Aug. 30, 1932. E. A. HALL 1,874,969

GAS CONTROLLING DEVICE

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Fig. 1

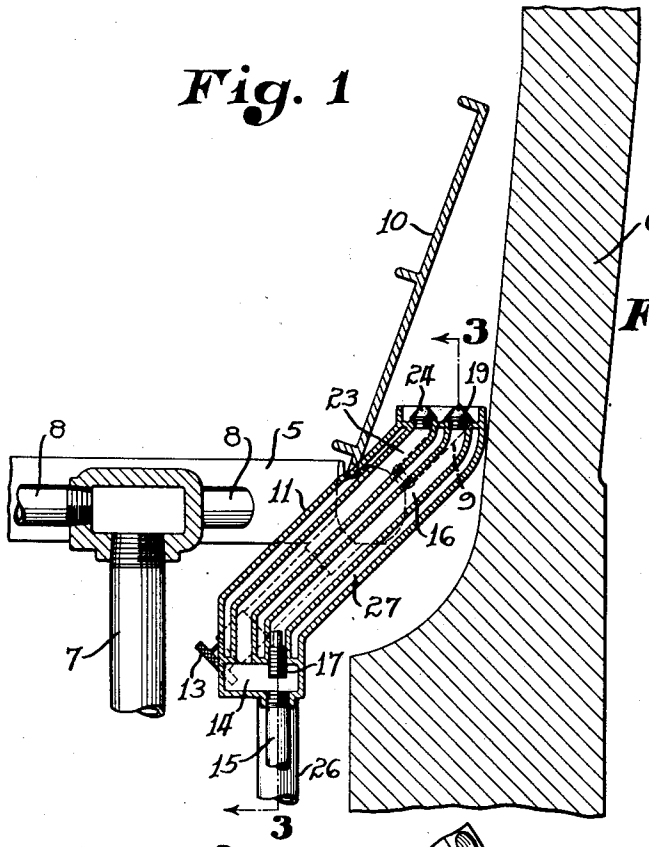


Fig. 3

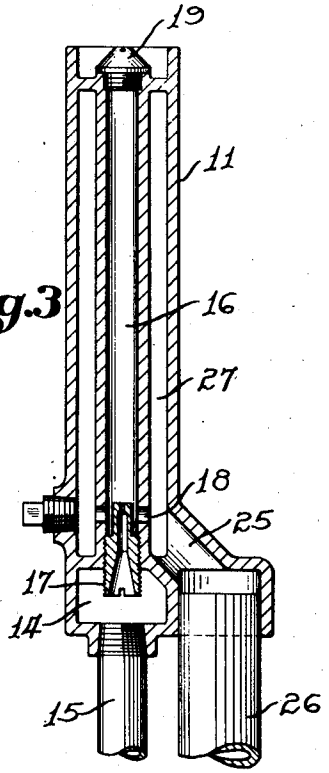


Fig. 2

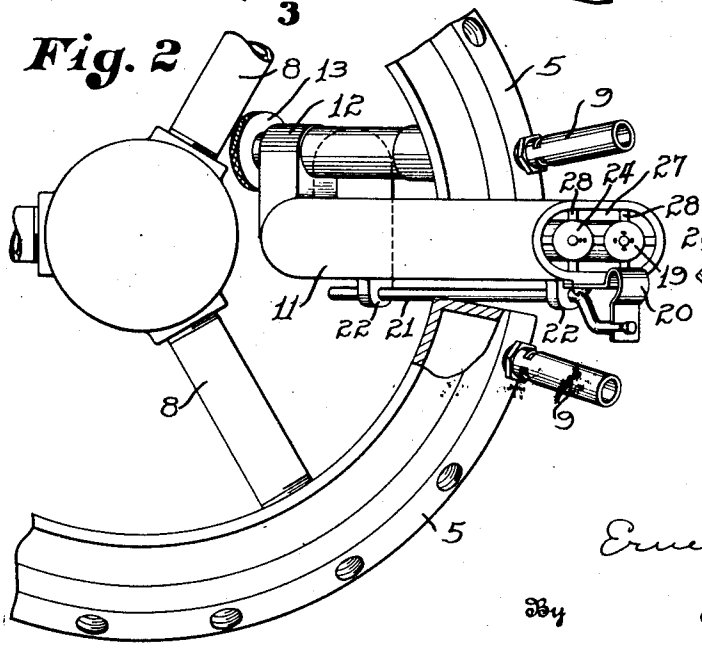
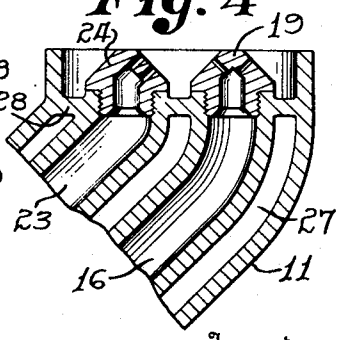


Fig. 4



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Fig. 5.

