

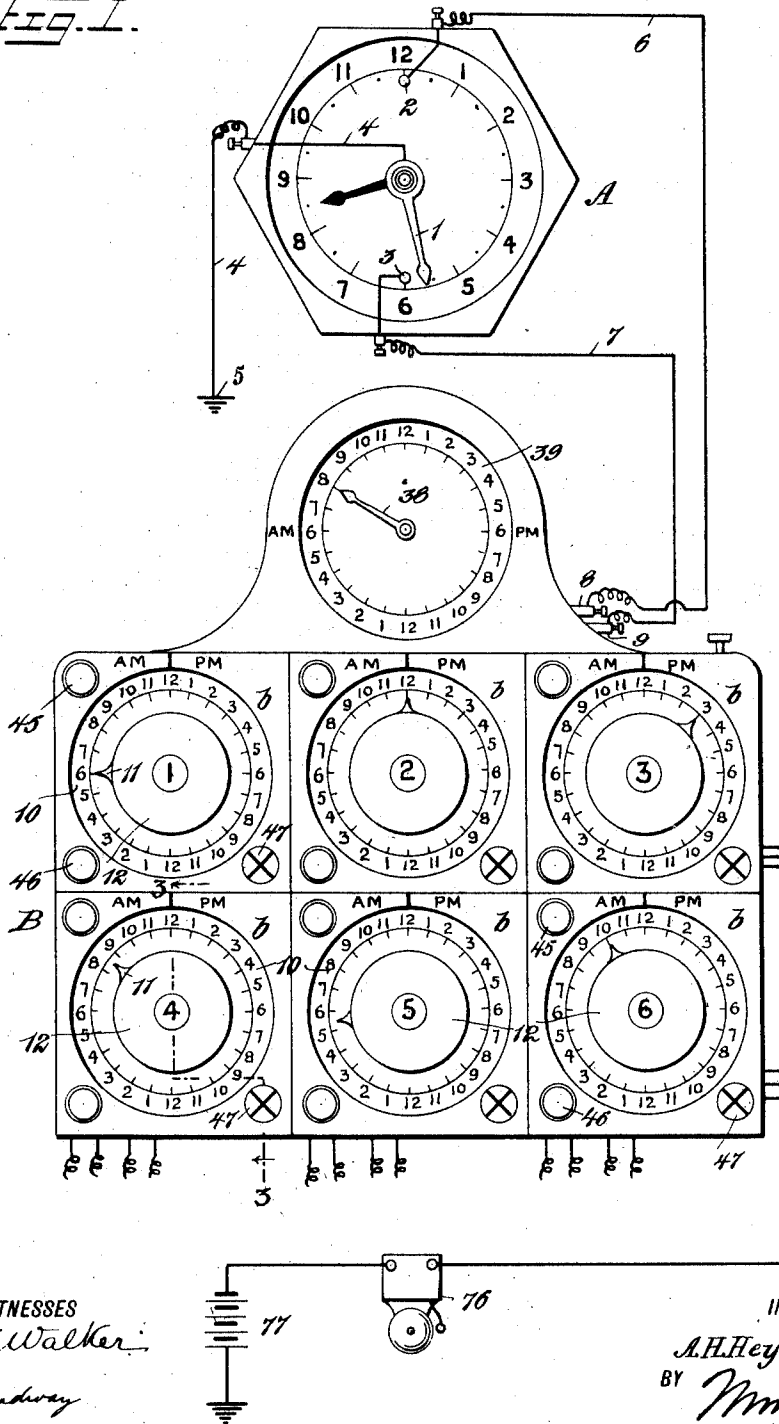
A. H. HEYROTH.
 AUTOMATIC CALL SYSTEM FOR HOTELS.
 APPLICATION FILED JAN. 19, 1921.

1,390,907.

Patented Sept. 13, 1921.

3 SHEETS—SHEET 1.

Fig. 1.



