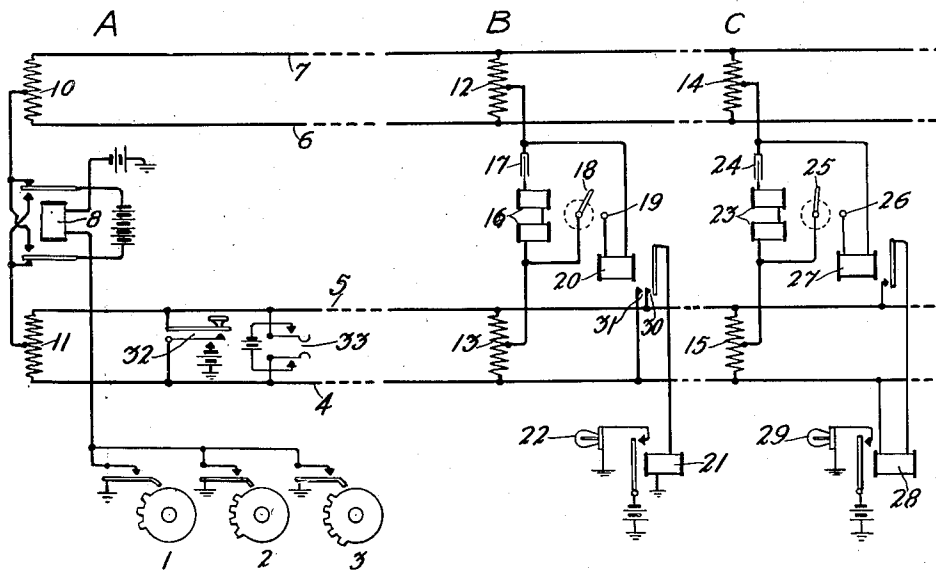


L. E. COON.
SWITCHING SYSTEM.
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1,381,451.

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UNITED STATES PATENT OFFICE.

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SWITCHING SYSTEM.

1,381,451.

Specification of Letters Patent. Patented June 14, 1921.

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To all whom it may concern:

Be it known that I, LESLIE E. COON, a citizen of the United States, residing at Chatham, in the county of Morris, State of New Jersey, have invented certain new and useful Improvements in Switching Systems, of which the following is a full, clear, concise, and exact description.

This invention relates to switching systems and more particularly to systems of this nature in which distantly controlled selectively operable signaling devices are employed.

In systems of this nature, it is sometimes desirable to employ a plurality of selectively operable electroresponsive signaling devices which vary widely in their operating requirements.

It is the object of this invention to provide a system of this nature in which a plurality of electroresponsive devices of widely different operating requirements may be selectively operated from a distant point.

To attain this object in accordance with a feature of the invention, electrical switching means at one station controlled from a distant station over a phantom circuit selectively arranges the physical conductors comprising such phantom circuit to prepare a suitable physical circuit for operating the selected signaling device from the distant station. More specifically, one signaling device upon being selected is included in bridge of one of the physical lines or side circuits of the phantom circuit so that it may be operated by current applied to such physical line or side circuit at the selecting station while another device upon selection is included in a grounded circuit, which includes the physical conductors of one of the physical lines or side circuits arranged in parallel.

This and other features of the invention not specifically mentioned above will clearly appear from the following specification and the annexed drawing which shows one embodiment of the invention as applied to a selective signaling system.

Referring to the drawing, at a selecting station A, multiply connected sending devices 1, 2 and 3 control reversing relay 8 to impress current impulses of alternating polarity upon a phantom circuit comprising physical lines or side circuits 4—5 and 6—7 and associated simplexing coils 10 to 13, inclusive, of any suitable type, leading to a

plurality of selectable stations such as B and C. Selectively operable circuit controlling devices 16 and 23 are included in bridge of the phantom circuit at the selectable stations B and C, respectively. The selectors employed may be of any suitable type capable of step-by-step advancement in response to closely succeeding reversed current impulses received through the associated condensers 17 and 24, respectively, from the phantom circuit, and of adjustment to mechanically retain its contact closed in response to predetermined series and arrangement of closely succeeding impulses of this nature. A suitable selector of this nature is disclosed in Patent No. 1,343,256, issued June 15, 1920 to Mr. Joseph C. Field. A relay 20 controlling another relay 21 is bridged across the phantom circuit when an arm 18 of selector 16 at station B engages its contact 19, while a relay 27 controlling another relay 28 is bridged across the phantom circuit when an arm 25 of selector 23 at station C engages its contact 26. Keys 32 and 33 at station A control the supply of current to the conductors 4—5 to control the operation of signaling lamps 22 and 29 at stations B and C respectively, by means of relays 20 and 27.

It is thought that the invention may be more fully comprehended from the following description of the operation of the system shown on the drawing.

