Feb. 26, 1935. C. B. DUSHANE, JR 1,992,198

TIME CONTROLLED DEVICE FOR GAS APPLIANCES

Filed Feb. 3, 1932 2 Sheets-Sheet 1

FIG. 1.

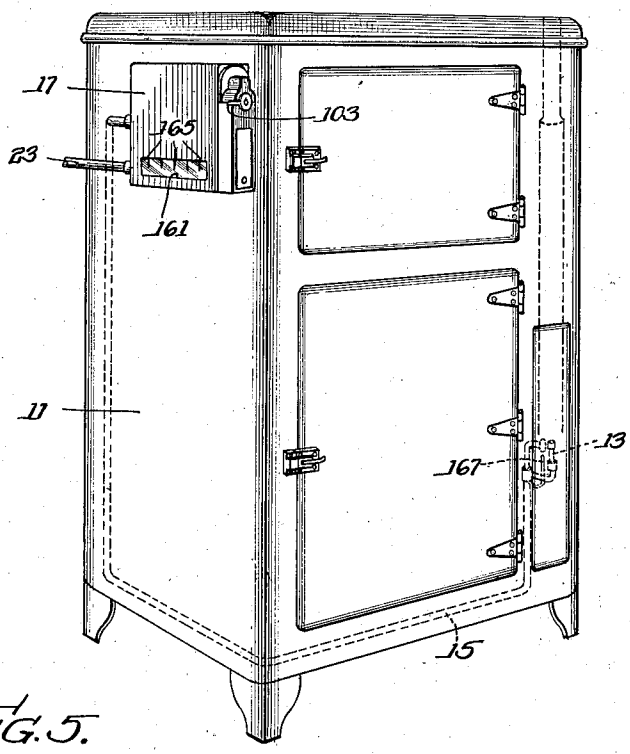


FIG. 5.

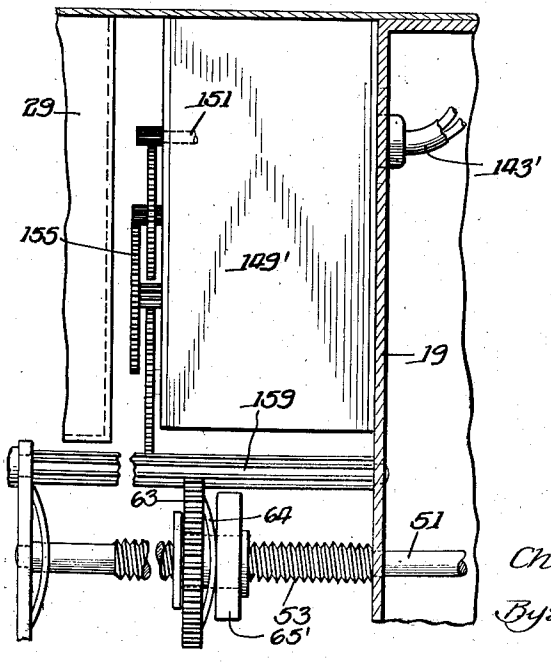
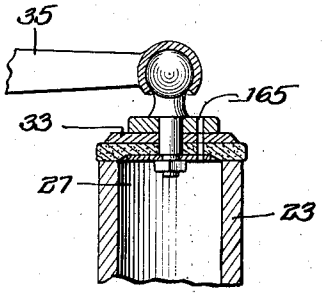


FIG. 6.



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TIME CONTROLLED DEVICE FOR GAS APPLIANCES

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FIG. 2.