WITNESSES
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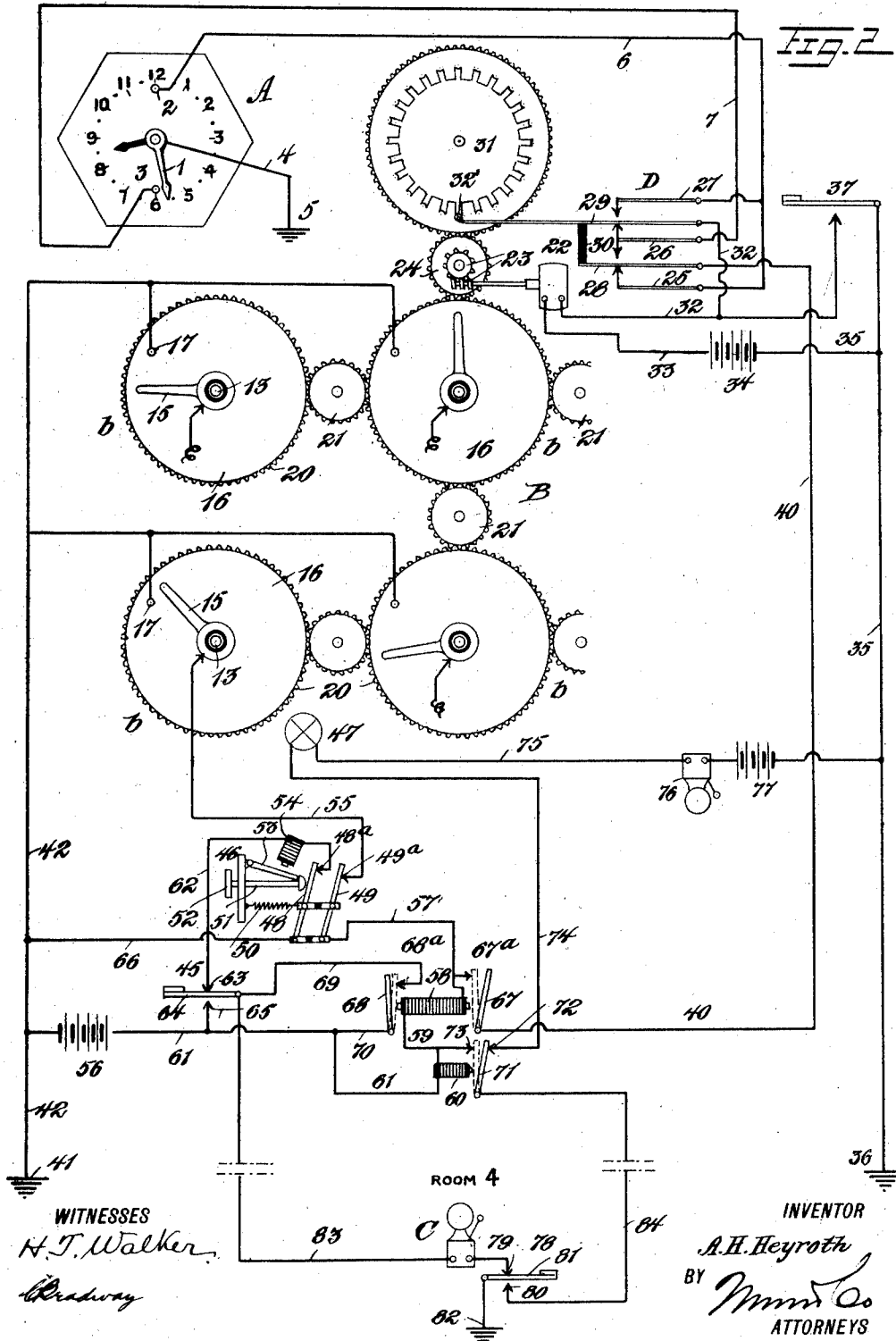
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3 SHEETS—SHEET 3.

Fig. 3.

