

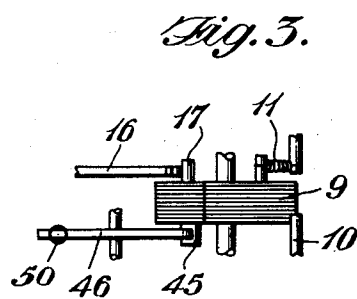
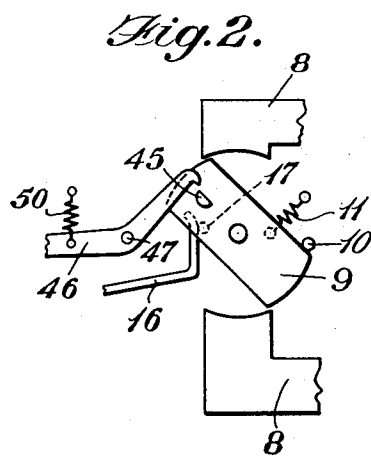
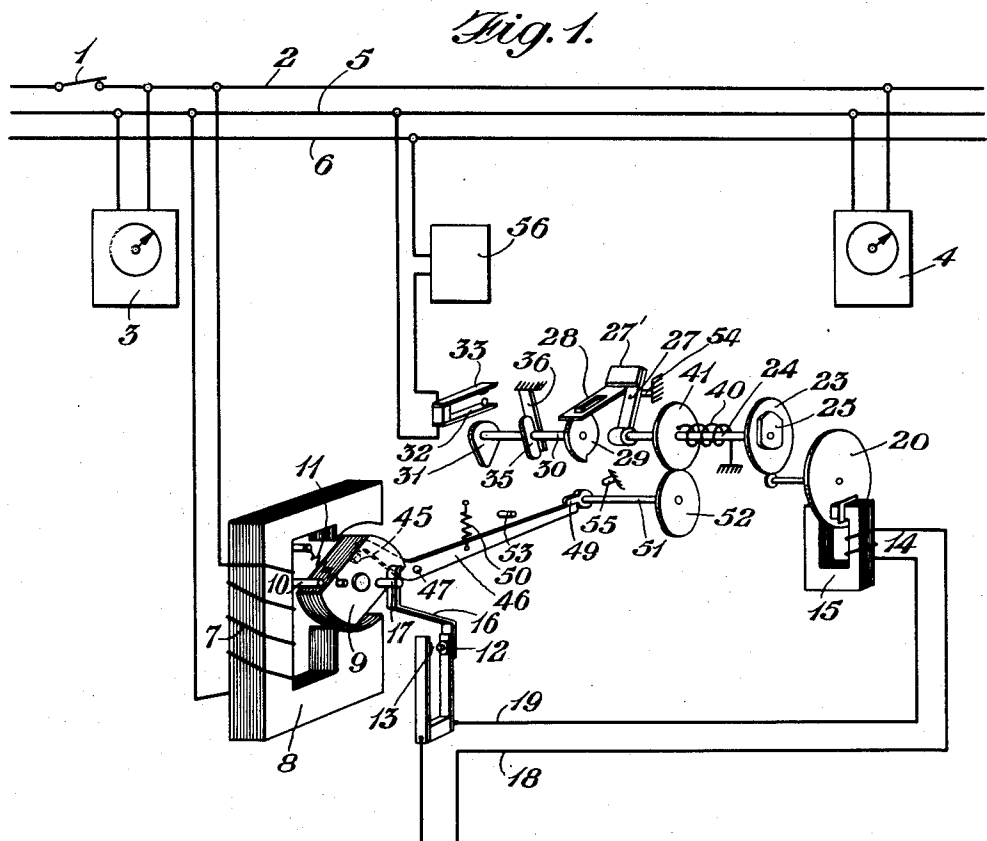
Dec. 7, 1937.

R. PUDELKO

2,101,269

REMOTE CONTROL SYSTEM

Filed Sept. 11, 1934



Inventor
Riccard Pudelko,

By Morgan, Finnegan & Durham,
Attorneys.

