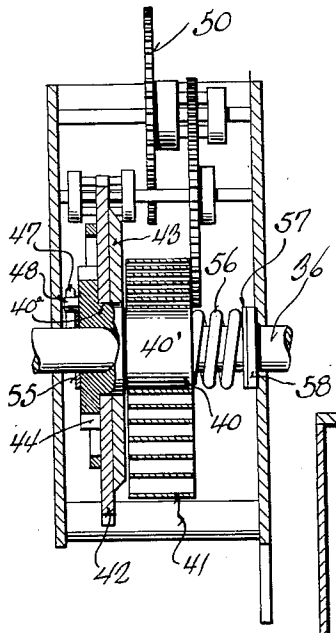
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TIME CONTROLLED MECHANISM FOR VALVES OR THE LIKE

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Fig. 4.



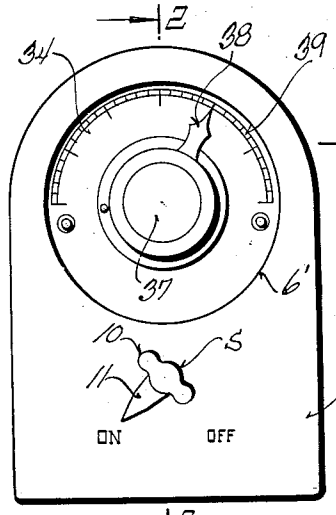


Fig. 1.

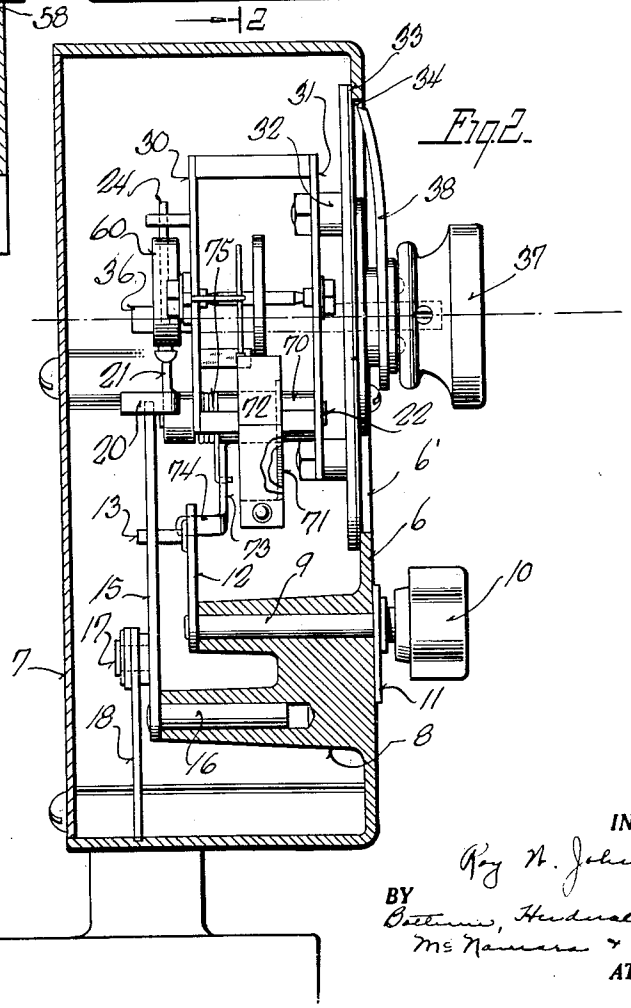


Fig. 2.

