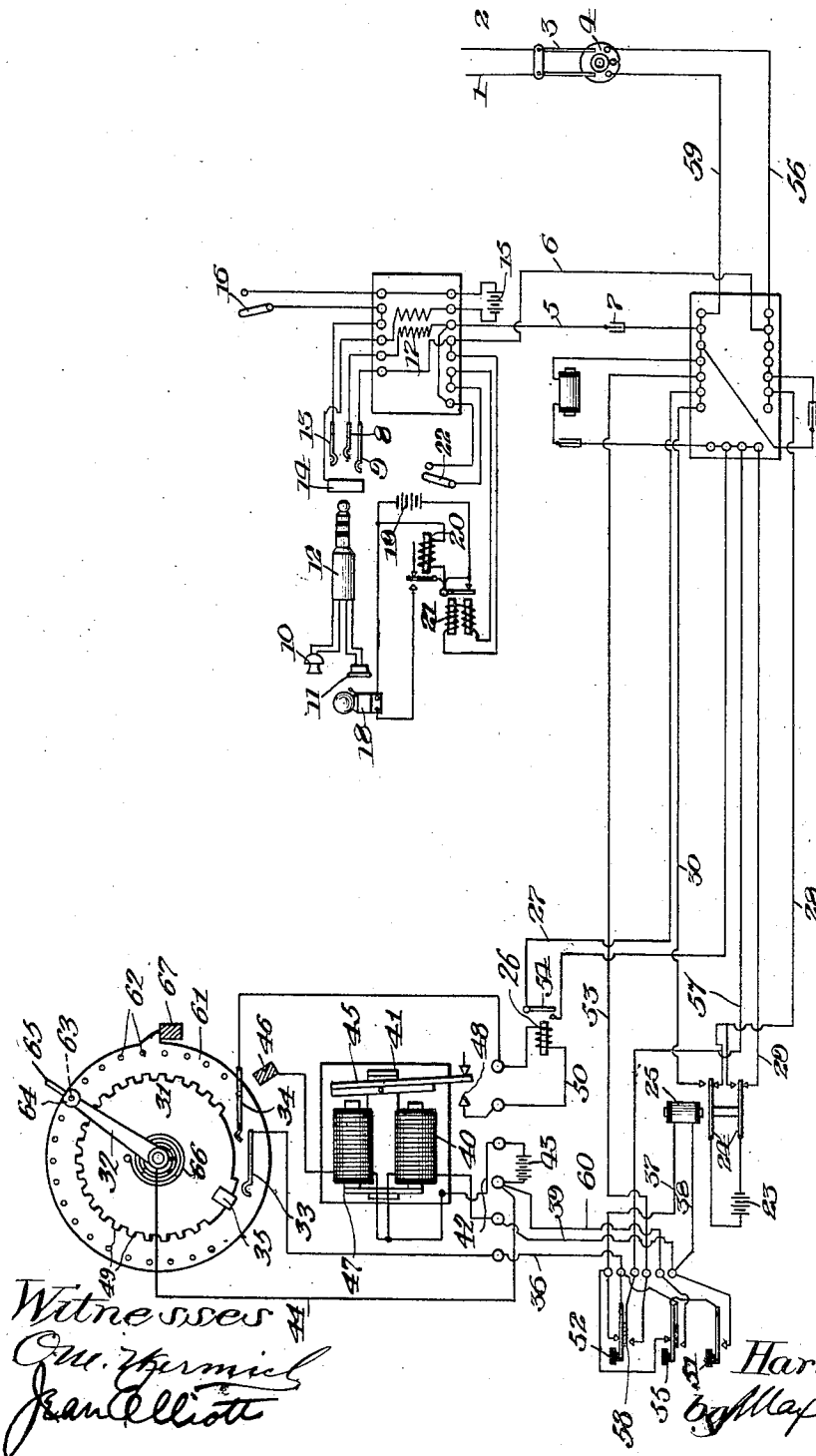


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 SIGNAL SENDING DEVICE.
 APPLICATION FILED NOV. 13, 1909.

1,065,628.

Patented June 24, 1913.



