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H. O. RUGH.

SIGNALING SYSTEM.

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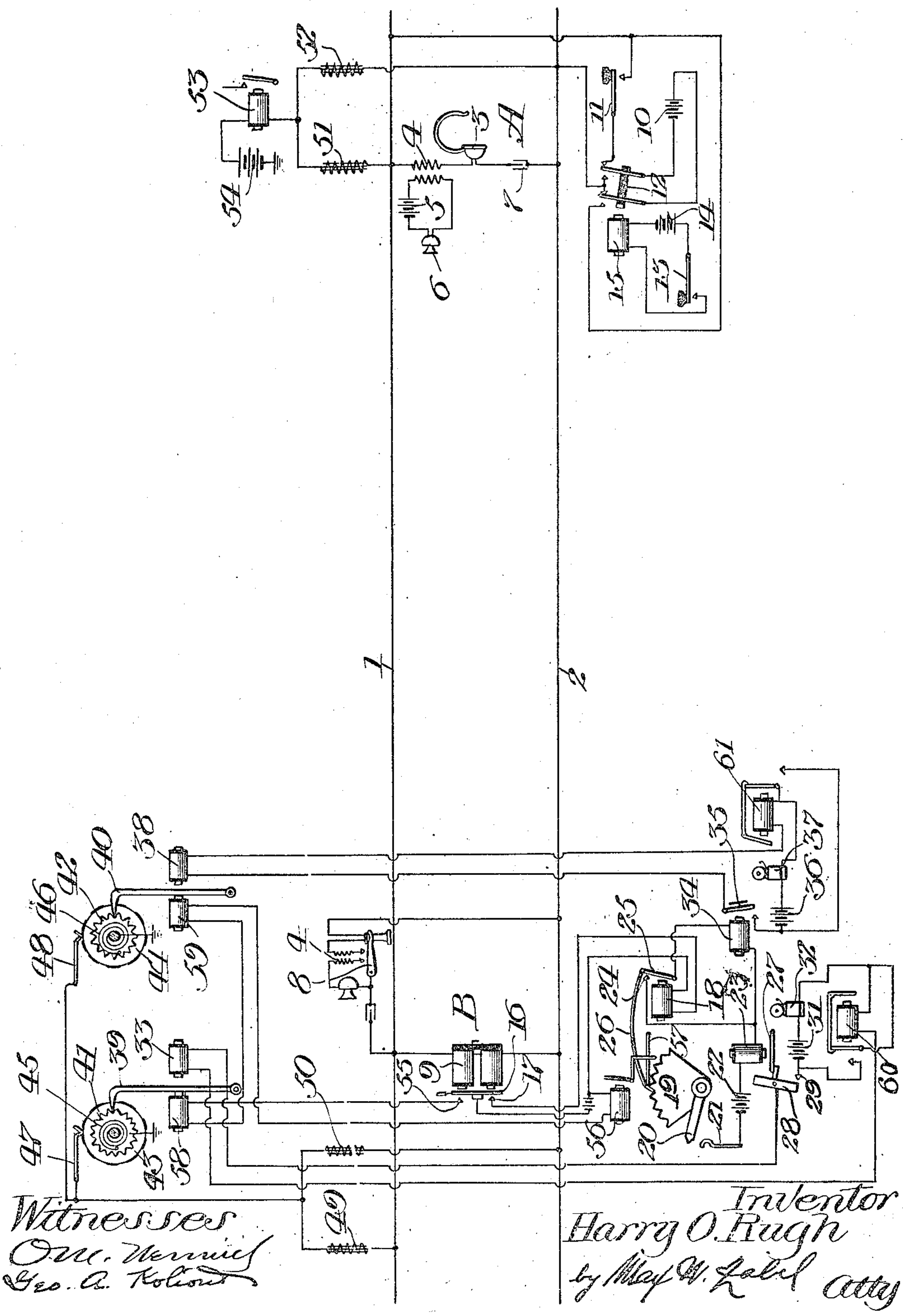
1,042,482. Patented Oct. 29, 1912.



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SIGNALING SYSTEM.

1,042,482. Specification of Letters Patent. Patented Oct. 29, 1912.

Application filed February 15, 1909. Serial No. 478,087.

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 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 improved signal sending devices and return signal-receiving apparatus, whereby it is possible to obtain a continuous indication from a signal that has been called, and one embodiment of the invention contemplates the continuous operation of this return signal indicator until said return signaling apparatus is released by the signal-sending station.

