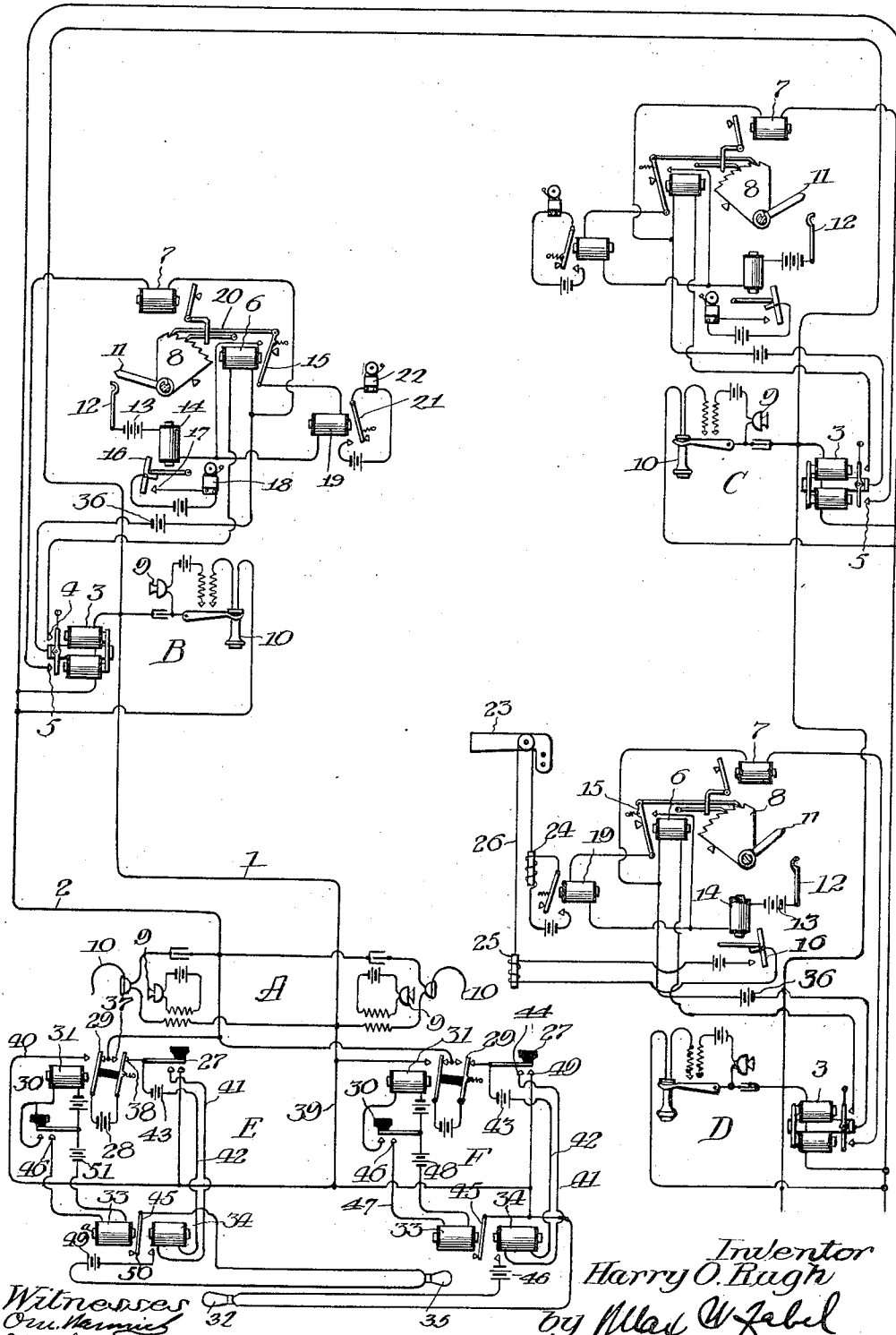


H. O. RUGH.
 SIGNALING SYSTEM.
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1,060,214.

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UNITED STATES PATENT OFFICE.

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SIGNALING SYSTEM.

1,060,214.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, HARRY O. RUGH, a 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 Signaling Systems, 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.

My invention relates to signaling systems and has for its object the provision of a signaling system in which two call boxes may be used to operate over a single signaling circuit and in which, in its preferred embodiment, there are two separate signals at each signal receiving station.

My invention contemplates the provision of indicating means at the call boxes or signal sending devices which will indicate whether the call box is in use. This is of particular utility in connection with train despatching telephone systems in which, in one embodiment of the invention, one call box might be used by the train despatcher to call a given predetermined one of the two signals at each signal receiving station, and in which the second call box might be used for message service by a message operator, and would serve to call the other of each pair of signals at the substations.