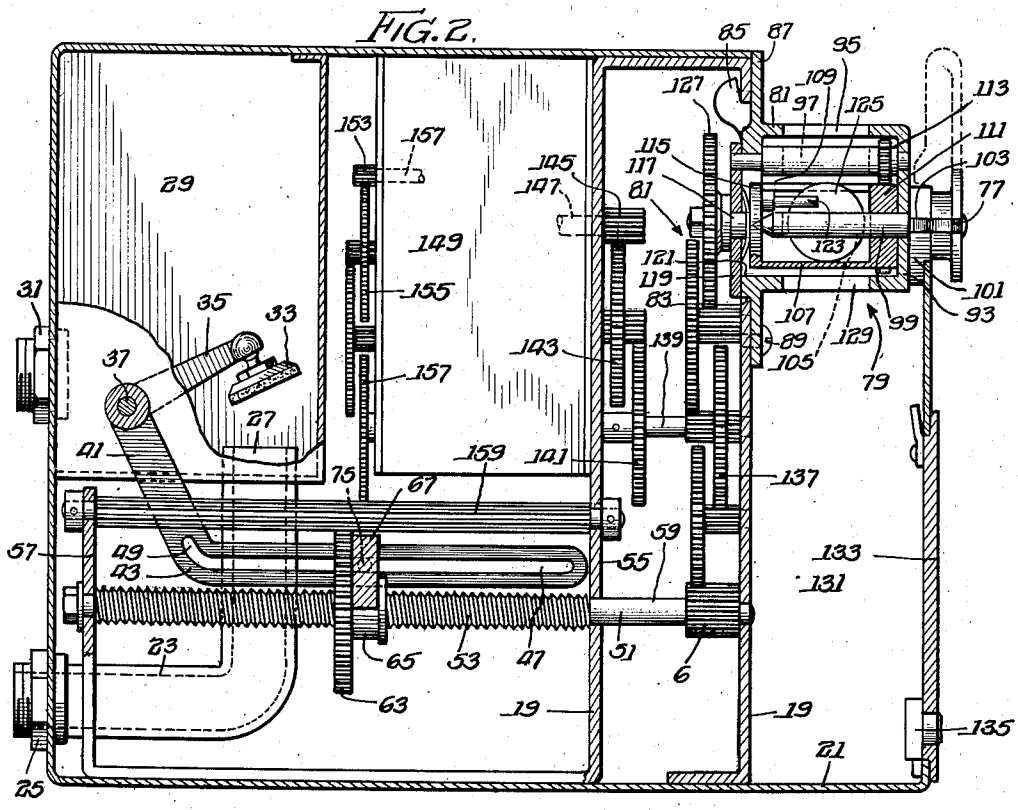


FIG. 3.

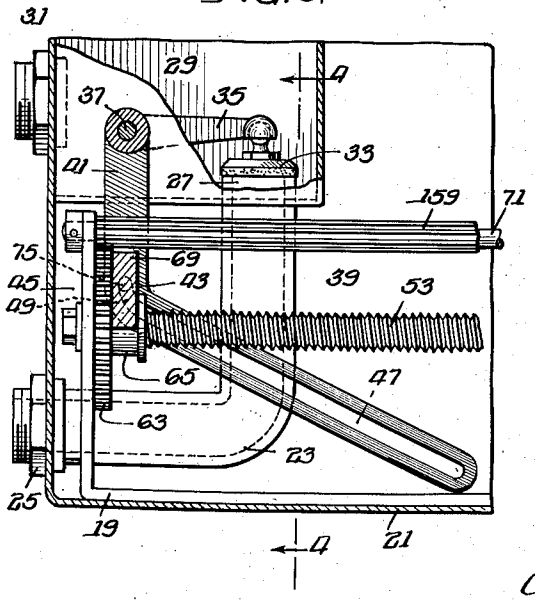
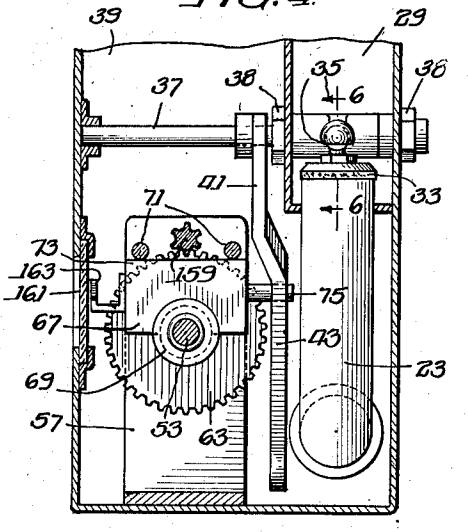


FIG. 4.



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UNITED STATES PATENT OFFICE

1,992,198

TIME CONTROLLED DEVICE FOR GAS APPLIANCES

Charles Benson Dushane, Jr., Chicago, Ill.

