

March 19, 1935.

F. LUX

1,995,070

TIME MECHANISM FOR OPERATING GAS VALVES

Filed Nov. 6, 1931

2 Sheets-Sheet 1

Fig. 1.

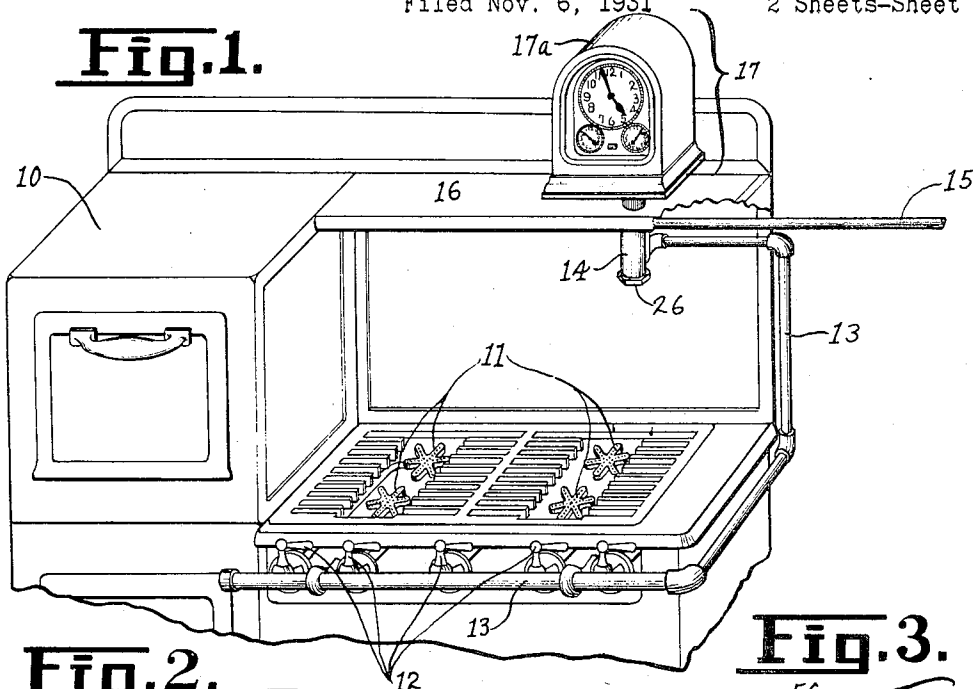


Fig. 2.

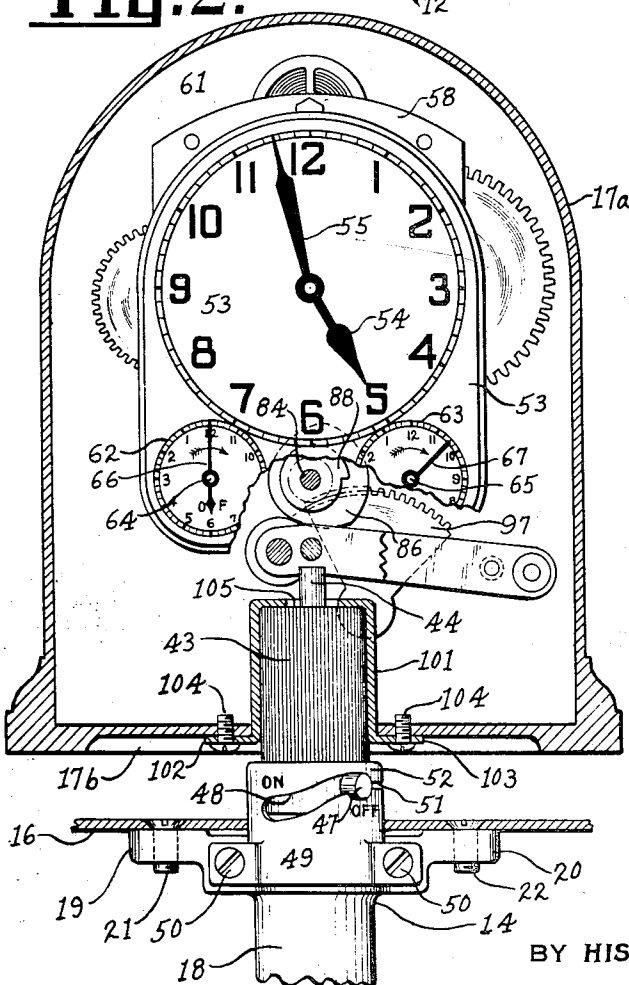
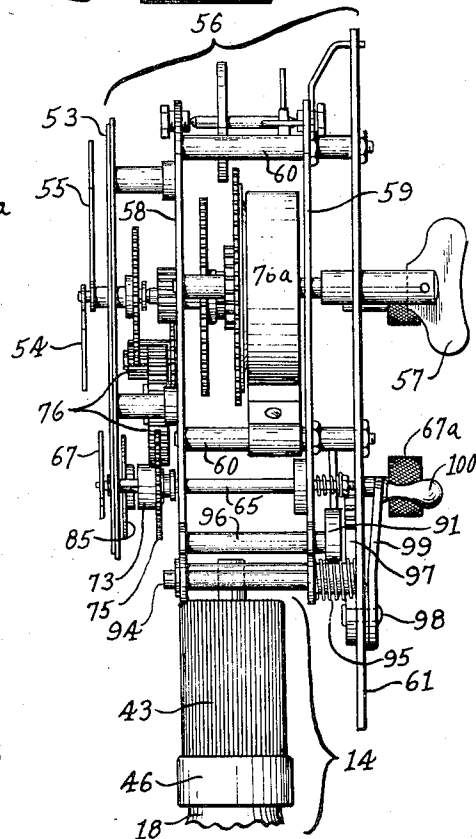


