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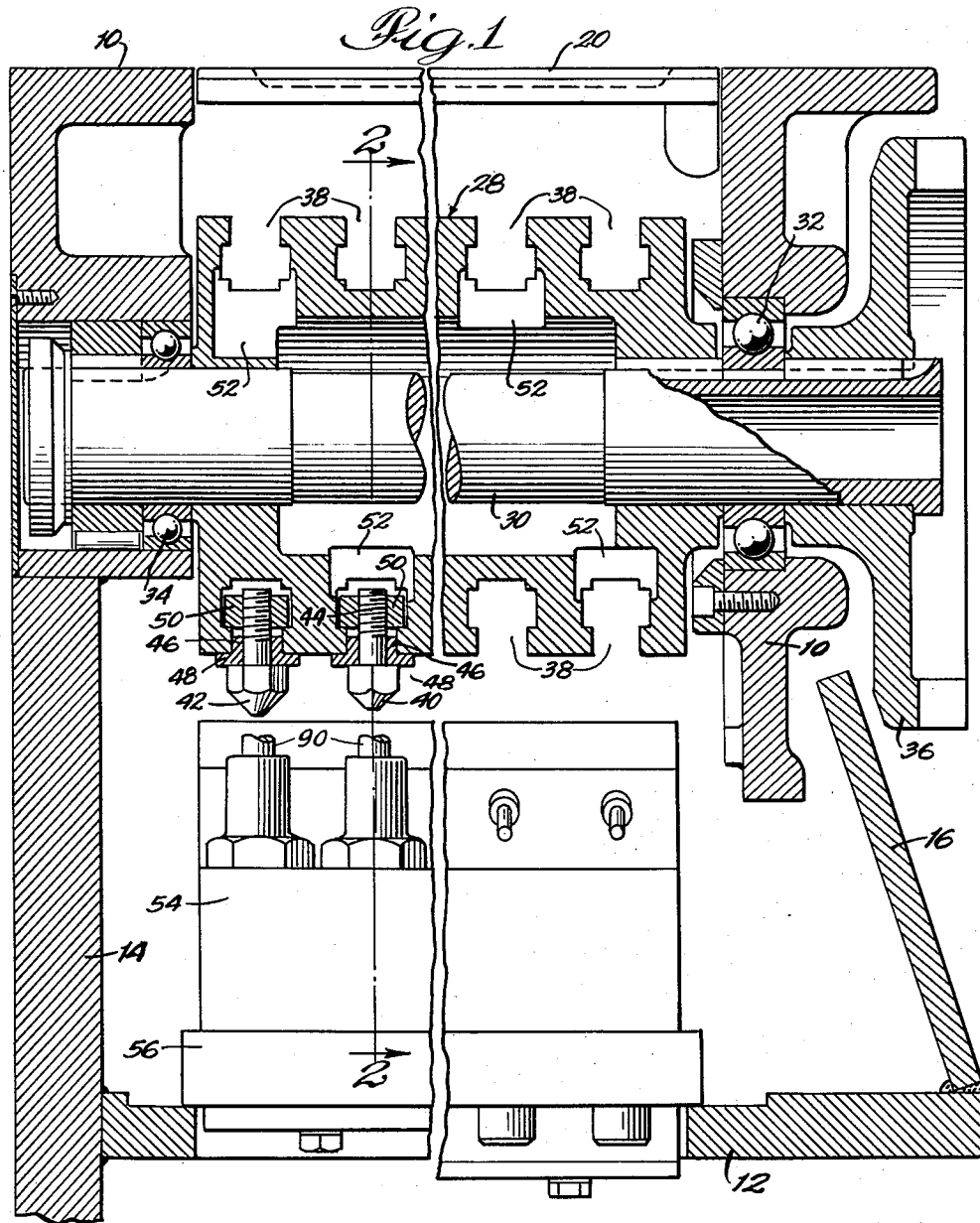
J. R. HAMILTON

