

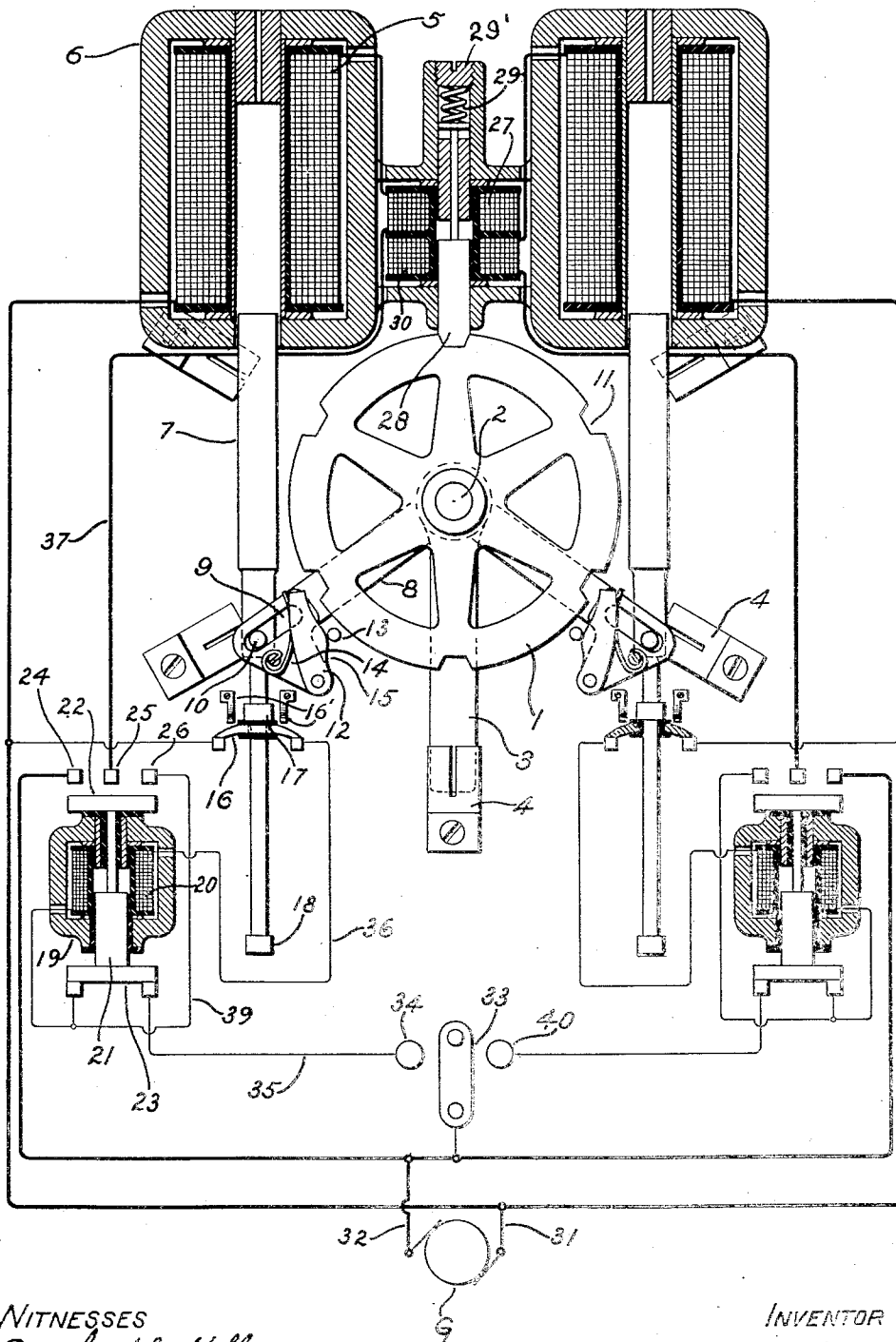
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PATENTED MAY 7, 1907.

G. WRIGHT.

REMOTE CONTROL DEVICE FOR ELECTRIC SWITCHES.

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WITNESSES

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REMOTE CONTROL DEVICE FOR ELECTRIC SWITCHES.

No. 852,690.

Specification of Letters Patent.

Patented May 7, 1907.

Application filed April 12, 1905. Serial No. 255,172.

