

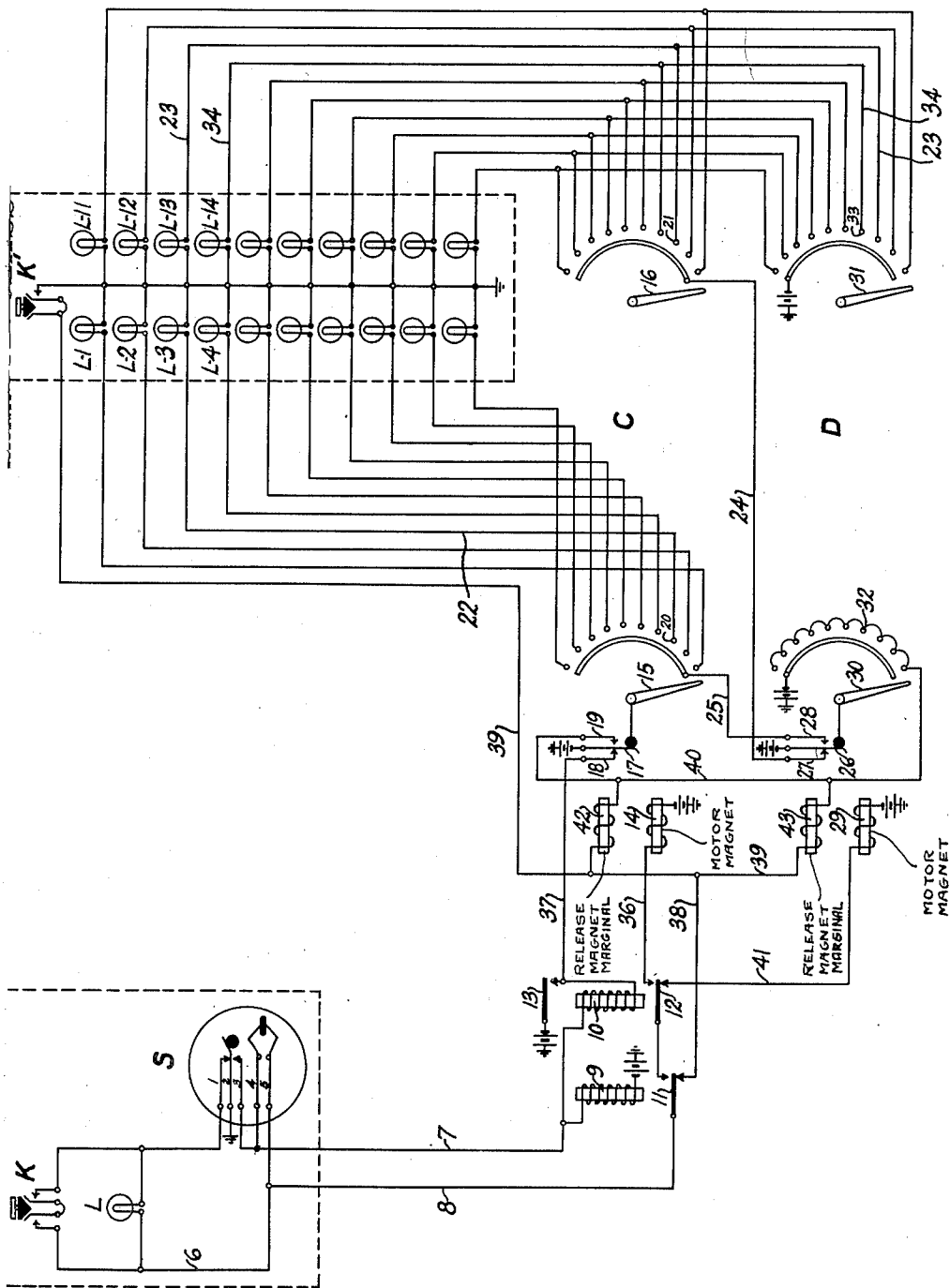
Nov. 11, 1930.

