April 8, 1952 E. GOODROAD ET AL 2,592,024

TIMING VALVE

Filed May 25, 1949 2 SHEETS—SHEET 1

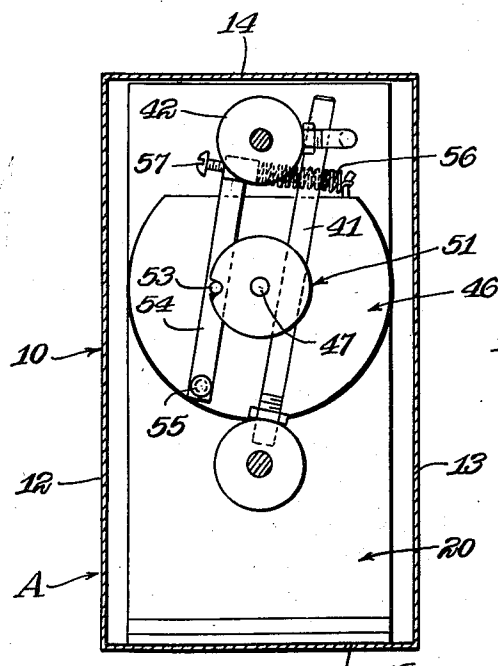


Fig. 4

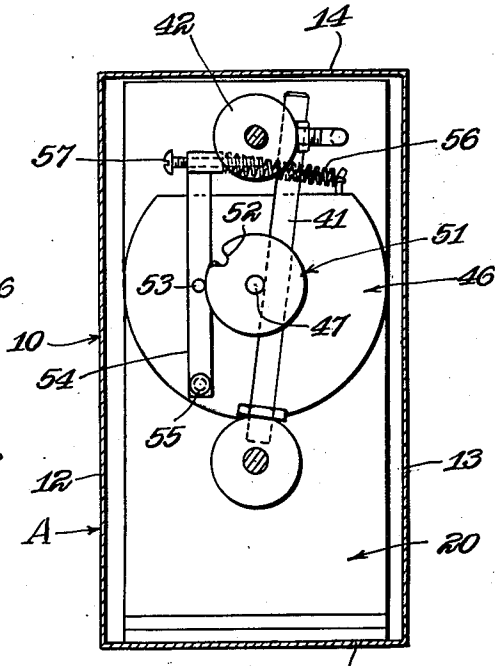


Fig. 5

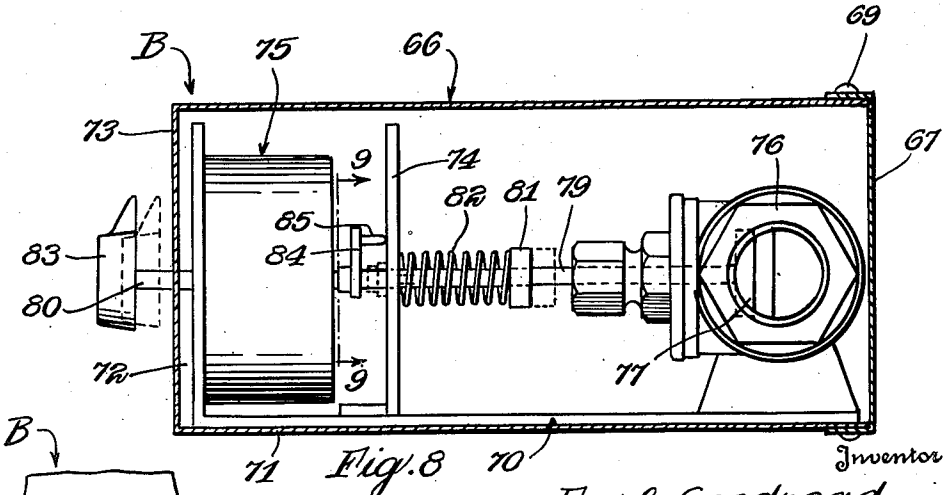


Fig. 8

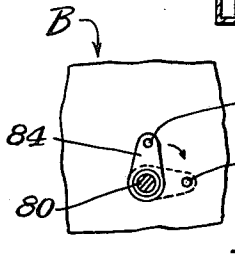


Fig. 9

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TIMING VALVE

Filed May 25, 1949 2 SHEETS—SHEET 2

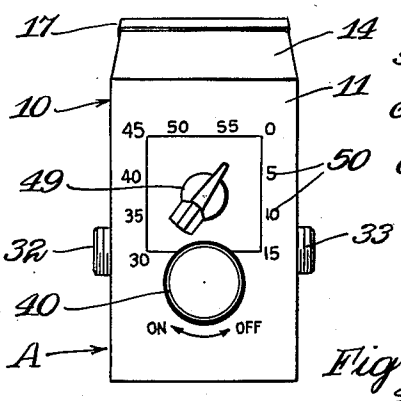


Fig. 1

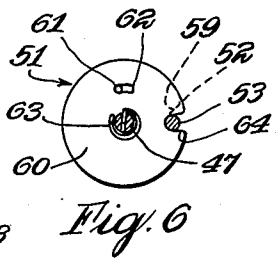


Fig. 6

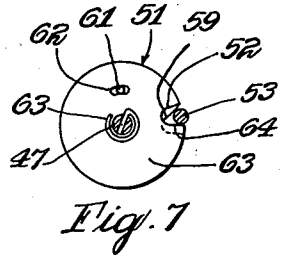


Fig. 7

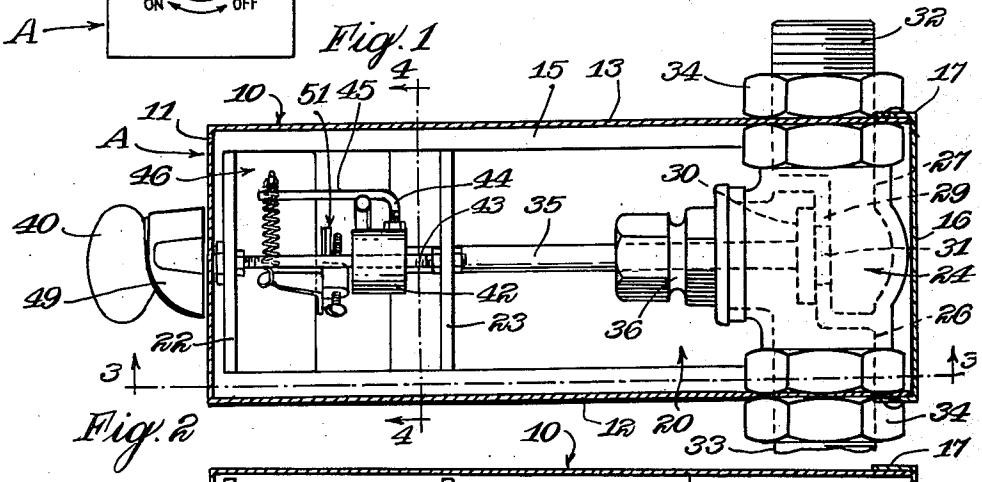


Fig. 2

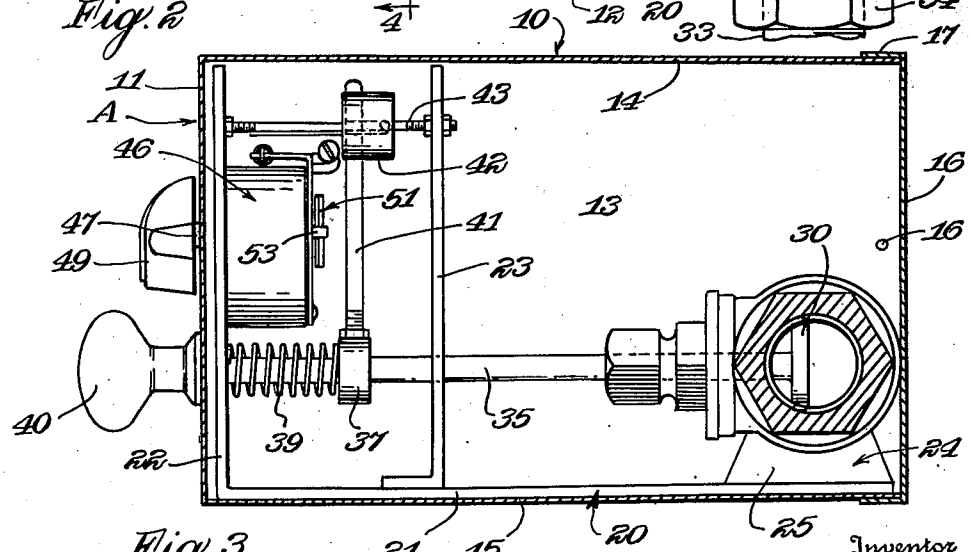


Fig. 3

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# UNITED STATES PATENT OFFICE

2,592,024

## TIMING VALVE

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Application May 25, 1949, Serial No. 95,184

6 Claims. (Cl. 161—7)

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Our invention relates to an improvement in fluid timing valve wherein it is desired to provide a timing device for actuating a valve in a fluid line.

Considerable fluid is wasted from time to time due to the lack of an inexpensive timing valve for controlling the operation of a fluid line. For example in watering a lawn or garden, it is often desirable to limit the watering period so that the attendant will not forget that the water is on and let the water run indefinitely. Similarly in supplying water to stock tanks and the like, it is usually necessary to turn on the water manually and to turn it off after a period of time. This requires the use of unnecessary time by an attendant in order to prevent the waste of water.

