

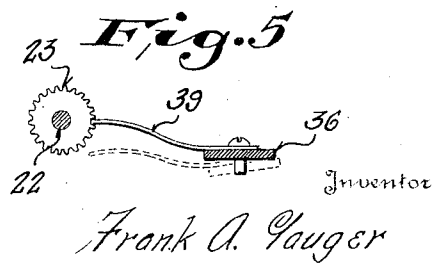
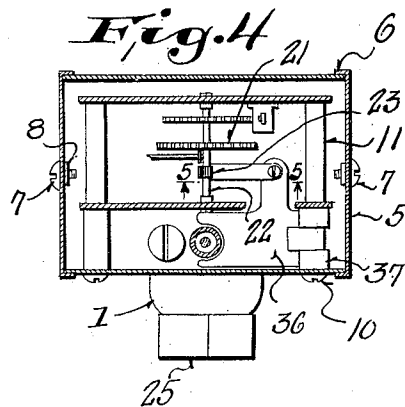
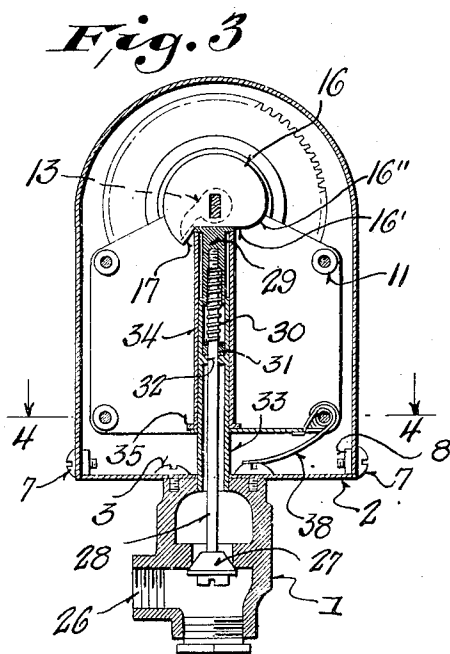
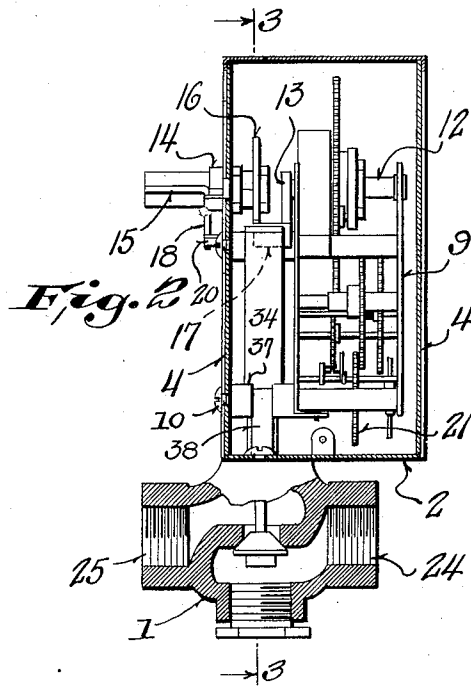
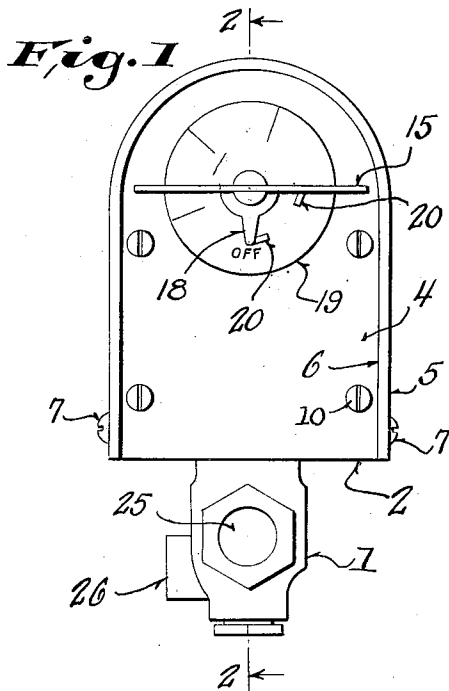
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TIME CONTROLLED VALVE

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TIME CONTROLLED VALVE

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This invention relates to time controlled valve mechanism.