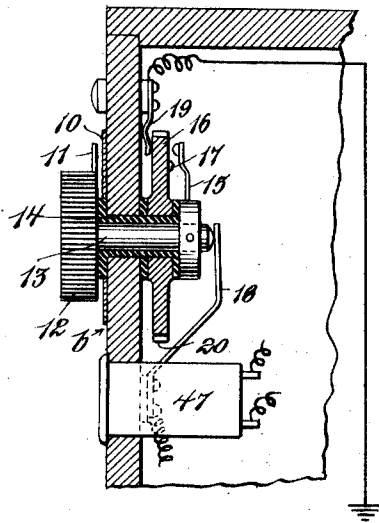
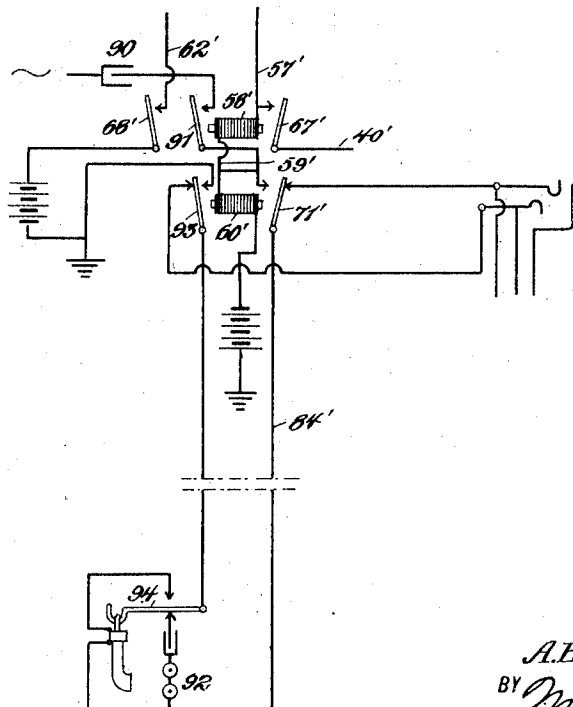


Fig. 4.



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UNITED STATES PATENT OFFICE.

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AUTOMATIC CALL SYSTEM FOR HOTELS.

1,390,907.

Specification of Letters Patent. Patented Sept. 13, 1921.

Application filed January 19, 1921. Serial No. 438,514.

To all whom it may concern:

Be it known that I, ALBERT H. HEYROTH, a citizen of the United States, and a resident of Duluth, in the county of St. Louis and State of Minnesota, have invented a new and Improved Automatic Call System for Hotels, of which the following is a full, clear, and exact description.

This invention relates to automatic call systems especially adapted for hotels, although it is not limited to this use.

The invention has for its general objects to improve the construction and operation of apparatus of this character so as to be more reliable and efficient in use, and comparatively simple to manufacture, install and operate.

A more specific object of the invention is the provision of a novel call system which embodies a master clock in combination with an annunciator cabinet or board having as many units as there are guest rooms, and also a motor switch controlling wheel which is geared to contact wheels of the units, whereby all of said wheels will move simultaneously and also in step with the hour hand of the master clock, but the said wheels move intermittently with, say, half-hour idle periods while the hour hand of the master clock moves continuously, the minute hand of the master clock serving to close through a special switch the motor circuit on the hour and half-hour, so that the contact wheels will move a step at a time each half-hour, although it is to be understood that shorter than half-hour intervals may be selected.

Still another object of the invention is the provision of novel switches or buttons, relays, signals or equivalent instrumentalities whereby the call apparatus may be set for calling the guests at predetermined times, whereby the called guests can cut out the calling signal, or whereby the guests can signal to the clerk.

An additional object is to provide a call system of such design as to be readily applied to an ordinary telephone system so that the same circuit wires can be used for two purposes.

With such objects in view, and others which will appear as the description proceeds, the invention comprises various novel features of construction and arrangement of parts which will be set forth with particu-

larity in the following description and claims appended hereto.