C. W. NESSELL

1,781,520

SIGNALING SYSTEM

Filed Jan. 6, 1928



Inventor
Clarence W. Nessell
W. H. Carter Att'y

UNITED STATES PATENT OFFICE

CLARENCE W. NESSELL, OF FOREST PARK, ILLINOIS, ASSIGNOR TO RESERVE HOLDING COMPANY, OF KANSAS CITY, MISSOURI, A CORPORATION OF DELAWARE

SIGNALING SYSTEM

Application filed January 6, 1928. Serial No. 244,785.

My invention relates in general to signaling systems, but more particularly to such systems designed especially for use in theatres, auditoriums, or any similar structures, where it is necessary that the person in charge of seating the patrons have means whereby his assistants may inform him of the number of unoccupied seats in the sections of the assembly under their direct supervisions. A signaling system of this kind is exceedingly useful, and, in fact, necessary in large theatres where patrons are continually waiting to gain admittance.

In such instances, the head usher is usually in the lobby of the theatre directing the doorman in allowing entrance to the patrons. In order that he might be apprised of the number of vacant seats in the house, I have provided a signaling system wherein, each captain having ascertained the number of unoccupied seats in his section of the theatre, may inform the head usher without its necessitating the captain leaving his station. The signaling system of my invention in this instance, is an improvement over the system disclosed in my pending application Serial No. 210,221, filed on August 3, 1927, and it is one which employs the minimum amount of equipment and the minimum number of conductors leading from the captain's station to the head usher's position. Thus I have provided a system which is cheaper than other systems in both initial cost and installation cost, besides being as inexpensive to maintain as other systems.

The provision of a system as referred to above constitutes the principal object of my invention.

For an understanding of my invention, I refer you now to the detailed description which is to follow, during the reading of which, reference should be had to the accompanying drawing.

The rectangle towards the upper left hand corner of the drawing represents the sender's station, or the captain's station. The equipment at the sender's station consists of the calling device S, the lamp L and the push button K. The calling device S may be of any of the well known types of impulse send-

ers used in automatic telephone systems and consisting of a mechanism controlled by a finger hole dial having ten finger holes located near the outer edge of the dial. These holes are numbered 1 to 0 inclusive. The operator, to operate the calling device, inserts a finger in the hole corresponding to the digit which he wishes to transmit and rotates the dial in a clockwise direction until his finger comes in contact with a stop. The dial is then released and allowed to return to its starting position under the influence of a spring. In so doing, it operates the mechanism to transmit a number of impulses corresponding to the digit selected.

Towards the upper right hand corner of the drawing is another rectangle. This rectangle represents equipment, located at the receiver's station, or head usher's station, associated with the sender's station. This equipment consists of a lamp panel provided with two rows of ten lamps each and is so fixed that the lamps when lighted will exhibit a numeral, but will not show the numeral when not lighted. The receiver's station is also provided with a pushbutton, the purpose of which will be explained later.

The equipment in the lower portion of the drawing represents the equipment used in establishing connections between the sending equipment and the receiving equipment. It may be located in any out-of-the-way place, but as near the receiving station as possible. It consists of two, rotary, selecting switches C and D having operating and release magnets, and two relays for controlling and operating these rotary switches. These switches each have two wipers and are of the well known rotary, homing type of switch. The switches are so arranged that the wipers are advanced upon the deenergizations of the motor magnets. It will be noted that only two wires are required to connect the sending station with this equipment, and also that, for a two-digit system, twenty one wires are necessary to connect the receiving station with this equipment.

The operation of the complete system will now be related in detail.

It will be assumed that the usher captain

whose sending equipment is represented in the drawing, desires to inform the head usher that there are some unoccupied seats in his section, and it will be assumed that in this instance the number of available seats is 34. In accordance with the first digit, he will insert his finger in the hole of the finger dial numbered 3 and rotate the dial in a clockwise direction. As soon as the finger dial is moved from rest, spring 2 will disengage spring 1 and engage with spring 3, applying ground to conductor 7. The effect of ground on conductor 7 is the operation of relays 9 and 10, their energizing circuits being traced as follows: for relay 9, from ground on spring 2, through spring 3, along conductor 7, through winding of relay 9, to battery; for relay 10, from ground on spring 2, through spring 3, via conductor 7, winding of relay 10, via conductor 37, through springs 18 and 17, to battery. Relay 10 in operating closes a locking circuit for itself at armature 13 and its make contact, and at armature 12 and its make contact closes the circuit of motor magnet 14 at that point. Relay 9 in operating, closes at armature 11 and its make contact, the circuit of motor magnet 14 at that point. However, the circuit for magnet 14 is still open at impulse springs 4 and 5 which are held apart by the impulse cam.