An object of the present invention lies in the provision of a simple timing valve which may close a valve in a fluid line after a predetermined time period. This timing valve may be set when the valve is opened and will act to close the valve after a predetermined period of time. As a result a fluid line may be turned on and forgotten as the fluid will be turned off after a desired period of time.

An added feature of the present invention lies in the provision of a timing apparatus which may act as a means of actuating a fluid valve. The timing mechanism may be operable through any desired time cycle and the valve may be mechanically held out of one extreme position. Resilient means are usually provided for urging the valve toward its other extreme position and means are provided actuated by the timing mechanism for releasing the valve so that it may be resiliently actuated after a predetermined period of time.

These and other objects and novel features of our invention will be more clearly and fully set forth in the following specification and claims.

In the drawings forming a part of our specification:

Figure 1 is a front perspective view of our timing device showing the general construction of the casing and controls.

Figure 2 is a sectional view through the casing looking down upon the operating mechanism.

Figure 3 is a side elevation view of the mechanism, the position of the section being indicated by the line 3—3 of Figure 2.

Figure 4 is a sectional view through the timing mechanism, the position of the section being indicated by the line 4—4 of Figure 2.

Figure 5 is a sectional view similar to Figure 4 showing the timing mechanism in timing position.

Figure 6 is a detail view of the cam used in conjunction with our timing apparatus.

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Figure 7 is a view similar to Figure 6 showing the parts of the cam in a different rotative position.

Figure 8 is a view similar to Figure 2 showing a modified form of construction.

Figure 9 is a sectional view showing a detail portion of our device.

The timing device A is preferably enclosed within a housing or casing 10. The housing 10 is generally rectangular in form and includes a front wall panel 11, side wall panels 12 and 13 and top and bottom panels 14 and 15 respectively. The rear end of the casing opposite the front panel 11 is open and is closed by a closure panel 16 having an encircling flange 17 thereupon which embraces a portion of the side, top and bottom walls of the casing 10 next to the open end thereof. The rear closure panel 16 is held in place by any suitable means such as by cap screws or metal screws 19 extending through the side walls 13 and 14 and through the closure flange 17.

