

Sept. 22, 1936.

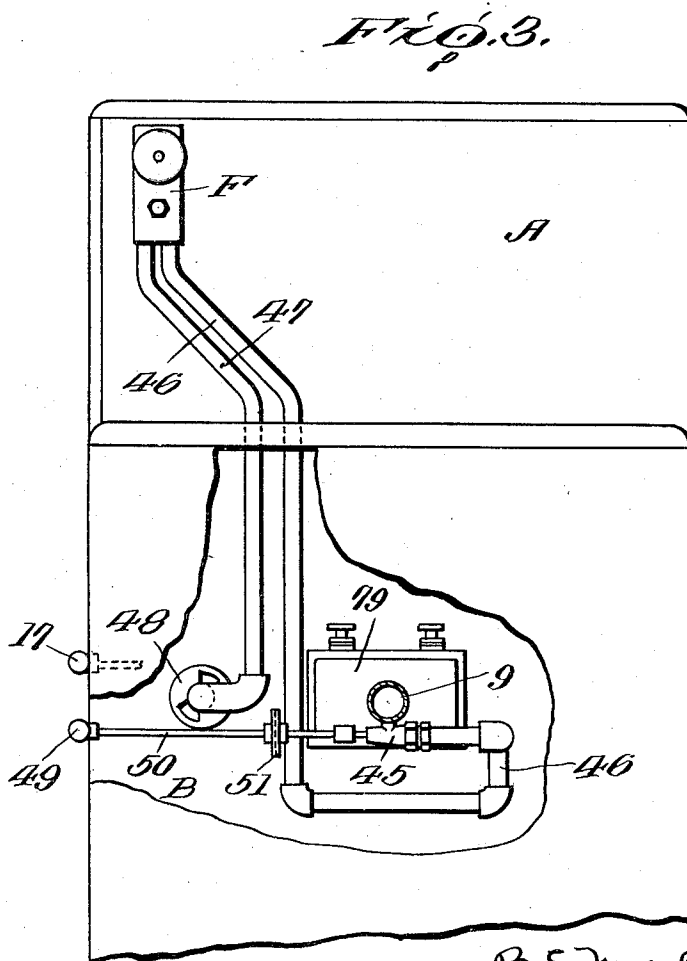
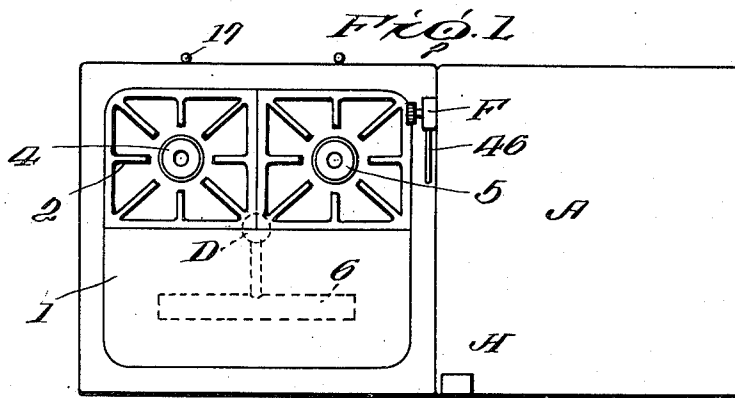
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2,055,384

