May 1, 1934. E. L. LIPP 1,957,069

ELECTRICALLY CONTROLLED VALVE SYSTEM

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Fig. 1.

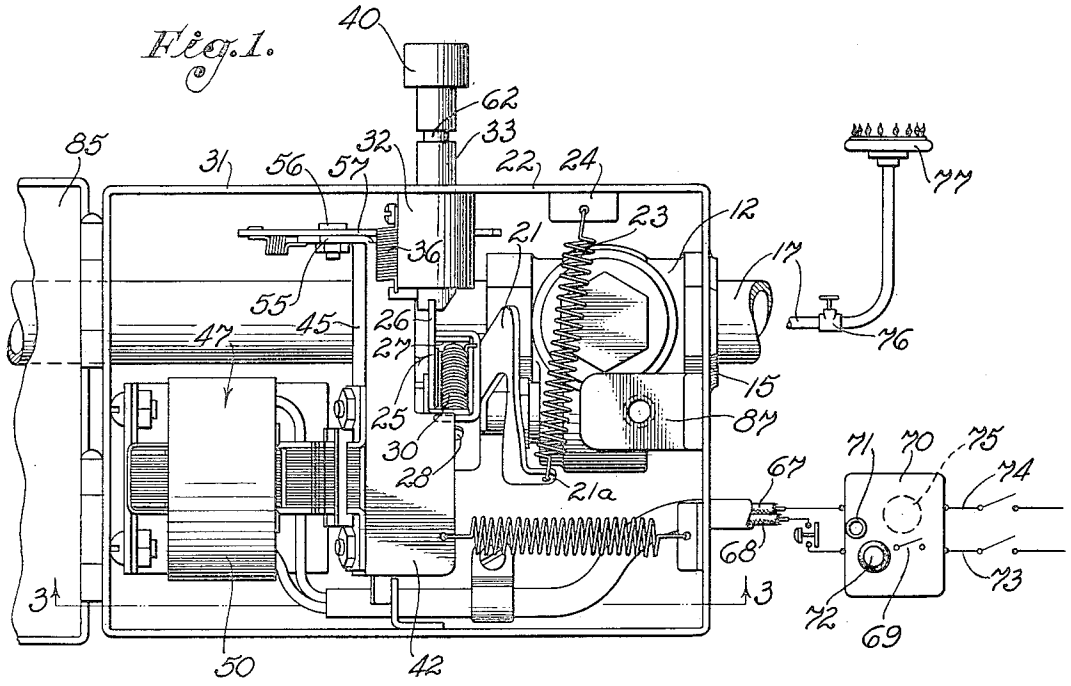
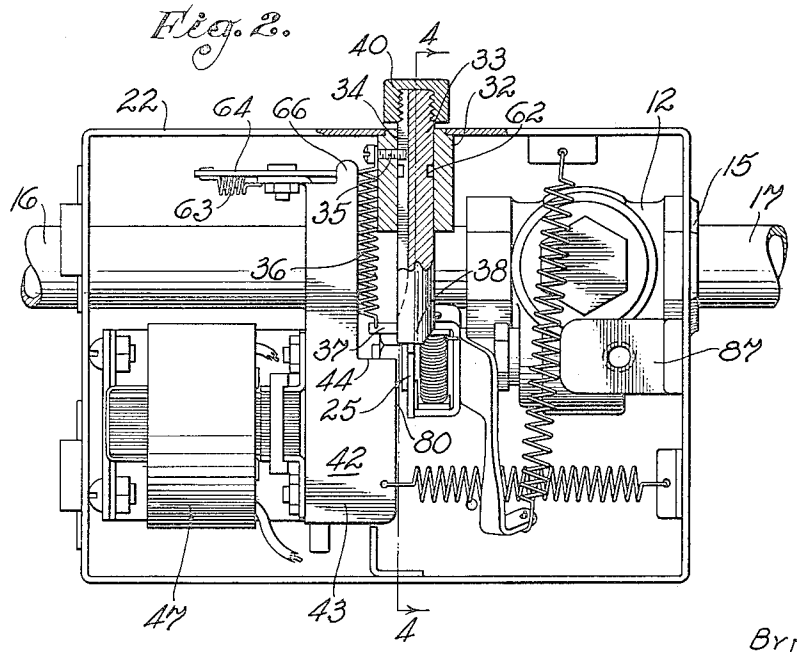


Fig. 2.



