

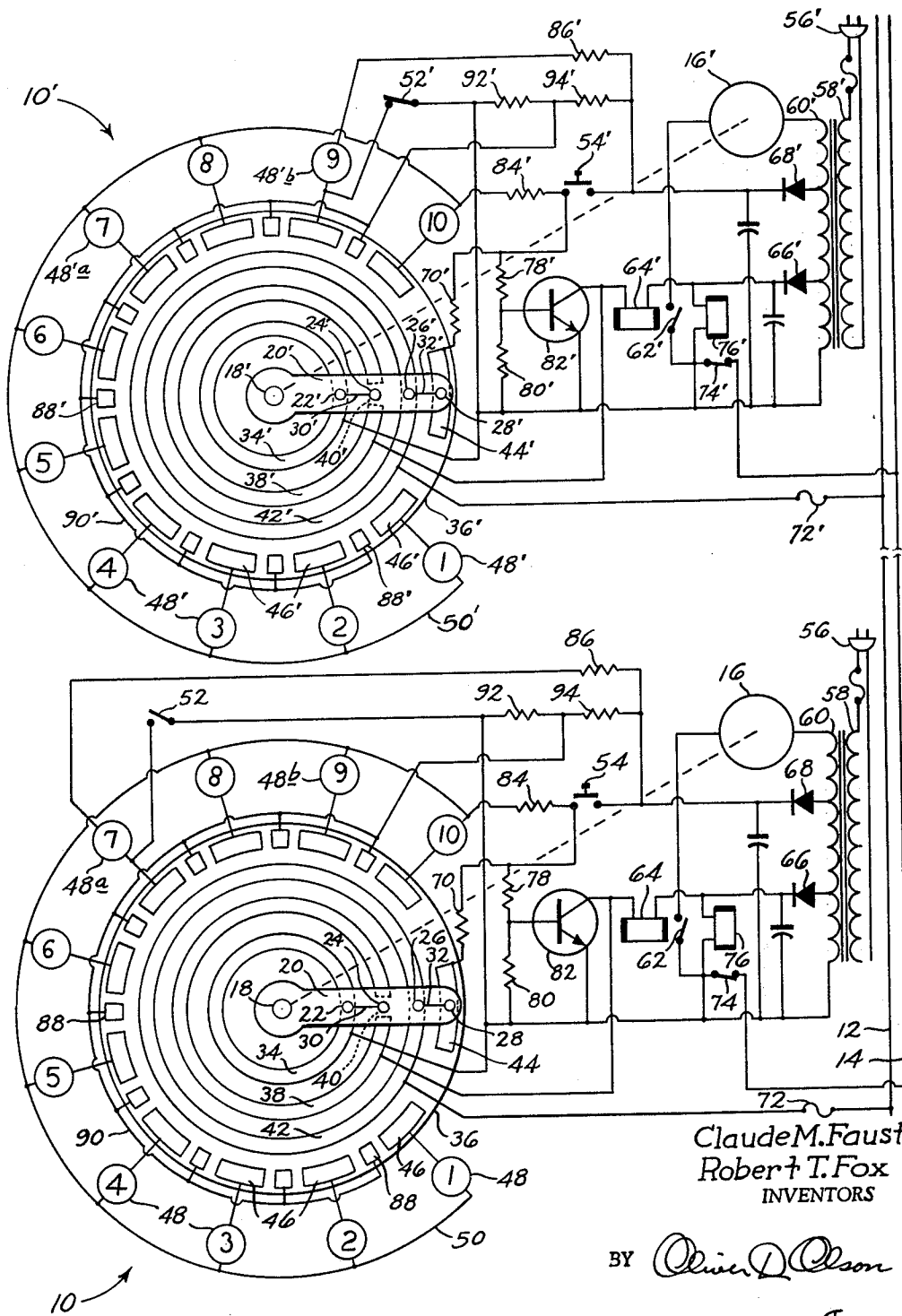
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ELECTRIC SIGNALLING SYSTEM FOR REMOTELY SPACED STATIONS

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## ELECTRIC SIGNALLING SYSTEM FOR REMOTELY SPACED STATIONS

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This invention relates to remote signalling systems, and more particularly to a system by which a plurality of remotely located stations may be interconnected for providing information to each other.