UNITED STATES PATENT OFFICE

2,101,269

REMOTE CONTROL SYSTEM

Riccard Pudelko, Zug, Switzerland, assignor to
Landis & Gyr, A-G., a corporation of Switzerland

Application September 11, 1934, Serial No. 743,623
In Switzerland September 15, 1933

5 Claims. (Cl. 175—375)

The present invention relates to remote control systems and more particularly to a novel and improved remote control system which is operated by means of impulses transmitted over a power distribution network.

Objects and advantages of the invention will be set forth in part hereinafter and in part will be obvious herefrom, or may be learned by practice with the invention, the same being realized and attained by means of the instrumentalities and combinations pointed out in the appended claims.

The invention consists in the novel parts, constructions, arrangements, combinations and improvements herein shown and described.

The accompanying drawing, referred to herein and constituting a part hereof, illustrates one embodiment of the invention, and together with the description, serve to explain the principles of the invention.

In the drawing, Figure 1 is a diagrammatic view partly in perspective showing a typical embodiment of the invention, together with the circuit employed therewith;

Figure 2 is an enlarged view, from the rear or opposite side, of a portion of the relay and cooperating parts; and

Figure 3 is a top plan view of the relay armature and cooperating parts.

The present invention has for its object the provision of a novel and improved remote control system operating on impulses transmitted over a power distribution network and which is more reliable in its operation than the systems heretofore generally used. A further object of the invention is the provision of a remote control system which is operable only upon impulses of relative long duration, and is not affected by impulses of relatively short duration which might be caused by extraneous disturbances or might be accidentally transmitted by the transmitter. Still another object of the invention is the provision of an electrically operated remote control system in which the receiver is provided with a motor operating during the transmission of the impulse and returning to its initial position after cessation of the impulse, the motor effecting the desired function only after it has been in operation for a predetermined period of relatively long duration.

In accordance with the present embodiment of the invention, the remote control system is operated by impulses transmitted over conductors, such as the conductors of a distribution system. These impulses operate a relay to close a switch

which always tends to return to its initial position. Operation of the motor for a sufficient length of time operates a switch which controls any desired apparatus. Means are also provided for preventing effective operation of the motor upon its actuation by a plurality of too short impulses, or before it has been returned to its initial position following a proper operation and other means are provided for preventing injury to the mechanism by too long operation of the motor.

It will be understood that the foregoing general description and the following detailed description as well are exemplary and explanatory of the invention but are not restrictive thereof.

Referring now in detail to the illustrative embodiment of the invention as shown by the accompanying drawing, the embodiment is shown as adapted for operation by impulses transmitted over a two phase system. The impulse transmitter 1 is in series with the pilot wire 2, and the impulses transmitted by it actuate the registering relays 3 and 4 which are connected to one of the other wires 2 and 5 of the transmission system.

The magnet coil 7 of a relay 8 is supplied with power from wires 2 and 5 upon closure of the transmitting key 1, moving the oscillatable armature 9 from its normal position as shown against stop 10, where it is normally held by spring 11, so as to cause closure of the contacts 12 and 13 in series with the windings 14 of a Ferraris induction motor 15. The movable contact 12 is provided with an extension 16 cooperating with a pin 17 on armature 9 by which the contacts 12 and 13 are opened and closed. Alternating current of suitable voltage and frequency may be supplied to the windings 14 from any suitable source through conductors 18 and 19.

The Ferraris motor 15 is provided with a rotatable armature 20 which is secured to pinion 21 on shaft 22 and meshes with a larger gear 23 on shaft 24. Gear 23 is coupled to its shaft 24 by means of disc 25, forming with the gear 23 a friction coupling to prevent damage which might result from too long continued operation of the motor 15.

