May 1, 1928.

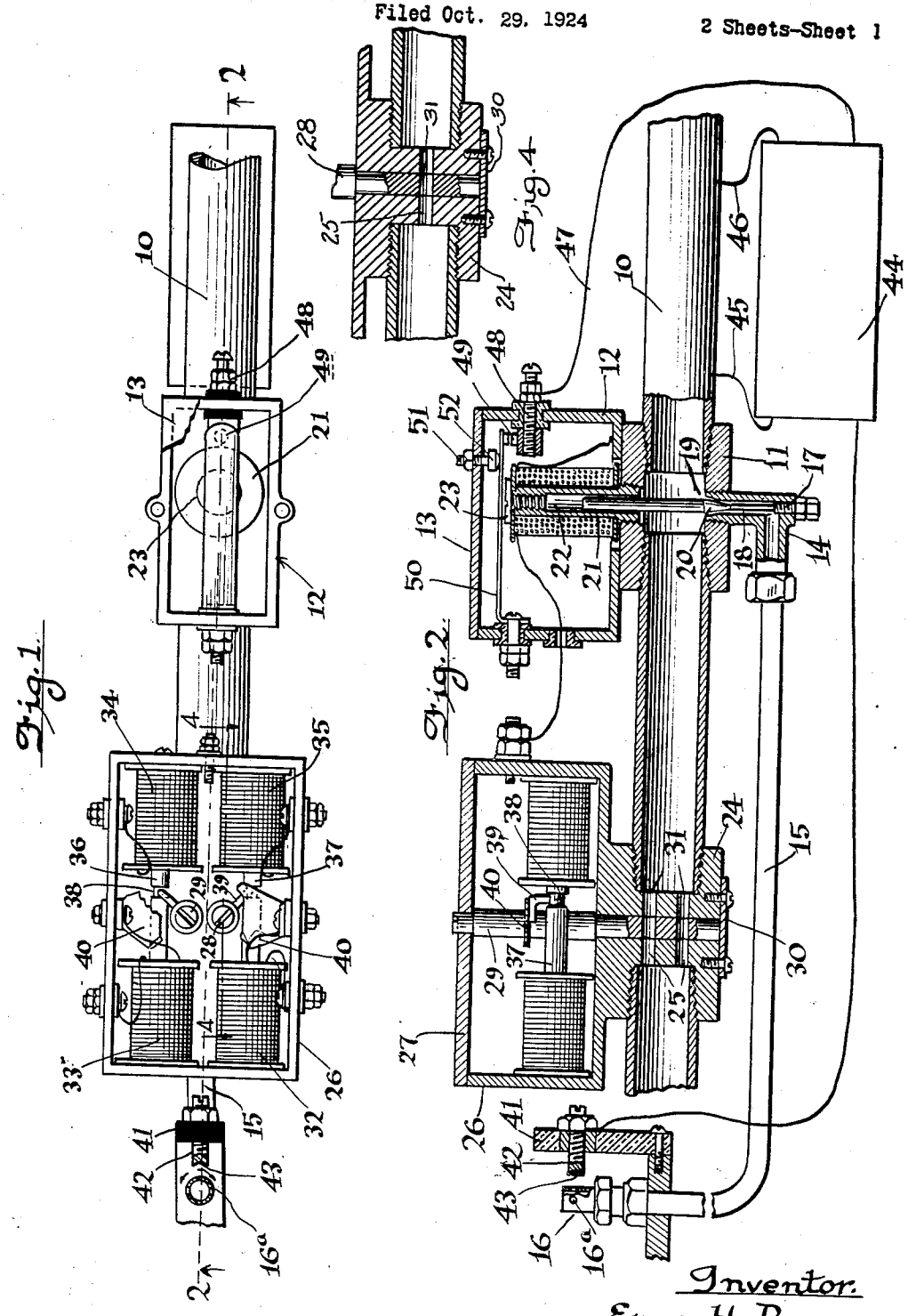
E. H. RYON

1,668,251

GAS BURNER CONTROL

Filed Oct. 29. 1924

2 Sheets-Sheet 1



Witness:

