J. S. BRISTOL.

REMOTE CONTROL ELECTRIC SWITCH.

APPLICATION FILED APR. 6, 1907.

900,658. Patented Oct. 6, 1908.

Fig. 1.

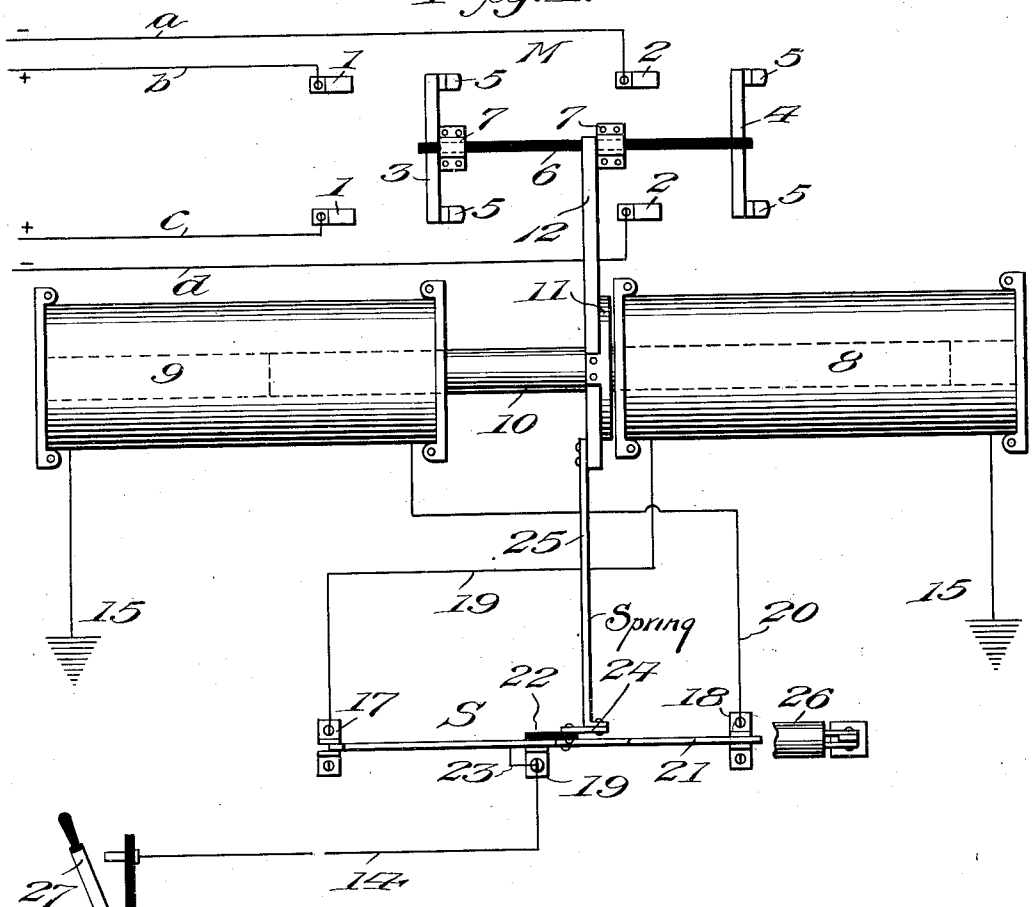
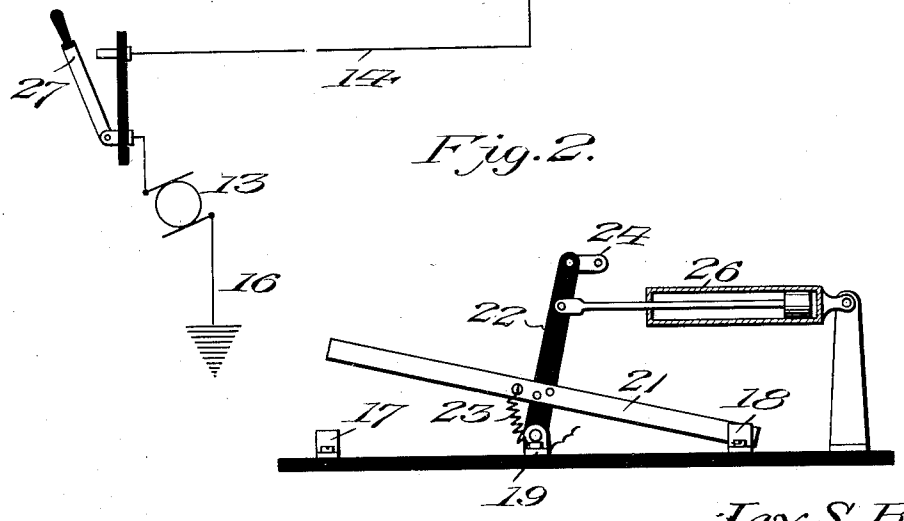


Fig. 2.



