

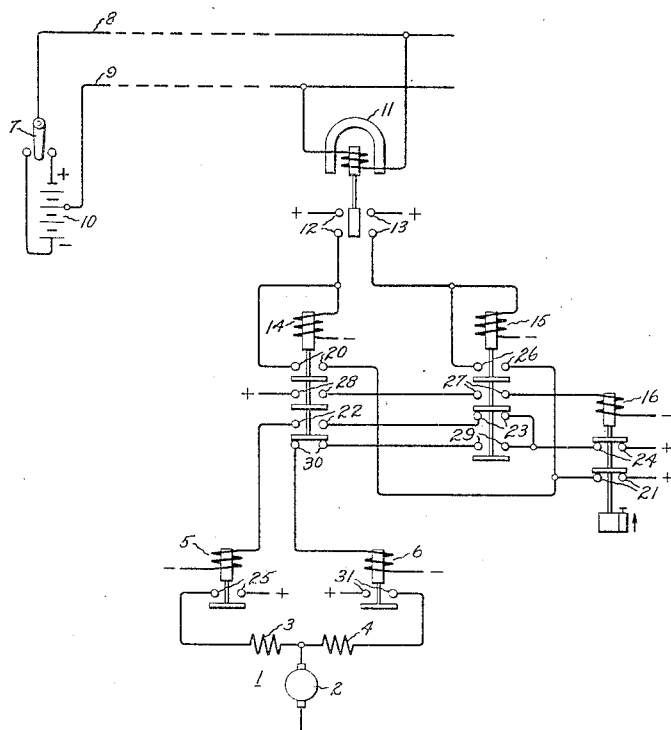
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C. E. STEWART

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REMOTE CONTROL SYSTEM

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Inventor:
Clyde E. Stewart,
by *Harry C. Dunham*
His Attorney.

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REMOTE CONTROL SYSTEM

Clyde E. Stewart, Upper Darby, Pa., assignor to
General Electric Company, a corporation of
New York

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My invention relates to remote control systems and particularly to a system for selectively starting and stopping the movement of a device in different directions, and its object is to provide an improved arrangement for accomplishing this result.

My invention will be better understood from the following description when taken in connection with the accompanying drawing, the single figure of which diagrammatically illustrates a reversible motor remote control system embodying my invention, and its scope will be pointed out in the appended claims.

Referring to the accompanying drawing, 1 represents a remotely controlled reversible motor having an armature 2, and two field windings 3 and 4. 5 is a relay which, when energized, completes a circuit through the armature 2 and field winding 3 in series so that the motor 1 rotates in one direction, and 6 is a relay which, when energized, completes a circuit through the armature 2 and field winding 4 in series so that the motor 2 rotates in the opposite direction. For remotely controlling the starting and stopping of the motor 1, I provide a manually controlled switch 7 which in one position connects a conductor 8 to the positive terminal of a suitable source of direct current such as a battery 10 and which in another position connects the conductor 8 to the negative terminal of the battery 10. A conductor 9 is permanently connected to the middle or neutral terminal of the battery. Therefore, by moving the switch 7, the operator can transmit impulses of opposite polarity over the two conductors 8 and 9. Connected across the conductors 8 and 9 is a polarized relay 11, which is arranged to close its contacts 12 when the switch 7 is closed so as to transmit a positive impulse over the conductors 8 and 9 and is arranged to close its contacts 13 when the switch 7 is closed so as to transmit a negative impulse over the conductors 8 and 9 and to move to its midposition as shown in the drawing when no impulse is being transmitted over the conductors 8 and 9. The contacts 12, when closed, complete an energizing circuit for the control relay 14, and the contacts 13, when closed, complete an energizing circuit for a control relay 15. When the control relay 14 is energized and the control relay 15 is deenergized an energizing circuit for the relay 5 is completed to effect the operation of the motor 1 in one direction, and when both of the relays 14 and 15 are simultaneously energized, this energizing circuit of the relay 5 is opened to effect the stopping of the motor 1. Similarly,

when the relay 15 is energized, and the relay 14 is deenergized the relay 15 completes an energizing circuit for the relay 6 to effect the operation of the motor 1 in the opposite direction. When, however, both of the relays 14 and 15 are simultaneously energized, this energizing circuit of the relay 6 is opened to effect the stopping of the motor 1. The relay 16 is a time relay which is energized when both of the relays 14 and 15 are energized to control the energization of these relays, and the relays 5 and 6 in the desired manner.