When the usher captain removes his finger to allow the dial to return to normal, the finger dial will rotate in a counterclockwise direction removing the impulse cam from between the impulse springs a number of times corresponding to the digit selected, which, in this case, it has been assumed to be three. Therefore the circuit to motor magnet 14 will be closed and opened three times and motor magnet 14 will receive three impulses from ground on spring 2, through spring 3, through impulse springs 4 and 5, via conductor 8, through armature 11 and its make contact, through armature 12 and its make contact, via conductor 36, through winding of motor magnet 14 to battery. Motor magnet 14 will energize and deenergize 3 times, advancing its wipers 15 and 16 three steps onto contacts 20 and 21 respectively. Now as the wipers 15 and 16 are moved from their normal positions, off-normal spring 17 is operated to engage spring 19 instead of spring 18 as it does when the switch is in its normal position. The effect of this is to open the original energizing circuit of relay 10, and to close the circuit of release magnet 42 at that point. However, since relay 10 has been locked up, the opening of its energizing circuit at this time has no effect.

Now, when the finger dial has returned to normal, the spring 2 again engages spring 1 and disengages spring 3. The disengagement of springs 2 and 3 opens the circuits of relays 9 and 10 and these relays deenergize.

Relay 9 in falling back closes at armature 11 and its back contact, the circuit for release magnet 42 at that point. The engagement of springs 2 and 1 closes the circuit for release magnet 42 at that point. The circuit for the release magnet is now complete, being traceable from ground on spring 2; through spring 1, through lamp L, via conductor 6, via conductor 8, through armature 11 and its back contact, via conductor 38, via conductor 39, through release magnet 42, via conductor 40, through springs 19 and 17 to battery. Lamp L lights in this circuit to indicate to the sender that connection has been made, but release magnet 42 will not operate in series with lamp L.

Returning now to the operation of switch C, when wiper 16 comes to rest on the third contact of its bank, here designated 21, a circuit has been completed for lamp L¹³ from ground, through lamp L¹³, via conductor 23, via contact 21 and wiper 16, via conductor 24, through springs 27 and 26 to battery. Lamp L¹³ will light in this circuit to exhibit the numeral "3" to the head usher. Wiper 15 also comes to rest on the third contact of its bank, here designated 20, with no effect other than close the circuit for lamp L³ at that point, that circuit still remaining open at off-normal springs 28 and 26 of switch D.

As this is the first digit of the number being sent by the usher captain, the head usher cannot yet determine if there are three or thirty seats vacant. If another number does not appear in a very short interval of time after the appearance of the first, as will be explained later, the head usher will know that there are only three vacant seats.

However, we have assumed that there are 34 unoccupied seats, so as soon as the usher captain sees that connection has been established, indicated by the lighting of lamp L, he will insert his finger in the fourth hole and again manipulate the dial as described previously. This time as the dial moves from normal, spring 2 is again moved out of engagement with spring 1 and into engagement with spring 3. Engagement of springs 2 and 3 again closes the circuit for relay 9 but not for relay 10, since the circuit for relay 10 is open at off-normal spring 17. Relay 9 operates as before and operates its armature 11. Then, as the dial returns to normal, the impulse springs 4 and 5 are closed and opened four times. Each time springs 4 and 5 are closed, an impulse is sent to motor magnet 29 from ground, through springs 2 and 3, through springs 4 and 5, via conductor 8, through armature 11 and its make contact, through armature 12 and its back contact, via conductor 41, through motor magnet 29 to battery. Motor magnet 29 is energized and deenergized four times, advancing its wipers 30 and 31 onto the fourth contacts of

their banks, here designated 32 and 33, respectively.

When the finger dial again comes to rest, spring 2 will disengage spring 3, allowing relay 9 to deenergize, and engage spring 1. Lamp L will light in the same circuit as traced before. This time, however, that circuit has another branch including conductor 39, release magnet 43, conductor 40, bank of switch D, contact 32, wiper 30 to battery. Neither magnets 42 or 43 will operate since lamp L is in the circuit.