GAS RANGE

Filed May 19, 1932

5 Sheets-Sheet 1



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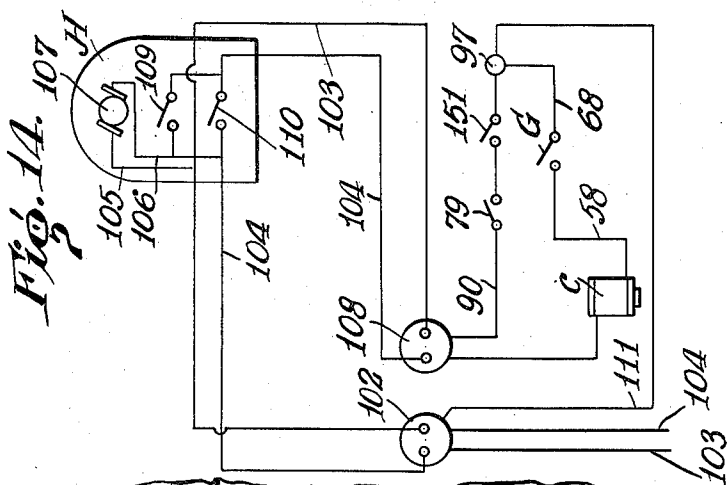
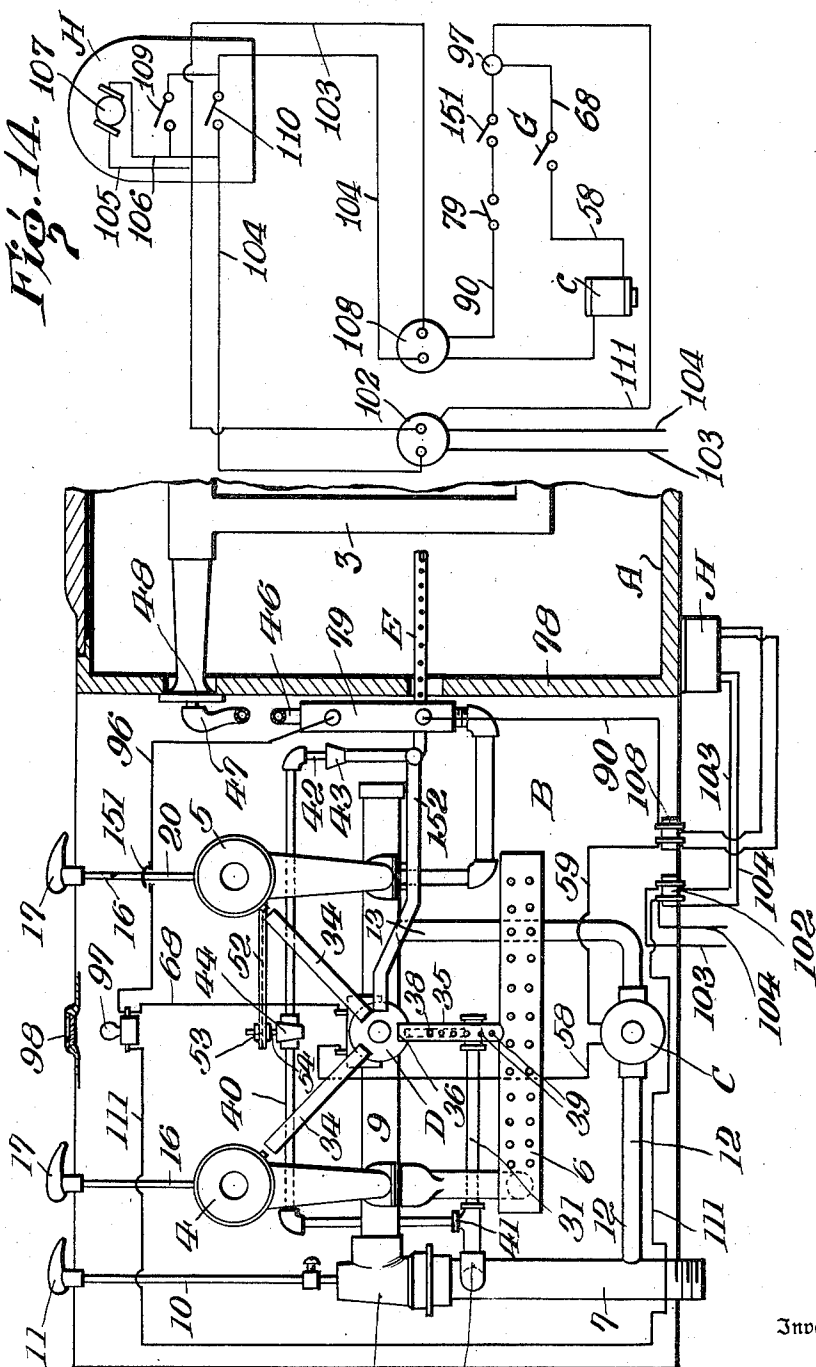
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GAS RANGE

Filed May 19, 1932

5 Sheets-Sheet 2

FIG. 2.



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GAS RANGE

Filed May 19, 1932

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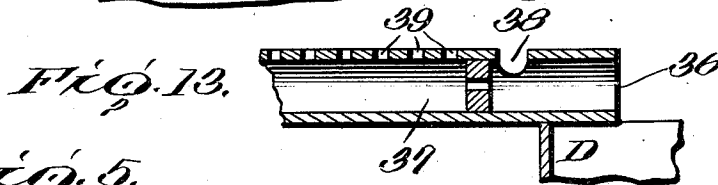
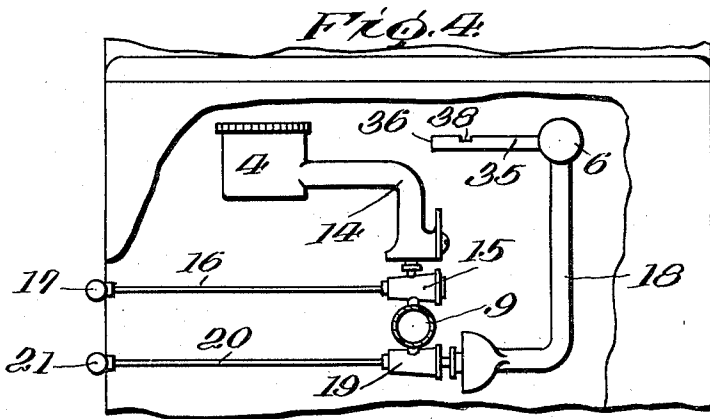