The operation of the arrangement shown in the drawing is as follows: When it is desired to start the remote motor 1 revolving in a predetermined direction, the operator at the controlling station moves the switch 7 so as to connect the conductor 8 to the positive terminal of the battery 10, thereby causing a positive impulse to be transmitted over the conductors 8 and 9. This positive impulse causes the polarized relay 11 to close its contacts 12 and thereby complete an energizing circuit for the relay 14. By closing its contacts 20, the relay 14 completes a locking circuit for itself through the contacts 21 of the relay 16. By closing its contacts 22, the relay 14 completes an energizing circuit for the relay 5 through contacts 23 of the relay 15 and the contacts 24 of the relay 16. The relay 5, by closing its contacts 25, completes a circuit for the field winding 3 and armature 2 of the motor 1 so that the motor rotates in one direction. Since the relay 14 completes a locking circuit for itself, it will be observed that the motor circuit remains completed after the positive impulse has been terminated by the operator moving the switch 7 so as to disconnect the conductor 8 from the positive terminal of the battery 10.

When it is desired to stop the motor 1 after it has been started by the transmission of a positive impulse over the conductors 8 and 9, the operator at the controlling station moves the switch 7 so as to connect the conductor 8 to the negative terminal of the battery 10, thereby causing a negative impulse to be transmitted over the conductors 8 and 9. This negative impulse causes the polarized relay 11 to close its contacts 13 and thereby complete an energizing circuit for the relay 15. By closing its contacts 26, the relay 15 completes another holding circuit for the relay 14 through contacts 13 of the relay 11 and contacts 20 of the relay 14. By opening its contacts 23, the relay 15 opens the circuit of the relay 5, which in turn opens the circuit through the field winding 3 and the armature 2 of the motor 1, so as to effect the

stopping of the motor 1. By closing its contacts 27, relay 15 completes an energizing circuit for the relay 16 through contacts 28 of the relay 14. A short time after relay 16 is energized, it opens its contacts 21 in the original holding circuit of relay 14 and its contacts 24 in the circuit of relay 5. Relays 14, 15, and 16, however, remain energized as long as the negative impulse continues to flow through the conductors 8 and 9 but the movement of the motor 1 is stopped as soon as the relay 15 picks up. At the termination of the negative impulse, polarized relay 11 opens its contacts 13 so that relays 14 and 15 are de-energized and they in turn effect the deenergization of relay 16.

When it is desired to start the motor 1 rotating in the opposite direction, the operator in the controlling station moves the switch 7 so as to transmit a negative impulse over the conductors 8 and 9. This negative impulse causes the relay 11 to close its contacts 13 and complete an energizing circuit for relay 15, which in turn, by closing its contacts 26, completes a locking circuit for itself through contacts 21 of relay 16. By closing its contacts 29, relay 15 completes an energizing circuit for relay 6 through contacts 30 of relay 14 and contacts 24 of relay 16. Relay 6, by closing its contacts 31, completes a circuit for the field winding 4 and armature 2 of motor 1 so that the motor rotates in the opposite direction. Since the relay 15 completes a locking circuit for itself, it will be observed that the motor circuit remains completed after the negative impulse is terminated by the operator moving the switch 7 so as to disconnect the conductor 8 from the negative terminal of battery 10. When it is desired to stop the motor after it has been started by the transmission of a negative impulse over the conductors 8 and 9, the operator at the controlling station moves the switch 7 so as to transmit a positive impulse over the conductors 8 and 9. This positive impulse causes the polarized relay 11 to close its contacts 12 and complete an energizing circuit for relay 14. By closing its contacts 28, relay 14 completes a holding circuit for relay 15 through contacts 26 of relay 15 and contacts 12 of relay 11. By opening its contacts 30, the relay 14 opens the circuit of relay 6, which in turn opens the circuit through the field winding 4 and armature 2 of motor 1 so as to effect the stopping of the motor. By closing its contacts 28, relay 14 completes an energizing circuit for relay 16 through contacts 27 of relay 15. A short time after relay 16 is energized, it opens its contacts 21 in the original holding circuit of relay 15 and its contacts 24 in the circuit of relay 6. At the termination of the positive impulse, the polarized relay 11 opens its contacts 12 so that relays 14 and 15 are de-energized and they in turn effect the de-energization of relay 16.

