June 6, 1944. J. S. NUNES 2,350,967

MANUALLY CONTROLLED TIME SWITCH

Filed Feb. 21, 1941

Fig. 2

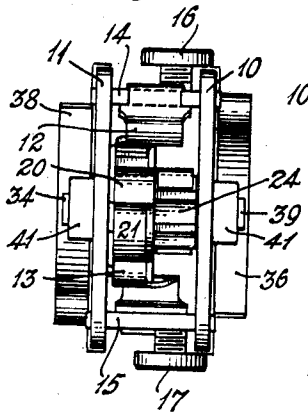


Fig. 1.

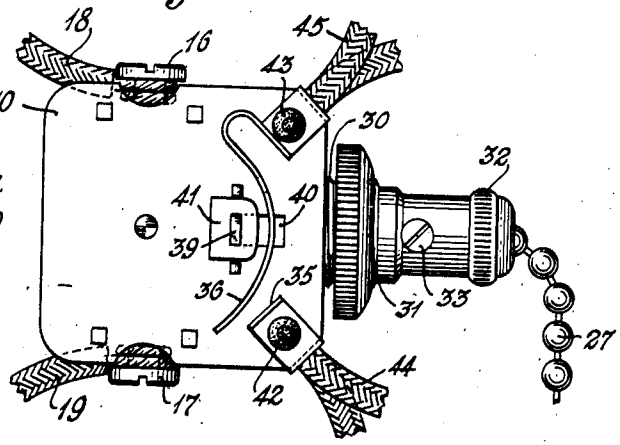


Fig. 3.

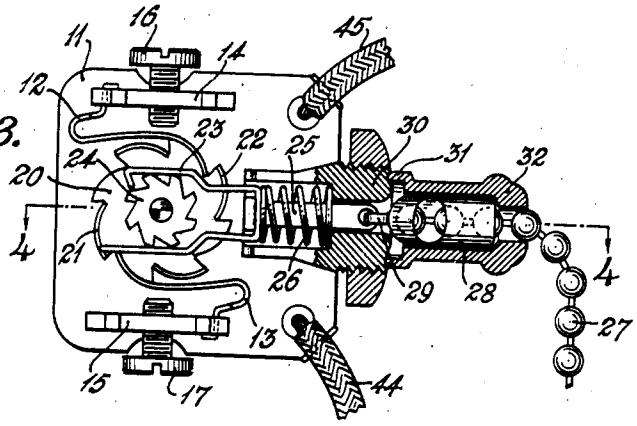


Fig. 5.

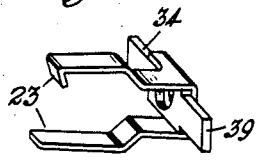
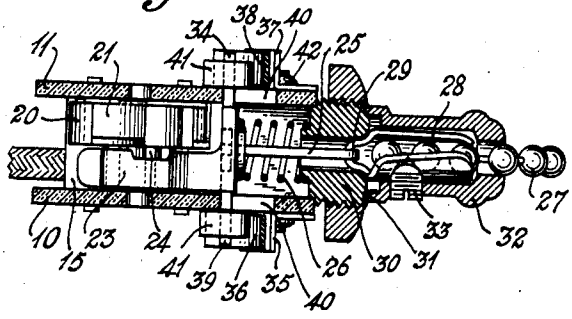


Fig. 4.



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MANUALLY CONTROLLED TIME SWITCH

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Application February 21, 1941, Serial No. 379,921

3 Claims. (Cl. 200—5)

My invention relates to electric switches and more particularly to an improvement in known forms of hand-operated switches whereby, in addition to the circuits controlled by the known switch structure, further circuits may be controlled for various periods of time at the will of the operator.

It is the general object of the invention to provide known switches wherewith one or more circuits are controlled in any desired manner or sequence, with a simple and inexpensive attachment or modification of structure, whereby additional circuits may be controlled upon the operation of the switch, as by a pull-chain, or the like, and especially additional circuits which are only temporarily closed during the actuation of the switch-operating element and then opened upon release of such element.

It is also an object of the invention to provide an electric switch of the character above set forth wherein the additional structure over the known switch structure, or the modification of the known structure is of simple, inexpensive, compact, and durable form and does not interfere with the normal use of the switch for the control of single or multi-circuit installations in homes, stores, industrial establishments, etc.

The present invention contemplates the mounting within or upon a known switch mechanism of a stationary contact which is connected in a circuit which is to be closed (or opened) only temporarily, under the control of the operator, a cooperating contact being associated with such stationary contact and arranged for movement with or by the normal actuating mechanism of the switch to close (or open) the additional or auxiliary circuit upon actuation of the switch by the operator, the additional or auxiliary circuit remained closed (or open) during the interval that the switch is manually actuated by the operator.