Returning now to the operation of switch D, when wipers 30 and 31 are moved from normal, off-normal spring 26 is moved out of engagement with spring 27 and into engagement with spring 28, thus breaking the circuit of lamp L¹³ and completing the circuit of lamp L³, lighting L³ and extinguishing L¹³. The circuit for lamp L³ is traceable from ground, through lamp L³, via conductor 22, through contact 20 and wiper 15, via conductor 25, through springs 28 and 26 to battery. Since wiper 31 rests on contact 33, the lamp L¹⁴ will light over the following circuit: from ground, through lamp L¹⁴, via conductor 34, via contact 33 and wiper 31 to battery. Thus it will be seen that lamps L³ and L¹⁴ are both lighted, indicating to the head usher that this usher captain has "34" unoccupied seats in his section of the theatre.

As the equipment now stands, the wipers of switch C stand on the third contacts of the switch bank associated with switch C, while the wipers of switch D stand on the fourth contacts of their bank, and none of the relays are energized. However, as previously stated, the circuits of release magnets 42 and 43 are both completed through lamp L, but with this lamp in the circuits, neither of the release magnets will operate.

In order to release the equipment so that another set of lamps may be lighted, I have provided means whereby either the sender or receiver may release the equipment. These means consists of a push button K at the sender's station which, when operated, will place a shunt about lamp L removing this lamp from the circuit of the release magnets allowing these magnets to energize and restore the switches C and D to normal; and a push button K' at the receiver's station which, when operated, will short circuit lamp L, allowing the release magnets to operate. As switches C and D return to normal they will again operate their off-normal springs to the positions shown in the drawing.

Since the wipers of the switches C and D return to their normal positions backward, the switch having been advanced the lesser number of steps will reach its home position first and operate its off-normal spring first. In the instance cited, switch C will reach its normal position first since this switch has ad-

vanced its wipers three steps while switch D has advanced its wipers four steps. Thus switch C in returning to normal operates its off-normal spring 17, breaking the original circuit for the release magnets. If the bank contacts wiped by wiper 30 were not multipled together and connected to release conductor 40 and battery through wiper 30, switch D would be stopped one step from its home position. Therefore, after switch C has returned home, the release magnet 43 of switch D still has an operating circuit through wiper 30 until switch D has returned to its normal position. When both switches have reached home, the push button effecting the release may be restored to normal. The equipment is now ready for another signaling process.

It will be seen, therefore, that I have provided a very simple signaling system which is positive and efficient in its operation and which, since it employs very little equipment and necessitates very few conductors from each sender's station, has a low initial cost and a low installation cost. Although I have chosen the present example to illustrate my invention, I do not intend it to be limited thereto since there are modifications and adaptations which can be made by one skilled in the art without departing from the scope of the invention.

Having thus described my invention, what I consider new and desire to have protected by Letters Patent will be pointed out in the appended claims.

What is claimed is:

1. In a signaling system, a sending station having means for sending signals comprising numbers of one or more digits, a receiving station having a plurality of rows of lamps, one row representing the units digit of a number, another row representing the tens digit of a number, a series of step-by-step switches, one switch for each digit, off-normal springs for one of said switches operative upon the first movement of the associated switch, and means operated responsive to the transmission of the first digit of a number signal to operate another of said switches for lighting a lamp in the units row through the off-normal springs, and for preparing a circuit for the corresponding lamp in the tens row through the off-normal springs said means operated responsive to the transmission of the second digit of the signal to operate the first mentioned switch for lighting another lamp in the units row and for operating the associated off-normal springs to extinguish the first lamp lighted in the units row and light the corresponding lamp in the tens row.

2. In a signaling system, a sending station having means for sending signals comprising numbers of one or more digits, a visual signal at the sending station, a receiving station having a plurality of rows of lamps, one row rep-

representing the units digit of a number, another row representing the tens digit of a number, a series of step-by-step switches, one switch for each digit, off-normal springs for each of said switches operative upon the first movement of the switches, and means operated responsive to the transmission of the first digit of a number signal to operate one of said switches for lighting a lamp in the units row through the off-normal springs of another of said switches, for preparing a circuit for the corresponding lamp in the tens row through the same off-normal springs and for operating the associated off-normal springs to light said visual signal, said means operated responsive to the transmission of the second digit of the signal to operate said other of said switches for lighting another lamp in the units row and for operating the associated off-normal springs to extinguish the first lamp lighted in the units row and light said corresponding lamp in the tens row.