Fig. 3.



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2 Sheets-Sheet 2

Fig. 4.

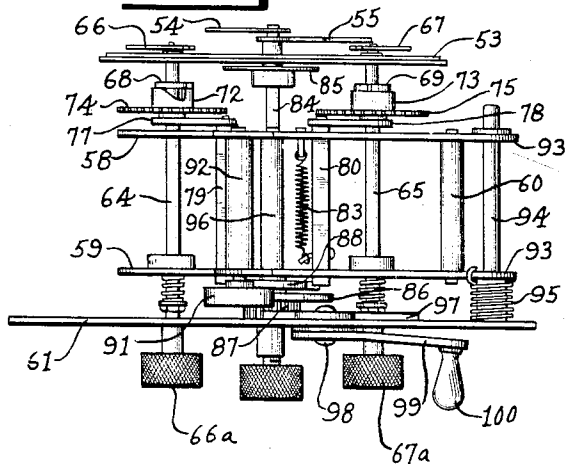


Fig. 5.

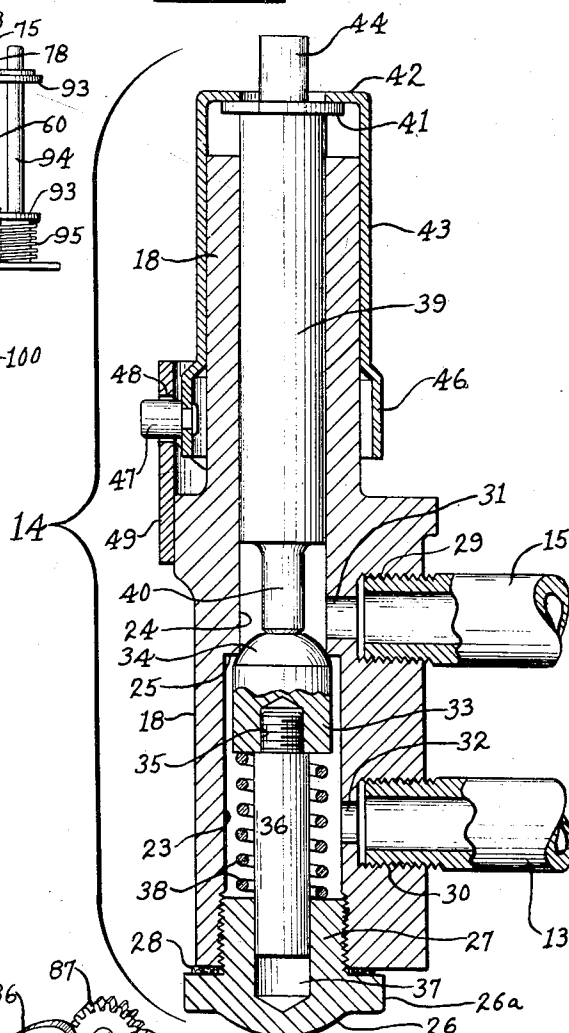
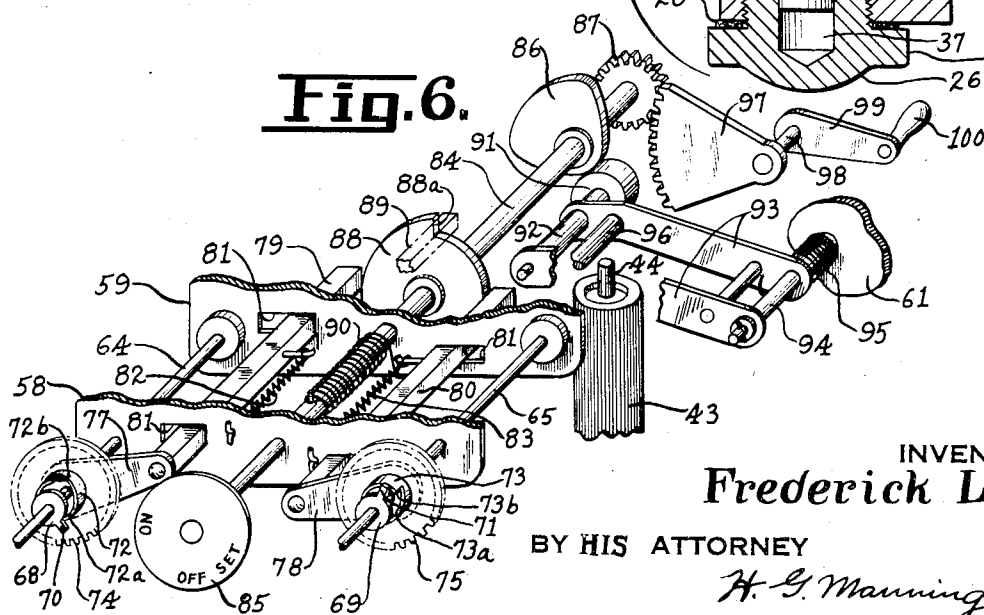


Fig. 6.



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UNITED STATES PATENT OFFICE

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TIME MECHANISM FOR OPERATING GAS VALVES

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Lux Clock Manufacturing Company, Water-
bury, Conn., a corporation of Connecticut

Application November 6, 1931, Serial No. 573,335

10 Claims. (Cl. 161—9)

This invention relates to automatic time controlled devices, and more particularly to a time operated mechanism adapted to open and close the master valve of a gas range at any predetermined times.

One object of this invention is to provide a time operated mechanism of the above nature in which the time interval during which the valve will remain open or closed may be adjusted at will.

A further object of the invention is to provide a detachable time operated mechanism for a gas range in which all of the gas pet-cocks may be simultaneously controlled by a single master valve.

A further object of the invention is to provide an attachment of the above nature in which the master valve may be operated manually as well as mechanically whenever desired.

A further object is to provide a time operated gas valve attachment of the above nature which will be simple in construction, inexpensive to manufacture, compact, ornamental in appearance, and very efficient and durable in use.

With these and other objects in view there has been illustrated on the accompanying drawings, one form in which the invention may be conveniently embodied in practice.

In the drawings:

Fig. 1 represents a perspective view of a gas range with a time operated master valve attached thereto.

Fig. 2 is a fragmentary front elevational view of the master valve and its associated time operated clock mechanism, the casing for the latter being shown in section.

Fig. 3 is a right-hand end view of the same.

Fig. 4 is a bottom plan view of the time-operated control mechanism.

Fig. 5 is an enlarged vertical section of the master valve.

Fig. 6 is a fragmentary diagrammatic perspective view of the operating mechanism which is located in the bottom part of the clock casing.