Application February 3, 1932, Serial No. 590,667

8 Claims. (Cl. 161—9)

My invention relates in general to controllable devices and has more particular reference to the control of power consuming devices by means of a token, such as a coin, deposited to permit the device to be conditioned for operation through the supply of operating power thereto; and the invention relates more particularly to the provision of coin or token controlled mechanism for controlling the supply of fuel to the device for the operation thereof.

Devices of this general character are especially well adapted for use in connection with the merchandising of power operated apparatus, such for instance as mechanical refrigerators, on the partial payment plan, and my invention has, for an important object, the provision of coin controlled means for use in connection with mechanical refrigerators and the like so that the same may be supplied with an operating power medium for a predetermined interval only after the deposit of a coin.

Another important object of the invention is to provide a coin controlled mechanism for use in connection with the fuel supply of a gas or other fuel consuming device in order to deliver fuel to the device for a predetermined time interval in response to the deposit of a coin or token whereby the device may be paid for as it is used.

Another important object is to provide a coin control for fuel operated apparatus wherein coin operation of the control mechanism is entirely independent of the fuel metering mechanism and merely controls the operation of the particular device with which it is associated in order to permit the device itself to be used for a limited time interval in response to the deposit of a coin or other token, the fuel used being paid for separately.

Another important object is to provide a control device of the class described in which several tokens may be deposited at one time in order to provide for the operation of the controlled device over an extended time interval without depositing tokens at intervals.

Another important object of the invention is to provide a device of the class described with means for indicating, at any time during the operation of the device, the time interval before it will be necessary to deposit another coin or token in the device in order to continue it in operation.

Another important object is to provide a coin control in combination with a timing device for operating a control valve controlling the flow of power, or a power medium, to a power operated device.

Another important object is to provide a coin control in combination with a clockwork mechanism for controlling the operation of a switch or valve to deliver power to a power operated device and at the same time winding the clockwork mechanism.

Another important object is to provide a coin control of the class described in combination with a continuously operated clock, preferably electrically driven, whereby operating power may be delivered to a device to be operated upon the deposit of a coin or token and wherein the clockwork mechanism is adapted to interrupt the power supply after a predetermined time delay.

Another important object of the invention is to provide a device of the class described with means for delivering continuously a minimal flow of power or power medium to the power operated device in order to maintain standby conditions in the operated device so that when the control is actuated to set the device in operation, it will be automatically self-starting.

Another important object is to provide a device of the class described of simple, inexpensive construction that can be made cheaply enough to enable it to be used with devices sold upon the partial payment plan and which can be adjusted so as to require the payment at intervals of money sufficient to meet the required payments under the sales agreement or partial payment plan under which the device is delivered to the purchaser.

Numerous other objects and advantages will be apparent as the invention is more fully understood from the following description, which, taken in connection with the accompanying drawings, discloses a preferred embodiment of my invention.

Referring to the drawings:

Figure 1 is a perspective view of a mechanical refrigerator of the type utilizing a gas flame to produce the power for operating the refrigerator and having a coin operating device for controlling the supply of gas to the refrigerator as an operating power medium;

Figure 2 is a vertical section taken longitudially of the coin operated control, the parts being shown in operating position;

Figure 3 is a fragmentary view of a portion of the device illustrated in Figure 2 showing the parts in inoperative or stand-by position;

Figure 4 is a vertical section taken substantially along the line 4—4 in Figure 3;

Figure 5 is a fragmentary view of a portion of the device shown in Figure 2 and illustrating the use of a continuously operating clockwork

mechanism, as for instance, an electrical clock assembled in the device in place of the spring-driven clock employed in the device illustrated in Figure 2; and

Figure 6 is a section taken substantially along the line 6—6 in Figure 4 to illustrate the details of construction of the fluid fuel control valve that is employed in the illustrated embodiment for the purpose of controlling the flow of fuel to the device.

To illustrate my invention, I have shown on the drawings, a mechanical refrigerator 11 of the type in which refrigeration is accomplished by means of heat generated by the combustion of a suitable fuel in the burner 13.

In the illustrated embodiment, fuel, comprising the operating power medium, is delivered to the burner 13 through a pipe or conduit 15 which extends from the burner to a coin operated valve control 17 for regulating the flow of the combustible power medium to the burner 13.

