N. B. WALES.

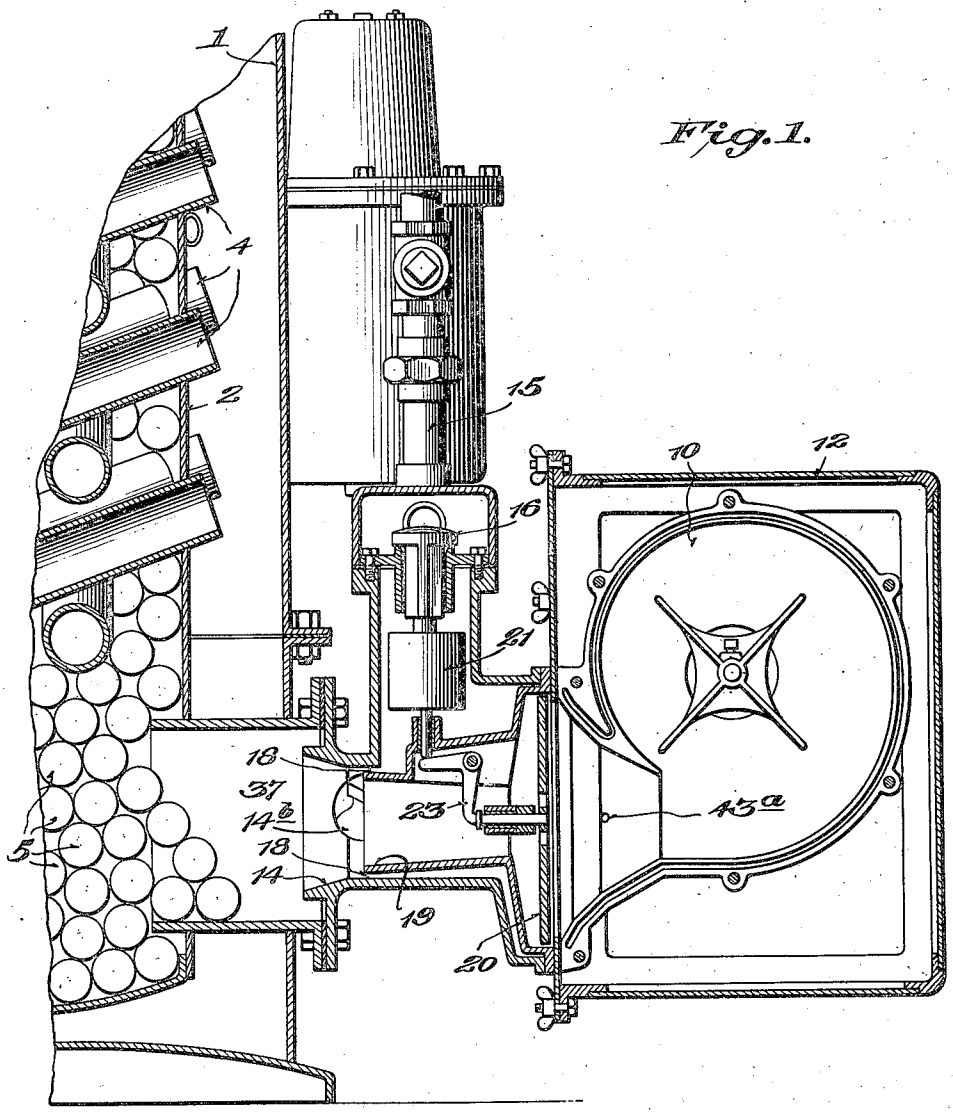
THERMOSTATIC PILOT LIGHT CONTROL.

APPLICATION FILED OCT. 28, 1921.

1,418,994. Patented June 6, 1922.

2 SHEETS—SHEET 1.

Fig. 1.



Inventor

Nathaniel B. Wales,

Witness:-

Chas. K. Friedauer

By Eugene C. Brown

Attorney

N. B. WALES.

THERMOSTATIC PILOT LIGHT CONTROL.

APPLICATION FILED OCT. 28, 1921.

1,418,994.

Patented June 6, 1922.

2 SHEETS—SHEET 2.

Fig. 2.