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Fig. 3.

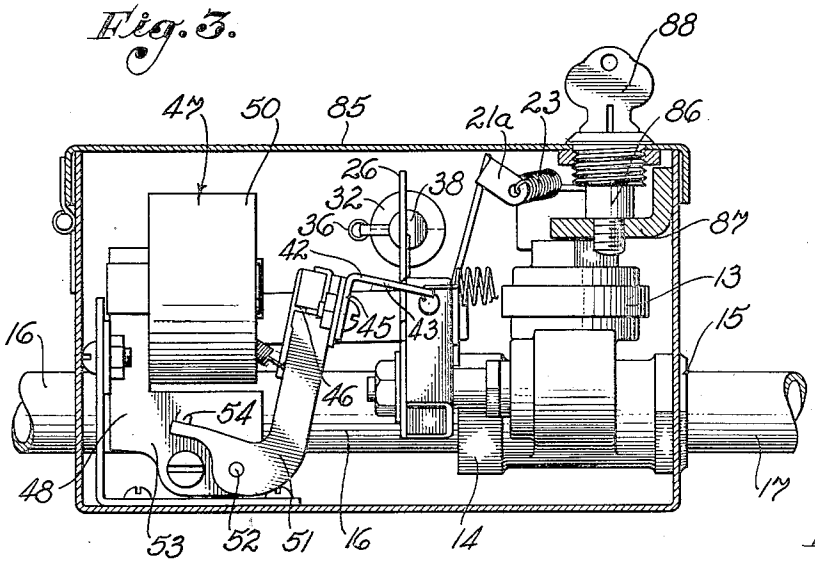


Fig. 5.

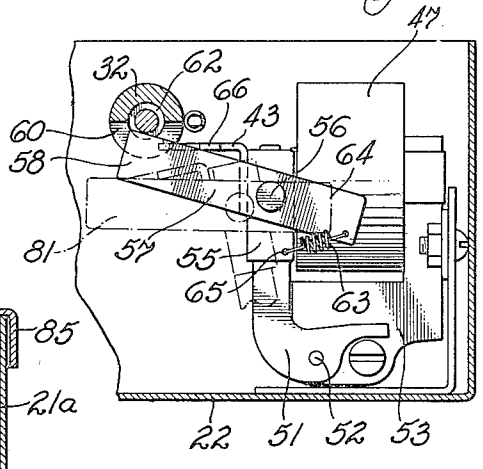
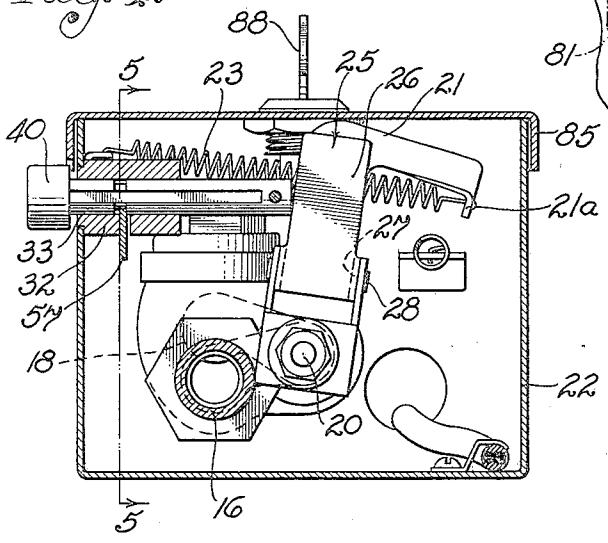


Fig. 4.