The device 17 comprises means, manually operable upon the deposit of a suitable coin or token in the device, to set up a flow of the power medium to the refrigerating mechanism for the operation of the same, and a time-delay shut-off, which is conditioned to discontinue the flow of the power medium after a predetermined interval. The several devices of the coin control are preferably mounted in a suitable frame 19 and the whole enclosed in a suitable casing 21. The combustible power medium is introduced into the coin control from a remote source through the pipe or conduit 23, which enters the case 21 through a suitable gland 25. The inner end 27 of the pipe 23 is located in a fluid-tight compartment 29 having an outlet 31, to which the pipe or conduit 15 leading to the burner 13 is connected so that the fluid power medium, entering the chamber 29 through the pipe 23, may be thence delivered through the pipe 15 to the burner 13.

Within the chamber 29 is a valve comprising a disk or pad 33 carried on the end of an arm 35, which is pivoted to rotate with a shaft 37. The pad 33 normally overlies and sealingly covers the end 27 of the fuel conduit but upon rotation of the shaft 37, the pad 33 may be raised to permit fuel to be delivered into the compartment 29. The shaft 37 is journaled by means of airtight packing nuts 38 in opposite walls of the compartment 29 and extends outwardly into a compartment 39 formed in the casing 21 to contain the valve operating and time delay mechanism. The portion of the shaft 37 extending in the compartment 39 carries a lever arm 41, which extends downwardly of the shaft 37 to a point 43 opposite the operating mechanism 45. Thus the arm extends forwardly paralleling the operating mechanism 45. This forwardly extending portion of the arm is or may be provided with a slot 47, which curls upwardly as at 49 opposite the bend 43. The operating mechanism 45 comprises a rotatable shaft 51 suitably supported in the frame 19 and having a threaded portion 53 extending between spaced portions 55 and 57 of the frame 19. The shaft 51 has a portion 59 extending on the opposite side of the frame portion 55 and provided with a pinion 61. The threaded portion 53 of the shaft carries an internally threaded nut, the peripheral portions of which are formed as a gear 63 and an adjacent collar 65, the external surfaces of which are cylindrical to receive a hook 67, which has a circular cut-out portion 69 to fit upon the cylindrical portion 65. The spaced portions 55 and 57 of the frame carry guides comprising rods 71 which extend substantially parallel with the shaft 51 and against the underside of which the upper flat edge 73 of the hook 67 slidingly engages to hold the hook upon the collar 65. The hook 67 carries a rearwardly extending pin 75 which projects and engages in the elongated slot 47 of the sleeve operating arm 41 and it will be obvious that as the shaft 51 is turned, the internally threaded nut, being held from rotation, will be shifted axially along the shaft and will move the pin 75 longitudinally in the slot 47. Conversely if the shaft 51 is held against rotation, and the internally threaded nut is rotated, the nut may be caused to travel axially along the shaft thus moving the pin 75 longitudinally in the slot 47.

When the internally threaded nut is at the left hand end of its travel along the portion 53 of the shaft 51, as shown in Figure 3 of the drawings, the pin 75 will be in the curved portion 49 of the slot and the arm 35 will have been moved downwardly to a position in which the member 33 seals the opening 27 of the fuel inlet pipe. If now the shaft 51 is rotated in the proper direction, the internally threaded nut will be moved along the shaft toward the right. When this movement commences the arm 41 will be raised to the position shown in Figure 2 of the drawings, the pin 75 moving into the straight portion of the slot 47. The valve 33 will thus be opened and fuel will be admitted into the chamber 29 and thence into the pipe 15 and be delivered to the power operating device 11.

The shaft 51 is rotated by means of a manually operable handle 77, accessible from outside of the casing 21, which operates, through a coin controlled device 79 and a train of gears 81, to rotate the pinion 61 carried on the end of the shaft 51. The control device 79 comprises a casing 81 mounted in an opening 83 in the frame 19 by means of a lug 85 formed in a flanged portion 87 of the casing, which flange is adapted to fit into the upper edge of the opening 83 and the flange 87 may be fastened to the frame 19 by means of nuts and bolts 89 securing the lower portion of the flange 87 to the frame, the upper portion of the flange being interfittingly held on the casing by means of the lug 85. Outwardly of the flange 87 extends a housing portion having an opening 121 centrally of the flange at one end of the housing through which the contents of the housing may be introduced into the housing and which opening is closed by a cover 119. The housing contains a rod 91 having its opposed ends journalled respectively in perforations formed in the cover 119 and in the outer wall 93 of the casing. The top of the casing also is provided with a slot 95 adapted to receive a coin or token and the shaft 91 is located directly and vertically beneath the slot 95 and has a diametrical slot 97 which is adapted to register with the casing slot 95 when the shaft is rotated.