Inventor.
Eppa H. Ryon.
By Hazard and Miller
Attorneys

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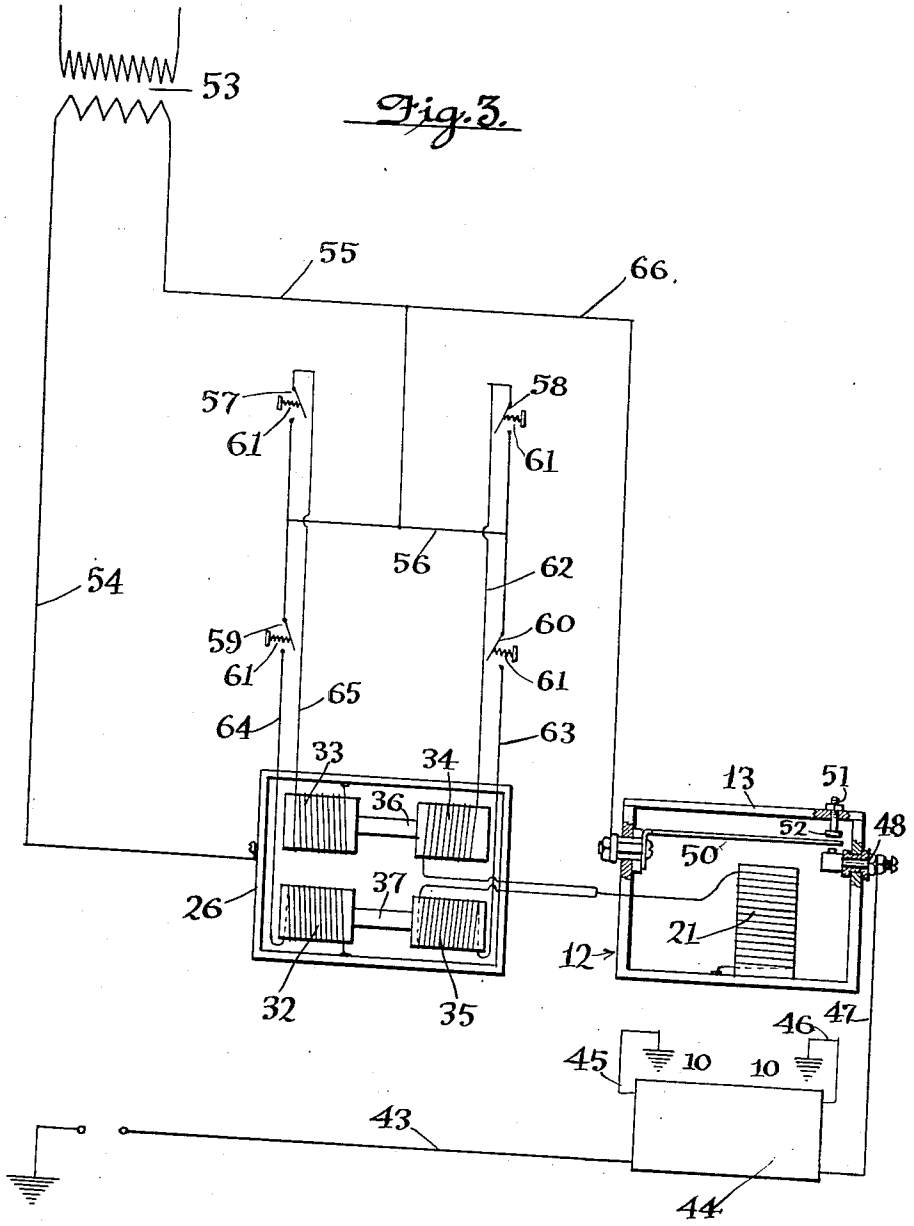
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2 Sheets-Sheet 2

Fig. 3.



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Patented May 1, 1928. 1,668,251

UNITED STATES PATENT OFFICE.

EPPA H. RYON, OF PASADENA, CALIFORNIA.

GAS-BURNER CONTROL.

Application filed October 29, 1924. Serial No. 746,537.

This invention relates to improvements in gas burner control mechanisms.

It is an object of this invention to provide a fuel line delivering fuel to a burner, which burner has a pilot light associated therewith with two valves, one of which is adapted to control the delivery of fuel through the fuel line to the burner, and the other of which is adapted to control the delivery of fuel from the fuel line to the pilot light. These valves are to be so connected that upon the opening of the valve controlling the delivery of fuel to the burner, the pilot controlling valve will be simultaneously opened, thereby increasing the delivery of fuel to the pilot light and consequently enlarging the flame of the pilot light thereby insuring ignition of the fuel coming from the burner.

A further object of this invention is to provide a fuel line delivering fuel to a burner, which has a valve controlling the delivery of fuel to the burner, and which also has a pilot light associated with the burner with means for causing an electric spark to be produced adjacent the pilot light upon the opening of the burner controlling valve which will insure the burning of the pilot light. Frequently a pilot light for any one of a number of reasons goes out and when the fuel is turned on to the burner, this fuel is not ignited. By producing a spark adjacent the pilot light upon the opening of the burner controlling valve, the pilot light will be re-ignited if it has gone out and will be able to ignite the fuel coming from the burner.