2,924,103

TIMER FOR GLASSWARE FORMING MACHINES AND THE LIKE

Filed Jan. 20, 1958

3 Sheets-Sheet 1



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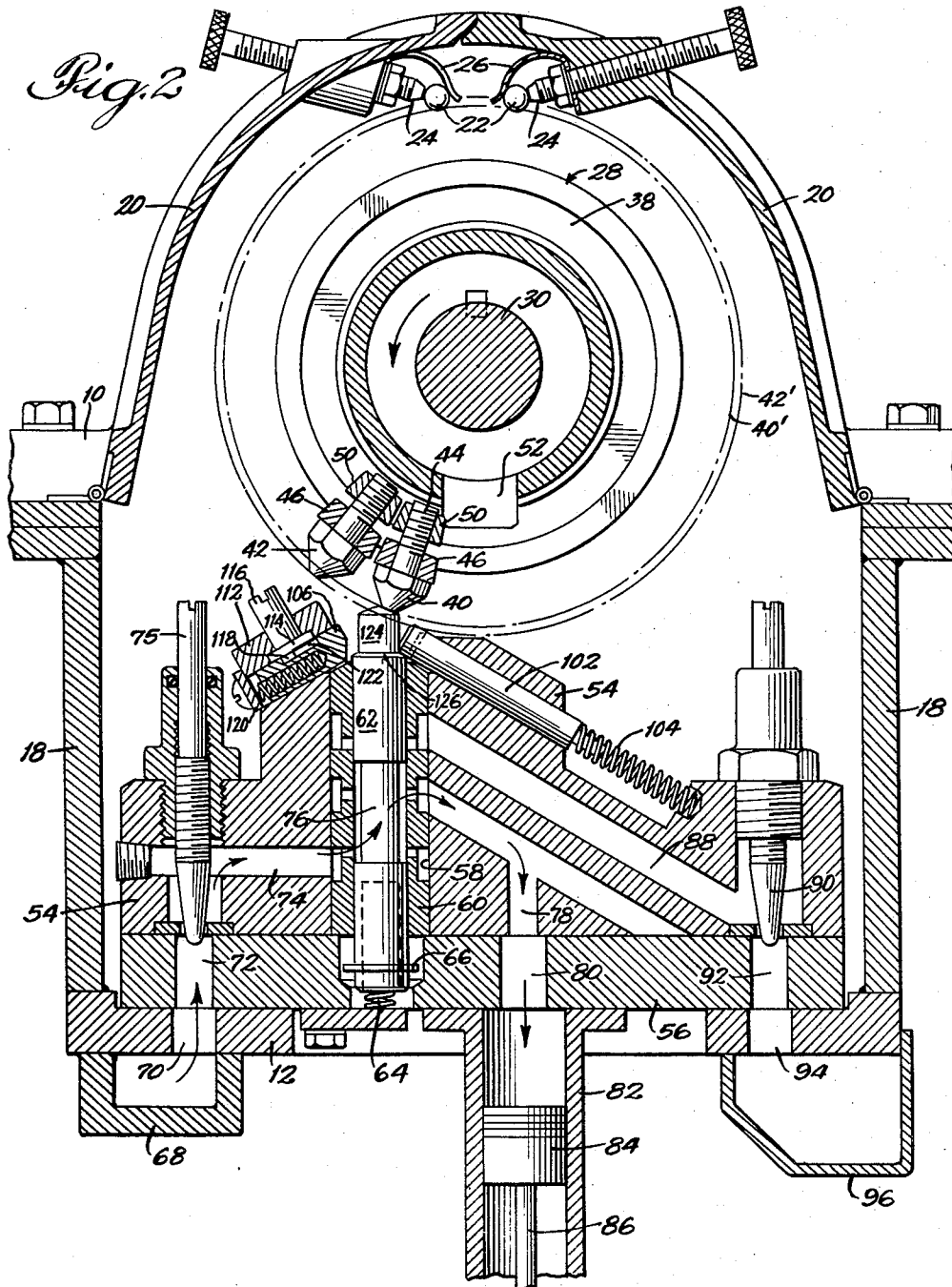