Vertically beneath the shaft 91 is a second shaft 99, the outer end of which extends through the wall 93 and is attached to the handle 77 to be rotated thereby. The outer wall 93 of the casing is also provided with bosses 101 providing shoulders adapted to form cooperating stops with a flange 103 formed on the handle 77 so that the handle may be rotated only sufficiently to turn the shaft 99 through 180°. The shaft 99 is also provided with a slot 105 adapted to be aligned with the slot 97 of the shaft 91 and the slot 95 of the casing. The shaft 99 carries a shell-like member

107 having a semi-cylindrical portion 109 which partially encloses the shaft 99 and a portion 111 which bears against the inner surface of the wall 93 and has gear teeth formed on its outer periphery, which teeth engage a pinion 113 formed on the shaft 91 so that when the shaft 99 is turned, the shaft 91 will turn with it in such a way that the slot 97 will be aligned with the slot 105 when the handle 77 is in either one of its extreme shifted positions. The slot 97 will also be in a vertical position when the handle 77 is midway between its extreme shifted positions and in order to prevent the insertion of a coin through the slot 95 and 97 when the parts are in this position, the semi-cylindrical portion 109 is formed to lie between the shafts whenever the handle 77 is intermediate its extreme position. This is a fool-proof feature in order to prevent inexperienced persons from inserting coins and jamming the mechanism. The inner end of the shaft 99 is pointed and bears in a depression formed in a rotatable plate 115 which is carried on a shaft 117 which is journaled in the cover plate 119. The plate 119 is in turn fastened to the casing 81 and closes the opening 121 through which the parts enclosed in the housing 81 are assembled in position therein.

The plate 119 also forms a journal for the inner end of the shaft 91 and is or may be fastened to the casing 81 by means of set screws or other suitable fastening devices. The disk 115 carries a pin 123 which extends inwardly in position to be engaged by a coin or token 125 when the same is received in the slot 105 of the shaft 99. When the handle is shifted to one of its extreme positions, the slots 95, 97 and 105 will be in alignment. The upper edge of the portion 109 is relieved so that a coin inserted in the slot 95 may pass through the slot 97 and enter the slot 105. The lower edge of the semi-cylindrical portion 109, however, is extended forwardly to underlie the lower edge of the coin and support it in place. If the handle 77 is now shifted, the coin 125 will be rotated in place and will engage the pin 123 and will rotate the disk 115.

The outer end of the shaft 117 on which the disk 115 is carried, carries a gear 127 which comprises the first element of the gear train 81 which is arranged to rotate the pinion 61 of the shaft 51 several times in response to the movement of the handle 77 through 180° between its two positions defined by the abutments 101. When the handle is turned through 180°, the coin will be inverted to a position permitting it to fall out of the slot 105 through a slot 129 in the bottom of the casing 81. This slot opens into a compartment 131 formed in the casing 21 from which the coins may be removed by duly authorized persons through a door 133, which is provided with a lock 135. It will thus be seen that by depositing a coin and turning the handle 57, the shaft 51 may be rotated to shift the internally threaded collar axially with respect to the shaft 51 so as to open the valve 33.

I prefer to form the device of my present invention to receive quarter dollars, since this is the most convenient monetary unit. Smaller coins than the quarter dollar may not work satisfactorily in connection with the pin 123, while larger coins than the quarter dollar are scarce enough so that the user of the machine might be inconvenienced if it was necessary to find a larger coin than the quarter dollar each time the device is set for operation.

One of the gears 137 of the gear train 81 has an elongated shaft 139 on which is mounted the initial gear 141 of a clockwinding gear train 143 which drives a pinion 145 on the winding shaft 147 of a clock 149, which is mounted on the frame 19 within the casing 21 so that each time the handle 77 is manipulated to drive the gear train 81, the gear train 143 will also tension the spring of the clock and set the same in motion.