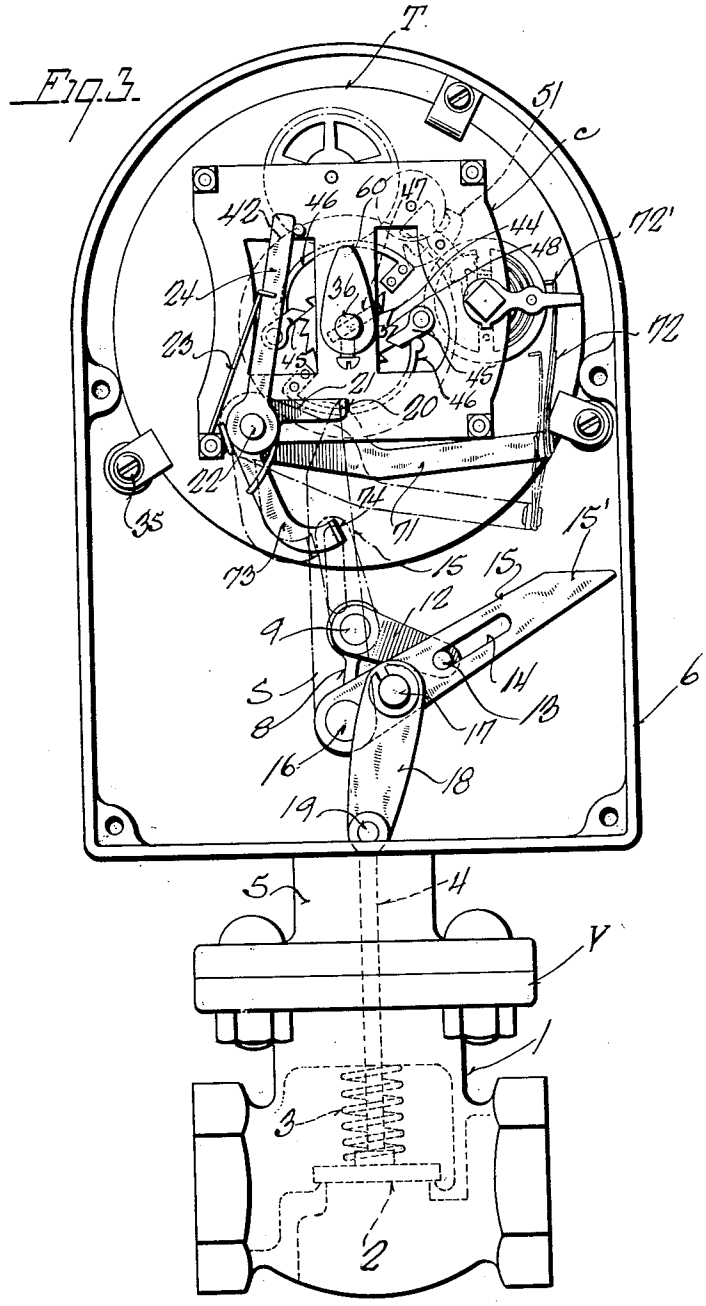
INVENTOR.
Roy W. Johnson
BY
Bottum, Hudnall, Fisher
McNamara & Michael
ATTORNEYS

Jan. 28, 1936. R. W. JOHNSON 2,028,933

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Fig. 3.



INVENTOR.

Roy N. Johnson

BY

Bottum, Hudnall, Lucas, McNamara & Michael

ATTORNEYS

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TIME CONTROLLED MECHANISM FOR VALVES OR THE LIKE

Roy W. Johnson, Milwaukee, Wis.

Application April 11, 1932, Serial No. 604,555

1 Claim. (Cl. 161—7)

This invention relates to a time controlled mechanism for regulating the action of a control means, such as a valve.

Among the objects of the invention are to provide a mechanism of this character which is simple and compact as to structure, reliable and accurate in operation, capable of easy installation, and susceptible of ready and convenient manufacture at a comparatively slight expense from materials and by means of facilities ordinarily available.

Another object of the invention is to provide a mechanism of this character which is readily set to maintain the valve open for any selected period within the range of the instrument and to insure its automatic closing at the end of such period and yet provides for the ready manual closing of the valve at any time without danger of injury to the clock work or other elements of the device.

Other objects and advantages reside in certain novel features of the construction, arrangement and combination of parts which will be hereinafter more fully described and particularly pointed out in the appended claim, reference being had to the accompanying drawings, forming a part of this specification, and in which:

Figure 1 is a view in front elevation showing one embodiment of the present invention;

Figure 2 is a view in section taken on line 2—2 of Figure 1, parts being shown in elevation for the sake of illustration;

Figure 3 is a view in rear elevation of the device, with the rear plate of the casing removed; and

Figure 4 is a sectional view showing the important features of the time controlled mechanism.