In the accompanying drawings, which illustrate certain embodiments of the invention and wherein similar characters of reference indicate corresponding parts in all the views,

Figure 1 is a front view of the call-board and master clock;

Fig. 2 is a diagrammatic view of the system;

Fig. 3 is a sectional view on the line 3—3, Fig. 1; and

Fig. 4 is a diagrammatic view showing the call system applied to a telephone circuit.

Referring to the drawing, A designates a master clock, B the annunciator cabinet or call-board, and C the installation in the guest's room.

In the present instance the clock A is so designed that it will close and open circuits at regular intervals on the hour and half-hour. For this purpose the minute hand 1 forms a movable contact which is adapted to engage two contacts 2 and 3 at the numbers 12 and 6 of the clock. The hand 1 is connected by a wire 4 to ground at 5, and the contacts 2 and 3 are connected respectively with the circuit wires 6 and 7 which lead to the binding posts 8 and 9 of the call-board B.

The call-board is made up of a plurality of units *b* which are numbered to correspond with the numbers of the guest rooms, there being one unit for each room. Each unit *b* comprises a dial 10 divided into twenty-four hour divisions, each half being numbered 1 to 12, and one-half representing a. m. time and the other p. m. time. This dial is stationary, and an index 11 on a rotatable knob 12 is moved to any desired hour number on the dial for the purpose of setting the device for calling a guest at the desired time. As shown in Fig. 3, the knob 12 is fastened to a stem 13 which is journaled in an insulating bushing 14, and carried by the inner end of the stem or arbor 13 is a movable contact hand 15 which is directly behind or in register with the index 11, so that the index will always determine the position of the contact hand 15. Associated with the contact hand 15 and mounted on the bushing 14 to rotate thereon is a wheel 16 bearing the contact 17. The hand 15 and contact

wheel 16 are connected in circuit respectively by brushes 18 and 19. The contact wheels 16 are adapted to move synchronously, and for this purpose they are provided with peripheral gear teeth 20, and between adjacent contact wheels of the units are idler pinions 21, so that all the contact wheels are interconnected. As shown in Fig. 2, an electric motor 22 is connected by a worm gearing 23 with the pinion 24, which meshes with one of the contact wheels 16.

The circuit of the motor is controlled by the master clock through the intermediary of a switch D. This switch comprises contacts 25, 26, and 27, the contact 26 being connected with the wire 7, and the contacts 25 and 27 being connected with the wire 6 of the master clock circuit. Between the contacts 25 and 26 is a contact 28 engageable with either of said contacts, and between the contacts 26 and 27 and engageable with either is another contact 29. The contacts 28 and 29 are connected together by an insulating connector 30, so that the two contacts will move together. The movement of these contacts is effected by a toothed switch controlling wheel 31 which is geared to the pinion 24 so that such toothed wheel will move synchronously with the contact 16 of the switch-board units. The wheel 31 has twenty-four teeth and twenty-four recesses, and on the extension of the contact 29 is a wheel 32 which is engaged by the teeth to move the contact 29 in one direction and which drops between the teeth to permit the contact to spring in the opposite direction, whereby the circuit of the motor 22 will be alternately closed through the wires 6 and 7 of the master clock circuit. The switch contact 29 is connected by a wire 32 with one terminal of the motor 22, and the other terminal is connected by a wire 33 with a battery 34, which is in turn connected by a wire 35 to ground at 36. A normally open switch 37 is connected with the battery 34 and motor so that the clerk can operate the motor independently of the switch D, so as to bring the contact wheels 16 or toothed switch controlling wheel 31 into phase with the master clock. To facilitate the ascertaining of this phase condition the toothed wheel 31 is connected with a hand 38, Fig. 1, which moves over a dial 39 similar to the dial 10 of a call unit. This hand being connected with the train of geared contact wheels 16 will move every half hour a distance equal to a half hour division on the scale 39. Returning to the switch D, the contact 28 is connected with wire 40, which is common to the system of room units, and which is grounded at 5 at proper intervals over contacts 2 or 3 of the master clock A; this ground connection being for the purpose of establishing a holding circuit for magnets 58 and 60 of those units which have received the

initial impulse over wire 57, as will be explained later.