The clock drives a shaft 151 carrying a pinion 153 which drives a train of gears 155, the terminal gear 157 of which meshes with the teeth of an elongated pinion 159 which is journalled at its opposite ends in the spaced apart portions 55 and 57 of the frame 19. The elongated pinion 159 extends parallel to the shaft 51 in position to engage the gears 63 formed in the periphery of the internally threaded collar. After the handle 77 has been manipulated, as heretofore described, to shift the internally threaded member on the shaft 51 to the right, viewing Figure 2 of the drawings, the shaft 51 remains stationary. The clockwork device, however, has been simultaneously conditioned for operation and will rotate the pinion 159 through the train of gears 155. Rotation of the pinion 159 through the gears will cause rotation of the internally threaded member on the threaded portion of the shaft 51 and this will result in the gradual movement of the internally threaded member toward the left, viewing Figure 2 of the drawings. The time required for the collar to return to the valve closing position depends upon the distance that the internally threaded member was moved to the right in conditioning the device for operation and the return movement of the collar will result in the pin 75 travelling into the curved portion 49 of the slot 47 and closing the valve 33.

The device is preferably built so that the internally threaded member is moved a fractional part of the distance between the vertically spaced portions 55 and 57 in response to each setting operation of the handle 77 and it is obvious that the handle 77 may be operated several times in succession by depositing quarter dollars successively in the slot 95 in order to shift the threaded member to a position at the extreme right end of the threaded portion of the shaft 51, viewing Figure 2 of the drawings. In this way, the device may be set to operate over a period several times as long as the period of operation provided for by the deposit of a single quarter dollar.

In order to provide a visual indication of the length of time for which the device may be set to operate, I form a window 161 in the outer wall of the casing 21, which window is elongated and extends adjacent the path travelled by the internally threaded member and the yoke 67 carried thereby. A pointer 163 is carried by the yoke in position to sweep across behind the window 161 and the window is or may be graduated as indicated at 165 to indicate the instantaneous position of the internally threaded member.

In Figure 5 of the drawings, I have shown a continuously operated timing device 149', which may be arranged in the housing in place of the intermittently operated spring driven clockwork mechanism 149 illustrated in Figure 2. When a continuously operated return drive for the internally threaded collar is utilized, the gear train 143 is eliminated and the clock is powered from an external source of electrical energy through the conductors 143'. The clock rotates the elongated pinion 159 continuously through the gear train 155 but some provision has to be made for releasing the gear 63 from driving engagement

with the threaded portion of the shaft 51. This is accomplished by forming the internally threaded collar in two portions, one of which, 65', forms the collar carrying the hook 67 and is permanently threaded upon the shaft 51. The other portion forms the gear 63', which is not threaded to the shaft 51 but which is connected to the collar portion 65' by means of a friction clutch 64 so that when the internally threaded collar reaches the valve closing position shown in Figure 3 of the drawings, the gear portion 63' may continue to rotate but will not drive the collar further along the shaft, the friction clutch permitting slipperage between the driving and driven parts.

Figure 6 of the drawings shows the details of construction of the valve 33 and it will be noted that the valve closing disk or pad has a permanently open restricted aperture 165 through which a minimal quantity of the power medium may escape in the chamber 29 to thus provide sufficient fuel to keep burning the pilot light 167 in order to maintain standby conditions in the device being operated.

It is thought that the invention and numerous of its attendant advantages will be understood from the foregoing description and it is obvious that numerous changes may be made in the form, construction and arrangement of the several parts without departing from the spirit or scope of my invention or sacrificing any of its attendant advantages; the form herein described being a preferred embodiment for the purpose of illustrating my invention.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is as follows:

1. A control for use in combination with the power supply connection of a power operated device, comprising control means to regulate the flow of a power medium to the device, threaded operating means to open and close the control means alternately to permit and prevent the flow of the medium, means to actuate the threaded operating means in one direction to open the control means, and continuously operating drive means to actuate the threaded operating means in a reverse direction to close the control means, said last mentioned means comprising yielding clutch means to discontinue the driving effect on the threaded operating means when said control means is at the end of its closing movement.