My invention further contemplates the receipt of a double indication from the station which is called. My invention, however, is not limited, of course, to the embodiments above mentioned.

I will now describe this invention more in detail by means of the accompanying drawing, illustrating one embodiment thereof. I have here shown two line wires 1 and 2, uniting a central station, or train despatcher's station, A, and a station B as a signal receiving station, which station B is one of a plurality of similarly constructed stations on the same line conductors 1 and 2, all adapted to be operated by mechanism similar to that shown at station B, with the exception that the step-up mechanism, or other selective mechanism employed to call the particular station desired is set differently for the different stations, as is common in the art, and it is not thought necessary in these drawings to illustrate additional stations B, the station B being a type of a plurality of signal-receiving stations connected to the same line wires 1 and 2, and being under the supervision of the central station A.

Referring more particularly to the station A, I have here shown a despatcher's telephone set comprising the head telephone 3, induction coil 4, battery 5, transmitter 6, and condenser 7, bridged across the line wires 1 and 2. This telephone set is adapted to coöperate with the telephone set at the station B, and the rest of the stations which may be connected along these line wires, and the sub-station B telephone sets being similarly connected to those at the station A, I have designated them by the same numerals, with the exception that I show, in addition, as a sub-station device, the switch-hook 8.

The polarized relay 9 at the substations is designed, through operative impulses transmitted from the central station A, to selectively call the desired substation, as will be more clearly described hereinafter. The polarized relay 9 is shown in this instance in a bridge across the line conductors 1 and 2, and is operated by impulses from the central station battery 10, through the agency of the key 11, which key sends positive impulses from said battery by the instrumentalities shown, consisting of the pole-changing switch 12 over the line wires 1 and 2, to energize the relay 9 in a given manner. The relay 9 is also capable of energization in a different manner, when the key 13 is operated, which closes the circuit through the battery 14, and a relay 15, the energization of said relay 15 serving to attract the pole-changing switches or reversing switch 12, to reverse the polarity of the current sent over the line wires 1 and 2 by the battery 10, thus to actuate the relay 9 in a different manner. Assume that positive impulses actuate the relay 9, so that its floating armature 16 is attracted in a manner to close contact with the contact 17, thereby to operatively energize the relay 18, thereby to step up the step-up mechanism 19 sufficiently to close contact between its arm 20 and the spring 21, the arm 20, of course, being set differently for different stations, so that a varied number of impulses is necessary to call the different stations, as is well understood in the art. The impulses are sent so rapidly until the desired station is reached that no substation relay has time to act merely when the arm 20 passes spring 21 in its continued forward movement. Assuming that sufficient impulses have been transmitted to step up the mechanism 19, so that parts 20 and 21 contact, circuit is then closed through battery 22, low wound relay 23, contact point 24, armature 25, arm 26, back to the contact arm 20. The actuation of the relay 23 operates its armature 27, which thereupon permits the sluggish mov-

ing element 28 to begin its travel toward making contact with the contact point 29. If the key 11 at the station A, which sends the positive impulses, is held in its closed position after the parts 20 and 21, contact, then the relay 23 will remain energized a sufficiently long time to finally permit the sluggish moving element 28 to come into engagement with the contact point 29. If this takes place, a circuit is established through a battery 31, local signal 32, and magnet 33, as will be more clearly described hereinafter. Now, however, should the lever 11 be actuated a sufficient number of times to arrange for contact between the elements 20 and 21, but said lever 11 not held down in its closed position but released after making its last impulse, then the sluggish moving element 28 will not have time, before the armature 27 falls back, to make contact with the contact point 29, by reason of the fact that the armature 25 does not remain a sufficient length of time in contact with the contact point 24, and circuit conditions are established as follows: From the element 19, through the arm 20, the element 21, the battery 22, the low wound relay 23, the high wound relay 34, the armature 25, the arm 26, back to the element 19. On account of the inclusion of the very high resistance relay 34 in this same circuit, not sufficient current can pass to the relay 23 to operate it, as the windings are arranged for that purpose, but the high-wound relay 34 has sufficient ampere turns to cause its armature 35 to draw up, thus closing circuit through battery 36 and a second local signal 37, which includes therewith a magnet 38. It will be seen that the central station A, therefore, can operate with the same position of the element 19, either one of the two local signals, namely, 32 or 37, and conjointly therewith, either one of the two magnets 33 or 38. When either one of the magnets 33 or 38 operates, their respective armatures, 39 or 40, are drawn out of engagement with the wheels 41, 42, and either one of the rotating, contact-making wheels 43 or 44, as desired, begins a continuous rotation by virtue of the clock mechanism, as indicated, by the springs 45 and 46. It will be thus seen that if the local signal 32 operates, it releases the signaling mechanism 43, whereas, if the local signal 37 operates, it releases the signaling mechanism 44.