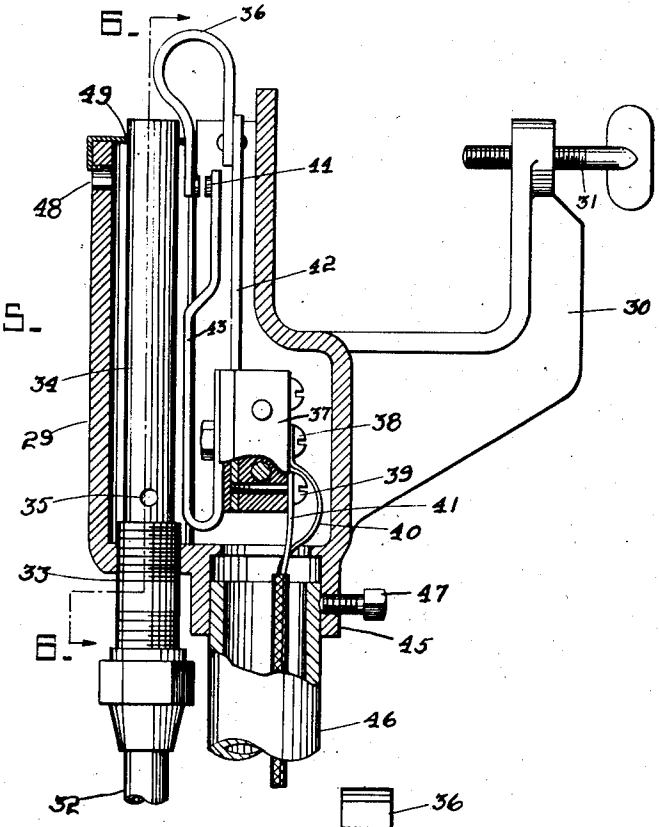
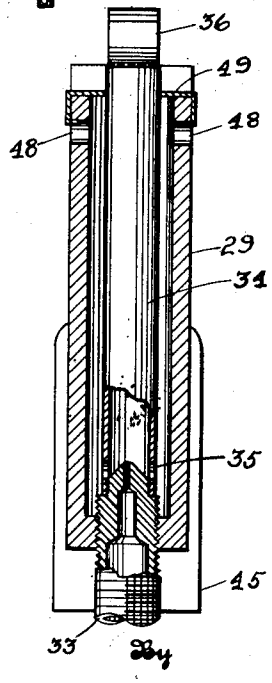


Fig. 6.



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UNITED STATES PATENT OFFICE

ERNEST A. HALL, OF TOLEDO, OHIO, ASSIGNOR TO THE COLUMBIA BURNER COMPANY, OF TOLEDO, OHIO, A CORPORATION OF OHIO

GAS CONTROLLING DEVICE

Application filed April 14, 1930. Serial No. 443,955.

This invention relates to a controlling device for gas burners with special reference to the use of the same in heating plants. In connection with heating plants of this type which have a thermostatic control, it has been customary to provide a pilot to light the burner or to relight the same, in case it becomes extinguished. Associated with this pilot, thermostatically controlled means are usually provided for shutting off the gas altogether, in case the pilot itself is extinguished. With such an arrangement in order to prevent the formation of carbon deposits on the thermostat, it is necessary to supply the gas to the pilot through a mixing tube or chamber, within which there is a primary admixture of air with the gas.

With the above conditions in mind, it is an object of the present invention to provide means tending to prevent premature ignition or heating of the pre-mixed gas supplied to the pilot, thus preventing the formation of deposits which would tend to clog it. This is effected by providing a conduit for circulating cold air or other cooling medium about the mixing tube leading to the pilot head.

Another object of the invention is to so arrange the mechanism associated with the thermostat controlling the pilot that it cannot be injuriously affected by heat, and preferably to arrange it in a compact manner close to the pilot, so that said mechanism, as well as the tube supplying pre-mixed gas to the pilot may be kept cool by a stream of cool air flowing past the same.

The present application is a continuation in part of my earlier application, Ser. No. 360,639, filed May 6, 1929.

The invention will be more particularly described in connection with the accompanying drawings, in which

Figure 1 is a vertical sectional view of the invention as associated with a gas burner.