Although the present invention has a wide diversity of uses, it is the principal objective of the present invention to provide a signalling system for a plurality of hotels or other hostelrys by which each member of the group may ascertain which members have vacancies, without the necessity of communicating directly with each member.

Another important object of this invention is the provision of a signalling system of the class described in which all of the remotely located units comprising the system are synchronized automatically one with the others.

A further important object of the present invention is the provision of a signalling system of the class described, which is of simplified construction for economical manufacture, which involves a minimum of moving parts, thereby assuring long and faithful operation with a minimum of maintenance and repair, and which operates with speed and precision.

The foregoing and other objects and advantages of the present invention will appear from the following description, taken in connection with the accompanying drawing in which the single figure is a schematic electrical diagram illustrating a remote signalling system embodying the features of the present invention.

The drawing illustrates two electromechanical system units 10 and 10' which form a part of the entire system. The components of each unit are identified by the same reference numerals, with the top unit being distinguished from the bottom unit by the prime superscript.

Each system unit is located in a different one of the member hostelrys of the group, which may comprise any desired number, and all of the units are interconnected electrically by means of transmission lines 12 and 14 which, conveniently, may be leased telephone lines.

Each unit includes an electric drive motor 16 coupled, preferably through a reduction gear unit (not shown), to the rotary shaft 18 connected to the rotary component 20 of a multiple contact rotary switch. In the embodiment illustrated, the rotary component of the switch is an electrically non-conductive arm which supports the radially spaced brushes 22, 24 and 26, 28. The inner pair of brushes 22, 24 are connected together electrically by the conductor 30, and the outer pair of brushes 26, 28 are connected together electrically by the conductor 32. Associated with the innermost brush 22 is a continuous annular contact 34 of electrically conductive material, supported upon the fixed component 36 of the switch and arranged concentrically with respect to the rotary shaft 18. The next outer brush 24 is associated with an annular conductive contact 38 mounted on the fixed switch component in concentric, spaced relation with respect to the inner contact 34. The second named contact 38 is not continuous, however, but rather is interrupted by the small electrically non-conductive gap 40.

The next outer brush 26 registers with a third annular conductive contact 42 mounted on the fixed switch component 36 in spaced, concentric relation with respect to the next inward contact 38. Like the innermost contact 34, the third named contact 42 forms a continuous ring. The outermost brush 28 is associated with a plurality of

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circumferentially spaced, arcuate, conductive contacts mounted on the fixed switch component 36 in spaced, concentric relation with respect to the next inner contact 42. One of these contacts 44 functions, with the radially aligned gap 40, to synchronize the switches of all units, as explained in detail hereinafter. This contact 44 is herein referred to as the home position contact.

Alternate ones 46 of the remaining arcuate contacts are connected each to one terminal of an associated electric signal lamp 48. The other terminal of all of the lamps but one are connected together by the common conductor 50. Each lamp identifies a different one of the hostelrys in the group, and the one lamp 48a not connected to the common conductor identifies the hostelry in which that particular unit is located. Thus, the unit shown at the bottom in the drawing is located in the hostelry which is identified on all of the units as No. 7, by lamp 48a. Similarly, the unit shown at the top in the drawing is located in the hostelry which is identified on all of the units as No. 9, by lamp 48'b. There being ten lamps in each of the units illustrated, there can be as many as ten hostelrys associated as a group.

It will be apparent that each unit includes a housing (not shown) on which the lamps 48 are mounted for viewing. The name of each hostelry in the group preferably is displayed adjacent its corresponding lamp on each unit, for ready identification.

Also mounted on the housing is a toggle switch 52 and a push button switch 54, the functions of which are described in detail hereinafter.