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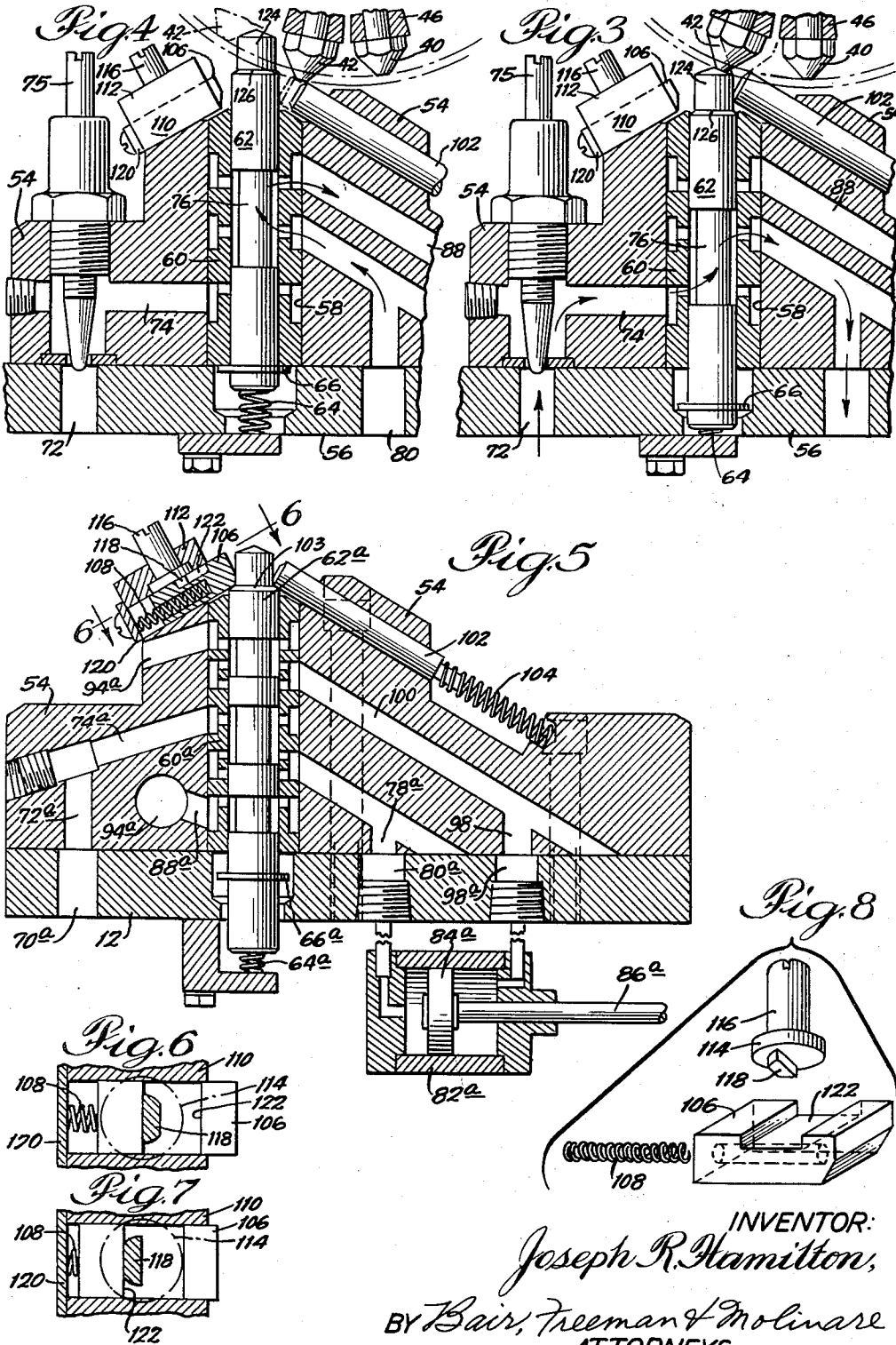
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TIMER FOR GLASSWARE FORMING MACHINES AND THE LIKE

