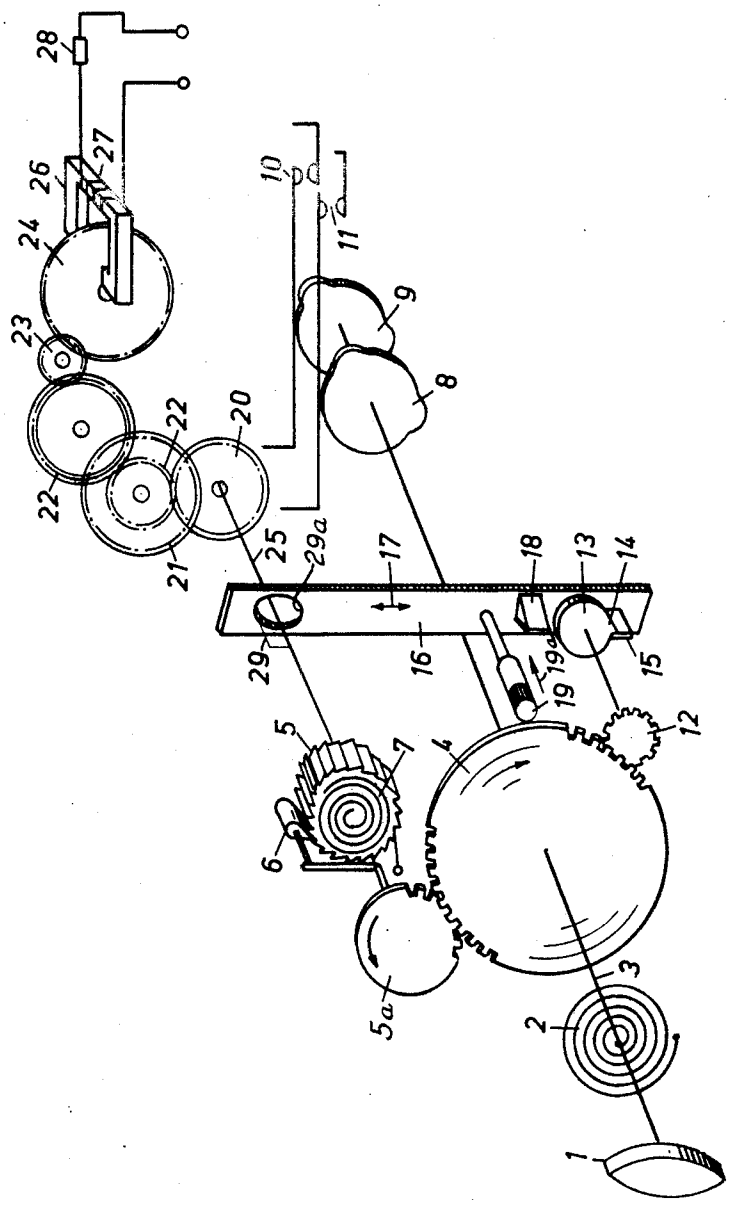
July 26, 1960 W. HOLZER 2,946,863

DEVICE FOR OPERATING A PRESET SWITCH

Filed April 29, 1957



INVENTOR:
WALTER HOLZER
By Otto John Munz
Attorney

United States Patent Office 2,946,863 Patented July 26, 1960

2,946,863

DEVICE FOR OPERATING A PRESET SWITCH

Walter Holzer, 43 Schuetzenrain, Meersburg-on-the-Bodensee, Germany

Filed Apr. 29, 1957, Ser. No. 655,869

Claims priority, application Germany Apr. 27, 1956

7 Claims. (Cl. 200—35)

The present invention relates to a method for operating a preset switch provided with a preselector, wherein a camshaft controller, which may be spring-driven, operates the individual sections of the process.

It is the object of the present invention to make it possible particularly in the operation of washing and rinsing machines, for a spring-driven camshaft controller, of a known type, to be influenced in its preset switching operation by simple controlling means in such a manner as to set the washing operation for white linen or colored linen or synthetic fabrics. Additionally, it should be made possible within a preset and preselected operation to provide changes by means of thermostats, e.g., for heating the water or starting the washing operation.

It is an essential object of the invention to dispense with complicated elements in order to make the construction of such a preset switch as simple and economical as possible and to secure a safe operation, especially when vibrations and changes of the temperature and of the moisture percentage occur, while the device according to the invention should be adapted for use with existing switches having the usual camshaft controllers.