The remaining circuitry associated with each unit is best described in connection with the operation of the system, as follows:

Each unit, located in a different hostelry, is connected to a conventional 117 volt alternating current source by means of the plug 56 connected to the primary winding 58 of the transformer. The drive motor 16 is connected across the secondary winding 60 of the transformer, through the normally open contact 62 of relay 64, whereby all of the drive motors normally are in a deactivated condition.

In the event any of the units are not in the proper starting position when plugged into the supply, i.e. with the rotary arm 20 positioning the brush 24 on the non-conductive gap 40, an electric circuit is completed from the secondary winding 60 through the rectifier 66, through the relay 64, thence through the annular contact 38 and its associated brush 24, thence through the conductor-connected brush 22 and associated inner contact 34, back to the reference end of the transformer secondary. The relay 64 thus is energized, closing its normally open contact 62 and completing the electric circuit of the drive motor 16. Accordingly, the drive motor continues to rotate the arm 20 clockwise until it arrives at the home position contact 44, as illustrated. In this position the outer brush 24 of the inner pair is positioned in the gap 40 separating the ends of the annular contact 38, thereby opening the circuit to the relay 62 and consequently opening the circuit of the drive motor.

Accordingly, it will be apparent that all of the units normally will be synchronized for starting from the home position.

Let it now be assumed that hostelry No. 7 has no vacancies and that hostelry No. 9 does have a vacancy. Accordingly, the toggle switch 52 on the unit of No. 7 is retained in the open condition, and the toggle switch 52' of the No. 9 unit has been closed, as illustrated, to indicate a vacancy. Assume now that a party inquires for lodging at hostelry No. 7. Since that hostelry has no vacancy, the clerk proceeds to determine which hostelrys of the group still have vacancies, so that he may either direct the party to the vacancy or telephone for a reservation.

Accordingly the clerk at hostelry No. 7 depresses the push button switch 54 to check for vacancies in the associated hostelries.

With the push button switch 54 maintained closed, a circuit is completed from the secondary winding 60 through the rectifier 68 and push button switch 54, through the resistor 70 and home contact 44, thence through the connected outer pair of brushes 26, 28 and the outer annular contact 42, through the fuse 72 to the positive telephone line 12. The negative telephone line 14 is connected to the reference end of the secondary winding 60 through the normally closed contact 74 of the relay 76. It is to be noted that this relay is connected permanently across the lower portion of the transformer secondary winding 60, through the rectifier 66. Accordingly, this relay remains energized at all times, maintaining its associated contact 74 normally closed.

Accordingly, a potential of 100 volts, for example, is applied from the secondary winding across the telephone lines. This potential thus is applied to all of the other units in the group.

Since all of the other units in the group are arranged in parallel, the operation of each unit is illustrated by the following operation of the unit at the top in the drawing.

The aforementioned potential across to the telephone lines is applied through the fuse 72' to the outer annular contact 42', thence through the connected pair of brushes 26', 28' and the home contact 44', through the resistance 70' and the voltage divider resistances 78', 80' to the base of the transistor 82', thence through the emitter and the normally closed contact 74' of the relay 76' to the negative telephone line 14, thence back to the bottom unit 10, through the closed relay switch 74 to the reference end of winding 60.

Simultaneously with closure of switch 54 in the bottom unit 10, the aforementioned potential is applied to the base-emitter circuit of the transistor 82 in that unit.

The transistors in all of the units thus are activated, thereby completing in each unit the circuit of the relay 64 from the secondary winding 60 through the rectifier 66 and relay 64, through the collector-emitter circuit of the transistor 82 to the reference end of the secondary winding 60. Activation of the relay 64 closes its associated contact 62 and completes the electric circuit of the drive motor 16 in each unit. The rotary switch arm 20 in each unit thus begins to rotate clockwise, and since all drive motors are alike the arms 20 all rotate at the same speed.

When the outer pair of brushes 26, 28 in each unit break contact between the home contact 44 and the outer annular contact 42, the circuit to the transistor 82 is broken. However, shortly before that condition is reached the inner pair of brushes 22, 24 interconnect the inner two annular contacts 34, 38 which, as described hereinbefore, serve to complete the circuit of the relay 64 and thus maintain the drive motor 16 in operation.