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Patented May 1, 1934

1,957,069

UNITED STATES PATENT OFFICE

1,957,069

ELECTRICALLY CONTROLLED VALVE SYSTEM

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Application February 14, 1933, Serial No. 656,703

14 Claims. (Cl. 194—3)

My invention relates to a means for controlling the opening and closing of a valve which in turn controls the flow of a fluid to a device in which such fluid is used.

As an example of the use of my invention, pressing devices such as employed for pressing wearing apparel have steam boilers for generating the steam employed in such pressers, these boilers generally deriving their heat from the burning of gas or oil. My new device provides a means for controlling the use of the presser by controlling the flow of fuel to the burner of the steam generator. It is now an extensive practice to sell devices of the above character to small cleaning establishments on time payment basis and to provide on the machine a coin receptacle in which a coin is to be placed each day by the user, which applies as payment on the purchase price of the device. In the preferred practice of my invention the placement of a coin in the coin receptacle starts the actuation of a timing device and the consequent actuation of a control means for the valve in the fuel line which will permit the valve to be opened so as to permit a flow of fuel to the burner of the device, the timing device then continuing to operate through a prescribed period of time, such as fifteen hours, at the end of which time the valve will be automatically closed, shutting off the fuel so that use of the device thereafter requires placement of another coin in the coin receptacle. By use of a device of this character on equipment being purchased on a time payment basis, assurance of placement of a coin in the coin receptacle each day is obtained for the reason that the timing device associated with and forming part of the invention operates to shut down the equipment before the starting of each consecutive working day.

It is an object of the invention to provide a device of the above character having a main controlling mechanism which may be in the form of a gate valve or in some instances an electric switch, means for manually actuating the main controlling mechanism to its relatively "on" position, together with a stop means which normally prevents actuation of the main controlling mechanism but which automatically moves into a position permitting actuation of such main controlling mechanism when the conditions for such actuation are proper. For example, a proper condition for the actuation of the main controlling mechanism may, in a device of the character described hereinabove, be the placement of a coin in a time controlled switch or similar timing mechanism.

A further object of the invention is to provide a device of the above character having an exposed, manually operable actuating member which may be moved to its relatively "on" position so as to place the main controlling mechanism in its "on" position when conditions for the same are proper. A feature of the invention is that the main controlling mechanism or valve need not be moved to its "on" position by use of the operating member until such time as the user may desire. Therefore, it will be seen that the valve is automatically opened but is manually opened at such time that the use of fuel is desired, and that therefore danger of escape of fuel and formation of an explosive mixture, due to a premature turning on of the fuel, is avoided.

It is a further object of the invention to provide a device of the above character which will positively operate to return the main controlling mechanism to its relatively "off" position when conditions for the "on" position of the mechanism are not proper, regardless of whether the operating member is in its relatively "on" or relatively "off" position. For example, where the invention is employed in conjunction with a time controlled switch, the main controlling mechanism, or valve, will be opened automatically at the end of a prescribed period of time.

Further objects and advantages of the invention will be made evident throughout the following part of the specification.

Referring to the drawings, which are for illustive purposes only,

Fig. 1 is a face view of a preferred embodiment of my invention with the cover thereof in open position, showing the valve thereof in relatively "off" position, this view including schematically an illustration of a burner to which the device is connected.

Fig. 2 is a view similar to Fig. 1 showing the operating parts of the valve in their relatively "on" position.

Fig. 3 is a cross section on a plane represented by the line 3—3 of Fig. 1.

Fig. 4 is a cross section on a plane represented by the line 4—4 of Fig. 2.

Fig. 5 is a fragmentary section on a plane represented by the line 5—5 of Fig. 4.