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UNITED STATES PATENT OFFICE.

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THE HALL SWITCH & SIGNAL COMPANY, A CORPORATION OF MAINE.

SIGNAL-SENDING DEVICE.

1,065,628.

Specification of Letters Patent.

Patented June 24, 1913.

Original application filed May 4, 1909, Serial No. 493,940. Divided and this application filed November 13, 1909. Serial No. 527,858.

To all whom it may concern:

Be it known that I, HARRY O. RUGH, citizen of the United States, residing at Sandwich, in the county of Dekalb and State of Illinois, have invented a certain new and useful Improvement in Signal-Sending Devices, of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawings, forming a part of this specification.

This invention relates to signaling systems, and has for its object the provision of new and improved devices to be used at a central station for calling a number of stations connected to the same line wires, which are preferably of the step-by-step or impulse type.

In application, Serial No. 493,940, filed May 4, 1909, I have shown a call box showing the general features of the call box of this invention, and also setting forth auxiliary features which are now divided from said application and made the subject-matter of the present application. These instrumentalities comprise auxiliary means in connection with a call-box arrangement, whereby, after one station has been called, additional stations can be called without using said call box, which auxiliary means enables the operator to signal any number of additional stations without again using the call box.

I will describe my invention more in detail by reference to the accompanying drawing, which illustrates the system diagrammatically.

Referring to the drawing, the line circuit over which the impulses are to be sent, is indicated at 1, 2, which, through the interposition of the switching mechanism 3, connects said line wires to a terminal block 4. From this terminal block, the train-dispatcher's telephone and signal-receiving circuit is brought out through the conductors 5 and 6, through the interposition of the condenser 7, which conductor 5, after passing through the secondary of an induc-

tion coil, connects directly with a spring of a spring jack. Conductor 6, as will be seen, connects with spring 9 of said spring jack. The transmitter 10 and receiver 11 are respectively connected to a plug 12, which is adapted to connect the same with the springs 8, 9 and 13, and contact 14, the receiver being connected with springs 8 and 9, and the transmitter being connected with the spring 13 and contact sleeve 14. The primary of the induction coil, in series with the battery 15 and a cut-in key 16, is connected between the contact sleeve 14 and the spring 13. The secondary 17 is connected to the spring 8 and to the conductor 5, and the other spring 9 is connected directly to the conductor 6. This establishes the operator's local talking circuit.

The local signal receiving circuit of the operator consists of the bell 18, battery 19, and operating relay 20, and a relay 21, which relay 21 is connected, through the interposition of the night bell switch 22, directly between the conductors 5 and 6, thus being in bridge of the line wires 1 and 2. A relay 21 is designed to be operated by vibratory currents. Normally its armature is in circuit with its back contact and thereby closes circuit through the relay 20 and battery 19, whereby relay 20 has its armature disconnected from its front contact, but connected with its back contact. The circuit through the bell 18 is thus open. When alternating current from the substations comes in over the line wires 1 and 2, it vibrates the armature of relay 21, thereby opening the circuit through the relay 20 and permitting the armature of the relay 20 to connect the bell 18 with the battery 19. The relay 21 is designed to be operated by vibratory currents. Normally its armature is in circuit with its back contact and thereby closes circuit through the relay 20 and battery 19, whereby relay 20 has its armature disconnected from its front contact, but connected with its back contact. The circuit through the bell 18 is thus open. When alternating current from the substations comes in, over

the line wires 1 and 2, it vibrates the armature of relay 21, thereby opening the circuit through the relay 20 and permitting the armature of the relay 20 to connect the bell 18 with the battery 19.

My improved signal-sending device is adapted to transmit periodic impulses over the line, corresponding to the number of the station to be called, and after sending sufficient impulses, establishes a circuit condition, which permits the signal at the substation to operate, whereafter, the signal-sending device impresses current on the line to release the various devices at the substations, all as will be now explained.

Impulses are transmitted over the line wires 1 and 2 from the battery 23, which battery is connected to two springs 24, 24, which springs are normally in the contact position as shown in the figure. When the relay 25 is actuated to draw up said springs 24, the polarity of the battery, as connected to the line conductors 1 and 2, is reversed. This will be more particularly explained later.