When the outer brush 28 reaches the arcuate contact 46 connected to the No. 1 lamp 48, connection is made in the checking unit No. 7 (bottom of the drawing) from the positive telephone line 12 through the fuse and the outer annular contact 42, through the outer pair of brushes 26, 28 and the arcuate contact 46, through the No. 1 lamp and common conductor 50, thence through the resistor 84 and the closed push button switch 54, which is held down by the clerk during the vacancy check, through the rectifier 68 and the lower section of the secondary winding 60, thence through the normally closed contact 74 of the relay 76 to the negative telephone line 14. Accordingly, it will be understood that if a short circuit were placed across the telephone lines 12 and 14 the No. 1 lamp would light, indicating a vacancy in the hostelry No. 1. However, let it be assumed that hostelries Nos. 1-8 have no vacancies and therefore the toggle switches 52 in those units remain open. Accordingly,

the rotary arm 20 in each unit continues to rotate clockwise without activating any of the lamps Nos. 1-8 on the checking unit No. 7.

When the outer brush 28 engages the arcuate contact 46 associated with the lamp 48 designating hostelry No. 9 (which had the toggle switch 52 on its unit closed to indicate a vacancy), the closed toggle switch completes a short across the telephone lines 12, 14. Accordingly, lamp No. 9 is caused to be activated in the checking unit No. 7, thereby giving the clerk in hostelry No. 7 visible indication that hostelry No. 9 has a vacancy. The clerk then may either direct the inquiring party to hostelry No. 9, or he may telephone hostelry No. 9 and make reservation for the party.

The rotary arm 20 in all of the units continues to rotate from the No. 9 arcuate contact until they reach the home position indicated in the drawing. At this point each brush 24 rests in the gap 40, thereby disconnecting the two inner annular contacts 34, 38 and breaking the circuit of the relay 64. Deactivation of relay 64 effects opening of its associated contact 62 in the electric circuit of the drive motor 16.

Closing of the toggle switch 52' in the unit of hostelry No. 9 also preferably completes an electric circuit from the rectifier 68' through the resistor 86' and the No. 9 lamp 48'b through the closed toggle switch to the reference end of the secondary winding 60. Thus, the No. 9 lamp is activated on the unit in hostelry No. 9 to provide a visible reminder for the clerk that he is advising the other members of the group that his hostelry has a vacancy.

As the rotary arm 20 of each unit rotates clockwise through its cycle, the outer brush 28 disengages from one of the arcuate contacts 46 and then makes contact with a small arcuate contact 88 interposed between adjacent contacts 46. These contacts 88 are connected together in series by the common conductor 90 which, in turn, is connected through the voltage dividing resistors 92, 94 and rectifier 68 to the secondary winding 60 of the transformer. Thus, there is applied to each of the contacts 88 a voltage of, for example, 35 volts which serves to maintain the telephone lines charged to that potential. In this manner the inherent capacitance which shunts the two telephone lines is maintained charged to a sufficient value that it will not charge again through the lamps 46, causing the latter to flash a false indication of vacancy.

Although the time of the vacancy checking cycle may be varied as desired, it has been found that a fifteen second cycle is quite satisfactory for units having as many as twenty lamps (accommodating a twenty member group). As explained hereinbefore, it is preferred that the clerk be required to maintain the button depressed during the entire checking cycle, in order to minimize unnecessary operation of the units. However, the circuit may be arranged to provide automatic opening of the push button switch upon the completion of a cycle, thus requiring only a momentary operation by the clerk. Alternatively, the push button switch may be replaced by a toggle switch to permit continuous operation of the unit. However, this is undesirable from the standpoint of operating life of the units and the correspondingly increased frequency of maintenance and repair.

In addition to interconnecting a plurality of hostelries for the purpose described, some units in a group may be located at airport terminals, tourist information centers and other appropriate stations from which it would be desirable to obtain vacancy information.