From the above description, it will be seen that when the motor 1 is at rest its rotation in one direction may be initiated by transmitting an impulse of one polarity over the conductors 8 and 9, and its rotation in the opposite direction may be initiated by transmitting an impulse of the opposite polarity over the conductors 8 and 9 and that when the motor is rotating it may be stopped by transmitting over the conductors 8 and 9 an impulse of the opposite polarity from the polarity of the impulse which started the motor rotating.

While I have, in accordance with the patent statutes, shown and described my invention as applied to a particular system and as embodying various devices diagrammatically indicated,

changes and modifications will be obvious to those skilled in the art, and I therefore aim in the appended claims to cover all such changes and modifications as fall within the true spirit and scope of my invention.

What I claim is new and desire to secure by Letters Patent is:

1. In combination, a conductor, means for transmitting through said conductor impulses of different character, a device movable in different directions, means responsive to a transmitted impulse when said device is not moving for initiating the movement of said device in a direction individual to the character of the transmitted impulse, and means responsive to an impulse of a character different from that which initiated the movement of said device for stopping the movement thereof.

2. In combination, a conductor, means for transmitting through said conductor impulses of opposite polarity, a device movable in two directions, means responsive to a transmitted impulse when said device is not moving for initiating the movement of said device in one of said directions if the polarity of said transmitted impulse is positive and in the other direction if the polarity of said transmitted impulse is negative, and means responsive to a transmitted impulse of the opposite polarity from that which initiated the movement of said device for stopping the movement thereof.

3. In combination, a conductor, means for transmitting through said conductor impulses of opposite polarity, a device movable in different directions, two relays, polarity responsive means connected to said conductor for effecting the energization of one of said relays in response to an impulse of a predetermined polarity and the energization of the other of said relays in response to an impulse of the opposite polarity, and means controlled by said relays for effecting the movement of said device in one direction when a predetermined one of said relays is energized and the other relay is de-energized and the movement of said device in another direction when said predetermined one of said relays is de-energized and said other relay is energized.

4. In combination, a conductor, means for transmitting through said conductor impulses of opposite polarity, a device movable in different directions, two relays, polarity responsive means connected to said conductor for effecting the energization of one of said relays in response to an impulse of a predetermined polarity and the energization of the other of said relays in response to an impulse of the opposite polarity, means responsive to the energization of a relay when the other relay is deenergized for completing a locking circuit for the energized relay, means responsive to the energization of a relay when the other relay is energized for completing another holding circuit for the initially energized relay and means controlled by said relays for effecting the movement of said devices in one direction when a predetermined one of said relays is energized and the other is de-energized and the movement of said devices in another direction when said predetermined one of said relays is de-energized and said other relay is energized.

5. In combination, a conductor, two relays, a device movable in different directions, means for selectively controlling over said conductor the energization of said relays, and means controlled by said relays for effecting the movement of said device in one direction when one of said relays is

energized and the other relay is de-energized and for effecting the stopping of said motor when both of said relays are simultaneously energized and de-energized.

6. In combination, a conductor, two relays, a device movable in different directions, means for selectively controlling over said conductor the energization of said relays, and means controlled by said relays for effecting the movement of said

device in one direction when one of said relays is energized and the other relay is de-energized and for effecting the stopping of said device when both of said relays are simultaneously energized and de-energized and for effecting the movement of said device in another direction when said one of said relays is de-energized and the other relay is energized.

CLYDE E. STEWART.