It is known to provide such controls with presetting preselectors. Furthermore, it is already known to use an escapement for controlling the preset operation. There already exist escapements wherein a rotary motion is transformed into a reciprocating motion by means of a crank slot mechanism, whereby the reciprocating motion releases or stops a carrying wheel, thus controlling the present operation.

In the above known devices the escapement operates at uniform time intervals, i.e., the escapement continues moving at predetermined time intervals and step by step.

The essential drawback of such arrangements is that they cannot be adapted to the steps of operation, for example, of the washing operation, when they are applied to washing machines in which the individual preset sections of the operation are not influenced by a different speed of the escapement, the latter always operating uniformly. Furthermore, there are constructional difficulties insofar as in such controllers but a relatively small angle of rotation of the switch shaft is at disposal, by means of which the largest possible number of controlling steps should be switched on or off, thus resulting in such a rapid sequence of contacts as to require special measures to secure exact connections.

It is an object of the present invention to avoid the drawbacks of the above-mentioned known arrangement by a so designed manually operated control means or switch as to enable a plurality of simply constructed contacts to be connected during the rotation of the switch shaft, notwithstanding the presetting and running-off of the most varied types of connections and of the individual steps, which are adjustable.

Another object of the invention is to provide an economical switch composed of the least possible and simple elements. The solution of the above-mentioned problem

consists in that the rotation of a camshaft controller of known type is influenced by an escapement, the speed of which is controlled by an eddy current brake. According to this feature, the rotation of the camshaft is not uniformly controlled but is influenced in any desired manner by the escapement.

It is important for the present operation according to the present invention that the preselector connects resistance combinations in the circuit of the electromagnet of the eddy current brake associated with the escapement, whereby additionally the field of the electromagnet is influenced by the rotating switch shaft controlled by the escapement through contacts associated therewith and by connecting resistances. According to this feature of the invention, the escapement has associated therewith an eddy current brake which may, for example, be a disc carrying magnets, said eddy current disc determining the rotation, whereby through resistance combinations the individual sections of the operation may be preset and/or influenced by the contacts associated with the switch shaft.

A preferred device for carrying the invention into effect consists in the provision of the escapement with a separate drive actuated by an auxiliary spring, the latter being tensioned together with the main spring of the camshaft controller.

According to said feature of the invention, not only is the escapement influenced by the switch shaft as with the known types of escapement, but a separate escapement exists, actuated by its own power drive. In this way, the torque of the side shaft of the escapement may be considerably smaller than the torque of the main shaft or switch controlling shaft. Thus, also the eddy current brake may have smaller dimensions, while its range of adjustment may be considerably extended.

For the construction of the auxiliary spring, it is furthermore essential that it is wound up by means of a ratchet from the main or controlling shaft, while the auxiliary spring is so dimensioned that after the running-down of the main spring the auxiliary spring still has power reserves stored therein.

A particularly advantageous design of the escapement consists in that the escapement includes an auxiliary spring followed by a multiple speed gear for an eddy current disc carrying permanent magnets and/or electromagnets with intrusion windings and, furthermore, a connecting rod formed with a crank slot and carrying stops for the actuation of the controlling shaft through an escape wheel.

Such an escapement may be constructed in a particularly simple form and is esasily controlled.

A preferred embodiment of the invention is illustrated in the accompanying drawing which together with the specification discloses further advantageous features of the invention.

The drawing shows a diagrammatic view of the device for the operation of the preset switch.

Referring to the drawing, **1** designates the knob for winding a control spring **2** which drives a control or main shaft **3**. The main shaft **3** has keyed thereon a driving wheel **4**. This driving wheel **4** may wind up an auxiliary spring **7** by means of a ratchet **6** engaging with the teeth of a gear **5**. This ratchet is actuated by a pinion *5a* which is in mesh with the gear **4**, so that when the device is wound up, the pinion *5a* will rotate in the direction of the arrow indicated thereon, thus causing the ratchet **6** to turn the gear **5**. The arrangements of the parts is such that the ratchet **6** does not move along a path fully coincident with the circumference of the gear **5**, so that as soon as the ratchet goes out of mesh with the gear **5**, the latter is free to rotate in the opposite direction under the influence of the now wound up spring **7**.

The control shaft **3** carries still other cam discs **8**, **9**, which actuate contacts **10**, **11**, the latter serving to operate a washing or rinsing machine or other machinery.