To all whom it may concern:

Be it known that I, GILBERT WRIGHT, a citizen of the United States, residing at Pittsfield, in the county of Berkshire and State of Massachusetts, have invented certain new and useful Improvements in Remote Control Devices for Electric Switches, of which the following is a specification.

This invention relates to means for operating rheostats, regulators and the like, and has for its object the provision of a device controllable from a remote point for positively shifting a contact arm from one contact to another.

Although my invention is applicable to any rheostat or regulator or, in fact, to any form of switch which it is desirable to control from a remote point, it is particularly well adapted for use in connection with commutating switches in which the contact arm is moved step by step in either direction continuously, as long as the control switch remains closed. In switches of this character, especially where they are to be used as regulating switches for regulating transformers, it is essential that positive movement be given to the contact arm so that it will not stop between contacts.

In carrying out my invention I have provided a driving mechanism for switches of the character above noted which will operate with a step-by-step movement in either direction at will, the construction being such as to render possible long, positive steps. I also provide means whereby the arm is locked in position on each contact, it being impossible by any careless manipulation of the control switch for the contact arm after it starts in motion in either direction to stop until it is in position on the next contact.

My invention is shown and described for purposes of illustration in connection with a specific type of mechanism capable of carrying it out, while the scope of the invention is set forth in the claims annexed to and forming a part of this specification.

In the single figure of drawing I have shown in a somewhat diagrammatic way the mechanism embodying my invention.

Referring to the drawing, 1 represents a driving disk or wheel mounted on shaft 2. A contact arm 3 is fixedly mounted with

reference to the said wheel and moves therewith. As my invention does not involve any feature of the switch itself, I have only shown it conventionally by means of the contact arm 3 and the clips 4 for engaging the same. The two mechanisms for driving the wheel 1 in opposite directions are substantially identical, and I shall therefore describe only one of them.

I provide a solenoid 5 surrounded by an iron casing 6 having a core 7 mounted to reciprocate within the solenoid. An arm 8 mounted for movement independently of wheel 1 on the shaft 2, has its free end provided with a slot 9 engaging a pin 10 on an extension of the core 7. The wheel 1 is provided with slots 11, the number thereof being preferably the same as the number of contacts on the switch. A pawl 12 is pivoted to the outer extremity of the arm 8 so that its free end may engage the slots 11. This pawl is normally held out of engagement with the slots by a pin 13 which is fixed with relation to the moving parts of the mechanism. A spring 14 tends to force the pawl into engagement with the slot, but the pawl is beveled at 15 so that as it is moved upward it is permitted to engage with the slot. A bridging contact 16 is loosely mounted on and insulated from the core extension, the latter being provided with two collars 17 and 18 for engaging the said contact.

For closing the circuit of the solenoid 5 I have provided a relay 19 composed of a solenoid 20 having a core 21 with bridging contact bars 22 and 23, respectively, at its upper and lower extremities. The bar 22 bridges three contacts 24, 25 and 26, the bridging of the contacts 24 and 25 energizing the solenoid 5, while bridging the contacts 25 and 26 energizes the solenoid 20. Another solenoid 27 has a core 28 which acts as a dog to engage the slots 11 in the wheel. This solenoid is in series with the solenoid 5 and is energized simultaneously therewith. A spring 29, the tension of which is adjusted by means of a screw 29', forces the core 28 into engagement, while the solenoid, when it is energized, draws it up to unlock the wheel. Another solenoid 30 operates upon the core 28 when the mechanism to the right of the drawing is used for shifting the switch in the opposite direction.