3. In a signaling system, a sending station, an impulse sending device and a signal lamp thereat, a receiving station having visual signals, a pair of conductors connecting the two stations, a pair of devices at the receiving station for translating signals from the sending station to the visual signals, means for associating the impulse sending device with one of said conductors to prepare operating circuits for said translating devices, means for associating the impulse sending device with the second conductor to operate said translating devices, and means in said translating devices for lighting said signal lamp over said second conductor upon the operation of said translating devices.

4. In a signaling system, a sending station, an impulse sending device and a signal lamp thereat, a receiving station having visual signals, a pair of conductors connecting the two stations, a pair of switches at the receiving station for translating signals from the sending station to the visual signals, an operating magnet and a release magnet for each switch, means for associating said device with one of said conductors to prepare operating circuits for said operating magnets, means for associating said device with the second conductor to operate said operating magnets, means in said switches for lighting said signal lamp over the second conductor upon the operation of the switches, and means at the sending station for operating the release magnets over the second conductor to release said switches.

5. In a signaling system, a sending station, a receiving station, a pair of conductors connecting the stations, a pair of relays at the receiving station connected to one of said conductors, a first signaling circuit, a second signaling circuit, a release circuit, each of said circuits including said other conductor, a sending device at the sending station,

means operated by the initial operation of said device for operating said relays over said one conductor to prepare said first signaling circuit, means operated by the continued operation of said device for transmitting a series of impulses over said first signaling circuit, means controlled by said impulses and effective at the end of the impulse series for rendering one of said relays inoperative, a subsequent operation of the first means operating only the other of said relays to prepare the second signaling circuit and a subsequent operation of the second means transmitting a series of impulses over said second signaling circuit, circuit connections controlled by said other relay for preparing said release circuit at the completion of the impulse transmission, and means for completing the prepared release circuit.

6. In a signaling system, a sending station, a receiving station, a pair of conductors connecting the stations, a pair of relays connected to one of said conductors at the receiving station, a sending device at the sending station having an off-normal movement and a return-to-normal movement, a first signaling circuit, a second signaling circuit, a release circuit, each circuit including said other conductor, off-normal springs operated by the off-normal movement of said device for operating said relays to prepare said first signaling circuit, impulse springs operated by the return-to-normal movement of said device for transmitting a series of impulses over said first signaling circuit, a registering device at the receiving station operated by said impulses and effective at the completion of the transmission thereof for rendering one of said relays inoperative, a subsequent operation of said off-normal springs operating only the other of said relays to prepare said second signaling circuit, a subsequent operation of said impulse springs transmitting a second series of impulses over said second signaling circuit, a second registering device at the receiving station operated by said second impulse series, circuit connections controlled by said other relay for preparing said release circuit upon the completion of the impulse transmission and means for completing the prepared release circuit for releasing said registering devices.

7. In a signaling system, a sending station, a receiving station, a pair of conductors connecting the stations, a pair of relays connected to one of said conductors at the receiving station and having make contacts and resting contacts, means at the sending station for operating said relays over said one conductor to prepare a first signaling circuit including said other conductor and the make contacts of both of said relays and then transmitting a series of impulses over said first signaling circuit, means at the receiving station controlled by said impulses and effective

at the end of the series to render one of said relays inoperative, said means at the sending station thereafter operating only the other of said relays to prepare a second signaling circuit including said other conductor, make
5 contacts of said other relay and resting contacts of said one relay and then transmitting a second series of impulses over said second signaling circuit to control said receiving station means, and means for completing a re-
10 lease circuit including said other conductor and the resting contacts of said other relay to release said receiving station means.

In witness whereof, I hereunto subscribe
15 my name this 4th day of January, A. D. 1928.
CLARENCE W. NESSELL.

20

25

30

35

40

45

50

55