*FIG. 5.*

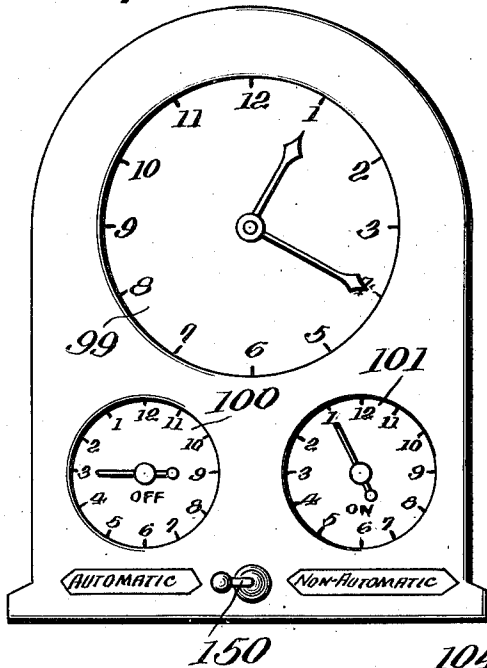
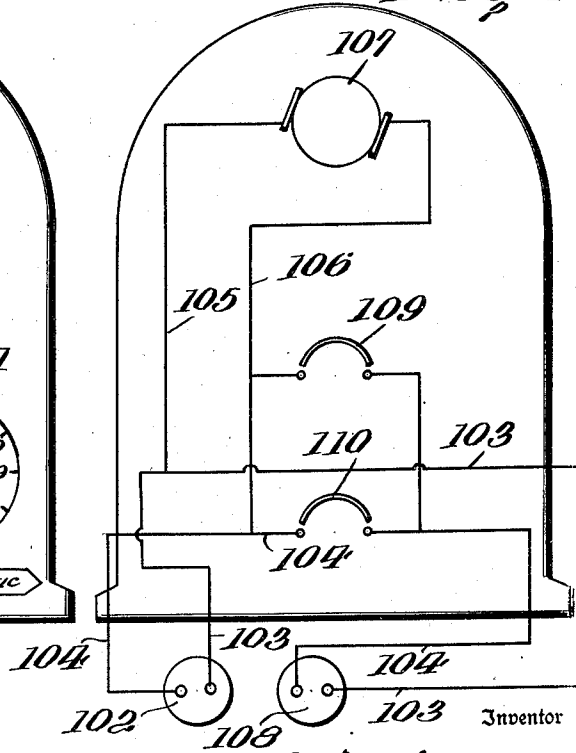


*FIG. 6.*



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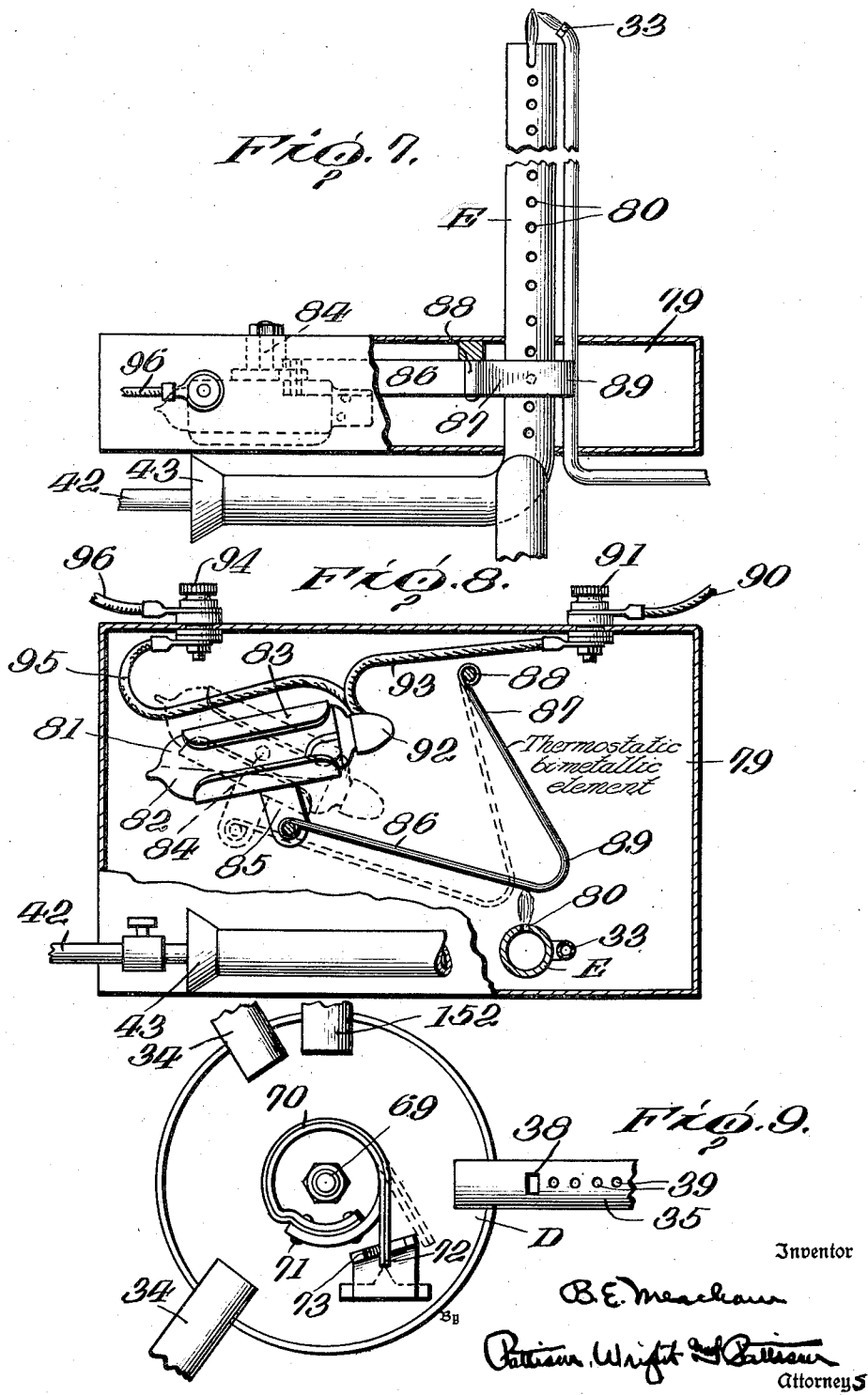
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GAS RANGE