It is frequently desirable to provide a time controlled valve, for instance, one for turning off fuel, such as gas, supplied the burner of an incinerator, water heater, or other device, which may be set to cut off further supply of fuel after a predetermined time.

Various attempts have been made to supply this type of device, but these attempts have not proven wholly satisfactory, for they usually resulted in a device which would gradually cut off the fuel as the clock mechanism approached a predetermined point in its operation, or which required a trigger mechanism which had to be cocked and set in addition to setting the clock mechanism. In addition to these defects, the prior devices usually had relatively delicately adjusted, easily deranged parts which, not infrequently, got out of order.

This invention is designed to overcome the above noted defects, and objects of this invention are to provide a time controlled valve in which the valve is opened by the mere act of setting the clock mechanism, in which the valve is automatically closed by the clock mechanism, and in which a quick motion is imparted to the valve during closing by the inherent nature of the device and without the necessity of additional mechanism which has to be separately set or cocked.

Further objects of this invention are to provide a time controlled valve which has a single instrumentality, which may be manually operated to both open the valve and set or wind the clock mechanism, and which may be manually reversely operated, independently of the clock mechanism, to close the valve in the event that the operator did not wish to wait until the clock mechanism had operated to close the valve.

Further objects are to provide a clock controlled valve which may be set to operate after any predetermined length of time, and which is so constructed that the escapement mechanism of the clock will be started, or given an additional starting impulse, by the mere act of setting the clock mechanism.

Further objects are to provide a clock controlled valve which does not require much "head room," as its overall dimensions are small, which may, therefore, be screwed into place upon the fuel supply pipe with the utmost facility even in constricted spaces, which is so made that a simple type of casing may be employed as a unitary part of the device for housing the clock mecha-

nism, and in which the casing may be formed of sheet metal having integral bottom, front, and back walls, and a readily removable sheet metal cover interlocking with the body portion of the casing.

Further objects are to provide a clock controlled valve in which the clock mechanism may be readily removed without disturbing the valve or associated parts, and which may be easily adjusted or inspected or replaced as occasion demands.

Further objects are to provide a clock controlled valve mechanism which is of very simple construction, which may be easily produced, which is cheap, and which is free from fragile or delicate parts.

An embodiment of the invention is shown in the accompanying drawing, in which:

Figure 1 is a front elevation of the device.

Figure 2 is a sectional view on the line 2—2 of Figure 1.

Figure 3 is a sectional view on the line 3—3 of Figure 2.

Figure 4 is a sectional view on the line 4—4 of Figure 3.

Figure 5 is a sectional view on the line 5—5 of Figure 4.

The device comprises a valve 1, which may be a fuel valve, which is rigidly attached to the bottom 2 of a casing in any suitable manner, for example, by means of the screws 3, as shown in Figure 3. This casing is provided with front and rear walls 4, which are integral with the bottom 2. The construction is readily followed by stamping the casing out of sheet metal and subsequently folding the integral side portions 4 upwardly. The casing is completed by means of the cover 5, which is also stamped from sheet metal and curved to fit the outline of the front and rear walls 4, as shown in the drawing. Preferably the cover 5 is provided with relatively narrow intumed flanges 6, which fit over the edges of the front and rear walls 4, to thereby hold these walls in position and to insure an interlocking of the cover with these walls. The cover is very easily attached by means of screws 7, which are threaded into lugs 8 struck upwardly from the bottom 2 of the casing, as shown in Figure 3. A clock mechanism, indicated generally by the reference character 9, is removably held in place by means of screws 10, which are threaded into the posts or spacing members 11, carried by the clock mechanism, as indicated in Figures 3 and 4. Preferably these screws extend inwardly through the front wall 4 of the casing

and are readily accessible, so that the clock mechanism may be removed as a whole by merely removing the screws 10.

The clock mechanism is provided with a spring shaft or arbor 12, which carries at its forward end a radially projecting arm 13, as shown in Figures 2 and 3. A winding shaft 14 is arranged in axial alignment but out of contact with the spring shaft or drive shaft 12 of the mechanism. This winding shaft 14 is journaled within bearings carried by the front wall 4 of the casing, and is provided with a thumb piece or arms 15, so that it may be rotated manually. The winding shaft or manually operable shaft 14 is provided adjacent its inner end with a cam disc 16, which has a rearwardly projecting tongue 17, see Figures 2 and 3. This tongue 17 is adapted to engage the flat face of the arm 13 when the winding shaft is rotated in a clockwise direction, as viewed in Figure 3. When the winding shaft is turned in a clockwise direction as viewed in Figure 3, it is obvious that the spring shaft or driving shaft 12 is similarly rotated and the clock mechanism is wound to the desired extent, depending upon the angle to which the shaft 14 is turned.