2. A device of the class described comprising means to regulate the flow of a power medium to a power consuming device, comprising a shiftable control member and means, to shift the control member, comprising a turnable shaft and a nut mounted on the shaft, means to rotate the shaft to cause relative longitudinal movement between the nut and the shaft in one direction for operating the control member, and means including a yielding clutch to turn the nut on the shaft to impart relative longitudinal movement between the nut and the shaft in the opposite direction.

3. A device of the class described comprising a shiftable control member for regulating the flow of a power medium to a power consuming device, and means, to shift the control member, comprising a turnable shaft, a nut threaded on the shaft, means to rotate the shaft to cause relative longitudinal movement between the nut and the shaft in one direction to actuate the control member to permit the power medium to flow to the power consuming device and means including a yielding clutch to turn the nut on the shaft to impart relative movement between the nut and the shaft in the opposite direction to operate the control member to restrict the flow of the power medium, said yielding clutch operating normally to drive the nut toward power-flow restricting position but yielding to permit the nut to lock with the shaft when it reaches a predetermined axial position thereon.

4. A device of the class described comprising a shiftable control member for regulating the flow of a power medium to a power consuming device, and means, to shift the control member, comprising a turnable shaft, a nut threaded on the shaft, means to rotate the shaft to cause relative longitudinal movement between the nut and the shaft in one direction and driving means comprising a prime mover and an elongated gear driven by the prime mover and extending parallel to and spaced apart from the shaft and having geared connection with the nut for turning the same on the shaft to impart relative axial movement between the nut and shaft in a direction to operate the control member to restrict the flow of the power medium to the power consuming device, said driving means including a yielding clutch operatively associated in the driving connection between the prime mover and the nut and adapted to yield to permit the nut to lock with the shaft when it reaches a predetermined point on its axial travel on the shaft.

5. A device of the class described comprising a shiftable control member to regulate the flow of a power medium to a power-consuming device, and operating means, to shift the control member, comprising a threaded shaft, a nut threaded on the shaft, coin-controlled conditioning means manually operable to relatively rotate the nut and shaft in order to cause relative longitudinal movement between the nut and the shaft in a direction for operating the control member to permit the power medium to flow, means including a continuously operating constant-speed driving device and means forming a driving connection between the driving device and operating means to turn the nut on the shaft in a direction to cause relative axial movement therebetween in a direction causing the control member to assume a position preventing the flow of the power medium, said connecting means including a yieldable coupling adapted to permit the nut to remain stationary on the shaft when at a limit of its axial movement thereon.

6. A control, for use in combination with the power supply connection of a power-consuming device, comprising control means to regulate the flow of a power medium to said device, threaded operating means to open and close the control means in order to permit or prevent the flow of the medium, coin-controlled means for actuating the threaded operating means in one direction to open the control means, and means to drive the threaded operating means in a reverse direction to close the control means comprising a continuously operating constant-speed motor and a driving connection from the motor to the operating means including a non-positive clutch adapted to normally transmit driving movement and adapted to yield when the control means reaches closed position.

7. A control device of the class described comprising a co-operating pair of threaded members, means to rotate one of said members while holding the other from rotation whereby to shift said other axially, control means operable in response to the axial shifting of said other member to

permit a power medium to be delivered to a power consuming device, a continuously operating motor, and a driving connection, comprising a yielding clutch, operatively associated with said motor and one of said co-operating members whereby to rotate said member with respect to its companion member in order to return said member axially on its said companion member whereby, after a predetermined time delay, to operate the control to prevent the flow of power to the power consuming device, said clutch normally functioning to rotate said member on its companion member but yielding to permit said member to remain stationary with respect to its companion member when it reaches the flow stopping position.

8. In combination with a fluid supply conduit, a valve for controlling the flow of fluid through said conduit, operating means for opening and closing said valve comprising a screw member and a nut member threaded thereon, manually operable coin control means for turning one of said members while the other is prevented from turning, whereby to relatively shift said members axially in order to open the valve, a constant speed, continuously-operating motor, and a driving connection including yielding clutch means operatively connected between said motor and one of said members whereby to rotate said member while its companion member is held from rotation in order to axially shift said members relatively in a direction to close said valve, said clutch means being adapted to yield in order to permit said members to remain stationary without further relatively angular movement therebetween when the members reach valve-closing position.

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