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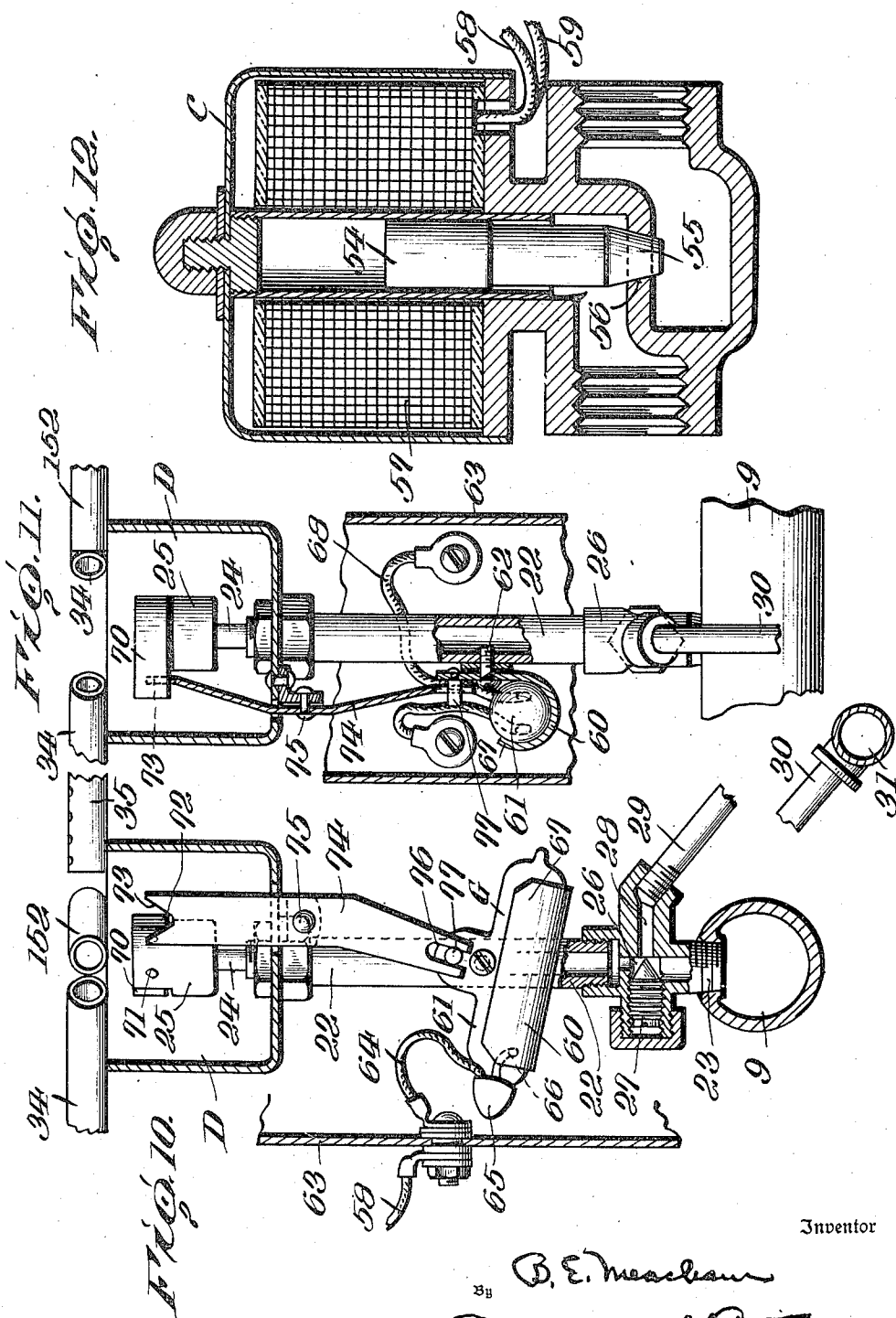
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GAS RANGE

Filed May 19, 1932

5 Sheets--Sheet 5



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## UNITED STATES PATENT OFFICE

2,055,384

## GAS RANGE

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Application May 19, 1932, Serial No. 612,309

5 Claims. (Cl. 158—117.1)

This invention relates to improvements in gas ranges pertaining, however, more particularly to a gas range, which is automatically turned on and off at predetermined times.

5 The primary object of the invention is the provision of an improved gas range in combination with means to turn on and off the gas to the range burners at a predetermined time.

10 Another object of the invention is the provision of a signal lamp in combination with the oven lighter burner of the range to indicate and signal whether or not this burner is lighted or is out.

15 Other particular and specific objects, novel features of constructions and improved results of the invention appear more specifically in the following description taken in conjunction with the accompanying drawings.

20 In the drawings Figure 1 is a top plan view of the improved range.

Figure 2 is a horizontal sectional view through the range with the cooking top plates of the open burner portion of the range removed.

25 Figure 3 is a fragmentary end view of the range, a portion of the end wall of the open cooking top portion of the range being broken away to better illustrate the construction.

30 Figure 4 is also an end view of the range with the end of the cooking top portion of the range being broken away to better illustrate the construction.

Figure 5 is a front view of the electric control clock.

35 Figure 6 is a diagrammatic showing of the electrical hook up of the clock to effect the control of the gas delivery to the range.

40 Figure 7 is a fragmentary view partially in horizontal section illustrating the oven lighter burner and the thermostatic switch in conjunction therewith.

Figure 8 is a side view of the structure shown in Figure 7, the figure being partially broken away and shown in vertical section.

45 Figure 9 is a plan view of the thermostatic switch operating element surrounding the pilot light for the burners of the open cooking top of the range.

50 Figure 10 is an enlarged detailed view partially in vertical section of the thermostatically operated switch operated by the pilot light for the open cooking top burners.