As shown in the drawings, my invention includes a main controlling mechanism 12 which may be represented by a gate valve of the type having a body 13 with connections 14 and 15 for

pipes 16 and 17, this body, as shown in dotted lines in Fig. 4, having a gate 18 mounted on a shaft 20 so as to be swung between opened and closed positions relative to the passage of the valve. For operating the valve, I provide an operating element 21 in the form of a lever mounted on the projecting shaft 20 and being adapted to swing from the relatively "off" position in which it is shown in Fig. 1 to the "on" position in which it is shown in Fig. 2. It is preferable to mount the valve within a suitable protective casing 22, and within this casing a spring 23 may be provided for normally urging the member 21 toward its "off" position, the spring 23 being shown in the drawings as connected to a plate 24 mounted on a wall of the case or box 22 and to an extension 21*a* formed on the member 21. Pivotally mounted on the member 21 is an actuating member 25 consisting essentially of a flat metal plate or leaf 26 and tongues 27 bent into laterally extending positions at one end thereof and being drilled for engagement with a pin 28 carried by the member 21 in a plane perpendicular to the axis of the shaft 20. A spring 30 mounted on the pin 28 resiliently forces the actuating member 25 into the position in which it is shown in Fig. 1. Against the force of the spring 30, the member 25 may be rotated rightwardly from the position in which it is shown in Fig. 2 or, in other words, may be moved in a direction essentially perpendicular to the plane of movement of the member 21 when such member 21 is swung between "on" and "off" positions. Mounted in the upper wall 31 of the casing 22 is a tubular guide 32 through which an actuating member 33 extends, this actuating member comprising a bar having a vertical slot 34 therein adapted to be engaged by a screw 35 which is threaded through the member 32 whereby to prevent rotation of the member 33. From the head of the screw 35 a spring 36 is carried to a projection 37 formed on the member 33 near the lower end thereof, this spring exerting a force for returning the member 33 from its position of Fig. 2 to its position of Fig. 1.

The guide member 32 is so placed that the lower end 38 of the member 33 will have a path of movement coinciding with the plane of the member 25 when such member 25 is in the position in which it is shown in Fig. 1. Therefore, the lower end 38, upon downward movement of the member 33, will engage the upper edge of the member 25, and, if conditions are proper, by exertion of pressure manually on the head 40 of the member 33, the engagement member 25 may be swung downwardly so as to carry the operating element 21 of the valve 12 into its "on" position of Fig. 2. A proper condition for the movement of the member 21 and the member 25 from their positions of Fig. 1 to their positions of Fig. 2 is the movement of a stop member 42 from its position of Fig. 1 to its position of Fig. 2. It will be noted that this stop member comprises a plate 43 having a shoulder 44 which in Fig. 1 rests under the lower edge of the engagement member 25 and therefore prevents downward movement of the member 25 by manual operation of the member 33; but when the member 42 is swung leftwardly into the position in which it is shown in Fig. 2, the shoulder or stop proper 44 will be out of the path of movement of the member 25, and such member 25 may be then moved downwardly from its position of Fig. 1 to its position of Fig. 2 by application of downward force on the upper end of the member 33.

The plate 43 of the stop 42 has a web 45 formed perpendicularly thereon, as shown in Fig. 3, this web being secured to an armature 46 of a magnetic control or actuating means 47 which further includes a field member 48 of U-shaped form on which a coil 50 is mounted in accordance with the general practice of making A. C. magnets. The armature 46 has side arms 51 which in Fig. 2 engage pivot members 52 carried by the base 53 of the magnetic device 47, there being a stop 54 for limiting the outward movement of the armature 46 relative to the field member 48. On the upper end of the web 45 a portion 55 is bent leftwardly, and such portion carries a pivot bolt 56 on which a latch lever 57 is mounted. An end 58 of the lever 57 extends behind the guide member 32 and is adapted to swing through a slot 60 in the rearward portion of the member 32, into engagement with a circumferential groove 62 in the member 33, when the stop member 42 is in its position of Fig. 2 and when the member 33 is depressed as also shown in this figure. A spring 63 extends between the end 64 and an opening 65 in the web 45 and has the function of rotating the end 58 of the lever 57 outwardly toward a stop lug 66 formed on the upper end of the plate 43 of the stop 42, as shown in Figs. 2 and 5.