Referring now to the drawings in which like reference numerals denote corresponding parts throughout the several views, the numeral 10 indicates a gas range having a plurality of gas burners 11 adapted to be controlled by a like number of manually-operated pet-cocks 12 of the customary type used in gas ranges. The pet-cocks 12 are each connected to a pipe 13 extending rearwardly and upwardly to a master overhead valve 14, which in turn is connected to a pipe 15 leading to the gas supply line. The master valve 14 is mounted below a shelf 16 forming a part of the

gas range 10, said shelf serving to support an automatic time-controlled valve operating mechanism 17 housed within a casing 17a.

Master gas valve mechanism

The master valve 14 includes a hollow body member 18 having a pair of laterally extending attachment lugs 19 and 20 by means of which the valve 14 may be detachably secured to the shelf 16, as by a pair of screws 21 and 22. The body member 18 is provided in its lower section with a cylindrical valve chamber 23, and in its upper section with a concentric central bore 24 of smaller diameter, thus providing a stepped shoulder 25 at the junction point between said chamber 23 and said bore 24.

The bottom of the valve chamber 23 is tapped and adapted to be closed by a cap member 26, preferably having a hexagonal head 26a and a threaded shank 27 for screwing into the tapped section of said valve chamber 23. A rubber washer 28 or other sealing means may be compressed between the lower face of the body member 18 and the hexagonal head 26a of the cap member 26. The rear of the body member 18 is provided with a pair of horizontal tapped sockets 29 and 30 for receiving the threaded ends of the gas supply pipe 15 and the burner supply pipe 13. The upper pipe socket 29 is connected to the central bore 24 of the valve chamber by a passage 31 while the lower socket 30 is connected to the valve chamber 23 by a similar passage 32.

The master valve 14 is adapted to be opened and closed by means of a valve plug 33 having a frusto-hemispherical head 34 adapted to seat against the sharp edge of the stepped shoulder 25. The valve plug 33 is provided with a tapped socket 35 in its lower end for detachable connection with the reduced threaded upper end of a vertical guiding stem 36, the lower end of which is slidably fitted within a socket 37 centrally located in the end cap member 26. The guiding stem 36 and attached valve plug 33 are adapted to be normally held in their uppermost or "closed" position by means of a helical compression spring 38 surrounding said stem 36.

The valve plug 33 is adapted to be depressed against the action of the spring 38 by means of an elongated vertical shaft 39 having a reduced lower end 40 for engaging the flat top of the frusto-hemispherical head 34. The upper part of the shaft 39 is provided with an annular flange 41 adapted to abut against the inturned end 42 of a shell member 43 slidably mounted upon the upper part of the body member 18. The upper

end of said shaft 39 is provided with a reduced pin 44 which is adapted to be mechanically depressed by a suitable means forming a part of the clock mechanism 17.

5 The master valve 14 may also be manually operated whenever desired by grasping the knurled outer surface of the shell member 43 and turning it in the proper direction. The knurled shell 43 has an enlarged lower section 46 into which
10 is riveted a laterally extending guide pin 47 which is slidably engaged within an inclined cam slot 48 formed within an upstanding arcuate plate 49 secured to the body member 18, as by a pair of screws 50 (see Fig. 2). The right-hand edge of
15 the plate 49 is split at 51 and communicates with the slot 48, thus providing a resilient arm 52 which is adapted to press downwardly against the guide pin 47 for holding it firmly in any desired angular position. The words "on" and "off" are preferably
20 marked at the ends of the slot 48 to indicate whether the valve is open or closed.

If it is desired to manually open the master valve 14, it will be only necessary to turn the knurled shell 43 in a clockwise direction until the
25 guide pin 47 is opposite the word "on". As will be understood, this action will cause the valve plug 33 to unseat from the shoulder 25 and thus open the passage between the inlet pipe 15 and the outlet pipe 13 (see Figs. 2 and 5).

30 Automatic timing mechanism

The timing mechanism 17, which is employed to mechanically operate the master valve 14 at the desired predetermined times, comprises the
35 clock casing 17a having a dial plate 53 upon which the time of day is indicated by an hour hand 54 and a minute hand 55, said hands being rotated by a constant speed spring driven clock movement generally indicated by the numeral 56 and adapted
40 to be wound up by a handle 57.