Whenever relay 26 is actuated to close circuit through its armature, circuit is closed through the conductor 27, through the line wire 1, back over the line wire 2, through conductor 28, upper contact spring 24, battery 23, lower contact spring 24, conductor 29, back to the conductor 27. Thus, for every operation of the relay 26, an impulse is sent over the line wires 1, 2. Now, should the relay 25 be energized temporarily, while the relay 26 is not energized, the reverse battery polarity is transmitted over line conductors 1 and 2, through the agency of conductors 30 and 28. I will now describe how the relays 25 and 26 are operated to send these various impulses.

My contact-making device consists of a wheel 31, operable by means of a handle 32, and adapted to engage the springs 33 and 34, which are normally not in contact therewith. The element 31 is secured to a wheel 61 which has holes 62 therein, which holes are adapted to be engaged by a pin 63 carried by the arm 32 and manipulated by the button 64 thereof. The holes 62 correspond to the various substations to be called and the pin 63 is inserted in the hole 62 corresponding to the station desired, whereupon the handle 32 is rotated contra-clockwise until its projection 65 engages a stop 46 for purposes described hereinafter. After this the manual operation of the device ceases and the spring 66 rotates the element 31 and wheel 61 to normal against the stop 67. The projection 65 is of course so arranged that it does not interfere, but passes above stop 67. In starting the mechanism, the handle 32 is made to engage the wheel 31, and to rotate in a contra-clockwise direction, which thereby permits spring 33 to engage a con-

tact strip 35, which closes a circuit that can be traced from said contact spring 33, the conductor 36, conductor 37, relay 25, conductor 38, conductor 39, through the winding 40, of the polar relay 41, to the frame of the relay 41, through conductor 42, battery 43, conductor 44, element 31, and element 35. This energizes the relay 25, and sends current of what I will call "negative polarity" over the conductors 1 and 2, to release the selective devices at the substations. At the same time, the coil 40 of the relay 41 repels its armature 45, so that it is not in contact-making position. After the arm 32 has been further swung around, spring 33 breaks with contact element 35, and spring 34 begins to engage element 31, but no contact is established through relay 26 on this account, as circuit is not closed by armature 45. The further actuation of the arm 32, in a contra-clockwise direction, however, electrically connects it with the contact element 46, and thereby a circuit is established through the coil 47, which serves to attract the armature 45 to close circuit with its contact point 48. The manual actuation of the arm 32 thereupon ceases, and the clockwork mechanism begins to rotate the element 32 in clockwise direction, during which time spring 34 alternately engages teeth 49, thereby intermittently actuating relay 26, until the number of impulses has been completed, and the spring 34 stays in permanent connection with the element 31, which thereby maintains current upon line conductors 1 and 2, by reason of keeping relay 26 actuated, which is designed to operate the substation signal, all as more clearly explained in my co-pending application, Serial No. 478,088, filed February 15, 1909.

The circuit through the relay 26 is traced as follows: contact spring 34, relay 26, conductor 50, armature 45, frame of relay 41, battery 43, conductor 44, to the element 31 and its teeth. The actuation of relay 26 thereupon sends positive impulses over line wires 1 and 2, as previously set forth. The arm 32 can be adjustably set with respect to the element 31, thus to vary the number of impulses to be transmitted over line wires 1 and 2, before the contact spring 34 comes into a definite circuit condition to operate the local substation signal. Before the clockwise rotation of the element 31 has been finally completed, the spring 33 again engages contact element 35, which again actuates relay 25, to send a negative impulse over the conductors 1 and 2, to release the substation devices.