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REMOTE-CONTROL ELECTRIC SWITCH.

No. 900,658. Specification of Letters Patent. Patented Oct. 6, 1908.

Application filed April 6, 1907. Serial No. 366,818.

To all whom it may concern:

Be it known that I, JAY S. BRISTOL, a citizen of the United States, residing at Gillespie, in the county of Macoupin and State of Illinois, have invented new and useful Improvements in Remote-Control Electric Switches, of which the following is a specification.

This invention relates to a remote control electric switch which is especially designed for throwing into and out of circuit any system or part thereof located at a distant point from the powerhouse, at the will of the engineer. For instance, in an electric supply system current can be delivered from the powerhouse to a sub-station from which extent power or lighting circuits which require current at different times, and the said circuits can be independently cut into and out of operation by the engineer at the powerhouse, thus requiring no attendant at the sub-station.

The invention has for one of its objects to improve and simplify the construction of remote control switches so as to be comparatively easy and inexpensive to manufacture, thoroughly reliable and efficient in use, and readily controlled.

A further object of the invention is the employment of a main switch for cutting a supply circuit into and out of connection with the source of supply, solenoids being arranged to open and close the main switch, the circuits of the solenoids being alternately changed by an automatic switch or circuit changer intermediate the solenoids and powerhouse.

Another object of the invention is the employment of a switch of the character referred to in which a single wire may be employed between the powerhouse and the substation for controlling the solenoids, the latter being grounded, as is also the source of power or generator. If desired, however, a metallic return may be employed between the sub-station and powerhouse but the economy of a grounded return renders the former method more advantageous.

With these objects in view and others, as will appear as the description proceeds, the invention comprises the various novel features of construction and arrangement of parts which will be hereinafter more fully described and set forth with particularity in the claims appended hereto.

In the accompanying drawing, which illustrates one of the embodiments of the invention, Figure 1 is a diagram of the switch and circuits therefor. Fig. 2 is a detail view of the circuit changer or secondary switch for controlling the circuits of the solenoids.

Similar reference characters are employed to designate corresponding parts throughout the several views.

Referring to the drawing, *a* and *b* designate the two sides of a service circuit and *c* and *d*, the leads connected with the sub-station or powerhouse and adapted to be connected with the service leads *a* and *b* by the main switch M that is located at a suitably remote point from the powerhouse or center of distribution. This main switch comprises two pairs of contacts 1 and 2, the former for connecting the positive leads of the circuits and the latter for connecting the negative leads. Bridging contacts 3 and 4 are arranged to cooperate respectively, with the contacts 1 and 2 so as to open or close the circuits. The bridging contacts 3, which are provided with shoes 5, are mechanically connected together by a slide-rod 6 of fiber or other suitable insulating material, guides 7 being provided for guiding the movement of the rod 6. The movable element of the main switch M is actuated by oppositely disposed solenoids 8 and 9 having a common core 10 on which is an armature 11. The armature has secured thereto an arm 12 to which the slide-rod 6 is rigidly attached and the solenoids are so arranged that the core thereof will move back and forth in a line parallel with the slide-rod 6. In the present instance, the solenoids are adapted to be connected with a source of direct or alternating current designated by 13 which is located at the powerhouse from which the main switch is to be controlled, a single conductor 14 being employed to supply the current for actuating the solenoids, which latter are grounded at 15, whereby current passes by way of the ground 16 to the generator 13. The solenoids are intended to be actuated separately so that the main switch can be opened by one solenoid and closed by the other. For this purpose, a circuit changing switch designated by S is employed that is located between the generator 13 and solenoids. This secondary switch comprises a pair of blade-receiving contacts 17 and 18 and a center contact 19, the latter being connected with the conductor 14. The solenoids 8 and 9 are connected respectively with the contacts 17 and 18 by conductors 19

and 20. Coöperating with the contacts 17 and 18 is a blade 21 in the nature of a walking beam that is mounted to swing on a lever 22 of fiber or other insulating material fulcrumed on the middle contact 19 and between the latter and the lever is a flexible wire or conductor 23, whereby the blade of the switch is permanently connected with the conductor 14. The free end of the lever 22 is connected by means of a link 24 with a spring rod 25 that is fixedly secured to the core 10 or any suitably attached parts. To retard the movement of the lever 22 so that a time element will be introduced between the actuation of the solenoid core and the throwing of the switch blade 21, a dash-pot 26 is employed, the plunger of which is connected with the lever. The solenoids are adapted to be momentarily connected with the generator 13 by a single-throw, single-pole knife switch 27 or equivalent means. The main switch solenoids and secondary switch are all located at the sub-station or other point remote from the powerhouse and may be mounted on a common base, and the conductor 14 is of any desired length, as is indicated by the break therein.