Figure 2 is a plan view of the same.

Figure 3 is a section taken substantially on the line 3—3 of Figure 1.

Figure 4 is a vertical sectional view of the upper part of the pilot on an enlarged scale.

Figure 5 is a vertical sectional view showing a modified form of the invention and

Figure 6 is a section taken on the line 6—6 of Figure 5.

As illustrated in Figures 1 to 4, the invention is associated with a gas burner 5, which is located within a fire-pot 6 and is supplied with gas through a pipe 7 and branch pipes 8. The burner is shown as provided with spuds 9 which are inclined upwardly toward the wall of the firepot beneath a baffle 10 which extends upwardly and outwardly from the burner 5. A further explanation of the burner is unnecessary, since its construction is immaterial in the present invention.

In adapting the invention for use with the burner illustrated in the drawings, a manifold 11 is supported in suitable position with respect to the burner. As a convenient means for supporting the manifold, the latter is shown herein as having a laterally extending bracket 12, which is secured to a lug on the burner 5 by means of a thumb screw 13. The manifold 11 is formed at its base with a chamber 14, to which gas is supplied through a pipe 15. Gas is supplied from the chamber 14 to a passageway 16 leading upwardly within the manifold 11. The inlet to the passageway 16 is through a nipple 17, adjacent to which the passageway 16 is provided with air inlet openings 18, thus providing for the admixture of air with the gas within the passageway 16. At the upper end of the passageway 16 there is a pilot head 19, which is disposed in suitable position for lighting the gas which flows from the burner 5 through the spuds 9.

A metal thermostat 20 is supported in proximity to the pilot head 19, and connected with the thermostat is a rod 21 slidably mounted in ears 22 extending from one side of the manifold 11. This thermostat 20 is normally heated by the flame from the pilot head 19, but in case such flame becomes extinguished, the cooling of the thermostat results in a longitudinal movement of the rod 21, which is adapted to shut off the flow of gas completely. No claim is made to any improvement in the thermostatic controlling means itself, and a further description thereof is therefore unnecessary.

Within the manifold 11 there is also a passageway 23 leading upwardly from the cham-

ber 14 and terminating at its upper end in an auxiliary pilot head 24, located in proximity to the head 19. The passageway 23 has no air inlet, so that raw gas is supplied to the pilot head 24. This auxiliary pilot head is so disposed that the flame therefrom plays across the gas flow from the head 19, to relight the same in case it becomes extinguished. This auxiliary pilot, which is supplied with raw gas, is much more reliable than a flame which is supplied with pre-mixed gas in the manner which has heretofore been customary. At the same time, the jets from the head 24 are in position to ignite gas flowing from the head 19 but do not come in contact with any solid surface and consequently no carbon deposits are formed.

In pilots as heretofore constructed, in which premixed gas is used exclusively, not only have drafts caused the pilot occasionally to become extinguished, but premature heating or partial combustion often takes place in the primary mixing chamber, resulting in deposits which soon clog the pilot and render it inoperable. In order to overcome this defect, the manifold 11 is provided at its base with a comparatively large inlet 25, which is supplied with cold air or other cooling fluid medium through a pipe 26 leading from outside the furnace. This cooling fluid flows upwardly within the manifold through the space 27 surrounding the passageways 16 and 23 and leaves the upper end of the manifold between the lugs 28 which maintain the pilot heads 19 and 24 in properly spaced relation to the walls of the manifold. Thus the walls of the passageways 16 and 23 will also be kept cool and the temperature of the gas flowing therethrough is always maintained below the ignition point.

In the form of the invention illustrated in Figures 5 and 6, there is a housing 29 formed with a bracket arm 30 so that it may be secured to the burner in the desired relation thereto by means of a thumb screw 31 mounted in the end of the bracket arm. Gas for the pilot light is supplied through a pipe 32 which is connected with a nipple 33 leading into the bottom of the housing 29. A pilot 34 is connected to the nipple 33 within the housing and is formed at its base with suitable air inlet openings 35 to supply the proper mixture to the pilot to support complete combustion. A bimetal thermostat 36 is supported at the outlet end of the pilot tube 34 in position to be normally heated by the pilot light.

As a safety precaution, in case the pilot becomes extinguished, a block 37 of insulating material is mounted within the housing 29 and is provided with binding posts 38 and 39 to which may be connected the wires 40 and 41 of an electric circuit which is adapted to shut off the gas from the pilot as well as from the burner whenever such circuit is closed. A conductor bar 42 is connected to one binding post, as 39, and supports the thermostat 36. A conductor bar 43 is secured to the other binding post 38. The bar 43 and thermostat 36 are provided with contact points 44 which are adapted to be closed to complete the circuit, whenever the pilot light is extinguished so as to allow the thermostat 36 to become cold.