A supporting frame 20 is provided within the casing 10 to support the various elements of the timing mechanism. The supporting frame 20 includes a base panel 21 and a front mounting panel 22 extending upwardly therefrom. An upwardly extending mounting panel 23 is secured to the base 21 in spaced relation to the mounting panel 22. This supporting frame acts to support the mechanism of the device and is enclosed within the casing or housing 10.

A valve 24 is mounted within the housing 10 upon the base panel 21 near the rear end thereof. The valve 24 is supported by a supporting stand 25 shown in Figure 3. The valve 24 includes opposed inlet and outlet passages 26 and 27 and a ported partition 29 extending therebetween. A valve element 30 is engageable against the ported partition 29 to close the opening 31 therethrough. The specific form of the valve is not important in the present invention and the valve shown is merely illustrative. Furthermore, either of the passages 26 or 27 may form the inlet of the device.

The ends of the valve are provided with nipples 32 and 33 which are threaded into the outlet and inlet passages 27 and 26. Lock nuts 34 are provided on the nipples 32 and 33 to hold the nipples in place relative to the casing 10. The lock nuts 34 are preferably integral with the nipples 32 and 33 and provide a means of rotating them. The nipples 32 and 33 extend through the side walls 13 and 12 of the housing 10 and hold the valve in fixed relation to the housing.

The valve element 30 is secured to a valve stem 35 which is shown as extending at right angles

to the axes of the inlet and outlet ports. The stem 25 extends through a suitable packing gland 36 to prevent the escape of fluid. By reciprocating the valve stem 35 the valve element 30 may be moved from open position to closed position. A collar 37 is mounted on the shaft 35 at a point spaced from the mounting panel 22. A spring 39 is interposed between the mounting panel 22 and the collar 37 tending to urge the valve element 30 into closed position. The valve stem 35 extends through the mounting panels 22 and 23 and through the front panel 11 of the housing 10. A knob 40 is mounted upon the exposed end of the valve stem 35 by means of which the valve stem may be reciprocated manually.

An arm 41 is secured to the collar 37 to extend radially with respect thereto. The arm 41 extends upwardly between the mounting panels 22 and 23 and is designed to engage with a collar 42 mounted upon a rod 43 extending between the mounting panels 22 and 23. The collar 42 is held in adjusted position upon the fixed rod 43 and acts as a shoulder against which the arm 41 may engage. An arm 44 is secured to the collar 42 and extends radially therefrom and is then bent at right angles to provide an arm end 45 extending parallel to the fixed rod 43. Thus the upper extremity of the rod 41 is confined between the fixed rod 43 and the second fixed rod 44.

The collar 42 acts as a means of holding the valve element 30 in open position. In opening the valve the knob 40 is pulled outwardly until the arm 41 is clear of the collar 42 whereupon the valve stem 35 may be rotated by the knob so that the arm 41 engages the collar 42. The arm 41 will not remain engaged with the collar 42 unless the timing mechanism is in operation as will be later described in detail.

The timing mechanism is illustrated in general by the numeral 46. The details of this timing mechanism are not illustrated, as numerous such devices are commercially available. The timing device is always under spring tension and rotates continually at a fixed rate of speed until it is mechanically stopped from rotation. A stop is provided for limiting the movement of the timing apparatus and for keeping the operating spring from unwinding beyond a predetermined extent.

The timing mechanism includes an operating shaft 47 which projects through the mounting panel 22 and also through the front wall 11 of the housing. A knob 49 is mounted upon this shaft by means of which the shaft may be rotated. Indicia 50 is provided on the front panel 11 of the housing to indicate time intervals. For example in the specific form of construction illustrated the timer is arranged to make one complete revolution in sixty minutes. Thus when the knob 49 is rotated in a clockwise direction as viewed in Figure 1, the timing mechanism will start to function to rotate the shaft 47 in a counter-clockwise direction at the rate of one revolution per hour in the specific construction shown.