In the embodiment of my invention employed for illustrative purposes, I show conductors 67 and 68 which connect the coil 50 of the magnetic means 47 with a suitable switching mechanism 70, this device 70 being preferably a coin operated time switch of the general character shown in my copending application Serial No. 641,496, filed November 7, 1932, for Release for coin controlled switch, having an external coin opening 71 into which a coin may be inserted to permit rotation of an external control knob 72 which will close a switch 69 for connecting the conductors 67 and 68 to feed conductors 73 and 74 and at the same time starting a timing device 75, such as a synchronous motor, which will at the end of a set period of time open the switch 69.

The method of operation of the device is as follows: Let it be assumed that the pipe 17 connects through a valve 76 with a burner 77 which may be employed in the steam generator of a pressing machine. Before the burner can be lighted, the valve 12 must be opened, which is accomplished by inserting a coin, such as a quarter, in the coin opening 71 of the coin operated timing switch 70, so that the knob 72 may be turned to close the switch 69, whereupon the coil 50 will be energized and the armature 46 will be magnetically moved from its position of Fig. 1 to its position of Fig. 2, thereby carrying the stop 42 leftwardly. Thereafter, the member 33 may be depressed to engage the member 25 and thereby move the member 21 downwardly from "off" position to "on" position, with the result of swinging the gate 18, Fig. 4, into open position. When the circumferential groove 62 of the member 33 coincides with the slot 60 in the guide member 32, the end 58 of the latch lever 57 will move into engagement with the groove 62, thereby latching the member 33 in lowered position and holding the parts 25 and 21 in their "on" position so as to maintain the valve 12 open. From an inspection of Fig. 2 it will be noted that the engageable member 25, when in "on" position, lies adjacent the edge 80 of the stop 42. Accordingly, when the timer 75 of the device 70 operates to open the switch

69 and the armature 46 is magnetically released, the stop member 42 will move rightwardly from its position of Fig. 2 to its position of Fig. 1 and will swing the member 25 rightwardly from its position of Fig. 2, out from under the lower end 38 of the member 33, whereupon the spring 23 will move the operating lever 21 upwardly, carrying the member 25 upwardly along the right side of the member 33. At the same time the movement of the stop 42 into its position of Fig. 1 will result in the lug 66 engaging the lever 57 so as to move the end 58 of the lever 57 into a dotted line position 31, out of engagement with the groove 62 of the member 33, thereby permitting the spring 36 to move the member 33 from lowered position as shown in Fig. 2 to its raised position of Fig. 1. It is to be noted, however, that the turning off of the valve 12 in consequence of the release of the control device formed by the magnetic member, its associated parts, and the timer 70 is positively accomplished, regardless of whether the member 33 moves upwardly or not, for the reason that the member 25 is moved out from under the lower end 38 of the member 33. Accordingly, it is not possible to maintain the valve 12 in closed position by holding the member 33 in lowered position, and therefore the purpose of the device cannot be defeated in the manner above described.

Although the timer may be situated within the casing 22, in the drawings it is shown outside the casing 22 and such case is provided with a hinged cover 85 adapted to be secured in closed position by means of a screw lock 86 which threads into a bracket 87 secured to the interior of the casing 22. When a key 88 is inserted in the lock 86, it may be unscrewed and the door 85 may be opened to give access to the mechanism.

Although I have herein shown and described my invention in simple and practical form, it is recognized that certain parts or elements thereof are representative of other parts, elements, or mechanisms which may be used in substantially the same manner to accomplish substantially the same results; therefore, it is to be understood that the invention is not to be limited to the details disclosed herein but is to be accorded the full scope of the following claims.

I claim as my invention:

1. A device of the character described, including: a valve having an operating element adapted to be moved between "on" and "off" positions, there being a part for manually moving said element to "on" position; a magnetic control adapted to be changed from operative to inoperative condition, said magnetic control having a stop for preventing movement of said element from "off" position to "on" position when said magnetic control is in inoperative condition; and means for causing movement of said element to "off" position when said magnetic control changes from operative to inoperative condition.