The clock movement 56 is supported by a pair of front and rear frame plates 58 and 59 adapted to be held in spaced relation by a plurality of
45 pillars 60. The clock movement 56 is adapted to be attached to the front side of a rear mounting plate 61 adapted to be suitably connected to the back of the casing 17a.

The lower part of the dial plate 53 is provided with a pair of small "On" and "Off" setting dials
50 62 and 63, each of said dials having the numerals 1 to 12 marked thereon in a counter-clockwise direction. The setting dials 62 and 63 have shafts 64 and 65 extending therethrough, said shafts 64 and 65 carrying setting pointers 66 and 67, respectively. The shafts 64 and 65 extend rearwardly
55 through the frame plates 58 and 59 and the mounting plate 61 and are adapted to be rotated to the desired times by manipulation of a pair of knurled knobs 66a and 67a located behind the mounting plate 61.

The shafts 64 and 65 have rigidly mounted thereon, intermediate the front frame plate 58 and the dial plate 53, a pair of cam follower
60 discs 68 and 69 having radial lugs 70, 71 projecting therefrom. Slidably mounted on each of the shafts 64 and 65 are a pair of sleeve cams 72 and 73, said cams being secured to a pair of gear wheels 74 and 75 which are adapted to mesh with a gear train generally indicated by the
65 numeral 76. The gear train 76 is adapted to be driven by a main spring 76a at such a speed that the sleeve cams 72 and 73 make one revolution every twelve hours.

The sleeve cams 72 and 73 are provided with
75 cam faces 72a and 73a arranged in alinement

with the lugs 70 and 71 of the discs 68 and 69. Each of the cam faces 72a and 73a have abrupt
shoulders 72b and 73b to permit the cams 72 and 73 to snap suddenly and release the valve-
operating mechanism to be described later. The
5 cams 72 and 73 are pressed forwardly at all times against their respective lugs 70 and 71 by a pair of elongated arms 77 and 78 rigidly mounted on the forward ends of a pair of horizontal rods 79
10 and 80, which are adapted to slide in slots 81 provided in the frame plates 58 and 59. The rods 79 and 80 are adapted to be pressed forwardly by a pair of helical springs 82 and 83, as clearly
15 shown in Figs. 4 and 6. By means of this construction it will be seen that the cams 72 and 73 will be held in their rearmost positions when the lugs 70 and 71 are engaging high portions of the cam faces 72a and 73a, and conversely
20 will be held in their foremost positions when the shoulders 72b and 73b have snapped over the lugs 70 and 71.

Attention is called to my prior application filed February 8, 1930, for the timing mechanism, under Serial No. 426,845, now Patent No. 1,951,027,
25 Mar. 13, 1934.

In order to mechanically open or close the master valve 14 on the gas range 10 at a predetermined time by means of the clock movement 56, said clock movement 56 is provided with a cam
30 shaft 84 journaled in the frame plates 58 and 59 intermediate the square shafts 79 and 80, and carrying on its forward end an indicating disc 85 having the words "On", "Off" and "Set" marked thereon. The words on the indicating disc 85 are
35 adapted to be visible through a suitable aperture provided in the dial plate 53. The cam shaft 84 has an oval-shaped cam 86 rigidly mounted thereon, said cam being positioned between a pinion gear 87 and a detent wheel 88 also mounted on said shaft 84. The detent wheel 88 has
40 an abrupt shoulder 88a formed on its periphery and is normally held in abutment with a square stop pin 89, as shown in phantom in Fig. 6, said stop pin 89 being preferably carried by the rear frame plate 59.

The cam shaft 84 is adapted to be rotated in a clockwise direction at all times by means of a
45 small coil spring 90 surrounding said shaft 84 between the frame plates 58 and 59. One end of the spring 90 is attached to said shaft 84 and the other end to the rear frame plate 59, as clearly
50 shown in Fig. 6. The detent wheel 88 is located in alinement with the rear ends of both of the square shafts 79 and 80 when said shafts 79 and 80 are in their rearmost positions and out of
55 alinement therewith when said shafts 79 and 80 are in their foremost positions.