A cam 51 is mounted upon the shaft 47 to rotate in unison therewith. This cam is provided with a notch 52 in its periphery which is engageable with a pin 53 mounted upon a pivoted trip lever 54. The trip lever 54 is pivoted at 55 to the timer casing and is urged in one rotative direction by a spring 56. A set screw 57 is adjustably supported upon the trip lever 54 and the end of this set screw 57 is engageable with the arm 41 to disengage the arm from the collar 42.



In actual practice the cam 51 is made as best illustrated in Figures 6 and 7 of the drawings and includes a first disc 59 which is secured to the shaft 47 for rotation in unison therewith and a second disc 60 which is secured to the first disc for limited rotation with respect thereto. The relative rotation between the two discs may be regulated by a pin 61 mounted on the disc 59 and extending through a slot 62 in the disc 60. A spring 63 may urge the disc 60 toward one extreme position.

The disc 60 is provided with a notch 64 of just sufficient width to slidably engage about the pin 53. The cam disc 59 is provided with a notch 52 having an inclined side. As the shaft 47 is rotated in the clockwise direction as viewed in Figures 6 and 7, the pin 53 will ride up the inclined side 52 of the cam disc 59, the notched disc 60 pivoting somewhat relative to the disc 59 to permit this action. As soon as the pin 53 is in engagement with the outer periphery of the discs 59 and 60, the disc 60 shifts so that the deepest portions of the notches 52 and 64 are in registry as viewed in Figure 6. Thus as the two discs rotate slowly in a counter-clockwise direction, the pin 53 remains in engagement with the periphery of the discs until sufficiently aligned therewith to quickly drop into the notches. This arrangement is designed to permit a quick operation of the trip lever 54 rather than the gradual operation, which would otherwise be necessary if the second cam disc 60 were not provided.

In operating the timer A the pointer 49 is rotated until the end thereof indicates a proper time interval. In other words, the pointer 49 may be rotated in a clockwise direction until it points to ten, fifteen, or any other of the indicia 50 to produce the desired time interval. The knob 40 is then pulled outwardly to open the valve element 30 and the knob is rotated in a clockwise direction until the arm 41 engages the collar 42.

While the timer 46 is in operation the trip lever 54 is in the position shown in Figure 5 with the pin 53 in engagement with a portion of the periphery of the disc. The timer continues until the pin 53 may drop into the notches 52 and 64 of the cam 51 at which time the trip lever 54 pivots into the position shown in Figure 4 of the drawings. This is accomplished by engagement of the set screw 57 with the arm 41. As soon as the arm 41 is swung out of engagement with the collar 42, the spring 39 forces the valve element 30 into closed position, thus closing the valve.

Obviously the timing mechanism may be arranged so that the valve will be open after a predetermined time interval when such an arrangement is desired. However, it is more commonly desired to leave the valve open for a time interval and then to close the same.

In Figures 8 and 9 of the drawings we disclose a timing valve B of somewhat simpler construction. The valve B includes a casing 66 similar to the casing 10 and closed at one end by an end closure 67 provided with a peripheral flange 69 which lies in telescoping relation to the housing end. A frame 70 is supported within the casing 66 and includes a bottom panel 71 and an upwardly extending mounting panel 72. The mounting panel 72 is in parallel spaced relation to the front casing panel 73. A second mounting panel 74 is secured to the base panel 71 in parallel spaced relation to the mounting panel 72. A timing mechanism 75 is secured to the mounting panel 72.

A valve 76 similar to that previously described is provided with a valve element 77 by means of

which the valve may be closed. A valve rod or stem 79 is provided on the valve element 77 and this valve rod 79 forms an extension of the shaft 80 of the timing mechanism 75. The shaft 80 is slidably and rotatably supported by the timing mechanism.