Although the system has been described hereinbefore in association with a plurality of hostelries, it will be apparent that the system may be utilized for other purposes. The push button switch 54 or toggle switch 52 may be operated automatically upon the attainment or development of a specified condition, and the lamps may be replaced by other electric loads such as relays for controlling a subsequent operation.

It will be apparent to those skilled in the art that various changes may be made in the details of construction described hereinbefore, without departing from the spirit of this invention and the scope of the appended claims.

Having now described our invention and the manner in which it may be used, what we claim as new and desire to secure by Letters Patent is:

1. An electric system for actuating electric loads at a plurality of remotely located stations, comprising at each station a plurality of electric loads each having an electric circuit and each designating a different one of said stations, at each station a movable scanner switch including a plurality of operating switches one connected in the electric circuit of each of said loads, an electric circuit interconnecting the plurality of scanner switches and loads, the scanner switches being arranged to actuate simultaneously all of the operating switches designating the same one of the stations, electric drive means for each scanner switch for actuating the associated operating switches one at a time, each electric drive means having an electric circuit, electric drive control means at each station including switch means in the electric circuit of each drive means for controlling the operation of the latter, an electric circuit interconnecting the plurality of drive control means, control switch means at each station in the electric circuit of the scanner switches and each operable at its station for releasably completing the electric circuit of its designating loads at the other stations, and start switch means at each station in the electric circuit of the drive control means and each operable at its station for actuating the plurality of drive control means simultaneously from said station.

2. The system of claim 1 including electric synchronizing means associated with each drive control means for maintaining the scanner switches in said arranged condition.

3. The system of claim 1 wherein each scanner switch includes a synchronizing switch arranged in the circuit of the drive control means.

4. The system of claim 1 wherein each scanner switch has a rotary section and each drive means comprises an electric motor having a rotary output shaft engaging the rotary section of the switch.

5. The system of claim 1 wherein said electric loads are indicators, said stations are hostelryes, and the electric circuits include electric transmission lines common to said hostelryes.

6. An electric system for actuating electric loads at a plurality of remotely located stations, comprising at each

station an electric device including a scanner switch having a fixed section and a rotary section, a plurality of circumferentially spaced electric contacts on the fixed switch section, first brush means on the rotary switch section, conductor means connecting the first brush means to one of a pair of transmission lines common to all stations, an electric load connected to each contact at one of the load terminals, conductor means connecting together all but one of the other load terminals, a start switch connecting said conductor means to one side of a source of electric potential the other side of which is connected to the other of said pair of transmission lines, control switch means connecting the contact associated with said one of the other load terminals to said other transmission line, an electric drive motor having a rotary driven shaft engaging the rotary switch section, motor switch means connecting the drive motor to a source of electric potential, electric motor switch actuator means having one terminal connected to one side of a source of electric potential the other side of which is connected to said other transmission line, an annular electrically conductive contact on the fixed scanner switch section having an electrically nonconductive segment separating the spaced ends of the contact, the other terminal of the actuator means being connected to said annular contact, second brush means on the rotary switch section and associated with the annular contact, conductor means connecting the second brush means to said other transmission line, a home position contact on the fixed switch section aligned with the nonconductive segment of the annular contact and disposed for engagement by the first brush means, conductor means connecting the home position contact to the first named source of potential through said start switch, and a transistor having its base-emitter circuit connected between the home position contact and said other transmission line, and its emitter-collector circuit shunting the annular contact and second brush means.

7. The system of claim 6 wherein said electric loads are indicator lamps, said stations are hostelryes, and the transmission lines include telephone transmission lines common to said hostelryes.

#### References Cited in the file of this patent

##### UNITED STATES PATENTS

|           |                        |               |
|-----------|------------------------|---------------|
| 1,965,393 | Schleicher et al. .... | July 3, 1934  |
| 2,710,392 | Jammer .....           | June 7, 1955  |
| 2,980,890 | Staten .....           | Apr. 18, 1961 |
| 2,990,537 | Putz .....             | June 27, 1961 |