55 Figure 11 is an enlarged view partially in vertical section illustrating the same structure illustrated in Figure 10, the view, however, being

taken looking towards the end of a pivotally mounted mercury switch.

Figure 12 is an enlarged detailed view in vertical section of the electric solenoid gas valve.

Figure 13 is a fragmentary detail view in longitudinal section of the lighter tube for the elongated burner of the open cooking top of the range.

Figure 14 is a schematic diagram of the electrical control circuit for the range.

10 Describing the invention in detail in reference to the accompanying drawings, wherein similar parts are designated by like reference numerals throughout the description, A indicates the oven of the range and B the burner housing of the open cooking top portion of the range. One half of the open cooking top portion of the range is covered with a solid plate 1 while the other half is provided with grids 2. Within the oven is the usual oven burner 3 while beneath the grid portion of the cooking top are two burners 4 and 5. An elongated burner 6 is positioned beneath the solid portion 1 of the cooking top.

25 Gas for the several burners of the range is supplied from any suitable source and enters from the rear of the range through a conduit 7, which at its inner end is provided with a valve 8 through which the gas can pass into the main gas manifold 9 extending centrally throughout a major portion of the length of the burner housing of the cooking top portion of the range. The valve 8 is provided with an elongated operating rod 10 terminating at the front face of the cooking top portion of the range in an operating handle 11.

35 A by-pass gas conduit 12 has its one end in communication with the gas inlet conduit 7 in front of the valve 8 and its other end 13 in communication with the main gas manifold 9 whereby this conduit 12 constitutes a by-pass around the valve 8. An electrically operated solenoid valve C is positioned in this conduit 12 for a purpose which will be hereinafter described, as will also the particular structure of the valve which is illustrated in Figure 12 of the drawings.

40 The burners 4 and 5 receive their gas from the main manifold 9 through downwardly extending mixing tubes 14 as clearly illustrated in Figure 4 of the drawings. In this figure of the drawings will be further seen a valve 15 positioned intermediate the gas manifold 9, and the mixing tubes 14 of the burner to control the supply of gas to this burner. This valve 15 is provided with an elongated operating rod 16 terminating at the

outer face or front of the cooking top of the range in a valve operating handle 17.

Still referring to Figure 4 of the drawings, it will be seen that the burner 6 is provided with an elongated mixing tube 18, which receives gas from the manifold 9 through a valve 19, which is provided with an elongated valve operating rod 20 terminating at its outer end in a valve operating handle 21 positioned on the front of the cooking top portion of the range.

The pilot light D is centrally arranged in respect to the burners 4, 5 and 6 as clearly appears in Figure 2 of the drawings. By reference to the Figures 10 and 11 of the drawings, it will be seen that a conventional type of pilot light is used in that a vertical gas pipe 22 has its one end 23 in communication with the gas manifold 9, while its opposite end 24 burns a small flame within a cup 25. Just above its connection to the manifold 9 the pipe 22 is provided with a fitting 26 having therein a screw valve 27 by means of which the gas delivery to the pilot can be controlled to maintain at the pilot a flame of any desired size. The fitting is also provided with a secondary gas inlet 28 having communication with a gas conduit 29.

The gas conduit 29 has its opposite end 30 connected to the gas conduit 31. This gas conduit 31 has its one end connected as at 32 to the main gas inlet pipe 7 at a point in front of the valve 8.

Extending from a point adjacent the burners 4 and 5 to a point adjacent the flame of the pilot light D are flash tubes 34 through which gas from these burners travel to the pilot light where it is ignited and flashes back to in turn ignite either or both of these burners as may be desired. The burner 6 is ignited when desired from the pilot light D by means of a lighter tube 35, which has its ends 36 terminating adjacent the flame of the pilot light. As appears in Figure 4 of the drawings gas from the burner 6 travels through the orifice 37 and passes through the outer end of the arm where it is ignited by the pilot flame. When ignition takes place, there is a flash back which causes the flame to flash up through the opening 38 in the arm and ignite the gas, which is escaping from these orifices 39 in the upper face of the arm. The flame will travel along these orifices and thus ignite the main burner 6.

Gas is supplied to the oven lighter burner E by means of the conduit 40 which has its one end 41 in communication with the gas line or pipe 31 and its opposite end 42 in communication with the mixing tube 43 of the burner E.

At a point intermediate its length the gas delivery line 40 to the burner E is provided with a valve 44. The gas supply to the oven burner 3 is taken from the main manifold 9 through a valve 45, which communicates with the pipe 46. The pipe 46 runs up to and through the oven thermostat control F. The gas, which is allowed through the thermostat control F, is conveyed by a pipe 47 to the mixing tube 48 of the oven burner. The valve 45 is operated by the valve handle 49 positioned on the end of the elongated valve operating rod 50. Intermediate its length this operating rod is provided with a sprocket or gear wheel 51 over which passes a chain 52, which also passes over a sprocket wheel 53 carried by the extending shaft 54 of the valve 44. As a consequence, as the valve 49 is opened and closed by the rotation of the rod 50, so will the valve 44 be opened and closed by the sprocket chain 52.

At this point some special reference should be made to the thermostat control F. This thermo-

stat control is for the purpose of maintaining in the oven a heat of a predetermined degree. Devices for this purpose are common in respect to gas ranges and as is well known, there is in within them a valve for controlling the amount of gas delivery to the oven burner. This valve is operated by a thermostat positioned within the oven. To obtain a control of the gas supplied to the burner, it is therefore necessary to carry the gas through the thermostat control prior to its delivery to the oven burner. Hence, the necessity of the pipes 46 and 47 as heretofore described.