It is, of course, necessary, as shown, that the negative impulses be not made coincident with the positive impulses. I provide auxiliary appliances, so that when one station has been called, and I desire to call

following stations, this may be done without again operating element 31, and for this reason I have provided a key 51, which is closed with its contact when the element 31 is on its return stroke, and this short-circuits relay 25, and prevents the sending of the negative impulse which would release the local substation stepping devices. After the element 31 has completed its movement and come to rest, I operate the key 52, which, as will be seen, closes, through the agency of the conductor 53, the same circuit that is ordinarily established by the armature 54, and thereby I send additional positive impulses to step-up the devices further, or to maintain a given circuit position after a number of impulses have been sent, thereby to call the station desired. I further provide a key 55, which, when depressed, actuates the relay 25, to send a negative impulse, thereby to release any substation devices. It will be seen that the key 51 short circuits the conductors 37 and 38 of the relay 25, thus to prevent sending of the release impulse. The front contact of the key 51 is directly connected with conductor 38 and the lever of the key through the lever of the switch 55 and its back contact is directly connected with the conductor 37. This key 51 thus prevents sending of the release impulse. Thereafter key 52 is operated to send additional impulses to call one or more than one succeeding stations and the circuit which accomplishes this is traced from the line conductor 2, line conductor 56, conductor 28, battery 23, conductor 29, conductor 57 to the lower contact switch 58 of the key 52, its associated front contact, the conductor 53, conductor 59 to the line wire 1.

To send a release impulse of negative polarity, I use the key 55 and depressing this key operates the relay 25 to send the release impulse, circuit conditions being as follows: from the upper terminal of relay 25, through conductor 37, lever of switch 52, lower contact spring of key 55, front contact of key 55, conductor 60, battery 43, conductor 42, coil 40, conductor 39, conductor 38 to the lower terminal of the relay 25.

It will be seen from this that the auxiliary keys 51, 52 and 55 enable me to selectively call a plurality of stations without again using a call-box arrangement, consisting of the impulse wheel 31 and handle 32.

While I have herein shown and particularly described the preferred embodiment of my invention, I do not limit myself to the precise construction and arrangement as herein set forth, but

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

1. In a signal sending device for selectively calling a plurality of stations, the combination with a movable member and

means controlled thereby to select either one of a plurality of stations and to restore the apparatus thereat to normal after actuation, a handle to operate said member to send a call for a predetermined station, means to render ineffective the restoration controlling means, auxiliary switching means for including currents of given electrical character with the line circuit for selecting succeeding stations, auxiliary switching means for including currents of different electrical character with the line circuit for substation signal release purposes, and a line circuit to which said devices and means are adapted for association.

2. In a signal sending device for selectively calling a plurality of stations, the combination with a movable member and means controlled thereby to select either one of a plurality of substation signal receiving devices, means for operating said member to send a call for a pre-determined station, means controlled by said member whereby to restore said signal receiving devices when said member has completed its signal sending operation, auxiliary means to temporarily render said signal receiving device restoration controlling means ineffective, and auxiliary means to select succeeding stations.

3. In a signal sending device for selectively calling one or more of a plurality of stations, the combination with a call box having means when actuated to select for operation any desired station and to control the restoration thereof upon completion of the call, auxiliary means to temporarily render ineffective the restoration controlling means, and auxiliary means to select succeeding stations.

4. In a signal sending device for selectively calling one or more of a plurality of stations, the combination with a call box having means when actuated to select for operation any desired station and to control the restoration thereof upon completion of the call, auxiliary means to temporarily render ineffective the restoration controlling means, said means including a circuit controlling switch, and auxiliary means to select succeeding stations.

5. In a signal sending device for selectively calling one or more of a plurality of stations, the combination with a call box having means when actuated to select for operation any desired station and to control the restoration thereof upon completion of the call, auxiliary means to temporarily render ineffective the restoration controlling means, and auxiliary means to select succeeding stations, said last aforesaid means including electrical switching devices.

6. In a signal sending device for selectively calling one or more of a plurality of stations, the combination with a call box

having means when actuated to select for
operation any desired station and to control
the restoration thereof upon completion of
the call, auxiliary means to temporarily
5 render ineffective the restoration controlling
means, said means including a circuit con-
trolling switch, and auxiliary means to select
succeeding stations, said last aforesaid

means including electrical switching de-
vices.

In witness whereof, I hereunto subscribe
my name this 4th day of October, A. D. 1909.
HARRY O. RUGH.

Witnesses:

MAX W. ZABEL,
O. M. WERMICH.