The edge of the cam wheel 86 is adapted to contact at all times with a cam follower roll 91
60 carried on one end of a roller shaft 92 rotatably journaled in the free ends of a pair of rocker arms 93. The opposite ends of the rocker arms 93 are journaled on a pivot shaft 94 and are adapted to be held in position by means of a coil spring 95
65 surrounding said pivot shaft 94. The rear end of the pivot shaft 94 is secured to the mounting plate 61, and said coil spring 95 is located on said shaft 94 intermediate the rocker arm 93 and said mounting plate 61. A cross-rod 96 is carried by
70 the rocker arms 93 directly behind the roller shaft 92, and is located directly above the vertical depression pin 44 of the valve shaft 39, whereby vertical movement of the cross-rod 96 will cause the valve 14 to be opened or closed, depending on the direction of said movement.

In order to facilitate the turning of the cam shaft 84 in a counter-clockwise direction against the action of the coil spring 90, provision is made of a segment gear 97 adapted to mesh with the end pinion gear 87. The segment gear 97 is staked or otherwise secured to the forward end of a short shaft 98 journaled in the mounting plate 61. The rear end of the shaft 98 carries a crank arm 99 having a handle knob 100, by means of which the spring 90 may be wound each time the clock is set.

In order to place the clock 17 in operating position upon the master valve 14, the clock casing 17a is provided in its base 17b with a cylindrical inverted cup-shaped shell 101 having a pair of outwardly extending integral lugs or ears 102 and 103 at its open end, by means of which said shell 101 is rigidly secured to said base 17b, as by a pair of screws 104 (see Fig. 2). The shell 101 is adapted to fit over the knurled shell 43 of the master valve 14. The closed end of the shell 101 is provided with a central aperture 105 through which the valve depression pin 44 is allowed to protrude so as to be engaged by the cross-rod 96.

Operation

In operation, assuming that it is desired to set the device so that one or more of the individual gas burners 11 are to be automatically turned on and off at predetermined times, as for example, "On" at 10:30 o'clock and "Off" at 12 o'clock. The pet-cocks 12 controlling each of the desired burners 11 to be lighted will first be opened, it being understood that no gas can escape through the burners 11 at this time because the main gas pipe 15 is shut off at the master valve 14. The set pointers 66 and 67 will then be rotated by means of the knurled knobs 66a and 67a until said pointers 66 and 67 indicate 10:30 and 12:00 on the "On" and "Off" dials respectively. The crank arm 99 will then be manually rocked downwardly as far as it will go causing the cam shaft 84 and detent wheel 88 to rotate in a counter-clockwise direction about 270 degrees, or until the detent 88a is caught by the top face of the square shaft 80. The clock 17 will then be placed upon the master valve 14 in the position shown in Figs. 1 and 2.

When the first predetermined time, "10:30", arrives, the square shaft 80 will be caused to slide forwardly out of alinement with the detent wheel 88 by means of the action of the sleeve cam 73 and radial lug 71 on the follower disc 69. The detent wheel 88 will then automatically rotate in a clockwise direction under the action of the spring 90 until its shoulder 88a comes into contact with the bottom face of the square shaft 79. This motion will cause the cam 86 to force the cross rod 96 downwardly against the top of the valve depression pin 44, thus opening the master valve 14 and allowing gas to flow through the open pet-cocks 12 and their respective burners 11. The burners will automatically be lighted in the customary manner by means of pilot lights, not shown.

When "12 o'clock" arrives, the square shaft 79 will automatically slide forwardly out of alinement with the detent wheel 88 permitting said wheel 88 to rotate back to its original position with the shoulder 88a engaging against the stop pin 89, as shown in Fig. 6. This will permit the cross-rod 96 under the influence of the spring 95 to swing upwardly out of contact with the valve depression pin 44. The master valve will thus

be closed, shutting off the gas supply to the burners 11.

It is to be understood that, if desired, the gas range 10 may be operated without the use of the clock mechanism 17 merely by setting the master valve 14 at "open" position.