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7 Claims. (Cl. 74—2)

This invention relates to a timer for glassware forming machines and the like wherein valves for the control of compressed air or hydraulic fluid under pressure are controlled (shifted from one position to another) by a timer drum.

One object of the invention is to provide a timer of simple, durable and inexpensive construction in which valve plungers normally biased to normal positions are actuated by certain valve actuating pins on a timer drum to non-normal positions. The valve plungers are provided with automatic latches in their non-normal positions, and cooperation between other valve actuating pins and the latches unlatch the valve plungers for return to their normal positions.

Another object is to provide a valve plunger adapted to be actuated in one direction by a valve actuating pin of one length and automatically latched in that position, a longer valve actuating pin in alignment with the first one also cooperating with the valve plunger and additionally coacting with the latch to effect an unlatching operation.

A further object is to provide a timer construction of this general character adaptable for both 3-way and 4-way valves, and for both air and hydraulic operation depending on the requirements of the glassware forming machine.

Still a further object is to provide manual latches for the valve plungers for latching them in their non-normal positions in the event it is undesirable for the mechanisms controlled thereby to remain inoperative.

With these and other objects in view, my invention consists in the construction, arrangement and combination of the various parts of my timer, whereby the objects above contemplated are attained, as hereinafter more fully set forth pointed out in my claims and illustrated in detail on the accompanying drawings, wherein:

Fig. 1 is an axial sectional view through a timer drum and the timer mechanism embodying my present invention;

Fig. 2 is a vertical sectional view on the line 2—2 of Fig. 1 showing a valve in non-normal (automatically latched) position;

Fig. 3 is a similar sectional view showing the valve in non-normal position just prior to the unlatching thereof during a cycle of operation of the valve;

Fig. 4 is a similar sectional view showing the valve in normal position just after the unlatching thereof has been completed;

Fig. 5 is a sectional view similar to Figs. 3 and 4 showing a modified construction for a 4-way valve instead of a 3-way valve as shown in Figs. 2, 3 and 4;

Fig. 6 is a sectional view on the line 6—6 of Fig. 5 to show details of a manual latch in operative position;

Fig. 7 is a similar sectional view showing the manual latch in inoperative position; and

Fig. 8 is a perspective view of the manual latch and its actuating mechanism.

On the accompanying drawings I have used the refer-

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ence numeral 10 to indicate a timer housing. A valve mounting plate is shown at 12 and is connected to the housing 10 by end plates 14 and 16 and a pair of side plates 18, the assembly being welded together.

Hinged covers 20 are provided to enclose the timer mechanism. As shown in Fig. 2 these are limited in their closed positions by means of stop screws 24 engaging stop pins 22 and are retained in closed position by spring catches 26. The covers 20 may be readily opened by using the stop screws 24 as handles and forcing the spring catches 26 to unlatch relative to the stop pins 22 for the purpose of adjusting valve actuating pins on a timer drum 28 as will hereinafter appear.

The timer drum 28 is mounted on a timer shaft 30 which is journaled in suitable bearings 32 and 34. At 36 a timer shaft driving element (such as a clutch jaw) is illustrated and may be operatively connected with the glassware forming machine to rotate the timer drum 28 in synchronism therewith.

Timer drum grooves are illustrated at 38 and the timer drum may have any desired number of these grooves depending on the requirements of the glassware forming machine. Usually one to two dozen grooves are required, only four thereof being shown in Fig. 1. For each groove there may be air valves and/or hydraulic valves as required. Valve actuating pins 40 and 42 are provided for actuating these valves, the pins 42 being longer than the pins 40 for a purpose which will hereinafter appear. The pins 40 and 42 have threaded studs 44 extending through blocks 46 and into rectangular nuts 50. As shown in Figs. 1 and 2 the blocks 46 have flanges 48 to engage the periphery of the drum, and the nuts 50 are located in undercut portions of the grooves 38 so that the pins may be readily adjusted around the grooves to any angular position on the drum and then retightened. In Fig. 1 I illustrate nut openings 52 for convenience of mounting the nuts 50 in the grooves 38. This is done by inserting the rectangular nut through the groove while turned lengthwise of the groove and into the opening 52, then turning the nut 90° to lie crosswise of the groove and pulling it back out to the final position shown in Figs. 1 and 2, and tightening the pin 40 (or 42).

