the position illustrated in FIG. 4, causing the signal lamp 11 to extinguish.

Now in FIG. 5 there is illustrated a further embodiment of apparatus for a signalling- and indicating installation. It contains one of the indicator keys 9, a differentiation element embodying the resistor 41 and the capacitor 20, the transistor 40 and the transmitter embodying the diodes 23, 24 and 25. The receiver, apart from the already mentioned separate inputs 16 and 17, further possesses an additional input 64 and a second bistable, polarized relay embodying the windings 65 and 66 and the switching contact 67. The winding 66 can be energized by a transistor 68 when the base 68a of this transistor has delivered thereto a pulse via the third signal line 37, the input 64 and the protective resistor 69.

The collector 54a of the transistor 54 is connected to the winding 49 of the first polarized relay 49 - 51 and the winding 65 of the second polarized relay 65 - 67, so that, when pulses simultaneously appear at the address lines 29 and 33 and at the signal line 36, both windings 49 and 65 are energized, and therefore, both switches 51 and 67 are brought into the other position from that shown in FIG. 5. This then brings about that the signal lamp 14 no longer continuously illuminates, rather begins to flicker because now it is no longer electrically coupled via the switching contact 51 with the supply line 38, rather via the switching contact 67 with the supply line 39 which, in turn, is coupled with the previously discussed not particularly illustrated flickering current circuit.

An apparatus according to FIG. 5 could be employed for instance for group III, that is to say, in the supervisory area for the chamber maids. When the departing guest has paid his bill at the cashier area and the cashier
has actuated the appropriate indicating key, the signal lamps will not be extinguished, rather will begin to flicker. This then would be a sign for the chamber maid that she can begin to prepare the room which has just been freed by the departing guest for a new guest. After the room has been newly made-up, then by depressing the indicator key 9 there can be signalled that the corresponding room is again ready to be occupied. By depressing the indicator key 9 flickering of the signal lamps stops and the signal lamp extinguishes.

FIG. 6 schematically illustrates the construction of a unit according to FIG. 4 or FIG. 5. Within a housing 70 which is illustrated in section and which possesses the configuration of a pipe or tube having a rectangular cross-section there is arranged a plate member 71 equipped with a non-illustrated printed circuit containing likewise non-illustrated components. A so-called luminous key 72 is arranged at one of the open ends of the housing 70 so as to partially extend into such housing. This luminous key 72 contains the switching or changeover contact associated with the indicator key 9 and the signal lamp 11. The other open end of the housing 70 is closed by a multiple plug or multi-pin connector 73, wherein the plug pins 74 of this multiple plug 73 define the outputs 13, 14, 15 and 48 of the transmitter and the inputs 16, 17, 18, 19 and 64 of the receiver, as previously discussed.

FIGS. 7 and 8 illustrate parts of a frame or panel 75 as viewed from the side and front respectively. In a plane which is parallel to the plane of the frame 75 there is provided a so-called multiple arrangement 76 which has only been partially illustrated in principle in FIG. 7. This multiple arrangement 76 resides in that all required supply-, signal-, and address-lines are multiplied by each plug-in location provided for the apparatuses. Between the multiple arrangement 76 and the apparatuses there is provided a respective intermediate plug 77. Such intermediate plug 77 possesses insert pins 78 of two different lengths, whereby only the long plug pins 78 make contact with those supply-, control- signal-, and address-lines which are necessary for the apparatus inserted at this location.

Although the previously described apparatus has been specifically discussed in conjunction with a signalling-and indicating installation for a hotel, it would of course be possible to also construct by means of such apparatuses installations for other purposes, where it is necessary to collect certain information at certain locations, if desired to vary such, and again to extinguish same.

With the above-described apparatus the address to which the message should be directed is determined by the selection of two address or connection lines. Of course, physical constructions are also conceivable wherein the address can be determined by the selection of three or more address lines. Similarly, it is naturally possible not only to use two or three signal lines rather also a greater number of signal lines. Those skilled in the art will make the most favorable selection for each encountered situation in order that the construction of the individual apparatuses, which of course can be universally employed, is not unnecessarily complicated.

The great advantage which is offered by the above-described apparatuses is the fact that the cost of the installation can be considerably reduced because between the individual localities of the groups only a few lines or wires must be laid. Further, it is possible to completely dispense with the use of a centrally situated apparatus equipped with the relays and self-holding contacts as were required by similar prior art equipment as heretofore discussed.

While there is shown and described present preferred embodiments of the invention, it is to be distinctly understood that the invention is not limited thereto but may be otherwise variously embodied and practiced within the scope of the following claims.

Accordingly what is claimed is:

1. A system for hotels for reparting and signalling, to at least one central monitoring location, the condition of each one of a plurality of individual rooms, wherein the system comprises: a plurality of modules, said modules each including means for transmitting coded signals and means for receiving coded signals, said means for transmitting coded signals including an indicator key means, a coding mechanism controllable by said indicator key means for simultaneously generating at least two address signals and at least one control signal, said means for receiving coded signals including a decoding mechanism, a storage mechanism actuated by said decoding mechanism, a signal lamp responsive to said storage means, a plurality of n address lines for interconnecting the rooms into said system where n is at least less than the number of rooms, said transmitter means and said receiving means each being interconnected to at least two of said address lines and one of said control signal lines, an individual one of said plurality of modules being located in each one of said plurality of rooms, connection means for the delivery of power to said modules, and wherein is provided a plurality of said modules at said central monitoring location, the modules being interconnected to ones of said address and control lines identified with the respective room located modules.

2. The system as defined in claim 1, wherein said coding mechanism embodies an amplifier means with at least three decoupled outputs, said decoding mechanism comprising at least two AND-gates, each of said AND-gates being provided with three respective inputs and a respective output, said storage comprising a binary storage means which is electrically coupled with the outputs of said AND-gates, a respective two inputs of each said AND-gate being parallely connected and serving to receive the address signals, and the remaining respective input of each said AND-gate serves to receive the control signal.

3. The system as defined in claim 1, further including a differentiation element arranged between said indicator key and said coding mechanism for producing control and address signals of brief duration which are independent of the duration of actuation of said indicator key.

4. The system as defined in claim 3, wherein said coding mechanism comprises a direct-current, single stage transistor amplifier having an input and an output, said transistor output being connected via diodes with three output terminals, said differentiation element comprising a capacitor for connecting said indicator key with said input of said transistor amplifier and a discharge resistor bridging said capacitor.

5. The system as defined in claim 2, wherein said binary storage means defines a two-stage flip-flop storage.
6. The system as defined in claim 2, wherein said binary storage means defines a two-stage storage in the form of a bistable polarized relay.

7. The system as defined in claim 1, further including a second coding mechanism, said indicator key comprising switch means having a contact means connected with said second coding mechanism.

8. The system as defined in claim 1, further including a substantially quadratic shaped housing for accommodating said apparatus, said indicator key and signal lamp being combined into a luminous key and at least partially arranged in an open end of said housing, the other end of said housing being provided with a multiple plug, an intermediate socket for selectively connecting connection terminals for the control and the address signals with corresponding control and address lines.

9. The system as defined in claim 7, means defining a multiple arrangement for supply-, control signal- and address lines, said intermediate plug possessing different length plug pins which can be inserted into said multiple arrangement.

10. The system of claim 1 wherein said n address lines are operative to connect at least \( n(n-1)/2 \) rooms.

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