With the foregoing and other objects in view which will be made manifest in the following detailed description and pointed out in the appended claims, reference is had to the accompanying drawings for an illustrative embodiment of the invention, wherein:

Figure 1 is a top plan view of the improved gas burner control mechanism;

Fig. 2 is a vertical section taken substantially upon the line 2—2 of Fig. 1;

Fig. 3 is a wiring diagram of the improved gas burner control mechanism; and

Fig. 4 is a vertical section taken substantially on the line 4—4 of Fig. 1.

Referring to the accompanying drawings wherein similar reference characters designate similar parts throughout, the fuel line is designated at 10, which delivers fuel in the direction of the arrow shown on Fig. 2 to a suitable burner, not shown. A coupling 11 joins the ends of adjacent sections of pipe forming the fuel line 10 and has a suitable casing 12 mounted thereon, which may be provided with a cover 13. An elbow 14 is threaded into the bottom of the coupling 11 and has a suitable pipe or tube 15 connected to it, which carries fuel from the fuel line 10 to the pilot light 16 associated with the burner. The elbow 14 has a suitable adjusting screw 17 threaded into the bottom thereof, which is adapted to engage the reduced stem portion 18 of a valve 19. The valve 19 is tapered, as indicated at 20, and the tapered portion 20 is held slightly above the seat formed by the end of the elbow 14 by means of the adjusting screw 17. The upper end of the valve 19 constitutes a core which is adapted to be attracted by a solenoid 21, this solenoid being shown as wound about a tubular member 22 having its base or lower portion threaded into the coupling 11. A suitable screw 23 is threaded into the top of the tubular member 22 and prevents escape of gas herethrough.

The operation of the valve 19 is as follows: The tapered portion 20 being held above its seat by the adjusting screw 17 permits a small amount of gas to pass through the elbow 14 and through the pipe 15 to the pilot light 16, thereby supplying fuel to the pilot light. Upon energizing the solenoid 21, the valve 19 is lifted, thereby increasing the amount of fuel which may pass to the pilot light 16 and causing the flame to flare up, thereby insuring the ignition of fuel coming from the burner. When the solenoid 21 is no longer energized, the valve 19 falls under gravity to its original position, thereby reducing the amount of fuel delivered to the pilot light 16.

A second coupling 24 is mounted in the pipe line 10 and has a plurality of bores 25 formed therein. This coupling 24 carries a casing 26 which may be formed integral with the top thereof and which may be provided with a removable cover 27. A pair of valves 28 and 29 are disposed within the bores 25 and are supported by a small plate 30 secured upon the bottom of the coupling 24. The coupling 24 preferably has three longitudinal bores 31 formed therein, two of which bores extending through the valve 29 and the third bore extending through the valve 28. By rotating the valves 29 and 28 90 degrees, the bores 31 formed in these valves will be disposed at right angles to the por-

tions of the bores formed in the coupling 24, and delivery of fuel to the gas burner will be cut off.

Four solenoids 32, 33, 34 and 35 are mounted within the casing 26. The solenoids 33 and 34 are provided with a common soft iron core 36 which is slidable therein. In a similar manner, the solenoids 32 and 35 are provided with a common core 37. The cores 36 and 37 are provided with annular grooves 38, which grooves receive the downwardly bent portions of angular pins 39 carried by the valves 28 and 29 respectively. Suitable pieces of sheet metal 40 are secured to the sides of the casing 26 and press downwardly upon the angular pins 39 and serve to frictionally hold the valves 28 and 29 in their open or closed positions. The solenoids 34 and 35 are adapted to cause opening movement of the valves 28 and 29 upon becoming energized. It being understood that these solenoids attract the cores 36 and 37 and because of the engagement of the angular pins 39 carried thereby with the grooves 38, the valves 28 and 29 will be rotated. When the solenoids 32 and 33 are energized, the cores 36 and 37 will be caused to move in the opposite direction and will cause closing movement of the valves 28 and 29. Because of the fact that the valve 28 has only one passage 31 formed therein, this valve upon being opened will produce a low fire. A medium fire is produced by allowing the valve 28 to stay closed and opening the valve 29; and if a hot fire is desired, both valves may be opened.