A valve body is shown at 54 and a valve body cover plate at 56. The elements 54 and 56 extend the length of the timer drum as illustrated in Fig. 1 and the valve body has a valve bore 58 in alignment with each of the timer drum grooves 38. A valve sleeve 60 is pressed therein and suitably ported in the usual way for controlling the flow of compressed air or hydraulic fluid. A valve plunger 62 is provided which is normally in the position of Fig. 4 under the action of a return spring 64 with a stop flange 66 thereof engaging the outer end of the valve sleeve 60.

In Fig. 2 a supply manifold 68 is shown with passages 70 and 72 leading therefrom to an inlet passageway 74 to the sleeve 60. A flow adjusting needle valve 75 is interposed between the passageways 72 and 74 to control the rate of flow of compressed air or hydraulic fluid from the manifold 68 to the valve plunger 62.

Passageways 78 and 80 lead from the valve 62 to a device to be controlled such as a cylinder 82 having a piston 84 therein and a stem 86 for actuating an element of the glassware forming machine. In this type of construction there is usually constant air pressure against the under side of the piston 84 for returning it when the compressed air or hydraulic fluid is let out of the cylinder 82, or the piston may be returned by a return spring, weight or the like.

When the valve plunger 62 is in the position of Fig. 2 actuating fluid flows from 68 to 82 as indicated by the arrows whereas in the position of Fig. 4 the actuating

fluid returns as indicated by the arrows and leaves the valve plunger 62 by way of an outlet passageway 88 from the valve past a rate-of-flow-adjusting needle valve 90 and through passageways 92 and 94 to an outlet manifold 96 that may lead to the oil tank, or may discharge to atmosphere in case compressed air is the actuating medium.

In Fig. 5 I show a modified construction with parts such as 60a to 98a corresponding to similar parts (without the *a* designation) described in Figs. 3 and 4. The valve here shown is one of the 4-way type and the valve sleeve 60a and the plunger 62a are modified so as to be adaptable for 4-way control as distinguished from 3-way control. The device to be actuated in this case may be a 2-way piston 84a in a cylinder 82a with return actuation by way of a return passageway 100 supplying actuating fluid to the piston rod end of the piston 84a in the usual manner. A pair of outlets 94a are illustrated for the exhaust of air to atmosphere, whereas in the case of hydraulic fluid these would be connected to a return line leading back to the hydraulic fluid reservoir.

Latch pins 102 are provided for the valve plungers 62 to cooperate with latch shoulders 103 thereof as shown in Figs. 2 and 5 and these are normally in the extended positions therein shown under the action of springs 104. The operation of the latch pins will be later described.

In the operation of glassware forming machines it is desirable to prevent the operation of certain actuating elements at certain times so that adjustments or replacements may be made. If the control valves for these elements are rendered inoperative, the desired result is accomplished. I show manual latches 106 for the valve plungers 62 and 62a in their non-normal positions. The manual latches are slidable in ways of a bar 110 having a cover plate 112 thereon and normally assume the extended position of Figs. 5 and 6 under the bias of manual latch springs 108 backed by a bar 120. Manual latch actuators 114 are provided in the form of discs having stems 116 and off-center actuating projections 118. The projections 118 are received in cross slots 122 of the latches 106 and, as shown in Figs. 6 and 7, may be in one position for allowing the springs 108 to extend the latches to the operative position of Figs. 5 and 6 or may be rotated either clockwise or counterclockwise by means of a screw driver in a cross slot of the stem 116 to cause the latch to assume the inoperative position of Fig. 7. This is the retracted position also shown in Figs. 2, 3 and 4. The projection 118 has flat side faces to cooperate with the left face of the cross slot 122 under bias of the spring 108 and thus retain the latch 106 in either its operative or inoperative position.