A ratchet wheel **13** with a pinion **12** serving as a reduction gear may be arranged on the driving wheel **4**. This ratchet wheel **13** has a stop **14** which in the shown position engages the stop **15** of the connecting rod **16**. When the connecting rod **16** is moved upwards or downwards in the direction of the arrow **17**, in a manner to be described below, it will be seen that the ratchet wheel **13** first engages the stop **15**, then the other stop **18** of the connecting rod, while the continuously rotating ratchet wheel **13** accomplishes half a rotation each time. The push rod **19** enables the connecting rod **16** to be displaced in the direction of the arrow **19***a* in such a manner as to move the stops **15** and **18** out of the reach of the ratchet wheel and stops **13**, **14**, thus permitting the ratchet wheel **13**, and with it the control shaft **3**, to rotate unimpeded.

The reference characters **20**, **21**, **22**, **23** designate the elements of a speed-up gear from the auxiliary spring **7** up to the eddy current brake disc **24**.

It will be seen that in addition to the main or control shaft **3** there is provided an auxiliary shaft **25** serving as the shaft of the escapement, while the speed of the shaft **25** is not dependent on the speed of the control shaft **3**. It is possible to change the speed of brake disc **24** by means of a diagrammatically indicated magnet **26** having the winding **27** such as by interposing resistances **28** or combinations thereof. The wheel **21** will be moved according to the speed of the disc **24**, and the rotation of this disc is transformed into a reciprocating motion of the connecting rod **16** by a crank portion **29** which is carried by the shaft **25** and which is adapted to engage the inside of a cam slot **29***a* cut into the rod **16**.

The arrangement operates as follows:

The spring **2** is wound at **1**. The rotation, however, is checked at **15**, **18**, according to the speed of the auxiliary shaft **25**. Said speed is adjustable through combinations of resistances **28** so as to control the speed of the escapement.

It will be understood that this invention is susceptible to modification in order to adapt it to different usages and conditions and, accordingly, it is desired to comprehend such modifications within this invention as may fall within the scope of the appended claims.

What I claim is:

1. A spring actuated pre-set switch comprising in combination: preselector means of a sequence of operations including a cam shaft control driven by a main spring means; an escapement having an auxiliary spring means; a multiple speed reduction train gear means driven by said auxiliary spring means; an eddy current brake disc driven by said multiple speed gear train means; means to dampen the movements of said eddy current brake disc; and common tensioning means for said main and said auxiliary spring means.

2. A spring actuated pre-set switch as claimed in claim 1, wherein said common tensioning means further comprise a ratchet means for winding said auxiliary spring means, said ratchet means connected with said main spring driven cam shaft through a transmission gear; wherein said auxiliary spring means has dimensions in excess of those of said main spring means to store reserve driving power after the driving power of the said main spring has been spent.

3. A spring actuated pre-set switch as claimed in claim 1, further comprising a horseshoe magnet; said eddy current brake disc mounted for rotation between the poles of said horseshoe magnet; means to change the speed of said rotation of said disc by said magnet; and said escapement having a connecting rod formed with a crank slot and carrying stops for the escapement of the control shaft through a main wheel.

4. A spring actuated pre-set switch as claimed in claim 1, wherein said pre-selector means of a sequence of operations include electrical resistance across the circuit of the horseshoe magnet of the said eddy current brake disc and means to control the field intensity of the horseshoe magnet by the said resistances through the rotation of said cam shaft.

5. A periodic switch comprising, in combination, a switching mechanism; first driving means for driving said switching mechanism; an escapement operatively associated with said first driving mechanism; second driving means for driving said escapement, said second driving means acting independently of said first driving means; and eddy current brake means operatively associated with said second driving means for controlling the speed thereof.

6. A periodic switch as defined in claim 5 wherein said eddy current brake means comprise a U-shaped magnet, a disc mounted for rotation between the poles of said magnet, and means for varying the field intensity of said magnet, whereby the speed of rotation of said disc may be varied.

7. A periodic switch as defined in claim 6 wherein said magnet includes a coil and wherein said means varying the field intensity of said magnet include variable resistor means in circuit with said coil.

References Cited in the file of this patent

UNITED STATES PATENTS

1,325,235	Craighead	Dec. 16, 1919
1,603,049	Hall	Oct. 12, 1926
1,795,013	Denman	Mar. 3, 1931
2,510,770	Bohn	June 6, 1950
2,596,649	Butler	May 13, 1952