A suitable block of insulating material 41 is mounted adjacent the pilot light 16 and carries an electrode 42. This electrode 42 has its face concaved, as shown at 43. As clearly shown in Fig. 1, the pilot light 16 is provided with three ports 16^a, one of which directs gas toward the electrode 42. By having the electrode 42 concaved, the gas will strike the electrode and be deflected backwardly as indicated by the arrows upon Fig. 1. The electrode 42 is connected by means of a wire 43 to the secondary coil of a transformer 44, the other terminal of the secondary coil of the transformer being shown as grounded upon the fuel line 10, as at 45. One of the terminals of the primary coil of the transformer 44 is grounded, as at 46, and the other terminal is connected by means of a wire 47 to a suitable binding post 48 carrying a contact 49, which binding post is mounted upon the casing 12. A suitable leaf spring 50 formed of soft iron is also mounted upon the casing 12 and is adapted to be attracted by the solenoid 21, when this solenoid is energized. An adjusting screw 51 is mounted upon the cover 13 of the casing 12 and carries a piece of insulating material 52, which engages the upper side of the leaf spring 50. The leaf spring 50 constitutes a circuit closer for producing a spark between the electrode 42 and the pilot light 16, and is adapted to be actuated simultaneously with the actuation of the valve 19.

Referring now to the wiring diagram shown in Fig. 3, the complete gas burner control is adapted to be actuated by a housing current, the voltage of which may be stepped down by means of a transformer 53. One terminal of the secondary coil is grounded upon the casing 26 by means of a wire 54. The other terminal of the secondary coil is connected by means of a wire 55 to a center contact 56 which is engageable by either of the switches 57, 58, 59 and 60. These switches are preferably held in open position by means of springs 61. A wire 62 connects the contact engageable by the switch 58 with the solenoid 34. A similar wire 63 connects the contact engageable by the switch 60 with the solenoid 35. The switches 59 and 57 are connected by means of wires 64 and 65 respectively to the solenoids 32 and 33 respectively. The solenoids 32 and 33 have the opposite ends of their windings grounded to the casing 26. The remaining ends of the solenoids 34 and 35 are connected together and are connected to the solenoid 21 which has its free end grounded upon the casing 12. A wire 66 connects the wire 55 with the leaf spring or circuit closer 50.

The operation of the complete control is as follows: Assuming the valves 28 and 29 are closed, closing the switch 58 energizes the solenoids 34 and 21, thereby causing the valves 29 and 19 to be opened. The energizing of the solenoid 21 attracts the circuit closer 50 and simultaneously causes a spark to jump between the electrode 42 and the pilot light 16. The valve 19 will remain open and sparks will continue to jump between the electrode 42 and the pilot light 16 as long as the switch 58 is closed. Upon release of the switch 58, the valve 29 will remain open but the valve 19 will fall under gravity to substantially closed position, and the circuit closer 50 will rise because of its resiliency and open the circuit producing the electric sparks adjacent the pilot light 16. In a similar manner, closing the switch 60 will open the valve 28 and momentarily open the valve 19 and close the circuit closer 50 as long as the switch 60 is held closed. Closing of either of the switches 57 or 59 merely energizes the solenoids 33 and 32 respectively, and causes the valves 29 and 28 to close.

It is seen that the improved gas burner control enables the burner to be controlled at a location remote from the burner by the use of electric switches and that means is provided which is operated by the valve or valves controlling the delivery of fuel to

the burner for simultaneously increasing the delivery of fuel to the pilot light and producing a spark adjacent the pilot light, thereby insuring ignition of the pilot light and of the burner.

It will be understood that various changes in the detail of construction may be made without departing from the spirit or scope of the invention as defined by the appended claims.

I claim:

1. In a fuel line having a burner and a pilot light, means for continuously delivering fuel to the pilot light, a valve controlling the delivery of fuel to the burner, and means actuated upon the opening of said valve for increasing the delivery of fuel to said pilot light.

2. In a fuel line having a burner and a pilot light, means for continuously delivering fuel to the pilot light, a valve controlling the delivery of fuel to the burner, and means actuated upon the opening of said valve for momentarily increasing the delivery of fuel to said pilot light.

3. In a fuel line having a burner and a pilot light, means for continuously delivering fuel to the pilot light, a valve controlling the delivery of fuel to the burner, and electro-magnetic means actuated upon the opening of said valve for increasing the delivery of fuel to said pilot light.

4. In a fuel line having a burner and a pilot light, means for continuously delivering fuel to the pilot light, a valve controlling the delivery of fuel to the burner, and electro-magnetic means actuated upon the opening of said valve for momentarily increasing the delivery of fuel to said pilot light.

5. In combination, a fuel line delivering fuel to a burner, a pilot light associated with said burner and continuously receiving fuel from said fuel line, an electrically operated valve controlling the delivery of fuel to said burner, and a second valve controlling delivery of fuel to said pilot light, said second valve being connected to the first valve whereby when said first valve is opened, said second valve will be simultaneously opened to increase the delivery of fuel to said pilot light.