The arrangement of the circuits is as follows: 31 and 32 are the leads from the generator G. When the control switch 33 is closed on the contact 34, the circuit is completed as follows: from lead 32 to switch 33, contact 34, wire 35, bridging contact 23, through solenoid 20, wire 36, bridging contact 16, back to lead 31. When the solenoid 20 is energized the core 21 is drawn up, opening the circuit at bridge 23 and bridging the contacts 24, 25 and 26 with the bridge 22. The path of the current will now be as follows: from lead 32 to contact 24, through bridge 22 to contact 25, thence to wire 37, solenoid 27, solenoid 5, and back to the line. At the same time the bridging of the contacts 25 and 26 closes a branch circuit through wire 39, solenoid 20, thence through wire 36, bridge contact 16, back to the line. By this arrangement it is immaterial for how long a time the switch 33 is closed on the contact 34, for even if this switch is opened immediately, the solenoid 20 will still remain energized through the circuits just described. Upon the energization of solenoid 27 the dog 28 is drawn up out of engagement with the slot 11, thereby unlocking the wheel 1. At the same time the solenoid 5 which is in series with solenoid 27 is energized, drawing up the core 7 and with it the arm 8. As the arm is drawn up the pawl 12 is forced inward by the spring 14 engaging the adjacent slot and carrying it upward. This movement continues until the collar 18 engages the bridge contact 16 and lifts it to break the circuit, a pair of clips 16' retaining it in raised position. Upon this circuit being broken, the solenoids 5 and 27 are de-energized, allowing the core 7 and arm 8 to drop by gravity until the collar 17 in its descent engages the bridge 16 to again close the contact. At the same time when the solenoid 27 is de-energized, spring 29 forces the dog 28 into engagement with the adjacent slot 11 to lock the wheel in place. When the collar 17 in its downward movement engages the bridge 16, to close the circuit of the solenoid 20, if the switch 33 remains closed the operation just described will be repeated and will continue this step-by-step motion as long as the switch is held in a closed position. If the switch 33 is moved to the right onto the contact 40 a duplicate mechanism, above referred to, will be operated to shift the wheel 1 in the opposite direction, the mechanism and the arrangement of circuits being identical to that above described.

It will be seen from the arrangement just described that it will be impossible by a careless manipulation of the operator, for the wheel 1, and therefore the switch arm 3 connected therewith, to stop after it is once started in motion until it has completed a step by moving onto the next contact. Moreover, the wheel is locked in this position and

cannot be moved therefrom until the control switch is again closed.

What I claim as new, and desire to secure by Letters Patent of the United States, is,—

1. The combination with a switch arm, of electromagnetic means for advancing the same step-by-step, means for locking said switch at the end of each step, and electromagnetic means energized simultaneously with the energizing of the operating means for unlocking the same.

2. The combination with a rotary switch arm, of electromagnetic means for operating the same step-by-step, means for locking said switch at the end of each step, electromagnetic means for unlocking the same, and electromagnetic means for closing the circuit of said operating and said unlocking means simultaneously and maintaining them closed until the end of the step.

3. The combination with a rotary switch, of means for operating the same step-by-step, comprising an electromagnetic driving means, a control switch therefor, and electromagnetic means controlled by said switch for opening said control circuit and simultaneously closing a circuit through said driving means and maintaining it closed until the end of a step.

4. The combination with a normally locked rotary switch, of means for operating the same step-by-step, comprising electromagnetic unlocking means, driving means for said switch, a control switch, and electromagnetic means controlled by said switch for opening said control circuit and simultaneously closing a circuit through said unlocking and driving means and maintaining it closed until the end of the step.

5. The combination with a rotary switch, of means for operating the same step-by-step in either direction, comprising a disk, solenoids having cores mounted to move in straight lines on opposite sides of said disk, and ratchet driving connections between said disk and said cores.

6. The combination with a rotary switch, of an operating disk therefor, oppositely disposed solenoids having cores mounted to reciprocate on opposite sides of said disk, and ratchet driving connections between said cores and said disk.

7. The combination with a rotary switch arm and driving wheel therefor, of means for giving the same a step-by-step movement, comprising a solenoid and core therefor mounted to reciprocate adjacent the periphery of said wheel, ratchet driving connections between said core and said wheel, means for closing an electric circuit through said solenoid, and means for breaking said circuit when the core reaches a predetermined limit of movement.

8. The combination with a rotary switch

arm and driving wheel therefor, of means for giving the same a step-by-step movement, comprising a solenoid, a core therefor adjacent to said wheel mounted to be drawn into
5 said solenoid when the latter is energized and to descend by gravity when it is de-energized, ratchet driving connections between said core and said wheel, and means for breaking the circuit of said solenoid when the core is

drawn upward to, a predetermined limit of movement.

In witness whereof, I have hereunto set my hand, this eighth day of April, 1905.

GILBERT WRIGHT.

Witnesses:

F. M. PLATT,

THOMAS E. CASSIDY.