The continuous operation of the contact wheel 43 (assuming that one to have been operated) alternately makes and breaks a circuit through the spring 47, by virtue of the slight insulation strips, as shown on the wheel 43. Similarly, if wheel 44 operates, it closes circuit through the spring 48. The wheel 43 is connected to ground, and the springs 47 and 48 are connected to the center of the two windings 49 and 50, which have their remaining terminals connected to the line wires 1 and 2, thus establishing a circuit condition whereby the springs 47 and 48 use the line wires 1 and 2 in parallel, with the ground as return circuit. This circuit from the springs 47 and 48 is continuous over the now parallel line wires 1 and 2, and ends in similar impedance coils 51 and 52, arranged at the central station, where a terminal is taken out of the center of these two windings 51 and 52, which passes through the sounder 53, and from there through the battery 54 to the ground. The sounder 53 also uses the line wires 1 and 2 in parallel, with the ground as return circuit, the same as the spring 47 and the spring 48. It will be seen, therefore, that when the signal 32 operates, it starts in operation the contact-making wheel 43, which keeps continuously operating and sending back impulses over the relay 53, to indicate that said signal 32 has been actuated; or if signal 37 operates, it starts the mechanism 44, which sends back impulses designed to indicate that signal 37 is operating. I use the word signal as applied to the devices 32 and 37 in the broad sense of signal giving or operating means.

In order to stop the devices 43 and 44 from rotation, and at the same time restore the mechanism 19 to normal, the key 13 is depressed, which sends an impulse of opposite polarity to the relay 9, thereby closing contact with its other contact point 55, whereby magnet 56 is energized, the energization of whose armature serves to release the bars 26 and 57, thereby allowing the mechanism 19 to return to normal. Magneto drops 60, and 61 are provided to maintain the continuous operation of the signals 32 and 37 after they have been started until manually stopped by the attendant upon restoration of the armatures of said drops as is well understood. Included serially with the relay 56, are magnets 58 and 59, which respectively are associated with the armatures 39 and 40. Thus, when the step-up mechanism 19 is released and restored to normal, whichever armature, 39 or 40, has been drawn out, is drawn back by the conjoint energization of the relays 58 and 59, and the signal wheels 43 and 44 are prevented from further rotation.

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

Having thus set forth its most salient features, what I claim as new and desire to secure by Letters Patent is:

1. A signaling system consisting of a central station and sub-stations, a selective signal-receiving device at each sub-station, switching devices at the central station for selecting the same, a signal-sending device

at each sub-station, a signal-receiving device at the central station responsive to indications from the sub-station signal-sending devices, automatic means associated with the sub-station signal-receiving device to start, when actuated, the sub-station signal-sending device and devices controlled at the central station for stopping the operation of the substation signal-sending device without disturbing established line connections between said stations.

2. A signaling system consisting of a central station and sub-stations, a selective signal-receiving device at each sub-station, switching devices at the central station for selecting the same, a signal sending device at each sub-station, a signal-receiving device at the central station responsive to indications from the sub-station signal sending devices, automatic means associated with the sub-station signal-receiving device to start, when actuated, the sub-station signal-sending device, and devices controlled at the central station for stopping, irrespective of the operation of the sub-station signal, the operation of said sub-station signal-sending device.

3. A signaling system consisting of a central station and sub-stations, a selective signal-controlling device at each sub-station, a plurality of signal-operating devices under the control thereof, switching devices at the central station for selecting said signal-controlling devices and also selecting the signal-operating devices associated therewith, a signal-sending device at each sub-station for each signal-operating device, a signal-receiving device at the central station for receiving the indications of said sub-station signal-sending devices, and automatic means whereby the operation of a signal-operating device starts in operation its associated signal-sending device.

4. A signaling system consisting of a central station and sub-stations, a selective signal-controlling device at each sub-station, a plurality of signal-operating devices under the control thereof, switching devices at the central station for selecting said signal-controlling devices and also selecting the signal-operating devices associated therewith, a signal-sending device at each sub-station for each signal-operating device, a signal-receiving device at the central station for receiving the indications of said sub-station signal-sending devices, automatic means whereby the operation of a signal-operating device starts in operation its associated signal-sending device, and devices controlled at the central station for stopping, irrespective of the operation of the sub-station signal-operating devices, the operation of said sub-station signal-sending devices.