Coming back to the electric solenoid valve, reference is made to Figure 12 of the drawings wherein it will be seen that the valve is in the form of a plunger 54 having a tapered end 55 cooperating with a tapered valve seat 56. The solenoid coil is indicated at 57 and is energized from an electrical source hereinafter to be described with which it is connected by wires 58 and 59. It will be immediately evident that as the coil is energized the plunger will be lifted to permit the passage of gas and that when the coil is deenergized, the plunger will fall by gravity and thus close the valve and prevent the passage of gas in the pipe line 12.

Referring now to Figures 9, 10 and 11 of the drawings G indicates a mercury switch in the form of a tube 60 supported in a carrier 61, which is pivotally supported intermediate its length at 62. One end of the electric wire 58 of the solenoid valve C is fastened to a suitable support 63 and a short lead wire 64 connects the wire 58 to the end 65 of the tube 60. A metallic contact 66 extends into the tube, and the tube, as is common, contains mercury 67 to which electricity is delivered from a suitable source hereinafter to be described by means of a wire 68. Surrounding the flame from the end 69 of the pilot D is positioned a coil of thermo-metal 70 having its one end riveted or otherwise suitably fastened as at 71 to the cup 25 and its other and free end 72 positioned within the notched end 73 of a lever 74, which is pivotally mounted intermediate its ends as at 75 and is provided in its lower end with a notch 76 within which is positioned a pin 77 carried by the mercury tube carrier 61.

From the foregoing it will be understood that as the thermo-metal expands and contracts by reason of there being heat or no heat at the pilot, the mercury tube will be rocked upon its pivotal support by reason of the arm 74. When the mercury tube is in a position, as indicated in Figure 10 of the drawings, the electric circuit is open. When the tube is rocked into the opposite position the mercury runs towards the contact 66, the electric circuit will be closed between the wires 68, 64 and 58.

Positioned adjacent the oven wall 78 and penetrated by the oven lighter burner E, there is a box or housing 79. The lighter burner E is provided with a plurality of burner openings 80, some of which are within the housing 79 while the others are within the oven. A mercury switch, comprising a tube 81 having therein mercury 82, is supported within a carrier 83 which is pivotally mounted as at 84 to one wall of the housing. This carrier has a downwardly extending arm 85 to which one end of a thermostatic bimetal element 89 is attached. This element is of a V-shape and has its opposite end 87 secured to a pin 88 carried by the wall of the housing. Parts thus far described are so positioned that the V portion of the thermo member is above the flame orifices of the burner E within the housing. When

the burner E is not burning, the thermo element and the mercury switch are in the position shown in full lines in Figure 8 of the drawings. When the burner E is burning, the heat from the flames will cause the thermo element to expand and the parts will take the positions shown in dotted lines in Figure 8 of the drawings.

Electric current from a suitable source, hereinafter to be described, is brought by a wire 90 to the binding post 91 and from that post to the end 92 of the mercury switch by a wire 93.

The outgoing current through the switch is conveyed by the wire 95 to the binding post 94 and from there, by wire 96 to the electric light 97. It is to be noted that the thermostatic metal moves out of the flame zone when it is heated, which will prevent over heating of the metal which would, of course, prove injurious to it. Notwithstanding the fact that the thermostatic metal moves out of the flame zone when it is heated, the metal still remains sufficiently close to the flame to be affected by the heat of the flame and to stay in its expanded condition as long as the flame is burning.

Reference has just been made to the electric light 97. This light is positioned in the burner housing of the cooking top portion of the range immediately behind a red prism glass 98 in the front face or front wall of the cooking top portion of the range.

Referring now to Figures 5 and 6 of the drawings, which illustrate the electric clock for controlling the turning off and on of the gas to the burners at a predetermined time, this clock is provided with three dials on its face. The dial 99 is that of a regular electric clock, the dial 100 carrying a hand for setting the off time for the operation of the gas and the dial 101 carrying a hand for the setting of the on operation of the gas.

Referring to the wiring of the clock and the several mercury switches and the solenoid valve, reference should be made to Figures 2 and 6 of the drawings. Here it will be seen that at the rear, the range is provided with an electric plug or socket 102 to which the electric street current ordinarily used for the electric lights of the house is brought by the two wires 103 and 104. From this plug continuations of the wires 103 and 104 run to the clock, which is designated as an entirety by H. From these main current supply wires 103 and 104 lead off wires 105 and 106 go to an ordinary electric clock motor 107, which actuates the hands on the clock dial 99. These main current wires 103 and 104 terminate in a second plug 108 at the rear of the range. Intermediate the plugs 102 and 108 and in the clock housing are two contacts 109 and 110. The contact 109 is for the purpose of making or breaking the circuit in the main current wire 104 and is automatically operated by the clock mechanism in accordance with the setting of the on and off dials of the time control. The contact 110 is also in the main current wire 104 and is for manual operation to be operated independently of the clock.

From the plug 108 the wire 90, heretofore referred to, runs to the binding post 91 of the mercury switch, which is operated by the oven pilot light. At the opposite side of the mercury switch wire 96 leads to the electric light 97. The second wire from the plug 108, which is numbered 59 and which has been heretofore referred to, runs to the coil of the solenoid and from the coil of the solenoid a wire designated as 58

runs to the mercury switch operated by the pilot light D. From this mercury switch the current continues onward from the wire 68 to the electric light, where it joins wire 96. From the plug 102 a lead wire 111 is taken off of the main current conducting wire 104 and runs to one side of the electric light 97.