Means are provided for operating the main switch one step at a time from a motor wound spring and for this purpose an arm 27 is mounted on shaft 24, and at one end is provided with a resilient pawl 28 adapted to engage with the teeth of the ratchet 29, which as shown has only two teeth. Ratchet 29 is mounted on the rotatable switch operating shaft 30, which shaft is co-axial with shaft 24. Shaft 30 at its other end carries a switch operating cam 31 adapted to close or permit opening of the switch formed by

spring mounted contacts 32 and 33. A holding block 35, fixed to shaft 30 and cooperating with leaf spring 36 is provided for reducing the amount by which the shaft need be turned and for definitely positioning the cam 31. As embodied, ratchet 29 need be moved only slightly more than 90° by pawl 28 to effect operation of the switching cam 31, the remainder of the cam rotation being effected by spring 36.

Means are also provided for normally resetting the motor and pawl to their initial position and for constantly urging them towards this position, these means also furnishing the power-operating means for the switching cam 31. As embodied, a coil spring 40 has one of its ends fastened to a rigid support while the other end is attached to a gear 41 fast on shaft 24, the spring being coiled about shaft 24 so as to be wound by operation of the motor 15. After the supply of power to motor 15 has been discontinued, spring 40 is free to cause retrograde movement of the gear 23 and arm 27, thereby rotating arm 27 to operate cam 31 and resetting the pawl 28 to its initial position in which it is ready for a further operation.

For preventing effective operation of the motor 15 by a series of too short impulses or until after the motor and pawl 28 have been returned to their initial position, means are provided for preventing locking of the motor control switch 12, 13 in circuit closing position. As embodied, a stop pin 45 is mounted on the armature 9 of relay 8 and is adapted to cooperate with a stop lever 46 pivoted at 47 and normally held out of engagement with the stop pin 45 by means of cam 49 against the tension of spring 50. Cam 49 is mounted on shaft 51 on which is also secured the gear 52 meshing with gear 41, so that continued operation of the motor for any but an extremely short period of time moves cam 49 out of its normal position, permitting the stop lever 46 to be lifted by spring 50 until it is stopped by pin 53. In this position the end of lever 46 will engage stop pin 45 preventing closure of the contacts 12, 13, and thereby further operation of the motor 15 for the time being.

The operation of the apparatus is as follows:

When a short impulse occurs on the transmission line, the magnet 8 is energized and the armature 9 assumes a vertical position, thereby closing the circuit at 12, 13 through the motor 15, starting the shaft 24 counterclockwise and the shaft 51 clockwise. This would result in a very slight upward movement of the cam 49, not enough to have any appreciable effect on the locking lever 46. Immediately upon cessation of the impulse, magnet 8 is deenergized and the spring 11 pulls the armature back to its original position against the stop 10, breaking the circuit at 12, 13, and stopping the motor 20, spring 40 returning the parts to their original position. This movement is so slight as to have no appreciable effect on member 27.

When a succession of short impulses occurs, armature 9 would be moved at each impulse to the vertical position and would tend to return to the inoperative position of Fig. 2 as soon as the impulse ceases. However, every impulse would move cam 49 clockwise slightly and every successive impulse would move it a little more, so that the effect of the several successive impulses would be cumulative to raise cam 49, so that spring 50 would raise the long arm of locking lever 46, causing the nose 46' of lever 46 to engage with the lug 45 and hold it, so that further short,

successive impulses would have no effect on the motor because the locking lever would thereby hold the armature 9 in the circuit-breaking position.