As above stated, in providing thermostatic control devices adapted to be actuated by conditions within the furnace, it has been difficult to provide reliable mechanism for this purpose, since springs lose their temper on account of the heat and the lever arm generally used on such devices becomes permanently warped by the heat. Any slight variation due to such conditions throws the regulator or control device out of adjustment. In accordance with the present invention, however, provision is made for constantly maintaining a comparatively low temperature within the housing 29. For this purpose the bottom of the housing is provided with a downwardly extending boss or socket 45 within which the end of a pipe 46 is secured by a set screw 47 or the like. The pipe 46 leads from a point outside the furnace and is adapted to constantly supply a stream of cool air which flows past the mechanism controlled by the thermostat 36 and maintains the same at a comparatively low temperature. This stream of cool air also supplies air to the inlet openings 35 at the base of the pilot and maintains the pilot tube 34 at a comparatively low temperature, so that there is no danger that the pilot light will flare back. Corrosion of the contact points 44 is also prevented.

The housing 29 is formed with one or more openings as indicated at 48 so as to promote the flow of cool air past the pilot tube 34. A plate 49, however, is secured about the upper end of the tube 34 to prevent interference with the maintenance of the pilot flame, and the proper application of the same to the thermostat 36.

It is apparent that the basic principles of the invention are applicable to any type of gas burner and that the various details of construction may be modified in many ways without departing from the scope of the invention as claimed.

What I claim is:

1. The combination with a gas furnace, of a gas controlling device comprising a housing within the furnace, a thermostat in proximity to said housing, mechanism located within said housing and actuated by the thermostat, and a conduit leading from outside the furnace into said housing for directing a current of cooling fluid through the housing and past said mechanism.

2. The combination with a gas furnace, of a gas controlling device comprising a ther-

mostat, control means dependent on said thermostat, and a conduit leading through the furnace wall from the outside thereof for directing a cooling fluid medium past said control means.

3. The combination with a gas furnace, of a gas controlling device comprising a thermostat, a pilot in position to heat said thermostat, control means dependent upon the thermostat, and a conduit leading through the furnace wall from outside thereof for directing a cooling fluid medium past said control means and the base of the pilot.

4. The combination with a gas furnace, of a gas controlling device comprising a thermostat, an electric circuit having contact points controlled by said thermostat, and a conduit leading through the furnace wall from the outside thereof for directing a cooling fluid medium past said contact points.

5. The combination with a gas furnace, of a gas controlling device comprising a thermostat, a pilot in position to heat said thermostat, an electric circuit having contact points normally open when the pilot is lighted but adapted to be closed by said thermostat when the pilot is extinguished, and a conduit leading through the furnace wall from outside thereof for directing a cooling fluid medium past said contact points and the base of the pilot.

6. The combination with a gas furnace, of a gas controlling device comprising a housing, a thermostat in proximity to the housing, a pilot supported within the housing with its orifice beneath the thermostat so as to normally heat the same, the base of said pilot having an air inlet within the housing, mechanism located within the housing and actuated by the thermostat and a conduit leading from outside the furnace into said housing for directing a current of cool air through said housing to cool said mechanism and the base of said pilot and also to supply air to said inlet.

7. The combination with a gas furnace, of a gas controlling device comprising a thermostat, a pilot in position to heat said thermostat, the base of said pilot having an air inlet for providing a combustible mixture, an electric circuit having contact points controlled by said thermostat, and a conduit leading from outside the furnace for directing a current of cool air past said contact points and the base of said pilot and also to supply air to said inlet.

8. The combination with a gas furnace, of a gas controlling device comprising a housing within said furnace, a thermostat in proximity to the housing, a pilot in position to heat said thermostat, the base of said pilot having an air inlet within the housing to provide premixed gas to the pilot light, an electric circuit having contact points normally open when the pilot is lighted, but adapted to be closed by said thermostat when the pilot is extinguished, and a conduit leading from outside the furnace into said housing for directing a current of cool air through said housing to cool the base of the pilot, the contact points and parts adjacent thereto and also to supply air to said inlet.

9. The combination with a furnace wall and a gas burner within the same, of a pilot for said burner, means for supplying gas to said pilot, and a cold air conduit leading from outside the furnace wall and encompassing the portion of the gas supply means which is adjacent the pilot head.

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

ERNEST A. HALL.