Practical operation

In the operation of my timer the valve plunger 62 is normally in the position of Fig. 4 under the action of the return spring 64. By means of dotted lines the short valve actuating pin 40 is shown in Fig. 4 just starting to engage the plunger 62. Further rotation counterclockwise will cause it to depress the plunger as to the position of Fig. 2 which is the maximum depression and sufficient to permit the latch pin (which was previously riding the side of the plunger 62 as shown by dotted lines in Fig. 2) to project against a reduced portion 124 of the plunger and thus overlie a latch shoulder 126 thereof. The valve is now latched in the non-normal position illustrated until such time as it is unlatched by the long valve actuating pin 42.

Referring to Fig. 3, it will be noted that the long pin 42 has engaged the plunger 62 and depressed it. Dot and dash circles 40' and 42' are shown to illustrate that the pin 42 is longer than the pin 40. Accordingly, the pin 40 misses the latch pin 102 but after the pin 42 leaves the plunger 62 it engages the latch pin 102 (dotted position in Fig. 3) and moves it toward the right from the position of Fig. 3 to the position of Fig. 4 and slips past the latch pin to release it (the position illustrated in Fig. 4) permitting it to spring back to the dotted position in

engagement with the surface of the plunger 62 until the short actuating pin 40 again comes around to engage the valve plunger whereupon the cycle is repeated. Thus, the short pin 40 latches the valve plunger in the non-normal position and the long pin 42 unlatches it, and while the pin 42 also depresses the valve plunger (and does so more than the pin 40) there is no change in air flow as indicated by the arrows in Fig. 3 as the valve lands and the reduced portion 76 thereof may be suitably positioned to take care of this additional depression of the valve plunger. The long pin 42, however, projects to the circle 42' so that it engages the latch pin for unlatching it and holds it unlatched until the plunger 62 can spring back to the normal position of Fig. 4. Thus, the pins 40 and 42 may be in alignment in the same groove of the timer instead of out of alignment and in different grooves thereof which would require twice as many grooves.

The timer is also adaptable for 4-way valves as well as 3-way valves. Fig. 5 illustrates this possibility and obviously the 4-way valve may also be used for compressed air, hydraulic fluid under pressure, or any other actuating fluid.

Some changes may be made in the construction and arrangement of the parts of my timer for glassware forming machines without departing from the real spirit and purpose of my invention, and it is my intention to cover by my claims any modified forms of structure or use of mechanical equivalents which may reasonably be included within their scope.

I claim as my invention:

1. In a timer of the class described, a timer drum having a peripheral groove therein, a pair of actuating pins adjustable in said groove to desired angular positions with respect to said drum, one pin of said pair of pins being short and the other thereof being long, a support, an actuable element movable on said support, biased to an extended position and adapted to be engaged by said pair of actuating pins, said actuable element having a latch shoulder, an automatic latch pin therefor movable on said support and biased to an extended position overlying said latch shoulder, said latch pin being held retracted by said actuable element when in extended position, said short actuating pin being engageable with said actuable element to depress it to non-extended position whereupon it is latched by said latch pin, said short actuating pin being out of the path of said latch pin, and said long actuating pin being engageable with said actuable element to depress it to its non-extended position and also engageable with said latch pin to retract it sufficiently to allow said plunger to move to said extended position.

2. In a timer of the class described, a timer drum having a peripheral groove therein, a pair of actuating pins adjustable in said groove to desired angular positions with respect to said drum, one pin of said pair of pins being longer than the other, a support, an actuable element movable on said support, biased to an extended position and adapted to be engaged by said pair of actuating pins, said actuable element having a latch shoulder, a latch pin therefor movable on said support and biased to an extended position overlying said latch shoulder, the short one of said actuating pins being cooperable with said actuable element to depress it to non-extended position whereupon it is latched by said latch pin, said short actuating pin being out of the path of said latch pin, the long one of said pair of actuating pins being also cooperable with said actuable element to depress it to its non-extended position and further cooperable with said latch pin to retract it sufficiently to allow said actuable element to move to said extended position.