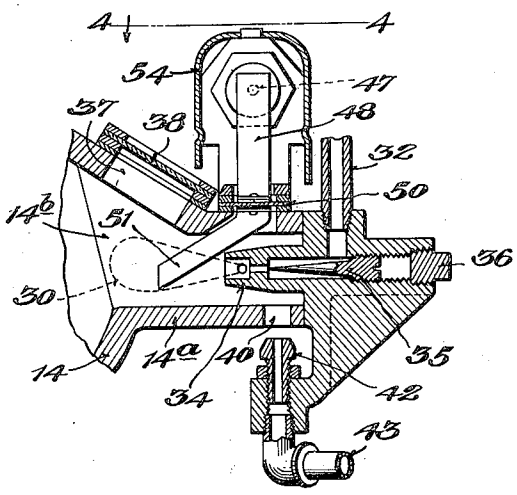


Fig. 3.

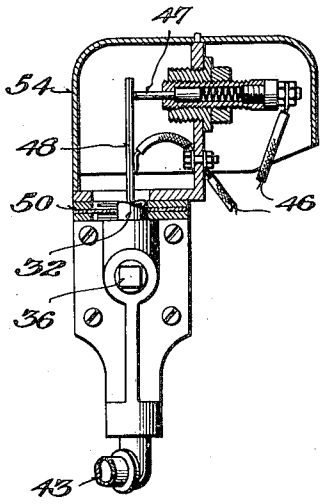
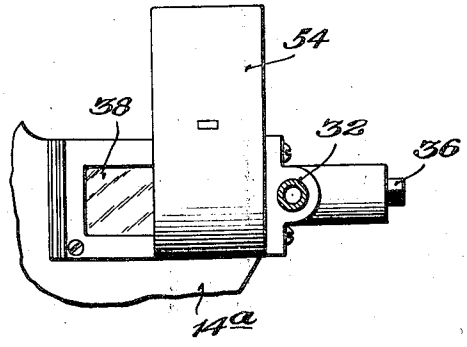


Fig. 4.



Inventor

Nathaniel B. Wales,

WITNESS:-

Chas. L. Tristram

By Eugene C. Brown

Attorney

UNITED STATES PATENT OFFICE.

NATHANIEL B. WALES, OF BOSTON, MASSACHUSETTS, ASSIGNOR TO THE WALES COMPANY, OF KALAMAZOO, MICHIGAN, A CORPORATION OF MICHIGAN.

THERMOSTATIC PILOT-LIGHT CONTROL.

1,418,994. Specification of Letters Patent. Patented June 6, 1922.

Application filed October 28, 1921. Serial No. 511,208.

To all whom it may concern:

Be it known that I, NATHANIEL B. WALES, a citizen of the United States, residing at 319 Commonwealth Avenue, Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Thermostatic Pilot-Light Controls, of which the following is a specification.

This invention relates to the automatic thermostatic control of the pilot light of burners employing gaseous fuel in heating systems.

For the purpose of the present disclosure I have shown the pilot light control applied to a steam heating plant but it will be evident that it may be applied to a system wherein water or air is the circulative heating medium. The object of my invention is to obtain complete automaticity with perfect safety in the control of the burner, which is attained by the immediate shutting off of the fuel supply upon the failure of any part of the heater to properly function.

In describing my invention I shall refer to the accompanying drawings, in which—Figure 1 is a fragmentary central vertical sectional view of a heating plant to which my pilot light control is applied; Fig. 2, is a central horizontal sectional view of the pilot light and thermostatic control device; Fig. 3 is an end view, partly in section, of the pilot light device shown in Fig. 2; and Fig. 4 is a side elevation of the same looking in the direction of the arrows 4—4 in Fig. 2.

The heater indicated in Fig. 1, is of the type disclosed in my prior Patent No. 1,393,654 and also in my prior application, Serial No. 505,651 filed Oct. 5, 1921, and therefore need not be further described herein. Likewise the manner in which the gas supply is directly controlled by the air pressure from the blower is fully set forth in my said prior application and hence does not require a detailed description. Briefly stated, the heater comprises an outer water-containing shell 1 and an inner heating chamber 2, crossed by obliquely disposed water tubes 4 and filled with a mass of fire brick or silica bodies 5.

The motor-driven blower 10, which supplies the air blast for the burner nozzle is enclosed in a sound proof casing 12.

The flow of gas to the burner nozzle 14 from the supply pipe 15 is regulated by the valve 16. After the gas passes the valve it enters the chamber 17 and passes to the nozzle 14 through the annular orifice 18, where it is drawn into the stream of air issuing from the air nozzle 19, thereby forming a combustible mixture that burns with an intensely hot flame as it impinges upon the fire clay briquettes 5.