In practice, the switch 27 at the powerhouse is momentarily closed so that there will be a rush of current through the switch blade, conductor 14, contact 19, flexible conductor 23, blade 21, contact 18, conductor 20, solenoid 9, grounds 15 and 16, and generator. This current energizes the solenoid and draws the core thereof to the left, thereby closing the main switch so that the supply circuit will be connected by the source of power. By interposing a spring 25 between the solenoid core and the lever 22 of the pole changing switch S and by the employment of the dash-pot 26, the movement of the lever 22 will lag somewhat behind the movement of the core 10 so that current will flow for a sufficient length of time to actuate the core to its full extent for insuring the closing of the main switch. At the expiration of this time element, the blade 21 of the secondary switch will be changed so that the solenoid 9 will be cut out of circuit and the solenoid 8 connected with the secondary switch. In the meantime, however the engineer's switch 27 at the powerhouse has been opened so that no current will be able to pass from the generator to the solenoid 8. The switch will thus remain closed as long as current is to be supplied to the service circuit from the leads *c* and *d*. When the engineer desires to cut the service circuit out of operation, he again momentarily closes the switch 27 so that current passes to the blade of the secondary switch by the usual path, thence through contact 17, conductor 19, solenoid 8, grounds 15 and 16, to the generator 13. This energizes the solenoid 8 so that the core 10 may be drawn to the right, thereby opening the main switch. The secondary switch is again changed after some delay to the first position, thereby cutting out the solenoid 8 and arranging the circuits so that the main switch M can again be closed by manipulating the engineer's switch at the powerhouse.

From the foregoing description, taken in connection with the accompanying drawing, the advantages of the construction and of the method of operation will be readily apparent to those skilled in the art to which the invention appertains, and while I have described the principle of operation of the invention, together with the apparatus which I now consider to be the best embodiment thereof, I desire to have it understood that the apparatus shown is merely illustrative and that such changes may be made when desired, as are within the scope of the claims.

Having thus described the invention, what I claim is:—

1. In a system of remote control, the combination of a main switch, oppositely disposed solenoids, a common core for the solenoids, means between the core and switch for opening and closing the latter, a circuit changer, circuits between the said changer and solenoids, and a controllable source of current, said circuit changer comprising fixed contacts, a blade adapted to engage one of the contacts at a time, an insulated member for moving the blade, a retarding device connected with the member, and a resilient element secured directly to the core and to said member coöperating with the retarding device to cause the said blade to move a suitable interval after the core begins to operate in either direction.

2. The combination of a main switch, electric devices for opening and closing the switch, a circuit-changer for automatically cutting one device into circuit while cutting the other device out of circuit, a resilient member connected with the circuit-changer and arranged to be actuated by the devices, and a dash pot connected with the circuit-changer and arranged to cause the said member to yield prior to the operation of the changer.

3. In a system of remote control, the combination of a switch, solenoids arranged to open and close the circuit, a circuit changing device controlled by the solenoids, an element actuated by the solenoids, a spring having one end attached to the element and the other end connected with the circuit-changer, means for delaying the movement of the circuit changing device with respect to the solenoids, and a switch adapted to be closed for producing a momentary flow of current to one or the other solenoids and to be opened before the said device completes its movement in each direction.

4. In a system of remote control, the combination of a switch, oppositely-disposed

solenoids having a common core, a rigid connection between the core and switch, a source of current connected in circuit with the solenoids, a circuit changer including a movable element, a resilient member connected with the core and said element and insulated from the latter and adapted to actuate the circuit changer by the movement of the core, and means for retarding the movement of the said element.

5. In a system of remote control, the combination of a main switch, oppositely disposed solenoids having a common core, a source of current connected in circuit with the solenoids, an engineer's switch located at a point remote from the solenoids, a circuit changer between the engineer's switch and solenoids and adjacent the latter and including a movable element, a spring mechanically connecting the said element of the circuit changer with the core, and a dash-pot connected with the movable element for delaying the movement of the circuit changer with respect to the core.

In testimony whereof, I affix my signature in presence of two witnesses.

JAY S. BRISTOL.

Witnesses:
J. W. CAUDRY,
FROZIE CARNEY.