3. A timer comprising a rotatable timer element, a pair of actuating pins adjustable to desired angular positions thereon, one of said pins being longer than the other, a support, an actuable element which is movable on said support, biased to an extended position and adapted to be engaged by said pair of actuating pins, a

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latch movable on said support, said actuatable element being biased to an extended position, said latch being held retracted by said actuatable element when in extended position, the short one of said actuating pins being cooperable with said actuatable element to depress it to non-extended position whereupon it is automatically latched by said latch, said short actuating pin being out of the path of said latch, the long one of said actuating pins also engaging said actuatable element to depress it to its non-extended position and thereafter engageable with said latch pin to retract it sufficiently to allow said actuatable element to move to said extended position.

4. In a timer, a timer drum having a groove therein, a pair of actuating pins adjustable in said groove to desired angular positions with respect to said drum, one of said pins being short and the other being long, a support, an actuatable element movable on said support, biased to an extended position and adapted to be engaged by said pair of actuating pins, and an automatic latch for said actuatable element movable on said support and biased to an extended latching position, said latch being held retracted by said actuatable element when in extended position, said short actuating pin being engageable with said actuatable element to depress it whereupon it is latched by said latch, said short actuating pin being out of the path of said latch, said long actuating pin being engageable with said actuatable element to depress it to its non-extended position and also engageable with said latch to retract it to unlatching position.

5. In a timer, a drum having a peripheral groove therein, a pair of actuating pins adjustable in said groove to desired angular positions with respect to said drum, one pin of said pair of pins being longer than the other, a support, an actuatable element movable on said support, biased to extended position and adapted to be engaged by said pair of actuating pins, said actuatable element having a latch shoulder, a latch pin therefor movable on said support and biased to an extended position overlying said latch shoulder, the short one of said pair of actuating pins being cooperable with said actuatable element to depress it to non-extended position whereupon it is latched by said latch pin, said short actuating pin being out of the path of said latch pin, the long one of said pair of actuating pins being also cooperable with said actuatable element to depress it to its non-extended position and further cooperable with said latch pin to retract it sufficiently to allow said plunger to move to said extended position, means to manually latch said actuatable element in its non-extended position comprising a latch element normally extended to latching position, and a latch actuating element for moving said latch element to either its latched or unlatched position.

6. In a timer, a drum having a peripheral groove therein, a pair of actuating pins adjustable in said groove to desired angular positions with respect to said drum, one pin of said pair of pins being short and the other thereof being long, a support, an actuatable element movable on said support, biased to an extended position and adapted

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to be engaged by said pair of actuating pins, said actuatable element having a latch shoulder, an automatic latch pin therefor movable on said support and biased to an extended position overlying said latch shoulder, said latch pin being held retracted by said actuatable element when in extended position, said short actuating pin being engageable with said actuatable element to depress it to non-extended position whereupon it is latched by said latch pin, said short actuating pin being out of the path of said latch pin, said long actuating pin being engageable with said actuatable element to depress it to its non-extended position and also engageable with said latch pin to retract it sufficiently to allow said actuatable element to move to said extended position, a slidable latch element biased to extended latching position with respect to said latch shoulder of said actuatable element and having a cross slot therein, a rotatable latch actuating element having an off-center actuating projection in said cross slot, and spring means biasing said latch actuating element to latched position.

7. A timer comprising a rotatable timer element, a pair of actuating pins adjustable to desired angular positions thereon, one of said pins being longer than the other, a support, an actuatable element movable on said support, biased to an extended position and engaged by said pair of actuating pins, a latch therefor movable on said support, said latch being biased to an extended position and held retracted by said actuatable element when in extended position, the short one of said actuating pins being cooperable with said actuatable element to depress it to non-extended position whereupon it is automatically latched by said latch, said short actuating pin being out of the path of said latch, the long one of said actuating pins also engaging said actuatable element to depress it to its non-extended position and thereafter engageable with said latch to retract it sufficiently to allow said actuatable element to move to said extended position, means to manually latch said actuatable element in its non-extended position comprising a slidable latch element, a return spring biasing said latch element to extended latching position with respect to said actuatable element, said latch element having a cross slot therein, and a rotatable latch actuating element having an off-center projection located in said cross slot, said projection having opposite flat sides to retain said latch element in either the latched or unlatched position under the action of said return spring engaging one side of said cross slot with one or the other of said flat sides when said latch element is in either of said positions.

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