Each unit *b* of the call-board includes a general call button 45, a rising call button 46 and an annunciator or signal light 47, the buttons being used to enable the clerk to send a general call to a guest room or to set the signal or alarm for calling a guest at any desired time, while the annunciator is employed to enable the guest to call a clerk. In Fig. 3 the clerk's pushbuttons are shown in connection with the calling device for only one room for the purpose of simplicity. The rising call pushbutton switch 46 includes a pair of movable contacts 48 and 49 which are mechanically connected together but electrically separated and which are adapted to engage respectively fixed contacts 48^a and 49^a. A spring 50 tends to move the contacts to open circuit position. The plunger 51 of the switch engages the contact 48 when the pushbutton 52 is pressed inwardly, and this moves the contacts 48 and 49 to closed-circuit position, and they are held in this position by means of a gravity latch 53 which forms the armature of a release magnet 54. A contact 49^a is connected by a wire 55 with the hand 15 of the same unit, and the contact 49 is connected with a source of current 56 by a wire 57, magnet 58, wire 59, magnet 60 and wire 61. The contact 48^a is connected with the release magnet 54, which in turn is connected by a wire 62 with one of the fixed contacts 63 of the general call switch or pushbutton 45, the movable contact 64 of which normally engages the contact 63, and is engageable with the other fixed contact 65, so that connection can be made with the battery 56, the latter having one terminal connected through the wire 42 with ground at 41. The contact 48 is connected by the wire 66 with the wire 42. The electromagnet or relay 58 operates on a pair of armatures 67 and 68 which form movable contacts engageable respectively with the contacts 67^a and 68^a, the former being connected with the wire 57 and the latter with a wire 69 which leads to the contact 64 of the clerk's general call switch 45. The contact 67 is connected with the wire 40 that leads to the switch D, and the contact 68 is connected by the wire 70 with the battery through the wire 61. The magnet 60 actuates an armature contact 71 which normally engages a contact 72 and is movable into engagement with the contact 73, the latter being connected with the wire 59 and the former being connected by a wire 74 with the annunciator or signal 47, which is in turn connected by a wire 75 with a bell or other signal 76 and a battery 77, which latter is connected with the wire 35. The wire 75 is a common return for the annunciators 47 of all the signals, and the bell 76 is common to all the units, so that when the

bell is actuated by a guest sending in a call, the clerk hearing the bell will look at the call-board to see which room is calling, which fact he ascertains by the annunciator or signals 47.

In each guest room is a bell C, as shown in Fig. 2, and a switch 78 which includes two fixed contacts 79 and 80 and a movable contact 81, which latter normally engages the contact 79 so as to connect the bell C to ground at 82. The bell is connected by a wire 83 with the clerk's general call switch 45, so that when the contact 64 of the switch 45 is depressed, the bell C will be energized by current flowing through the path consisting of the battery 56, wire 42, ground 41—82, contacts 81 and 79, bell C, wire 83, contacts 64 and 65, wire 61 and battery 56. The contact 80 of the guest room switch 78 is connected by a wire 84 with the armature 71 of the electromagnet or relay 60, so that when the guest presses the contact 81, a signal will be sent to the clerk by current flowing through the circuit consisting of the battery 77, wire 35, ground 36—82, contacts 81 and 80, wire 84, contacts 71 and 72, wire 74, annunciator 47, wire 75, bell 76 and battery 77. After a rising call signal has been sent to a guest room, the guest can automatically stop the ringing of the signal by pressing on the contact 81, which produces effects shortly to be explained. It will thus be seen that the guest room switch 78 performs two functions.