When, however, a long impulse comes over the line, an impulse of the type produced by actuation of the impulse transmitter 1, that is intended to reverse the position of member 31 and open or close the switch 32, 33, the armature 9 instantly assumes a vertical position as before, closing the circuit 12, 13 through the motor; the motor turns the shaft 24 counterclockwise and the shaft 51 clockwise, raising the cam 49, whereupon the nose 46' of lever 46 is positioned in the path of lug 45. This occurs after armature 9 has reached the circuit closing position. The motor continues its operation, the arm 27 rotating in the neighborhood of 180° until pawl 28 snaps over and engages the lower tooth on member 29. After the lower tooth on member 29 has been thus engaged, any further movement of member 27 is prevented by member 27 engaging against a stop 55. If, at this time, the current is still on, and therefore the motor 21 still operating, this movement is taken care of by slippage of the clutch 23, 25. If the resistance offered by the clutch is high, it may stop the motor. As soon as the long impulse ceases, magnet 8 is deenergized and the spring 11 pulls the armature 9 back to the position of Fig. 2, abutment 45 pushing or camming its way past the end 46' of lever 46, against the slight tension of spring 50, thereby breaking the circuit. The circuit at 12, 13 now being broken, spring 40 turns the shaft 24 clockwise and the shaft 51 counterclockwise, causing cam 49 to depress the outer end of lever 46 and restore it to its original position. As the arm 27 is moved clockwise, pawl 28, in engagement with the lower tooth on 29, moves 29 clockwise, until it is past dead center, whereupon spring 36 completes the 180° reversal of cam 31. Arm 27 continues its movement until stopped by abutment 54.

Contacts 32 and 33 may control any desired apparatus 56 which may be supplied with power from the mains 5 and 6. Inasmuch as the apparatus 56 does not form a part of the present invention, and may be any form of signal, switch, motor or other device, the details of its construction are not shown.

The term "too short impulse" as used in the specification is intended to apply to impulses of the usual duration and such as might otherwise be described as momentary, while "relatively long duration" is intended to describe an impulse the duration of which might be measured in seconds.

The invention in its broader aspects is not limited to the specific mechanisms shown and described but departures may be made therefrom within the scope of the accompanying claims without departing from the principles of the invention and without sacrificing its chief advantages.

What I claim is:

1. A remote control impulse receiving device including in combination a relay, an armature therefore, a motor supplied with power under control of the relay, a spring for returning the motor to its normal, initial position, a main switch, a cam for controlling the main switch, a pawl and ratchet drive operated by the motor for moving the cam whereby the cam is moved only after the motor has operated for a predetermined period, and means engageable with said

armature and controlled by operation of the motor, for preventing operation of the motor except from a position of rest.

2. In a remote control device, a device to be controlled; switch means therefor; a motor; a spring device; turnable means, movable in one direction by said motor and in the opposite direction by said spring device, for operating said switch means when the motor has made a predetermined number of revolutions; control means for said motor comprising a motor switch and an impulse actuated armature for controlling the motor switch; and a latching device for said armature, operatively connected with the motor, for holding the motor circuit open when short impulses are impressed on the relay.

3. A remote control device comprising an impulse receiving relay including an armature, a motor and motor switch controlled by the relay, spring means for moving the armature to a position for breaking the circuit to the motor, a second switch, means for actuating said second switch, means operatively connecting the motor to said actuating means for the second switch for moving said actuating means a predetermined amount in one direction, spring means for moving said actuating means for the second switch in the opposite direction upon breaking of the motor circuit, and a latching device, cooperating with the relay and operatively connected with the motor, for holding the armature

in position to break the motor circuit when short impulses are impressed on the relay.

4. In a remote control device, in combination, a relay, an armature therefor, a motor, a motor switch controlled by said armature, spring means for moving the armature to a position for opening the motor circuit when the relay is deenergized; a spring operated latching lever cooperating with the armature; a spring device; turnable means, movable in one direction by the motor and in the opposite direction by said spring device, for controlling said latching device; and switch actuating means, connected to the device to be remotely controlled, and connected to said turnable means, for actuation thereby.

5. In a remote control device, in combination, a relay, an armature therefor, a motor, a motor switch controlled by said armature, spring means for moving the armature to a position for opening the motor circuit when the relay is deenergized; a spring operated latching lever cooperating with said armature, a switch, a spring device, means rotatable in one direction by the motor and in the opposite direction by said spring device, for actuating said switch, a friction clutch associated with said rotatable means, and means independent of the motor, for quickly moving a portion of the switch operating means past certain positions.

RICCARD PUDELKO.