My invention herein was originally set forth in my application Serial No. 478,088 filed Feb. 15, 1909, and which application in accordance with requirements from the Patent Office was divided and a subsequent application filed bearing the Serial No. 486,119, filed March 29, 1909, and my present application is a divisional application of this later application 486,119 as per requirements from the Patent Office. The claims covering the double substation signal feature will be found in application 478,088, and the combination of the double call box feature with the double substation signal will be found in application 486,119, and in this application the double call box with its associated selective signaling features is claimed.

In the descriptive portion I will set forth not only the features herein claimed, but the combination of these features with the

other features as set forth in the aforesaid two applications.

I will explain my invention more in detail by reference to the accompanying drawing, which illustrates the same diagrammatically. I have shown the central station A, and substations B, C and D, united by two line conductors 1 and 2. Each substation has a polarized relay 3, which polarized relay, by virtue of its contacts 4 and 5, is adapted selectively to energize relays 6 and 7, as desired, to effect the step-by-step operation of an element 8. Means, to be described hereinafter, are provided at the central station for sending battery impulses of a certain polarity to actuate the relay 3 in a manner to operate the relay 6, and battery impulses of opposite polarity actuate the relay 3 to operate the relay 7, whereby to release the step-up mechanism. Each station is provided with a transmitter 9, and its associated receiver 10, connected in the ordinary manner.

When the step-up element 8 is in its operative position, which positions have different angular relations in the different stations, its contact arm 11 engages the spring 12, which thereby closes the signaling circuit, including the battery 13, the relay 14, the armature 15 of relay 6 and its associated contact. If, when the step-up element 8 has completed the contact with the spring 12, the relay 6 is held in its closed position without, however, sending any further impulses, then the slow moving element 16, which is released when the armature of the relay 14 pulls up, finally engages contact element 17, and operates the local signal 18. The relay 14 is of very low resistance. Now, however, should the step-up element 8, when closing circuit through the spring 12, remain in that position without further impulses, but the armature 15 of the relay 6 be permitted to retract to its normal position, as shown in the drawing, then circuit is completed from the arm 11, spring 12, battery 13, low resistance relay 14, high resistance relay 19, armature 15, arm 20, element 8, back to the arm 11. A very high resistance relay 19 is now included in the circuit, and this high resistance relay will attract its armature 21, but not enough cur-

rent flows through the low resistance relay 14 to permit it to attract its armature. Therefore, the local signal 22, under the control of the relay 19, will operate. From this
 5 it will be apparent that when the element 8 is stepped up to its operative position, if the key at the central station which sends the impulses is held in its closed position when sending the last impulse, the signal 18
 10 will operate, whereas, if the signal sending key, after sending the required number of impulses, is allowed to return to normal or its open circuit position, signal 22 will operate. Thus, I am enabled to selectively
 15 actuate signals 18 and 22 merely by holding the signal sending key in its closed or open position, after it has sent the required number of impulses to place the step-up mechanism in its operative position.

20 Considering the signals 18 and 22, I may employ a semaphore 23 under the control of solenoids 24 and 25, which, by means of a string 26, draw it into its clear position or danger position, depending upon whether
 25 the relay 14 or relay 19 is energized. The apparatus at the central station, which sends the impulses and which with its allied apparatus includes novel features to be covered herein consists of the sending key 27, which
 30 sends current of the required polarity to step-up the element 8 from the battery 28, over the line conductors 1 and 2, through the agency of the reversing springs 29. The impulses thus transmitted by either of the
 35 keys 27 extend through the circuit which may be traced from line wire 2 to the contact 37, pole changing switch 29, battery 28, the second spring of the pole changing switch 29, back contact 38, key 27 and conductor 39 to the line wire 1 through the sub-
 40 station relays 3 and back to the line wire 2. Current of opposite polarity is sent over the line wires 1 and 2, when the key 30 is depressed, which retracts the springs 29 by
 45 energizing the relay 31, thus reversing the polarity of the current. The circuit through which this reverse impulse passes can be traced from line wire 2, right hand spring of the circuit changing switch 29, battery
 50 28, left hand spring of the switch 29, conductor 40, to the line wire 1, the relays 3 at the substations back to the line wire 2. It will be noted in this latter case that the battery 28 is connected across the line wires 1
 55 and 2 in the reverse manner to that in which it is connected to these line wires when the key 27 is actuated and the key 30 remains unactuated. This reversal of the polarity operates the relay 7 to operate all the step-
 60 up elements and return them to normal. As before explained, if the key 27, in sending impulses, is held in its closed position after having sent the required number of impulses, the signal 18 at the station called will
 65 operate, whereas, if said key is held in its