A collar 81 is mounted upon the valve rod 79 and a spring 82 is interposed between this collar 81 and the mounting panel 74 to urge the valve element 77 toward one extreme position. The timing shaft 80 forming a continuation of the valve stem 79 is provided with a knob 83 on its outer extremity by means of which the shaft 80 may be rotated. The shaft 80 extends through the mounting panel 72 and the front wall 73 of the housing.

An arm 84 is mounted upon the timing shaft 80 for rotation in unison therewith. This arm 84 is provided with a pin 85 near its outer extremity which is engageable through an aperture 86 in the mounting panel 74 in one rotative position of the arm 84.

Upon rotation of the shaft 80 the pin 85 drops into the aperture 86 to limit rotation of the timing shaft 80. However, in all other angular positions the rounded end of the pin 85 bears against the mounting panel 74 and holds the valve element 77 in open position.

The operation of the timing device B is extremely simple. The valve 76 is opened by an outward pull upon the knob 83. After pulling the valve rod outwardly the knob 83 is rotated so that the pointer points to suitable indicia indicating a desired time interval. The pin 85 holds the valve element 77 in open position while the arm 84 is slowly rotated by the timing mechanism 77. When the pin 85 comes into registry with the aperture 86 the pin drops into this aperture as the valve stem 79 and shaft extension 80 are moved longitudinally by the spring 82.

Thus it will be seen that our timing device will act to hold a valve in one extreme position for a timed interval, and will then be resiliently urged into its other extreme position. As a result a flow of fluid through the valve may be continued or discontinued for a predetermined timed interval.

In accordance with the patent statutes, we have described the principles of construction and operation of our timing valve, and while we have endeavored to set forth the best embodiment thereof, we desire to have it understood that obvious changes may be made within the scope of the following claims without departing from the spirit of our invention.

We claim:

1. A timing valve comprising a valve movable between two extreme positions, a valve stem slidably and rotatably supported for moving said valve between extreme positions, a laterally projecting arm fixedly mounted on said valve stem for rotation therewith, a fixed shoulder against which said arm may engage to hold said valve in one extreme position, means urging said valve toward the other extreme position, a timing mechanism, and lever means actuated by said timing mechanism for rotating said arm to thereby disengage said arm from said shoulder means.



2. The structure described in claim 1 and including means for manually setting said timing mechanism.

3. The structure described in claim 1 and including cam means associated with said timing mechanism, the lever means being actuated by said cam means for disengaging said arm from said shoulder means.

4. A timing valve comprising a valve movable between open and closed positions, said valve having means normally biasing said valve toward one of said positions, manually operable means for moving said valve to the other of said positions, a laterally extending arm carried by said stem for rotation in a plane substantially perpendicular to the axis of said stem, a cooperable member engageable with said arm, timing mechanism, and a lever associated with said timing mechanism for rotating the arm to cause its disengagement from said cooperable member.

5. A timing valve comprising a valve movable between two extreme positions, a valve stem slidably and rotatably supported for moving said valve between extreme positions, an arm projecting from said valve stem, a fixed shoulder against which said arm may engage to hold said valve in one extreme position, means urging said valve toward the other extreme position, a timing mechanism, cam means associated with said timing mechanism, and a pivotally mounted lever actuated by said cam means, and means on said lever engageable with said arm for disengaging same.

6. A timing valve comprising a valve movable between two extreme positions, a valve stem slidably and rotatably supported for moving said valve between extreme positions, an arm projecting from said valve stem, a fixed shoulder against which said arm may engage to hold said valve in one extreme position, means urging said valve toward the other extreme position, a timing mechanism, cam means rotated by said timing mechanism, a pivoted lever including cam follower means engaging the periphery of the cam, resilient means for urging the follower against the cam, a notch in said cam into which said follower extends to stop movement of said timing mechanism, and means on said lever engageable with said arm for disengaging the same from said shoulder means.

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