

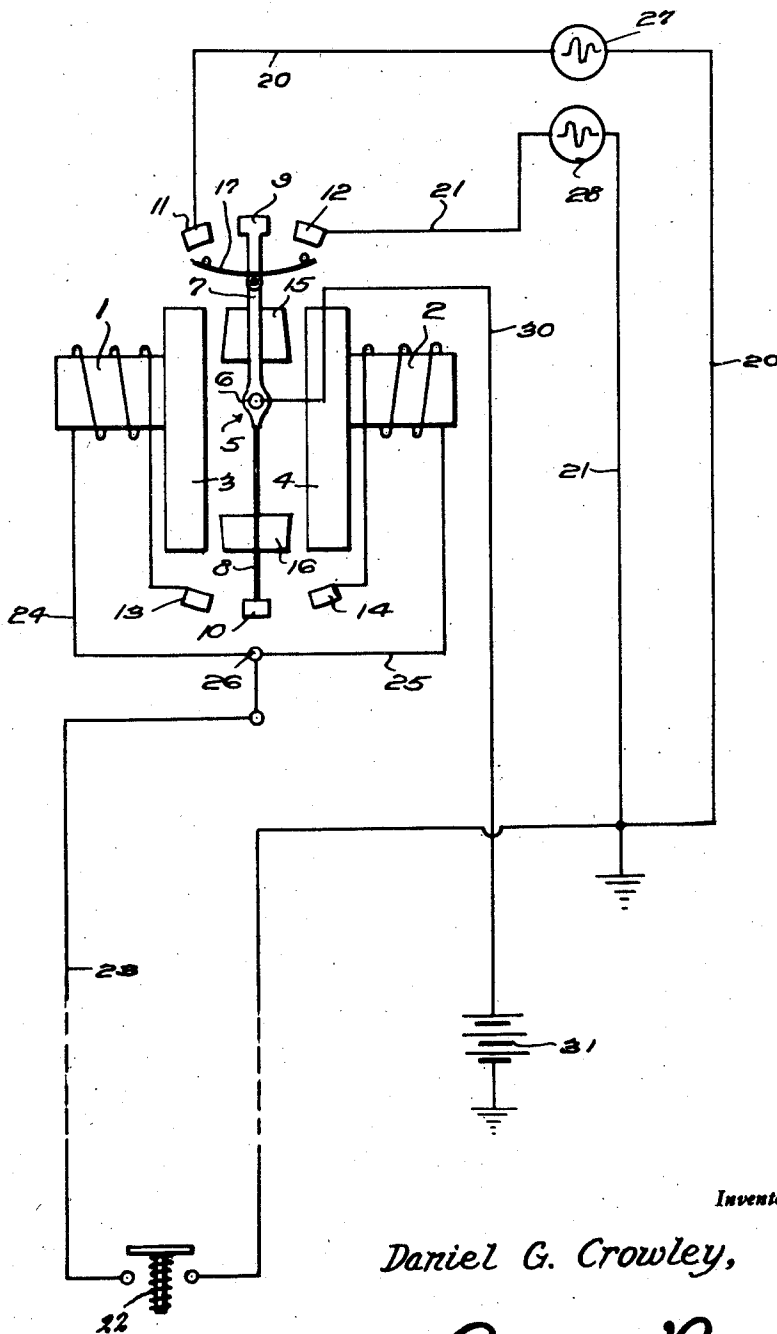
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REMOTE CONTROL SWITCHING DEVICE

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REMOTE CONTROL SWITCHING DEVICE

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2 Claims. (Cl. 171-97)

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This invention relates to switching devices operated by remote control of the type in which the closing or opening of a circuit at a point remote from the apparatus or installation to be controlled, produces the closing or opening of circuits in said apparatus or installation or in or near a load device to be switched on or off.

Switching devices of this type are of a relatively simple character when merely the closing or the opening of a circuit at the desired point has to be obtained as in this case they may be operated by a relay, a solenoid or a similar simple device. However, a much more complex arrangement is necessary as soon as the making and breaking of the control circuit is supposed to entail different operations each time when it occurs. This is however the rule in many instances, the usual button switch for alternately switching on full lights and dimmed lights being a conventional example. In such a case, however, in which different operations are performed by the switch either complex relay arrangements, or complex installations, or mechanical distributors or timers, usually spring operated, have to be employed which are not sufficiently simple, inexpensive and reliable for the purpose required.

It is therefore the primary object of the present invention to provide a simple inexpensive and reliable switching device for performing the above-named differentiation between several functions performed by the successive operations of one and the same remote control switch. It will be clear that a simple and inexpensive device of this type is of great practical importance, as it permits to use installations which could not be made otherwise on account of the length of heavy wire required, and of the work entailed by security regulations in connection with the wiring.

Noteworthy examples of installations in which switching devices of the type described are most useful are master switches in a house permitting to turn on or off the lights of the house from a number of different places, switching devices for dimming and brightening the lights of a house or shop from various remote places, switching devices arranged on the steering wheel and other places in a car for dimming and brightening the headlights of a car, and the like.

The invention essentially consists in an electromagnetic switch comprising a pendulous member with a rigid or stiff and a resilient and elastic section, each carrying a movable contact. The said pendulous member is mounted on a pivot or fulcrum for oscillatory movement between two solenoids or electromagnets.

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One of the movable contacts controls the circuits to be operated in succession while the other controls the circuits of the solenoids or electromagnets. The pendulous member whose movable contacts cooperate with fixed contacts may assume different operative positions according to the solenoid or magnet which has been energized.