6. In combination, a fuel line delivering fuel to a burner, a pilot light associated with said burner and continuously receiving fuel from said fuel line, an electrically operated valve controlling the delivery of fuel to said burner, and a second valve controlling delivery of fuel to said pilot light, said second valve being connected to the first valve whereby when said first valve is opened, said second valve will be momentarily opened to momentarily increase the delivery of fuel to said pilot light.

7. In a fuel line having a burner, a pilot light associated with the burner, a conduit delivering fuel from the fuel line to the pilot light, means providing a seat in the conduit, a closure for the seat, means for maintaining the closure in a position spaced from its seat so that fuel may be continuously delivered to the pilot light, a solenoid, and a core adapted to be attracted by said solenoid, said core being associated with said closure so that when the solenoid is energized, the closure will be farther removed from said seat so as to increase the delivery of fuel to the pilot light.

8. In a fuel line having a burner and a pilot light, means for normally supplying fuel continuously to the pilot light, a valve for controlling delivery of fuel to said burner, and means actuated upon the opening of said valve for producing a spark adjacent said pilot light.

9. In a fuel line having a burner and a pilot light, means for normally supplying fuel continuously to the pilot light, a valve controlling delivery of fuel to said burner, an electrode mounted adjacent said pilot light, and means actuated upon the opening of said valve for causing an electric spark to be produced between said electrode and said pilot light.

10. In a fuel line having a burner and a pilot light, means for normally supplying fuel continuously to the pilot light, a valve controlling delivery of fuel to said burner, an electrode mounted adjacent said pilot light, and means actuated upon the opening of said valve for causing an electric spark to be produced between said electrode and said pilot light, said pilot light being adapted to direct fuel against said electrode, said electrode being provided with a concaved face.

11. In combination, a fuel line delivering fuel to a burner, a pilot light associated with said burner, a valve for controlling delivery of said fuel to said burner, a second valve for controlling the delivery of fuel to said pilot light, means actuated upon the opening of the first valve for causing the second valve to simultaneously open, thereby increasing the delivery of fuel to said pilot light, and means actuated upon the opening of the first valve for producing a spark adjacent said pilot light.

12. In combination, a full line delivering fuel to a burner, a pilot light associated with said burner and normally receiving fuel from said fuel line, a valve for controlling delivery of fuel to said burner, an electrode mounted adjacent said pilot light, a valve for controlling delivery of fuel to said pilot light, and electro-magnetic means actuated upon the actuation of the first mentioned valve for causing said second valve to open thereby increasing the delivery of fuel to said pilot light, and also closing an electric

circuit, whereby a spark will be produced between said electrode and said pilot light.

13. In combination, a fuel line delivering fuel to a burner, a pilot light associated with said burner, an electrode mounted adjacent said pilot light, an electro-magnetically operated valve for controlling the delivery of fuel to said burner, a second electro-magnetically operated valve for controlling the delivery of fuel from said fuel line to said pilot light, and a circuit closer operable by said second valve and electrically connected to said electrode, said second valve having its operating mechanism electrically connected to the operating mechanism of the first valve whereby opening of the first valve will simultaneously actuate said second valve and said circuit closer, thereby increasing the delivery of fuel to said pilot light and causing an electric spark to be produced between said electrode and said pilot light.

14. In combination, a fuel line delivering fuel to a burner, a pilot light associated with said burner, an electro-magnetically operated valve for controlling the delivery of fuel to said burner, a gravity closed valve for controlling the delivery of fuel to said pilot light, electro-magnetic means for lifting said gravity closed valve, said means being electrically connected to the operating mechanism of the first mentioned valve, and a circuit closer operated by said electro-magnetic means and electrically connected to an electrode adjacent said pilot light, whereby opening of the first mentioned valve will cause said gravity closed valve to be temporarily lifted and a spark to be produced adjacent said pilot light.

15. In combination, a fuel line delivering fuel to a burner, a pilot light associated with said burner, a valve for controlling the delivery of fuel to said burner, and means actuated upon the opening of said valve for temporarily increasing the delivery of fuel to said pilot light and producing an electric spark adjacent said pilot light.

16. In a fuel line having a burner and a pilot light, means normally supplying fuel to the pilot light, a valve for controlling delivery of fuel to said burner, igniting means disposed adjacent the pilot light, and means actuated upon the opening of said valve for actuating said igniting means so as to insure ignition of the fuel at the pilot light.

In testimony whereof I have signed my name to this specification.

EPPA H. RYON.