When the guest in a certain room, say room 4, desires to be called at a particular time, say 8:30, the clerk adjusts the knob 12 of the call-board unit of room 4, so that the index 11 will be midway between 8 and 9, as shown in Fig. 1, and after doing this he also presses the pushbutton 52 of the switch 46. The apparatus is now set so that when it is 8:30 a. m. the rising signal in the guest room 4 will be automatically given. While the hand 1 of the master clock moves from 12 to 6, the hand 38 is stationary and remains so until hand 1 engages contact 3. The motor 22 is then started through the circuit being closed by the contacts 1 and 3 and the train of contact-carrying wheels 16 and the toothed wheel 31 will move a distance equivalent to a half-hour. This movement is momentary and it causes the roller 32' to drop off the tooth it has engaged, and the contacts 26 and 28 will be caused to engage each other and at the same time the contacts 15 and 17 of the unit for room 4 will have engaged, so that current will flow through a path consisting of the battery 56, wire 42, contacts 17 and 15, wire 55, contacts 49^a and 49, wire 57, magnet 58, wire 59, magnet 60, wire 61 and battery 56. This energizes the electromagnets so that the armatures thereof will be moved to the dotted-line position. By the movement of the armature 68 the re-

leasing magnet 54 will be energized by current flowing through a path consisting of the battery 56, wires 42 and 66, contacts 48 and 48^a, magnet 54, wires 62, contacts 63 and 64, wire 69, contact 68^a and 68, wires 70 and 61, and battery 56. The magnet 54 being thus energized, the armature latch 53 is attracted so that the spring 50 will move the contacts 48 and 49 to open circuit position, but this will not deenergize the electromagnets 58 and 60, because these are kept in circuit by the contacts 67 and 67^a being now engaged, so that current flows through a path consisting of the battery 56, wire 42, ground 41—5, wire 4, contacts 1 and 3 of the master clock, wire 7, contacts 26 and 28 (now engaged), wire 40, contacts 67 and 67^a, magnet 58, wire 59, magnet 60, wire 61 and battery 56. These magnets 58 will be energized as long as the hand 1 engages the contact 3, which can be for any desired length of time and as long as the magnet 58 is energized the bell C will ring by current flowing through a path consisting of the battery 56, wire 42, ground 41—82, contacts 81, 79, bell C, wires 83 and 69, contacts 68^a and 68, wires 70 and 61 and battery 56. If the guest wishes to stop the bell from ringing he presses the button 81 which causes current to flow through a path consisting of the battery 56, wire 42, ground 41—82, contacts 81 and 80, wire 84, contacts 71 and 73, magnet 60, wire 61 and battery 56. This causes a short circuiting of the magnet 58 so that the same will be deenergized and the contacts 68 and 67 will move to open position, thereby opening the holding circuit at contact 67—67^a, and opening the alarm circuit to bell C, at contact 68—68^a. Magnet 60 will remain energized as long as pushbutton 81 remains depressed, thereby preventing signal 47 from registering a call at the office. When 81 is released, magnet 60 becomes deenergized, and the line to signal 47 is reestablished over contact 71—72, so that button 81 again becomes the medium for registering calls in the office.

As stated above, this description relates to an application of the invention in which calls may be made on the hour, or on the half-hour. If it is desired to be able to make calls at closer intervals, corresponding changes are made in the contacts of the master clock, the toothed wheel 31, and the dial scale divisions on the call-board. To illustrate: In a system in which calls may be made at one-quarter-hour intervals, the master clock would be provided with two additional contacts, one at hour number 3 and the other at hour number 9. Cam wheel 31 would have forty-eight teeth, so that a tooth or gap would represent one-ninety-sixth of a revolution, corresponding to one-quarter hour intervals for a twenty-four hour day. The dials on the call-board would

be divided into one-quarter hour intervals instead of one-half hour, as shown.