It will thus be seen that the device is capable of producing at least two different switching operations at successive energizations and will be ready thereafter for another cycle. The shifting from one switching operation to another is performed by the elastic section of the pendulous switch member which swings to the position of rest on the other side and thus changes the connection of the solenoids with the source of current.

The invention is illustrated in the accompanying drawing showing one modification of the invention.

It is however to be understood that the fact that merely one modification of the invention is described and illustrated is not to be interpreted as limitative. The embodiment illustrated may be further modified without departing from the spirit or essence of the invention.

The drawing is a diagrammatic view of the device and of the circuits.

The device consists of two magnets or solenoids 1, 2, with pole pieces 3, 4 facing each other. Between them an armature 5 is pivotally fixed which may oscillate around a pivot 6 forming a fulcrum. The armature 5 consists of two sections 7 and 8, each provided with a contact 9 and 10, respectively, adapted to cooperate with two fixed contacts 11, 12 and 13, 14 respectively.

Each section 7 and 8 is moreover provided with a core 15 and 16, respectively, which is attracted by the pole pieces 3 and 4.

Section 7 is a rigid or stiff section of the armature which moves under the influence of its core 15 either to the right or to the left and which is held in its position by a leaf spring 17 when moved in the one or other direction towards contact 11 or 12. The leaf spring is so arranged that when held by pins on some fixed part near the armature it permits a change of position of section 7 from one of its contact positions to the other only under a certain amount of friction and under a slight compression of the spring produced by means of a pin, bolt or other part attached to the said section. Such a change of position may therefore only be performed under the influence of a force exceeding the frictional pressure, such as, for instance, the attractive force of a magnet pole on the core. Section 8 is a resilient section

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and it consists preferably of a leaf spring. This section may therefore move under the influence of its own elasticity.

The contacts 11 and 12 are connected to the two circuits 20, 21 to be closed and opened in succession by the remote control switch 22. These circuits include the section 30 connecting the armature 5 with the source of current supply 31.

The contacts 13, 14 are arranged in the circuits 24, 25 of the exciter coils of the magnets 1, 2, which are joined at (26) to the control circuit 23, containing remote control switch 22. The circuits 24, 25 are closed when one of the contacts 13, 14 is brought into operative contact with armature contact 10 which is connected with the circuit 30 and battery 31.

The operation of the device will be readily understood from the foregoing description.

Assuming that the circuits 20 and 21 are those of bright and dimmed lights 27, 28, respectively, and further assuming that the contact 9 rests on contact 11 and thereby connects the source of current 31 over circuit section 30, section 7 of armature 5 and contacts 9 and 11 with circuit 20; and further assuming that switch 22 which may be a spring pressed button switch is closed; then a current will flow not only through circuits 30 and 20 and lamp 27 but also through magnet 2 as in the assumed position contact 10 of member 8 rests on contact 14 and the circuit 25 of magnet 2 is closed through switch 22. The magnet 2 attracts the cores 16 and 15, the former already resting on its pole piece 4, the latter being pulled over from its original position. The elasticity of member 8 permits the pendulous member to have both cores 15 and 16 on the pole piece 4.

When section 7 of the pendulous member has been moved to the right, circuit 21 is closed and the dim lights 28 are turned on.

When switch 22 returns after having been pressed down the remote control circuit 23 is again opened and magnet 2 is deenergized. While member 7 continues to rest in its position, member 8 under the influence of its elasticity will move to the left and contact 10 will rest against contact 13, this being the position of rest of the member 8.

If now button 22 is pressed again, a circuit is established including magnet 1 which comprises the circuit sections 23, 24 and 30, the contacts 13, 10. Magnet 1 is energized attracting both cores 15 and 16 and thereby again switching in circuit 20. The operation in other respects repeats itself.

It is thus manifest that two successive operations of switch 22 will close different circuits, and will thus permit remote control by means of two

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wires and as the magnets do neither have a large current consumption nor require high voltages may be operated by circuits similar to those operating door bells. In this way installations necessary for the remote control are simple and inexpensive in spite of a much more complicated local wiring which can thus be reduced to a minimum.

I claim:

1. A magnetic switch for remote control circuit arrangements, comprising a pair of magnets, each having an elongated pole piece, a movable armature between said pole pieces, consisting of a rigid and a resilient section having its fulcrum between said sections and said pole pieces, two armature cores on said armature, arranged on the two sides of the fulcrum on the armature, both in operative position between the two above mentioned pole pieces, a movable contact on each section of the armature and two fixed contact sets, each cooperating with one of said armature contacts, for controlling the energization of the pair of magnets and the circuits to be controlled respectively.

2. A switching device for insertion between a plurality of consumer circuits operated selectively by remote control and a remote control circuit containing a remote control switch, comprising a pair of magnets provided with elongated pole pieces, an operative energizing circuit for each magnet of the pair, an oscillating armature, consisting of a rigid and a resilient section, arranged between said pole pieces and provided with a fulcrum located between said sections and between said pole pieces, an armature core on each side of said fulcrum, an operative circuit containing a source of current connected with said armature, a movable contact on each section of the armature, a pair of fixed contacts cooperating with each of said movable armature contacts, one contact pair being connected with the consumer circuits to be controlled, the other pair being connected with the energizing circuits of the pair of magnets, and a connection between said circuits and with the remote control circuit containing the remote control switch.

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