The uses to which the improved switch of the present invention may be put are quite various. One use for which the invention is particularly adapted is in the circuits of fluorescent lamps. It is at present the general practice to provide such lamps with a thermally controlled "starter" which, upon closing of the lamp switch, controls the pre-heating of the lamp and which, after a more or less fixed or predetermined time interval, automatically breaks the starting circuit and leaves the lamp to be operated by the normal heating circuit which includes the column of heated or ionized gas between the electrodes inside the lamp. This thermostatically operated starter or switch has not proved entirely satisfactory in practice because it fails to make allowance for the different characteristics of different lamps, with the result that upon starting, the lamps frequently flicker for a period of time before they begin to burn continuously, or the lamps may even go out, because of insufficient pre-heating of the gas contained in the lamp. Quite frequently, therefore, the switch had to be closed a second or even a third time before steady operation of the lamp was obtained. This control device was objectionable also for the reason that its cost was quite considerable, frequent replacement was necessary, and special provision had to be made for its mounting.

According to the present invention, a simple modification or addition to the known main switch of such a lamp circuit eliminates entirely the automatic starter with the mounting therefor and places the control of the normal lighting circuit of the lamp in the hands of the operator who, after operating the switch to close the starting and if desired, also the main, operating circuit, holds the switch in actuated condition until the lamp begins to burn continuously, whereupon the operator releases the switch actuating member and the starting circuit thereby becomes broken while the normal operating circuit is closed.

Other objects and advantages of the invention will appear from the following description taken in connection with the accompanying drawing, in which,

Fig. 1 is an external view of a known form of switch having my improved starting circuit connections incorporated therein;

Fig. 2 is an end view of the switch;

Fig. 3 illustrates a section through the interior of the switch;

Fig. 4 represents a section taken along the line IV—IV of Fig. 3, and

Fig. 5 is a perspective view of a switch actuating member according to the invention.

Referring to the drawing, the switch illustrated is of a conventional type and may include, for example, two spaced plates 10 and 11 made of suitable insulating material, between which one or more pairs of stationary spring contacts 12, 13 are suitably supported upon terminals 14, 15 in which screws 16, 17 are threadedly mounted for securing the ends of conductors 18, 19 thereto, as is well understood in the art. The stationary contacts 12, 13 are adapted to be connected and disconnected in any desired sequence by way of a rotary bridging contact wheel 20 of "star"

form which is made of insulating material and is provided at diagonally opposite portions with interconnected pairs of contacts 21, 22 which when brought into engagement with stationary contacts 12, 13, close the circuit in which such contacts are connected.

The wheel 20 is suitably mounted upon a shaft and is driven in step-wise fashion by means of a U-shaped pawl member 23 which cooperates with a ratchet wheel 24 rigid with the contact wheel 20. The pawl 23 is operated by a rod 25 which is actuated against the pressure of a helical spring 26 by a pull-chain 27 which is anchored within a member 28 connected by way of a universal joint 29 with the rod 25. The rod 25 and spring 26 are disposed within a hollow bearing member 30, the rod being adapted to reciprocate within the bearing member and thereby causing reciprocation of pawl 23. The bearing member 30 is provided externally with a circular groove within which rests the annular inner end 31 of a knuckle lever 32. The pull-chain is fixed to the knuckle lever 32 by way of a set screw 33. Upon actuation of the pull-chain from any direction, the knuckle lever will rock upon the bearing member 30 and pull the pawl 23 toward the right, as viewed in Fig. 3, thereby actuating the ratchet wheel 24 by one tooth. Upon release of the pull-chain the parts are restored by the spring 26 to the position shown in Fig. 3. The switch mechanism so far described is of the general type disclosed in the patents to Rudolf Popp, Nos. 1,974,054 and 2,158,084, and its construction and operation being well known, it need not be described in further detail.

In accordance with the present invention, there is associated with one of the reciprocating or oscillating parts of a switch, such as the switch of the type just described, an actuating member controlled from or by such reciprocating part and so arranged as to control an additional pair of contacts, the arrangement being characterized by the feature that the relationship of the additional contacts, e. g. their open condition, is altered, e. g. they are closed, only during the interval that the pull-chain or equivalent self-returning switch actuating mechanism is in the actuated or "pulled" condition, the additional contacts returning to their original condition upon release of the actuating mechanism. The operator is thus enabled to control the time interval during which the open or closed condition of the circuit containing the additional contacts is altered.