It will be seen that only two wires will connect the master clock with the call-board, regardless of the number of contacts in the master clock, since these contacts will be alternately interconnected to form two groups, to which wires 6 and 7 are connected respectively. It will be noted further that the master clock has a standard 12-hour dial, while the call-board dials cover 24 hours, making it possible to set calls for any time a. m. or p. m.

It is apparent that this system will work in connection with a house telephone system, without interfering therewith, by adapting the circuit to the telephone system in use. Since there are many such systems, and since the possibility of such adaptation is apparent, only one example is shown in Fig. 4.

Referring to said Fig. 4, when the alarm operates, the initial impulse comes over wire 57', and the holding circuit is closed over right contact 67' of the relay 58', as in the original case. The left contact 68' places the battery on the release magnet over wire 62', and releases the alarm button. The alternating ringing current flows through condenser 90, the middle contact 91, the right contact 71' of the relay 60', wire 84', telephone bell 92, the left contact 93 of the relay 60', earth, and rings the telephone bell, the length of the call, if left undisturbed, being, as before, dependent upon the master clock contacts. While the switch hook 94 remains depressed, direct current flow is cut off from the right contact relay 71', by the condenser in the bell circuit. When the guest answers the alarm by raising the switch-hook, a path for direct current is established from the left contact 93 to the right contact 71', and relay 60' is held, and relay 58' is short circuited as in the original case. Releasing relay 58' interrupts the circuit over wire 40', and the alternating current ringing circuit. The holding relay 60' prevents a call being made at the telephone switch-board. Depressing the switch-hook again, releases relay 60', thereby reestablishing the line from the room telephone to the house exchange.

When the invention is installed in connection with a telephone system as above, the push button 45 may be eliminated, since the rooms would preferably be called by telephone. The jack shown in Fig. 4 may be located on the call-board in place of button 45, as a multiple of the jacks in the telephone switch-board, or it may be omitted altogether. Annunciator 47 would be eliminated, since the telephone call system would serve its function.

Although several batteries are shown in the diagram, Fig. 2, it is to be understood

that only one battery will be required, but for convenience of illustration several have been shown for the different circuits.

Having thus described my invention, I claim as new and desire to secure by Letters Patent:

1. A call system of the class described comprising a clock, circuit-closing and opening means associated with the clock, a call-board having a plurality of call units each provided with a movable contact-carrying wheel, an adjustable contact, a twenty-four hour dial for enabling the adjustable contact to be adjusted for any desired time, a motor operatively connected with all the wheels for intermittently moving the same, an electric switch for connecting the circuit make-and-break means of the clock with the motor, and means operating in conjunction with the contact-carrying wheels and driven by the motor to control the said switch.

2. The combination of a clock having a minute hand formed of a contact, contacts with which the hand periodically engages, a motor, a switch in circuit between the motor and clock contacts, a plurality of contact wheels operatively connected with the motor, adjustable contacts associated with the said wheels, a toothed wheel operatively connected with the motor and arranged to control the switch, whereby the motor is operated each time the clock engages an associated contact, and call signals controlled by the contact wheels and adjustable contacts.

3. The combination of a clock having a minute hand formed of a contact, contacts with which the hand periodically engages, a motor, a switch in circuit between the motor and clock contacts, a plurality of contact wheels operatively connected with the motor, adjustable contacts associated with the said wheels, a toothed wheel operatively connected with the motor and arranged to control the switch, whereby the motor is operated each time the clock engages an associated contact, a circuit controlled by each contact wheel, an electromagnetic means in each circuit, and a guest's signal circuit normally open and adapted to be closed by the electromagnetic means therefor.

4. The combination of a clock having a minute hand formed of a contact, contacts with which the hand periodically engages, a motor, a switch in circuit between the motor and clock contacts, a plurality of contact wheels operatively connected with the motor, adjustable contacts associated with the said wheels, a toothed wheel operatively connected with the motor and arranged to control the switch, whereby the motor is operated each time the clock engages an associated contact, a circuit controlled by each contact wheel, an electromagnetic means in each circuit, a guest's signal circuit nor-

mally open and adapted to be closed by the electromagnetic means therefor, a switch at each guest's signal in normally closed circuit position with the signal, a clerk's signal, and a circuit in which the clerk's signal and the guests' switches are included, whereby any guest can signal to the clerk.