A pointer 18 is carried by the shaft 14 and located on the front side of the front wall 4 of the casing and cooperates with a graduated dial 19, carried by such front wall, to indicate the length of time the clock mechanism will run before it cuts off the fuel supply in a manner hereinafter described. The dial 19 is preferably provided with a pair of stops 20, see Figure 1, which are engaged by the pointer 18 at the two extreme limits of its motion.

The clock mechanism may be of any suitable or approved type, and is provided with escapement mechanism in the usual manner, such escapement mechanism including a balance wheel 21 carried by the balance wheel shaft 22, as shown in Figures 2 and 4. This balance wheel shaft 22 is provided with a small pinion 23 for a purpose which will hereinafter appear as the description proceeds.

The valve casing 1 is provided with inlet and outlet portions 24 and 25, see Figure 2, and with a by-pass or pilot light portion 26, see Figures 1 and 3. The pilot light is not shown, but it is preferable to provide an auxiliary hand control stop cock therefor in the usual manner.

The valve proper is indicated at 27 in Figures 2 and 3, and is provided with an upwardly extending stem or rod 28, whose upper end is screw threaded into a cam follower or plunger 29, see Figure 3. This plunger 29 is recessed and provides a seat for a small helical spring 30 loosely surrounding the valve stem 28. The lower end of the spring bears against a soft packing 31, which in turn contacts with a interiorly located guiding flange 32. The flange 32 is preferably formed integral with a rigidly positioned tube or hollow guiding stem 33 carried by the valve casing 1, as shown most clearly in Figure 3.

It is to be noted from Figure 3 that the interiorly located guiding web or partition 32 is located at a considerable distance above the valve 27. Also it is to be noted that the valve stem 28 has a loose fit with this web 32, and that the plunger 29 has a relatively loose fit within the tube 33. This allows a slight play for the valve 27 and insures accurate setting of such valve.

A sleeve 34 loosely surrounds the tube 33 and bears against the flanged upper end of the plunger 29. The lower end of this sleeve 34 is provided with a flange 35, which is engaged by the forked

arms of a rocking plate 36, see Figures 3 and 4. This rocking plate is provided with a pair of lips 37, see Figure 4, and these lips are wrapped around one of the spacing pillows 11 and thus provide a pivotal support for the rocking plate. A leaf spring 38, see Figure 3, is provided for urging the rocking plate upwardly into a position tending to lift the sleeve 34.

Means are provided for starting the clock mechanism whenever the sleeve 34 moves downwardly. This means is shown in Figures 4 and 5 and comprises a small spring finger 39 secured to an arm of the rocking plate 36, as shown in Figure 4, and projecting into the line of the teeth of the small pinion 23 carried by the balance wheel shaft 22. Clearly when the sleeve 34 moves downwardly, the spring finger 39 will engage the teeth of the pinion 23 and pass therefrom during its downward travel, thereby giving the balance wheel shaft 22 a sudden twist and insuring the starting of the escapement. It is clear that in the uppermost position of the plate 36 the spring finger 39 or starting finger could either interlock with the teeth of the pinion 23 and arrest further motion of the clock mechanism, or it could pass upwardly into its upper position, above that shown in full lines in Figure 5, and thus allow the clock mechanism to completely run down.

Referring again to the cam 16, particularly as shown in Figure 3, it will be seen that this cam is provided with a flat lower face or cut-off face 16' and with a sharply rounded portion 16''. The purpose of this construction will immediately be appreciated when the operation of the apparatus is considered, as will be outlined below.

When it is desired to turn on the fuel, the winding shaft 14 is given a part turn by means of the thumb piece 15, so that the pointer 18 indicates the correct length of time or graduation upon the dial 19, see Figure 1. The clockwise rotation of the shaft 14 winds the clock mechanism due to the engagement of the tongue 17 of the cam with the arm 13 of the driving shaft or spring shaft 12 of the clock mechanism. The mechanism is thus wound by the mere setting of the device. In addition to this, the sharply rounded corner 16'' of the cam suddenly depresses the valve 27 and the loosely mounted sleeve 34. This motion of the parts, therefore, opens the valve and, in addition, imparts a rocking motion to the plate 36, which, in turn, gives a sudden twist to the escapement mechanism and insures the starting of the escapement mechanism.