5. A signaling system consisting of a central station and sub-stations, a selective signal-receiving device at each sub-station, switching devices at the central station for selecting same, a signal-sending device at each sub-station, local means for continuously operating said device when started, a signal receiving device at the central station responsive to indications from the sub-station signal sending devices, automatic means associated with the sub-station signal-receiving device to start, when actuated, the sub-station signal-sending device and devices controlled at the central station for stopping the operation of the substation signal-sending device.

6. A signaling system consisting of a central station and sub-stations, a selective signal-receiving device at each sub-station, switching devices at the central station for selecting same, a signal-sending device at each substation, local means for continuously operating said device when started, a signal-receiving device at the central station responsive to indications from the sub-station signal-sending devices, automatic means associated with the sub-station signal-receiving device to start, when actuated, the sub-station signal-sending device, and switching devices controlled at the central station for stopping, irrespective of the operation of the sub-station signal, the operation of said sub-station signal-sending device.

7. A signaling system consisting of a central station and sub-stations, a selective signal-controlling device at each sub-station, a plurality of signal-operating devices under the control thereof, switching devices at the central station for selecting said signal-controlling devices and also selecting the signal-operating devices associated therewith, a signal-sending device at each sub-station for each signal-operating device, local means for continuously operating said device when started, a signal-receiving device at the central station for receiving the indications of said sub-station signal-sending devices, and automatic means whereby the operation of a signal-operating device starts in operation its associated signal-sending device.

8. A signaling system consisting of a central station and sub-stations, a selective signal-controlling device at each sub-station, a plurality of signal-operating devices under the control thereof, switching devices at the central station for selecting said signal-controlling devices and also selecting the signal-operating devices associated therewith a signal-sending device at each sub-station for each signal-operating device, local means for continuously operating said device when started, a signal-receiving device at the central station for receiving the indications of said sub-station signal-sending devices, automatic means whereby the oper-

ation of a signal-operating device starts in operation its associated signal-sending device, and devices controlled at the central station for stopping, irrespective of the operation of the sub-station signal-operating devices, the operation of said sub-station signal-sending devices.

9. A signaling system comprising a central station and sub-stations, a signal at each sub-station, means controlled at the central station for selecting the sub-station signals, a sub-station signal-sending device, automatic means for starting same when the local signal thereat operates, and devices controlled at the central station for stopping the operation of said sub-station signal-sending device independently of the operation of the sub-station signal.

10. A signaling system comprising a central station and sub-stations, a signal at each sub-station, means controlled at the central station for selecting the sub-station signals, a sub-station signal-sending device, automatic means for starting same when the local signal thereat operates, a signal-receiving device controlled at the central station responsive thereto, and devices at the central station for stopping the operation of said sub-station signal-sending device independently of the operation of said sub-station signal.

11. A signaling system comprising a central station and sub-stations, a signal at each sub-station, switching means at the central station for selecting the sub-station signals, a sub-station signal-sending device, automatic means for starting same when the local signal thereat operates, a signal-receiving device at the central station responsive thereto, means associated with each sub-station signal-sending device, whereby its signals to the central station are distinctive, and devices controlled at the central station for stopping the operation of said sub-station signal-sending device independently of the operation of the sub-station signal.

12. A signaling system comprising a central station and sub-stations, a signal at each sub-station, switching means at the central station for selecting the sub-station signals, a sub-station signal-sending device, local means for continuously operating said device when started, automatic means for starting same when the local signal thereat operates, and devices controlled at the central station for stopping the operation of said sub-station signal-sending device independently of the operation of the sub-station signal.

13. A signaling system comprising a central station and substations, a selective signaling device including a signaling means at each substation, means at the central station to select the substation signaling devices, return signal means associated with each substation signaling device to indicate to the central station the operation of its associated signaling means, and means controlled at the central station to stop the operation of the return signal means independently of the operation of the substation signaling means.

14. A signaling system comprising a central station and substations, a selective signaling device including a signaling means at each substation, means at the central station to select the substation signaling devices, return signal means associated with each substation signaling device to indicate to the central station the operation of its associated signaling means, said return signal means being adapted to operate continuously after starting until stopped by means controlled at the central station, and means controlled at the central station to stop the operation of the return signal means independently of the operation of the substation signaling means.

In witness whereof, I hereunto subscribe my name this 19th day of January, A. D., 1909.

HARRY O. RUGH.

Witnesses:
MAX W. ZABEL,
O. M. NERMIEL.