Referring to the drawings, the control means whose action is to be regulated, is illustrated as a valve designated generally at V. The valve V is of conventional construction and has the usual casing 1 and valve 2, the valve being biased to closed position by coil spring 3. The valve is provided with a valve stem 4 which passes up through a conventional stuffing box 5 and into a casing 6 which may be mounted on the stuffing box. The casing 6 has a removable rear wall 7 that is employed to house a time controlled mechanism and the setting mechanism. The lower portion of the casing 6 is provided with a bracket structure 8 on which the elements of the setting mechanism designated generally at S are mounted. The setting mechanism includes a setting shaft 9 rotatably supported in a bearing provided therefor in the bracket 8 and adjusted to an "on" and "off" position by a knob 10 fastened to its outer end. The portion of the shaft adjacent the knob and outside of the casing is provided with a pointer 11 which coacts with "on" and "off" indicia to indicate the position of the valve. The inner end of the shaft 9 has a crank 12 secured thereto and provided with a crank pin 13 which operates in a slot 14 of a setting lever 15. This setting lever is fulcrumed as at 16 on the bracket 8 and adjacent its fulcrum is pivotally connected as at 17 to one end of a link 18, the other end of which link is pivotally connected as at 19 to the valve stem 4.

When the knob 10 is turned to rotate the pointer 11 over to the "on" position, the lever 15 is swung from the full line position of Figure 3 to the dotted line position, and if, at this time, the time controlled mechanism has been set for any time other than zero, the upper tapered end 15' of the lever 15 snaps into engagement with the latching lug 20 of a latch 21. The latch 21 is rockably mounted on a pivot pin 22 and is biased into latching position by means of a latch spring 23. The latch spring 23 has one end fastened to the frame plate of a clock work designated at C and has its other end engaging a latch trip arm 24 which is interconnected with the latch 21 so as to constrain the latch 21 to partake of its movements. The latch is automatically released at the expiration of its selected time period by means of time controlled mechanism, designated generally at T.

As illustrated, this time controlled mechanism includes a pair of frame plates 30 and 31 suitably interconnected with each other. The front frame plate 31 is appropriately secured by fastening devices 32 to a panel 33 and dial 34. The panel 33 and dial 34 are in turn secured by fastening devices 35 to the margin of the opening 6' in the casing through which the dial may be viewed. Rotatably supported in the frame plates 30 and 31 is a main shaft 36. This shaft 36 has a knob 37 fixed to its outer end whereby it may be manually turned. An indicator or pointer 38 is also suitably secured to the outer end portion of the shaft and travels over the graduations 39 of the dial plate, these graduations designating minutes, or other units of time. On the shaft 36 a sleeve 40 is fitted and has a portion 40' to which the inner end of the clock spring 41 is connected, the spring being coiled in the usual fashion about the sleeve and having its other end appropriately connected to a stationary part of the clock work. The sleeve is of stepped formation (see Figure 4)

and on the step 40a thereof a large gear wheel 42 and its wear plate 43 are loosely fitted. The large gear wheel 42 abuts a ratchet wheel 44 which is integral with the sleeve 40. As shown in Figure 3, pawls 45 are pivoted to the gear wheel 42 and are urged into engagement with the ratchet wheel 44 by springs 46. A radial pin 47 extends through and is secured in a diametrical opening provided in the shaft 15 and projects beyond the periphery of the shaft. One end of pin 47 is designed and positioned to coact with a projection 48 formed rigid with or rigidly connected to the wheel 44 and extending longitudinally therefrom. With this arrangement it will be seen that when the shaft 36 is turned in one direction the pin 47 will engage the projection 48, if the clock needs winding, and turn the ratchet wheel 44, thereby also turning the sleeve 40 and winding up the spring 41. The gear wheel 42 remains stationary since the teeth of the ratchet wheel 44 click under and past its pawls 45 and inasmuch as this slight drag is not sufficient to overcome the action of the reduction gear train of which the gear 42 is an element. This reduction gear train is of conventional construction and is indicated generally at 50 and has the conventional escapement 51 associated therewith.