From the foregoing, it will be seen that the following wires are always hot wires, that is to say, current is always in these wires. These hot wires are 103 and its continuing wire 90, the wire 111 to one side of the electric light and the wire 104 up to its point of connection with the circuit makers and breakers 109 and 110. The wires 105 and 106 to the electric clock are also current conducting at all times for running the electric clock motor.

From this it will be understood that if the pilot light E is burning and causes the thermo-metal 89 to expand, the mercury switch will be closed and allow current delivered through the wire 96 to one side of the electric light 97, and from there through the wire 68 up to one side of the mercury switch adjacent to the pilot light D. Current is at all times being delivered to the electric light 97 through the wire 111. The electric light 97, therefore, constitutes a signal in that as long as the light is burning behind the prism glass the pilot light E is ignited. The minute the burner E goes out the thermo-metal 89 cools off and breaks the electric circuit thus putting out the electric light 97.

As long as the burner E is burning, current is being delivered to one side of the mercury switch adjacent the pilot light D through the wires 90, 96 and 68. The pilot light D is a constant burning pilot and thus the thermo elements surrounding it normally holds the mercury switch in a closed position thus normally forming a constant connection between the wires 68 and 58 to one side of the coil of the solenoid. Consequently when the automatic circuit maker and breaker 109 is closed and current flows to the other side of the solenoid through the wire 59, the circuit is completed and the solenoid valve 54 is opened.

Due to the fact that the valve 44 in the gas line to the oven lighter burner E is opened only when the gas valve controlling the supply of gas to the oven burner 3 is opened, this pilot has a gas supply only so long as the oven burner has a gas supply. Hence this burner E is not a constant pilot light.

By connecting the gas valve 44 for operation simultaneously with the oven burner gas valve, the operator can operate both valves by manipulating one valve handle only.

The oven burner pilot E will be ignited by the flash tube 152.

From the foregoing, it can be understood that the improved range construction provides a range which can be automatically or manually controlled, and that the range can be shifted from automatic to manual control quickly and easily. Furthermore, the automatic control is absolutely safe in that no gas whatsoever can be delivered to any of the burners unless both of the burners D and oven lighter burner E are burning.

In a range of the type herein described, which has an automatic operation, the provision of a cooking top having a solid portion is highly desirable for the reason that vegetables left in a pan of water to be cooked over the burner 6 must not be subjected to too much heat and must cook slowly to prevent the evaporation of the water

within the utensil. Fast cooking would cause considerable evaporation and the vegetables would soon be cooking dry in the utensil, and would in consequence be burned. This solid top portion 1 of the cooking portion of the range also makes it possible to heat a plurality of utensils over a single burner.

When natural gas is being used as fuel for the several burners a constant burning auxiliary pilot light 33 may be provided to insure ignition of the oven burner 3 and the oven lighter burner E. This pilot receives fuel through pipe 31. The flame of the pilot can be controlled as to size or completely eliminated by the valve 170.

#### 15 Operation

Having described the structure making up the present automatically controlled gas range, the operation of the device will now be described.

20 Let it be assumed that the lady of the house desires to spend the afternoon away from home and expects to return at six o'clock to find a well cooked meal awaiting her. Before leaving, she places in the oven a meat roast or other food 25 which she desires to bake and perhaps a pot of vegetables, which is to be cooked in water. The pot of vegetables she places over the burner on the solid cooking top portion 1 of the range as here the vegetables will cook more slowly.

30 To provide a well cooked meal at six o'clock, it will be necessary for the meal to start cooking at three o'clock. Accordingly, she operates the manual switch 150 of the clock to the automatic side thus opening or breaking the circuit through 35 the switch 110, sets the on dial for three o'clock and the off dial for six o'clock. Additionally, she operates the handle 11 to close the valve 8 with the result that gas to the main manifold 9 can be delivered only through the by-pass gas line 12, 40 which line is closed by the solenoid valve C. She also operates the valve handle 21 to open the valve 19 for the delivery of gas to the burner 6 under the solid cooking top portion 1 of the range. At the time this valve 19 is opened, no gas will 45 flow to the burner 6 as all gas supply conduits to the manifold 9 are closed. She also operates the valve handle 49 to open the valve 45 for the delivery of gas to the oven burner 3. When the valve handle 49 is operated in addition to opening 50 the valve 45, it opens the valve 44 and closes the switch 151. The opening of the valve 44 delivers gas to the oven lighter burner E, which will be ignited from the constant burning pilot D through the flash tube 152.

55 In approximately ten seconds' time the thermometer member 89 will expand and cause the closing of the mercury switch in the housing 79 through which the oven burner pilot light passes. As soon as this mercury switch is closed, the electric circuit is completed to the electric light 97 and this light 60 will become illuminated thus advising her that burner E is burning and that the range is ready for automatic operation by the electric controlling clock.

65 When three o'clock arrives, the electric clock will automatically close the circuit maker and breaker 109 and thus complete the electric circuit through the solenoid causing the solenoid valve to open. When the solenoid valve is opened, gas is 70 delivered to the main manifold 9 and as the valves 19 and 45 are opened, gas will flow to the burners 6 and 3 respectively and be ignited by the pilot light D and burner E, respectively. When six o'clock arrives, the contact 109 will be operated 75 to an open position by the clock and thus break

the electric circuit to the solenoid valve. The valve will then close thus cutting off the supply of gas to the manifold 9 and burners 3 and 6.