In the specific embodiment of the invention selected for illustration, the actuating member for the additional contacts is in the form of a lateral extension 34 on the central web portion of the U-shaped pawl 23. The additional contacts comprise a stationary contact 35 and a movable spring contact 36 mounted upon the outer face of the plate 10. A similar set of contacts 37, 38 is arranged upon the outer face of the plate 11 and is actuated by a second lateral extension 39 on the pawl 23. As the construction and operation of the two pairs of additional contacts and their actuating member is the same, a description of one pair will suffice for both.

The plate 10 is provided with an aperture 40 through which the lateral extension 34 passes. The upper end of the extension is provided with a head 41 of insulating material at the level of the spring contact 36. The contacts 35, 36 are secured to suitable terminals 42, 43 to which are connected conductors 44, 45 forming part of the circuit controlled by the contacts 35, 36. It will be understood that the whole mechanism may be housed within a suitable casing (not shown).

The operation and control of the additional contacts 35, 36 will be clear from the above description. Upon actuation of the pull-chain 27, for example, to cause closing of the contacts 12, 13, the pawl 23 and hence also the lateral extension 34, will be moved to the right. The contact 36 will thus be brought into engagement with the contact 35, and the circuit will remain closed so long as the operator (or the mechanical operating member in the case of an automatic installation) holds the pull-chain or equivalent member in actuated condition. An operator is thus able to control manually the time interval during which the circuit of the contacts 35, 36 remains closed. Where such circuit forms the starting circuit of a fluorescent lamp, the chain will be held in pulled position until the lamp has begun to burn without flickering. Upon release of the chain, the pawl will be returned to its original position while the contacts 35, 36 will be opened. It will thus be seen that the contacts 35, 36 are opened and closed during a single actuation of the switch, whereas the contacts 12, 13 are opened and closed only upon successive operations (two or more actuations, depending upon the design of the bridging contact wheel).

As the arrangement and operation of the additional contacts are quite independent of the normal contact arrangement of the switch, it will be evident that the latter may be of any suitable construction, and may control one or a plurality of circuits in any desired manner, for example, according to the various circuits shown in the patent to Popp No. 2,158,084.

The other set of additional contacts 37, 38 is shown as being operated similarly to the contacts 35, 36. It may however, be so arranged as to be operated in reverse order; that is, it may be normally closed but be temporarily opened on actuation of the pull-chain or the like. Obviously more than two sets of time-controlled additional contacts may be provided and they may be operated directly by the pawl 23 or through any other of the reciprocating or oscillating parts, or intermediately by way of a motion transmitting member.

I claim:

1. A switch for controlling the starting and operating circuits of fluorescent lamps and similarly controlled apparatus, comprising a housing, stationary contacts therein adapted to be connected in the operating circuit of the control apparatus, and to be connected and disconnected only upon successive actuations of the switch, a rotary member including bridging means for said stationary contacts and insulating areas adapted to be brought into active position with reference to the stationary contacts in predetermined sequence, mechanism for operating the rotary member and including a linearly reciprocable element for effecting a stepwise rotation of the rotary member during each complete reciprocation, contacts adapted to be connected with the starting circuit of the controlled apparatus and normally biased to the open position, a rigid member moving with the linearly reciprocable element and engaging one of the last mentioned contacts upon actuation of such element, whereby said last mentioned contacts are forced into engagement by the force applied to the reciprocable element as the latter is moved in one

direction, and a spring for returning the said element into its normal position and at the same time causing release of the said last mentioned contacts by said rigid member, whereupon said contacts are disengaged from each other and the starting circuit is opened.

2. A switch as set forth in claim 1, wherein the reciprocable element comprises a pawl, the rotary member having a ratchet wheel secured thereto, and engaged by the pawl, the rigid member constituting an integral projection of said pawl, said projection being positioned to engage and move one of the contacts for the starting circuit as the pawl is retracted to rotate the ratchet wheel.

3. A switch for controlling the starting and operating circuits of fluorescent lamps comprising a housing, stationary contacts therein adapted to be connected in the operating circuit of the fluorescent lamps and to be connected and disconnected upon successive actuations of the switch, a rotary member including bridging means for said stationary contacts and insulating areas adapted to be brought into active position with reference to the stationary contacts in predetermined sequence, mechanism for operating the rotary member and including a reciprocable element adapted to effect a stepwise rotation of the rotary member during each complete reciprocation, a pair of contacts adapted to be connected in the starting circuit of a fluorescent lamp and located upon each side of the reciprocable element, and rigid members extending in opposite directions from the reciprocable element and arranged to engage one of the contacts of each pair of the last-mentioned contacts upon actuation of said element, whereby such contacts are both closed and opened, in succession, during each actuation of the reciprocating element, whereby the period of operation of the starting circuits can be manually controlled and the reciprocating element released and the lamps placed under the operation only of the operating circuit only after the lamps have begun to burn continuously.

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