Assuming that it is desired to light signal lamp 22 at station B, sending device 1 is actuated. As the spring member engages the first tooth of the sending device 1 relay 8 operates over a circuit extending from battery, through the winding of relay 8, the contact of the sending device 1 to ground, thereby transmitting a current impulse of one polarity over the phantom circuit. Selectors 16 and 23 receiving this impulse through condensers 17 and 24, respectively, from the associated simplexing coils 12 to 15 inclusive, advance one step when the spring member of the sending device disengages the tooth relay 8 releases to transmit a closely succeeding current impulse of reversed polarity over the phantom circuit. Additional impulses are transmitted over the phantom circuit as the spring member of the sending device engages and disengages the succeeding teeth, one impulse being transmitted by each engagement and

another closely succeeding impulse being transmitted by the subsequent disengagement. When sending device 1 has been completely actuated, the proper series of closely succeeding impulses has been transmitted to cause selector 16 to attain its mechanically retained position with its arm 18 engaging contact 19, thereby bridging relay 20 across the phantom circuit. Selector 23 not being adjusted for such series of impulses is restored to normal. Relay 20 operates due to the current flowing through its winding from the simplexing coils 12 and 13 and closes its contacts 30 and 31. The key 32 may then be operated to cause the operation of relay 21 over a circuit extending from battery, through the contacts of key 32, conductors 4 and 5 in parallel, contacts 30 and 31 of relay 20, and the winding of relay 21 to ground. Lamp 22 is thereupon lighted over an obvious circuit and remains lighted while the key 32 is actuated. Since selector 16 is mechanically retained in its advanced position the signal lamp 22 may be relighted by the key 32 if desired. A clearing-out sending device 3 similar to sending device 1 is then actuated to transmit a series of impulses over the phantom circuit adapted to release any mechanically retained selectors, thereby releasing selector 16.

In case it is desired to light lamp 29 at station C, sending device 2 similar to sending device 1 is then actuated, in the manner described, to transmit a different series of reversed current impulses over the phantom circuit. As previously described, selectors 16 and 23 both advance one step in response to each impulse of the series but selector 23, being adjusted for the particular series being transmitted, is mechanically retained in its advanced position with its contact arm 25 engaging its contact 26, while selector 16, not being adjusted for such series, restores to normal upon the cessation of such series. Relay 27, thereby bridged across the phantom circuit, operates upon current received from simplexing coils 14 and 15. Relay 28 is thereupon bridged across conductors 4 and 5. The actuation of key 33 completes a circuit from one side of battery through one contact of key 33, conductor 5, the contact of relay 27, the winding of relay 28, conductor 4, and the other contact of key 33 to the other side of battery. Lamp 29 thereupon lights over an obvious circuit and remains lighted while key 33 is actuated. As before, due to the mechanically retained arrangement of the selected selector, the relay 28 may be reoperated to relight lamp 29 by the reactuation of key 33. The subsequent actuation of the clearing-out sending device 3 releases the operated selector as before and restores the system to normal.

It is evident that in a system embodying this invention it is possible to selectively ar-

range the physical conductors of a phantom circuit to vary the resistance of an operating circuit to meet the requirements of electro-responsive devices differing widely in their operating requirements.

It is also understood that the devices to be operated and their associated selectors may be located at the same station instead of at different stations, as shown in the drawing.

What is claimed is:

1. In a switching system, a phantom circuit, means for transmitting current impulses over the phantom circuit, a plurality of selectively operable switching devices associated with the phantom circuit and responsive to such impulses, and means individual to each of said devices and controlled thereby for arranging physical conductors of the phantom circuit in differing predetermined circuit relations.

2. In a switching system, a phantom circuit, means for transmitting current impulses over the phantom circuit, a plurality of switching devices associated with the phantom circuit responsive to such impulses, a relay individual to each of said devices and controlled thereby for arranging predetermined physical conductors of the phantom circuit in differing circuit relation, a signaling device associated with each switching device and adapted for inclusion in circuit with the selectively arranged physical conductors, a source of current, and means to associate the source of current with the selectively arranged conductors for operating the signaling device associated therewith.

3. In a switching system, a phantom circuit, a selecting station and a plurality of selectively operable switching devices associated therewith, means at the selecting station to transmit current impulses over the phantom circuit to advance any of the switching devices into a predetermined position, means controlled by each switching device to prepare a circuit including the physical conductors comprising a side circuit of the phantom circuit when the associated device reaches its predetermined position, the relation of such conductors in the prepared circuit differing for each device, signaling means controlled by each such prepared circuit, a second source of current, and means at the selecting station to associate such second source of current with the prepared circuit to operate the signaling means controlled thereby.

4. In a signaling system, a plurality of line conductors affording a plurality of circuits of different electrical characteristics, a plurality of selectively operable devices controlled over one of said circuits, signaling means individual to said devices, and means responsive to the operation of said devices

for arranging an operating circuit for said signaling means of a character different for each one thereof.

5 5. In a signaling system, a plurality of line conductors affording a plurality of circuits of different electrical characteristics, a plurality of electrically controlled devices operable over one of said circuits, signaling means individual to each of said devices,

and a relay individual thereto and responsive to the operation of said devices for arranging an operating circuit for said signaling means of a character different for each one thereof.

In witness whereof, I hereunto subscribe my name this 18th day of June A. D., 1919.

LESLIE E. COON.