A frictional or slip connection is provided between the sleeve 40 and the shaft 36. In the construction shown this frictional connection consists of a friction washer 55 interposed between the outer face of the ratchet wheel 44 and the pin 47 and a coil spring 56 interposed between the other end of the sleeve 40 and a washer 57 which is backed up by an integral flange 58 formed on the shaft 36. The spring 56 is under sufficient compression to set up such frictional engagement between the parts as to cause the clock, when it is running, to rotate the shaft 36, with sufficient power to enable it to perform its function of tripping the latching mechanism at the proper time as will be described more fully hereafter. The motion is properly timed since, when the clock is running, the spring 41 turns the sleeve 40 in such direction that the teeth of the ratchet wheel 44 act through the pawls 45 to turn the gear wheel 42 which is under the control of the gear train and the escapement regulating the speed of the same. This frictional connection does, however, provide for the slippage desirable when the valve is manually opened before the expiration of the time previously selected and when, in order to effect this operation, the knob 37 is utilized to turn the pointer back to its zero position. The shaft 36 may be turned back to release or zero position without unwinding the main spring or straining any part of the mechanism.

The rearward end of the shaft 36 projects beyond the frame plate 30 and has secured thereto a cam 60. The cam 60 is designed and positioned to coact at the expiration of any selected time with the latch trip 24 and in so doing swings this trip 24 in a counter-clockwise direction, as viewed in Figure 3, thereby elevating the latch arm 21 and disengaging its latching lug 20 from the setting lever 15. When the setting lever 15 is released the spring which biases the valve to closed position acts and the valve is closed.

In order to give the clock work an initial kick to insure starting of the same when the device is set, a sleeve 70 is rotatably mounted on the pivot pin 22 (see Figure 2) and adjacent one end carries a rather long arm 71 to the outer end of which a spring finger or brush 72 is secured. The inturned end 72' of this brush engages the periphery of the balance wheel. The sleeve 70 also has a downwardly extending arm 73 fixed thereto, the extremity 74 of the arm 73 being bent at right angles to the main portion of the arm, as will be understood from Figures 2 and 3. This portion 74 of the arm 73 lies in the path of movement of the crank 12 so that when the device is set the crank, in moving to its set position, strikes the portion 74 and rotates it and its arm 73, thereby causing partial rotation of sleeve 70 and downward swinging of arm 71 with the result that the end 72' of the finger or brush 72 gives an initial kick or starting impetus to the balance wheel. When the device automatically trips at the end of the selected time period, the starting arrangement is returned to its initial position by means of a coil spring 75 having one end engaged with the arm 73 and the other end engaged with the frame plate 30.

In operation, when the valve is to be turned on, the knob 37 is rotated until the pointer 38 comes opposite the graduation indicating the desired time interval. The setting knob 10 is then turned to the "on" position. This causes the valve to be opened and to be latched in open position due to the engagement of the latch 21 with the setting lever 15. At the expiration of the selected time period, the cam 60 wipes against the trip lever 24 to disengage the latch of the setting lever and permit the valve to close.

While I have shown and described one embodiment of the present invention it is to be understood that the construction shown has been selected merely for the purposes of illustration and that various changes in the size, shape and arrangment of the parts may be made without departing from the spirit of the invention or the scope of the subjoined claim.

The invention claimed is:

Time controlled mechanism comprising a clockwork, a manually rotatable shaft, a friction coupling between the shaft and the clockwork whereby the shaft is driven from the clockwork, a trip carried by the shaft, a latch pivotally mounted adjacent the clockwork and in cooperative relation to the trip, a single setting lever having one end pivotally supported and having its other end cooperable with the latch, the intermediate portion of the trip being provided with a slot, and a manually operable set shaft provided with a crank having a pin operatively fitted in said slot.

ROY W. JOHNSON.