The manner in which the gas valve 16 is controlled by the operation of the blower will be evident to engineers. The valve remains closed until the speed of the blower 10 is sufficient to maintain a predetermined pressure at the nozzle. When this is attained the static pressure acting upon the rear of the disk 20 is sufficient to move the disk outwardly with a force necessary to lift the weight 21, acting through the bell-crank lever 23, and thereby open the valve 16. If the blower should decrease its speed or cease to operate, the weight will fall, moving the disk 20 back to initial position and permitting the valve to seat. It is evident, therefore, that the gas cannot flow to the nozzle until and unless air is supplied to the nozzle at the predetermined pressure.

The combustible mixture is ignited by a pilot flame 30, which is housed in an offset 14^a in the nozzle casting and projects into the opening 14^b. A gas supply pipe 32 is connected to the pilot nozzle 34 which is supplied with a needle valve 35 that may be adjusted by removing the screw plug 36. The pilot flame may be inspected through the window 37, protected by a mica cover 38. Before the blower is in operation the air to support combustion of the pilot flame is drawn in through the opening 40. The pressure created in the nozzle 14 and by the resistance of the fire brick balls 5, causes a back pressure which would overcome the natural draft through the opening 40 and extinguish the pilot flame. To overcome this tendency I introduce a stream of air through the opening 40, which completely counteracts the back pressure from the nozzle 14, and thereby cause the pilot flame to burn steadily with the flame in the same position irrespective of whether or not the blower is in operation. This counter draft is produced by connecting a nozzle

42 by means of a small pipe 43, with the discharge opening or mouth of the blower at the point 43a.

It is essential that the blower should be stopped and the supply of gas cut off instantly in the event of the pilot flame being extinguished. For this purpose I connect a thermostatically controlled contact in the motor circuit adjacent the pilot. In Fig. 3, I have indicated wires of the motor circuit at 46, one of the wires being connected to a yieldably mounted contact 47 and the other wire to a thermostat bar 48, the latter being secured to one face of a metal disk 50 which closes an opening in the outer wall of the nozzle casting. A bar 51 of copper or other good heat conductor, is secured to the face of the metal disk 50, directly opposite the end of the thermostat bar 48, so that the bar 51 will practically constitute a continuation of the thermostatic bar and will conduct heat directly to it. The bar 51 projects directly over the pilot flame, as indicated in Fig. 2, By this arrangement the thermostat is immediately affected and controlled by the pilot flame while the nozzle casing or housing is nevertheless tightly closed so that no gas can escape and the roar of the burner is suppressed. As long as the pilot is ignited, the thermostatic bar 48 maintains the motor circuit closed at the contact 47, but in case it is extinguished the thermostat 48 moves away from the contact 47 and thereby opens the motor circuit. The thermostat and contact 47 are preferably enclosed in a housing 54 which is held in position by a spring action.

I claim:—

1. In a heating system wherein the heat is supplied by a main gas flame burner, a blower supplying air under pressure to said burner, a pilot burner therefor, a housing for said pilot burner which is subjected to back pressure from the air pressure supplied to the main burner, and means for introducing a jet of air in the rear of the pilot burner to counteract said back pressure.

2. In a heating system of the type described, a heating appliance, a fuel burning nozzle connected thereto, an air blower discharging into said nozzle, a source of gaseous fuel connected to said nozzle, a pilot light chamber opening into said nozzle, a pilot light nozzle in said chamber, an orifice in the wall of said chamber, and means for directing a jet of air from said blower into said orifice to counteract the back pressure from the nozzle into said pilot light chamber.

3. An automatic pilot light control device, comprising an enclosing housing or casing, a pilot light nozzle within said casing, a heat conductor member attached to the well of said casing and having a portion projecting over the pilot light, a thermostatic bar secured externally to said casing wall directly opposite the attachment of said member whereby the heat from the latter is conducted to said bar, and electric circuit contacts controlled by said thermostatic bar.

4. In a heating system, a main burner, a motor-actuated blower to supply air under pressure to said burner, a pilot light nozzle in operative relation to said burner, a housing or casing enclosing said nozzle, a metal plate forming a portion of the wall of said casing, a metallic heat conductor member attached to said plate and extending over the pilot light, a thermostatic bar secured to said plate external of the casing at a point directly opposite the attachment of said member whereby said member and said bar are in heat conductive relation, and circuit controlling contacts in circuit with the motor of said blower, said contacts being controlled by said thermostatic bar.

In testimony whereof I affix my signature.

NATHANIEL B. WALES.