The clock mechanism, therefore, is set into operation and slowly rotates the cam 16 in a counter-clockwise direction. After the clock mechanism has operated for a predetermined length of time for which the device is set, the sharply rounded portion 16'' of the cam begins to slide over the top of the plunger or cam follower 29. The upward pressure of the spring 30, which is also assisted by the spring 38, causes the cam 16 to quickly snap into its final position, as shown in Figure 3, and thus secures a quick and complete cut-off of the fuel. There is no gradual cut-off permitted by the mechanism described, but instead the fuel is either turned completely on or completely off.

If the operator should wish to cut the gas off without waiting for the clock mechanism to operate the valve, all that is necessary is that he grasp the thumb piece 15 and turn the pointer 18 to its "off" position. This rotates the cam 16 into its cut-off position, as shown in Figure 3,

and thus cuts off the fuel supply. It is to be noted that the winding shaft 14 can be turned in a counter-clockwise direction, as the tongue 17 is free to move away from the arm 13 when the cam is so rotated.

Thus the operator is given the utmost freedom to either set the device and wait for its automatic cut-off after the requisite length of time, or if occasion demands, he may instantly cut off the device by merely turning the pointer back to its "off" position. He is not required to wait for the clock mechanism to complete its action.

In addition to this, the operator is not required to manipulate any valves whatsoever when he turns on the fuel. He merely rotates the winding shaft 14 and this automatically turns on the fuel and sets the mechanism. As stated above, he may also cut off the fuel manually by merely reversing the winding shaft 14.

It will be seen also that the device is extremely simple in its construction, and that the casing, for instance, is formed of an integral bottom and front and rear walls and a simple one-piece cover. Further, it will be seen that the clock mechanism can be bodily lifted from the casing in a very simple and easy manner after the holding screws therefor have been removed from the front of the casing. Thus repair, inspection, or adjustment is effected with the utmost ease.

It will be seen further that the total overall dimensions of the apparatus are extremely small, as is obvious from an inspection of Figure 1, and, consequently, hardly any "head room" or clearance is required for the device while it is being screwed into place upon the supply pipe.

Further than this, no skill is required of the operator, as there is only one instrumentality, namely, the winding shaft, to operate in either setting the device or manually cutting off the fuel.

The device in actual trials has been found to work with the utmost certainty and to provide the maximum freedom for the operator. Further, the quick cut-off prevents flaring back or back firing of the burner.

Although the invention has been described in considerable detail, it is to be understood that the description is to be interpreted as illustrative rather than limiting, as the invention may be

variously embodied and is to be determined only as claimed.

I claim:

1. In a mechanism of the character described, clock mechanism having a winding shaft and a driving shaft, an arm carried by said driving shaft, winding means rigidly connected with said winding shaft and provided with a projecting portion adapted to positively engage said arm on one side of said arm when rotated in one direction and free to rotate away from said arm when rotated in the other direction, a cam carried by said winding means and having a rapidly curving corner portion, a spring pressed cam follower engaging said cam and having a quick motion when said rapidly curving corner portion is engaged to rotate said cam, and a valve operated by said cam follower.

2. In a mechanism of the character described, clock mechanism having a winding shaft and a driving shaft, an arm carried by said driving shaft, winding means carried by said winding shaft and provided with a projecting portion adapted to engage said arm on one side of said arm, a cam carried by said winding means, a valve, a plunger controlled by said cam for opening and closing said valve, said clock mechanism having an escapement, and means actuated by said plunger for starting and stopping said escapement.

3. In a mechanism of the character described, clock mechanism having a winding shaft and a driving shaft, an arm carried by said driving shaft, winding means carried by said winding shaft and provided with a projecting portion adapted to engage said arm on one side of said arm, a cam carried by said winding means, a valve, a plunger controlled by said cam for opening and closing said valve, said clock mechanism having an escapement, and means comprising rocking means actuated by said plunger for rocking into and out of engagement with said escapement, said rocking means starting said escapement when said rocking means is rocked out of engagement with said escapement, and stopping said escapement when said rocking means is rocked into engagement with said escapement.

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