open position after having sent the required number of impulses, signal 22 at the station will operate. It will be understood, of course, that in making the impulses until the desired station is reached, relay 19 of any of the preceding stations does not respond even
 70 though the armature of relay 6 necessarily falls back to make the succeeding impulse, because the impulses are sent so quickly that in passing over a station not wanted, the
 75 contact elements 11 and 12 touch only instantaneously and not sufficiently long to allow said relay 19 to respond. The mechanism associated with these double call boxes by-virtue of which I get the results as out-
 80 lined hereinbefore, namely, to indicate when a particular call box is busy will now be described. It is to these indicating features to which my invention herein is particularly limited, other features of various circuit arrangements herein being claimed
 85 elsewhere as stated.

I have shown duplicate signal sending apparatus at the central station, as illustrated, so that two operators may use the line circuits 1 and 2, and in one form of my invention one operator might be limited to the
 90 call of signals 18, although in emergency cases, it might be that an operator would wish to call either signal. In this case, of course, it is necessary to provide indications
 95 between the two operators to apprise one operator that the other is having the signaling system in use. I have designated the respective operator's positions as E and F, respectively, and I associate with the operator E, a signal 32, which is operated by
 100 relays 33 and 34, which relays 33 and 34 are respectively under the control of keys 30 and 27. It will be understood that the relay 34 which actuates the signal 32 located in connection with the call box E has a circuit
 105 which extends by means of the line wires 41 and 42 to the key 27 at the call box F, while the conductor 42 extends to the battery 43, whose free terminal is then connected to the said key 27. A front contact 44 of this said
 110 key 27 serves when connected with the said key to operate the relay 34 and to move its armature 45 into association with its contact, thereby to close circuit through the lamp 32 and the battery 46. The armature 45 stays in the position just mentioned during the time that impulses are being sent
 115 from the key 27 at the station F. Immediately the operation of the key 27 has been completed, key 30 at the said call box F is operated and this through the agency of contact 46 completes a circuit from said contact 46 through conductor 47, relay 33, bat-
 120 tery 48, switch lever of the key 30 to the contact 46. This key 30 therefore which must be operated to send the release impulse, withdraws the armature 45 from its contact and causes the lamp 32 to be extinguished.
 125 130

It will thus be clear from this that the lamp 32 lights immediately the operator at call box F begins to send a call and remains lighted only so long as is required for the completion of the call. Immediately the call is completed by the operation of the button 30 at the call box F the lamp 32 is deenergized. Vice versa, the signal 35 for the operator F is under the control of the keys 30 and 27 of the apparatus under the control of the operator E. Thus, the operator at E knows when the operator at F is using the calling devices; for when the operator F depresses the key 27, relay 34 operates to close the circuit through the lamp 32, and this circuit remains closed until the operator F actuates the key 30, which releases the signal sending mechanism, at the same time releasing the signal 32 by actuating the relay 33. A battery 49^a is provided in conjunction with the armature 50 to operate the lamp 35 when either of relays 33 and 34 are energized. Battery 51 supplies the current to the relay 33 and the battery 52 supplies the current to the relay 34. The circuit arrangements connecting the keys 30 and 27 and their associated contacts at the call box F are exactly the same as those just described in connection with the keys at the call box F and the relays associated with the lamp 32. I have shown batteries at each station for operating the relays 7.

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. A signaling system having at the calling station two call boxes each adapted for substation signal controlling purposes, indicating means associated with each call box, and means controlled at each call box to operate the indicating means associated with the other call box when said first aforesaid call box is in operation and to render said indicating means inoperative upon completion of the call sending operation.

2. A signaling system having at the calling station two call boxes, indicating means associated with one call box, and means controlled at the other call box to operate the said indicating means during the time said second aforesaid call box is in active operation and to render said indicating means inoperative upon completion of the call sending operation.

3. A signaling system having at the calling station two call boxes, a lamp associated with each call box, relays for each lamp to control same, and means controlled at each call box to control the operation of the relays of the lamp associated with the other call box to thereby actuate its associated lamp during the time said first aforesaid call box is in use and to control said relays to render the lamp inoperative upon completion of the calling operation.

In witness whereof, I hereunto subscribe my name this 21st day of November A. D. 1910.

HARRY O. RUGH.

Witnesses:

OTTO M. WERMICH,
HAZEL JONES.