2. A device of the character described, including: a valve having an operating element adapted to be moved between "on" and "off" positions, there being a part for manually moving said element to "on" position; a magnetic control adapted to be changed from operative to inoperative condition, said magnetic control having a stop for preventing movement of said element from "off" position to "on" position when said magnetic control is in inoperative condition; means for causing movement of said element to "off" position when said magnetic control changes from operative to inoperative condition; and means for delivering current to said control, such means embodying a switch and a timing device for actuating said switch.

3. A device of the character described, including: a valve having an operating element adapted to be moved between "on" and "off" positions, there being a part for manual movement from a primary position to a secondary position so as to move said element to "on" position; a magnetic control adapted to be changed from operative to inoperative condition, said magnetic control having a stop for preventing movement of said element from "off" position to "on" position when said magnetic control is in inoperative condition; and means for causing movement of said element to "off" position when said magnetic control changes from operative to inoperative condition independently of the position of said part for moving said operating element to said "on" position.

4. A device of the character described, including: a main controlling mechanism having an operating element adapted to be moved between "on" and "off" positions, there being a part for manually moving said element to "on" position; a magnetic control adapted to be changed from operative to inoperative condition, said magnetic control having a stop for preventing movement of said element from "off" position to "on" position when said magnetic control is in inoperative condition; and means for causing movement of said element to "off" position when said magnetic control changes from operative to inoperative condition.

5. A device of the character described, including: a main controlling mechanism having an operating element adapted to be moved between "on" and "off" positions, there being a part for manually moving said element to "on" position; a magnetic control adapted to be changed from operative to inoperative condition, said magnetic control having a stop for preventing movement of said element from "off" position to "on" position when said magnetic control is in inoperative condition; means for causing movement of said element to "off" position when said magnetic control changes from operative to inoperative condition; and means for delivering current to said control, said last named means embodying a switch and a timing device for actuating said switch.

6. A device of the character described, including: a main controlling mechanism having an operating element adapted to be moved between "on" and "off" positions, there being a part for manual movement from a primary position to a secondary position so as to move said element to "on" position; a magnetic control adapted to be changed from operative to inoperative condition, said magnetic control having a stop for preventing movement of said element from "off" position to "on" position when said magnetic control is in inoperative condition; and means for causing movement of said element to "off" position when said magnetic control changes from operative to inoperative condition independently of the position of said part for moving said operating element to said "on" position.

7. A device of the character described, including: a valve having an actuating member movable between "off" and "on" positions; a spring tending to move said actuating member from "on" to "off" position; an engageable member

movably mounted on said actuating member; an operating member adapted to be manually moved from relatively "off" to relatively "on" position and having a path of movement wherein it will engage said engageable member whereby to move said actuating member of said valve to "on" position; a stop member movably mounted so as to swing out of the path of movement through which said engageable member is moved by said operating member; means resiliently tending to hold said stop member in said path of movement of said engageable member; magnetic means for moving said stop member from said path of movement of said engageable member to permit movement of said engageable member by said operating member to its relatively "on" position; and latch means having operative connection with said stop member so that the movement of said stop member to its position out of the path of movement of said engageable member will cause said latch means to hold said actuating member in its "on" position when it has been moved into such position.

8. A device of the character described, including: a valve having an actuating member movable between "off" and "on" positions; a spring tending to move said actuating member from "on" to "off" position; an engageable member movably mounted on said actuating member; an operating member adapted to be manually moved from relatively "off" to relatively "on" position and having a path of movement wherein it will engage said engageable member whereby to move said actuating member of said valve to "on" position; a stop member movably mounted so as to swing out of the path of movement through which said engageable member is moved by said operating member; means resiliently tending to hold said stop member in said path of movement of said engageable member; magnetic means for moving said stop member from said path of movement of said engageable member to permit movement of said engageable member by said operating member to its relatively "on" position; latch means having operative connection with said stop member so that the movement of said stop member to its position out of the path of movement of said engageable member will cause said latch means to hold said actuating member in its "on" position when it has been moved into such position; and means operative when said actuating member is in relatively "on" position to move said engageable member out of the path of movement of said operating member as said stop member moves into said path of movement of said engageable member.