5 5. The combination of a clock having a minute hand formed of a contact, contacts
10 with which the hand periodically engages, a motor, a switch in circuit between the motor and clock contacts, a plurality of contact wheels operatively connected with the motor, adjustable contacts associated with
15 the said wheels, a toothed wheel operatively connected with the motor and arranged to control the switch, whereby the motor is operated each time the clock engages an associated contact, a setting switch associated
20 with each contact wheel, whereby a signal will be energized when the corresponding contact wheel and adjustable contact are in closed circuit position, a lock for holding the setting switch in closed circuit position,
25 and electrical means for releasing the lock to permit the setting switch to open the circuit upon the giving of the signal.

6. In a call system, the combination of a clock having a contact hand, contacts
30 ranged to be engaged by the hand, a switch having relatively movable contacts cooperating with the contacts of the clock, a motor circuit opened and closed by the switch and clock contacts, a toothed wheel operated by
35 the motor to relatively move the contacts of the switch to control the starting and stopping of the motor, a plurality of signals, wheels corresponding in number to the signals and having contacts, adjustable con-
40 tacts associated with the contact-carrying wheels, dials associated with the contact-carrying wheels, an adjustable contact at each dial and cooperating with a contact on a wheel, a general call switch associated
45 with each contact wheel for energizing the corresponding signal, a rising call switch associated with each contact-carrying wheel for energizing a corresponding signal, means for holding the rising call switch in closed
50 circuit position after it has been set, and means for releasing the rising call switch to permit the same to move to open circuit position.

7. In a call system of the class described,
55 the combination of a clock having a continuously moving contact hand and contacts with which the hand periodically engages, a motor, a switch in circuit between the motor and clock contacts, whereby the motor
60 is periodically operated, a switch-controlling element driven by the motor for affecting

the circuit to permit the motor to operate only when the clock contacts are engaged, contact-carrying wheels operatively connected with the motor, adjustable contacts
65 associated with contact-carrying wheels, guest room signals corresponding in number to the contact-carrying wheels, a general call switch in circuit with each signal, a clerk signal associated with each contact-
70 carrying wheel, a switch in each guest room for controlling the circuit of the corresponding clerk signal, a rising call switch associated with each contact-carrying wheel for controlling the circuit between the same and
75 the corresponding guest signal, magnets in circuit with the rising call switch, one magnet having means for controlling the releasing of the rising call switch after it has performed its function, and the same magnet
80 having contacts for connecting the clock with the guest signal to operate the same as long as the clock contacts are engaged, and contacts controlled by the first magnet for permitting the first-mentioned magnet
85 to be deenergized when the guest room switch is actuated to stop the signal.

8. In a clock system, the combination of a clock including a continuously moving contact hand, and a plurality of spaced fixed
90 contacts with which the hand is adapted to engage, circuits closed by the hand engaging the contacts, a motor in the said circuits, a motor-controlling switch having a movable element for cooperating with either fixed
95 contact to close the motor circuit, whereby the motor is intermittently operated, a plurality of guest call circuits, a switch in each guest call circuit including an intermittently movable contact, driving means between the
100 motor and all the intermittently movable contacts, and means driven by the motor for operating the movable element of the said motor controlling switch.

9. In a clock system for hotels and the
105 like, the combination of a clock having a constantly movable contact hand and a plurality of stationary contacts with which the hand engages intermittently, circuits controlled by the hand and contacts, an electric
110 motor in the said circuits, a motor-controlling switch including a movable element, a cam wheel operated by the motor and cooperating with the movable element of the switch to so prepare the motor circuit that the
115 motor will operate when the hand engages either contact of the clock, guest signal circuits, and switches including movable elements moved step by step with each operation of the motor.

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