While there has been disclosed in this specification one form in which the invention may be embodied, it is to be understood that this form is shown for the purpose of illustration only, and that the invention is not to be limited to the specific disclosure but may be modified and embodied in various other forms without departing from its spirit. In short, the invention includes all the modifications and embodiments coming within the scope of the following claims.

Having thus fully described the invention, what is claimed as new, and for which it is desired to secure Letters Patent, is:

1. In an automatic gas control device, a valve casing having inlet and outlet gas ports, a valve operating member, time controlled means for automatically depressing said valve operating member to open said valve, a movable shell surrounding said casing and having means to engage said valve operating member, a pin on said shell, and a fixed plate on said casing having a cam slot to receive said pin, whereby manual rotation of said shell will also depress the valve into open position.

2. In an automatic gas control device, a casing having inlet and outlet ports, a valve operating member in said casing, a time-operated means for controlling said valve operating member for opening and closing said valve, and a manually operated sleeve member surrounding and independently engaging the top of said valve operating member to permit manual operation of said valve independently of said time operated means, said sleeve member comprising a movable shell surrounding said casing.

3. In an automatic gas control device, an elongated valve casing having an interior seat for a piston valve, a piston engaging rod extending out of said casing, time-controlled detachable means in alinement with said rod for automatically depressing it to open the valve after the expiration of a predetermined interval of time, and a slidable inverted cup member surrounding said casing and engaging the upper part of said rod for permitting said rod to be manually depressed to open the valve independently of said time-operated means.

4. In an automatic gas control device, an elongated valve casing having an interior seat for a piston valve, a piston engaging rod extending out of said casing, time-controlled detachable means in alinement with said rod for automatically depressing it to open the valve after the expiration of a predetermined interval of time, a slidable inverted cup member surrounding said casing and engaging the upper part of said rod for permitting said rod to be manually depressed to open the valve independently of said time operated means, and means for releasably holding said cup member in depressed position to hold the valve open as long as desired.

5. In an automatic gas control device, a valve casing, valve-controlling means extending out of said casing for engaging a valve in alinement therewith, a lever member having a pin in alinement with said means, time-controlled cam-actuated means for rocking said lever to cause said pin to move said means to valve opening position, and a depressible shell surrounding said cas-

- ing and having means to engage said valve-controlling means to permit it to be manually depressed to open the valve, and means to retain said shell in depressed position as long as desired.
- 5 6. In an automatic gas control device, a valve casing, a slidable valve controlling member, said valve controlling member extending out of said casing, a lever member having a lateral pin in alinement with said means, time-controlled 10 means for rocking said lever to cause said pin to move said member to valve-opening position, a depressible shell surrounding said casing and having means to engage said valve-controlling means to permit it to be manually depressed to open the 15 valve, and means to retain said shell in depressed position as long as desired.
7. In an automatic gas control device, a valve casing, said casing having a lower socket for receiving a valve guide rod, an elongated valve engaging rod located in the upper part of said casing, a manually operated shell surrounding said 20 casing for engaging and depressing said elongated rod, means to detachably lock said shell in depressed condition, and independently operated timed automatic mechanism for depressing said 25 rod.
8. In an automatic gas control device, a valve casing, a valve controlling member in said casing, a manually operated depressible shell having a lateral pin projecting therefrom, said shell having means for engaging and depressing said valve controlling member, means to releasably hold said pin in depressed position, and detachable automatic time-operated mechanism engaging the 5 end of said member for actuating it independently of said manually operated means.
9. In an automatic gas control device, a valve casing, a valve controlling rod extending out of said casing, said rod having a flange, time controlled 10 means in alinement with said rod for automatically depressing it to valve opening position after the expiration of a predetermined interval of time, and a manually depressible member surrounding said casing and engageable with said 15 flange for operating said rod independently of said time controlled means.
10. In an automatic gas control device, a valve casing, a valve engaging rod extending out of said casing, said rod having a lateral projection out- 20 side of said casing, time controlled means in alinement with said rod for automatically depressing it to valve opening position after the expiration of a predetermined interval of time, and a detach- 25 able manually operated inverted cup member for engaging and independently actuating the projection on said rod.

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