9. A device of the character described, including: a valve having an actuating member movable between 'off" and "on" positions; a spring tending to move said actuating member from "on" to "off" position; an engageable member movably mounted on said actuating member; an operating member adapted to be manually moved from relatively "off" to relatively "on" position and having a path of movement wherein it will engage said engageable member whereby to move said actuating member of said valve to "on" position; a stop member movably mounted so as to swing out of the path of movement through which said engageable member is moved by said operating member; means resiliently tending to hold said stop member in said path of movement of said engageable member; time controlled means for moving said stop member from said path of movement of said engageable member to permit movement of said engageable member by said operating member to its relatively "on" position, said time controlled means subsequently returning said stop member to said path of movement of said engageable member; and latch means having operative connection with said stop member so that the movement of said stop member to its position out of the path of movement of said engageable member will cause said latch means to hold said actuating member in its "on" position when it has been moved into such position.

10. A device of the character described, including: a main controlling mechanism having an actuating member movable between "off" and "on" positions; a spring tending to move said actuating member from "on" to "off" position; an engageable member movably mounted on said actuating member; an operating member adapted to be manually moved from relatively "off" to relatively "on" position and having a path of movement wherein it will engage said engageable member whereby to move said actuating member of said valve to "on" position; a stop member movably mounted so as to swing out of the path of movement through which said engageable member is moved by said operating member; means resiliently tending to hold said stop member in said path of movement of said engageable member; time controlled means for moving said stop member from said path of movement of said engageable member to permit movement of said engageable member by said operating member to its relatively "on" position, said time controlled means subsequently returning said stop member to said path of movement of said engageable member; and latch means having operative connection with said stop member so that the movement of said stop member to its position out of the path of movement of said engageable member will cause said latch means to hold said actuating member in its "on" position when it has been moved into such position.

11. A device of the character described, including: a main controlling mechanism having an operating element adapted to be moved between "on" and "off" positions, there being a part for manually moving said element to "on" position and means exerting a yieldable force to move said element to "off" position; a magnetic control adapted to be changed from operative to inoperative condition, said magnetic control having a stop for preventing movement of said element from "off" position to "on" position when said magnetic control is in inoperative condition; and means cooperating with said force exerting means to cause movement of said element to "off" position when said magnetic control changes from operative to inoperative condition.

12. A device of the character described, including: a main controlling mechanism having an operating element adapted to be moved between "on" and "off" positions, there being a part for moving said element to "on" position and means exerting a yieldable force to move said element to "off" position; a control device adapted to be changed from operative to inoperative condition, said control device having a stop for preventing movement of said element from "off" position to "on" position when said control device is in inoperative condition; and means cooperating with said force exerting means to cause movement of said element to "off" position when said control device changes from operative to inoperative condition.

13. A device of the character described, including: a main controlling mechanism having an operating element adapted to be moved between "on" and "off" positions, there being a part for moving said element to "on" position and means exerting a yieldable force to move said element to "off" position; a control device adapted to be changed from operative to inoperative condition, said control device having a stop for preventing movement of said element from "off" position to "on" position when said control device is in operative condition; means cooperating with said force exerting means to cause movement of said element to "off" position when said control device changes from operative to inoperative condition; and a timer connected to said control device and operating to produce in said control device the aforesaid operative and inoperative conditions at timed intervals.

14. A device of the character described, including: a main controlling mechanism having an operating element adapted to be moved between "on" and "off" positions, there being a part for moving said element to "on" position and means exerting a yieldable force to move said element to "off" position, a control device adapted to be changed from operative to inoperative condition, said control device having a stop for preventing movement of said element from "off" position to "on" position when said control device is in inoperative condition; means cooperating with said force exerting means to cause movement of said element to "off" position when said control device changes from operative to inoperative condition; a timer connected to said control device and operating to produce in said control device the aforesaid operative and inoperative conditions at timed intervals; latch means for holding said part of said element for moving said operating element in its relative "on" position; and a release for said latch means having connection with said control device to cause its actuation in consequence of said control device being in said inoperative condition.

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