Thus it will be seen that the range has been automatically started and stopped and has auto- 5 matically caused the cooking of the meal, which will be ready upon the return to her home of the house-wife.

Inasmuch as the burners 4 and 5 are automatically ignited by the pilot light D, the house- 10 wife, if she desires, can also turn on the gas to these burners before leaving.

Upon her return to her home, the house-wife will find the light 97 burning as this light will 15 continue to burn as long as the burner E is burning, and the burner E will burn as long as the valve 45 remains open.

Attention is directed to the fact that for the automatic operation of the solenoid valve to take 20 place, both the pilot light burners D and E must be burning. If either of these pilot lights are not burning, the electric circuits cannot be completed to cause the solenoid to be energized. This is a safety feature and prevents any possibility of the escape of unignited gas from either of the 25 cooking top burners or the oven burners.

The range can, of course, be operated independently of the automatic control and when being so operated, the switch 151 is moved to the non-automatic side and the valve handle 11 op- 30 erated to open the valve 8 to cause a constant flow of gas to the manifold 9. With a constant flow of gas to the main manifold 9 the range can be operated in the ordinary and usual way.

As a matter of fact, if a non-automatic opera- 35 tion of the range is desired, the electric control and electric control can be dispensed with altogether by disconnecting the current input wires 103 and 104 at the plug 102 at the rear of the range.

Having described my invention, what I desire 40 to secure and protect by Letters Patent are as follows:

1. In a gas range having cooking top burners and an oven burner, a gas supply line leading to 45 each of said burners, an electrically operated valve in said gas supply line, a constant burning pilot light for the cooking top burners, a lighter burner adjacent the oven burner, means operable to ignite the oven lighter burner and the cook- 50 ing top burners from said constant pilot, an electric circuit including said electrically operated valve, thermostatically operated switches in said electric circuit and positioned to be closed by the heat of said pilot light and oven lighter burners 55 respectively, a clock in said electric circuit operable to open and close said circuit at predetermined times, means operable to supply fuel to said oven lighter independently of said valve, and a signal in said circuit operable to indicate whether or not the oven lighter burner is ignited or ex- 60 tinguished.

2. In a gas range having cooking top burners and an oven provided with a burner, a gas supply 65 line leading to each of said burners, a constant burning pilot light and means operable to cause said pilot to ignite the cooking top burners, a lighter burner positioned to ignite the oven burner, means operable to cause said pilot light to 70 ignite said oven lighter burner, an electrically operated valve in the gas supply line and controlling the delivery of fuel to said oven and cooking top burners, an electric circuit including said valve, a clock operable to open and close said circuit at predetermined times, thermostatically operated switches in said circuit and operable by 75

the heat from said constant pilot light and said oven lighter burners respectively to close said circuit, the parts operating as described to provide an automatic gas range.

5 3. In a gas range having cooking top burners and an oven burner, a gas supply line leading to each of said burners, an electrically operated valve in said gas line and controlling the delivery of fuel to said oven and cooking top burners, a constant burning pilot light for the cooking top burners, means operable to cause said pilot light to ignite said cooking top burners, a lighter burner positioned to ignite the oven burner, means operable to cause said pilot light to ignite the said oven lighter burner, an electric circuit including said electrically operated valve, thermostatically operated switches in said circuit and operable by the heat from said constant pilot light and said oven lighter burners respectively to close said circuit, a clock in said electric circuit operable to open and close said circuit at predetermined times, means operable to supply fuel to said oven lighter independently of said electrically operated valve, and a signal in said circuit operable to indicate whether or not the oven lighter burner is ignited or extinguished.

4. In a gas range having cooking top burners and an oven provided with a burner, a gas supply line leading to each of said burners, a valve in said gas supply line and controlling the delivery of fuel to said oven and cooking top burners, means yieldably holding said valve to a closed position, electrically operated means for opening said valve, a constant burning pilot light for the cooking top burners, means operable to cause said pilot light to ignite the cooking top burners, a lighter burner positioned to ignite the oven burner, means operable to cause said pilot light to ignite said oven lighter burner, an electric circuit including electric operating means for said valve,

a clock operable to open and close said circuit at predetermined times, thermostatically operating switches in said circuit and operable by the heat from said constant pilot light and said oven lighter burner respectively to close said circuit and to remain closed as long as their respective burners are ignited, and means operable to supply fuel to said oven lighter burner independently of said valve, the parts operating as and for the purpose described.

5. In a gas range, a main fuel supply line communicating with a manifold, cooking top burners and an oven provided with a burner, said burners receiving their fuel from said manifold, a constant burning pilot light for the cooking top burners, means operable to cause said pilot light to ignite said burners, an electrically operated valve in the main gas supply line for controlling the admission of fuel to said manifold, a lighter burner positioned to ignite said oven burner and receiving its fuel supply independent of the control of said electrically operated valve, an electric circuit including said electrically operated valve, a clock operable to open and close said circuit at predetermined times, thermostatically operated switches in said circuit and operable by the heat from said constant pilot light and said oven lighter burner respectively to close said circuit, a valve for controlling the flow of fuel from the manifold to the oven burner, a valve for controlling the flow of fuel to the oven lighter burner, means to simultaneously operate both of said last named valves whereby fuel is delivered to the oven lighter burner when the oven burner is placed in communication with the manifold, and means operable to cause said pilot light to ignite the oven lighter burner when gas is supplied thereto, the parts operating as described to provide an automatic gas range.

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