July 31, 1934. W. L. SHIVELY 1,968,319

THERMOSTAT CONTROL OF PILOT FLAMES FOR BURNERS

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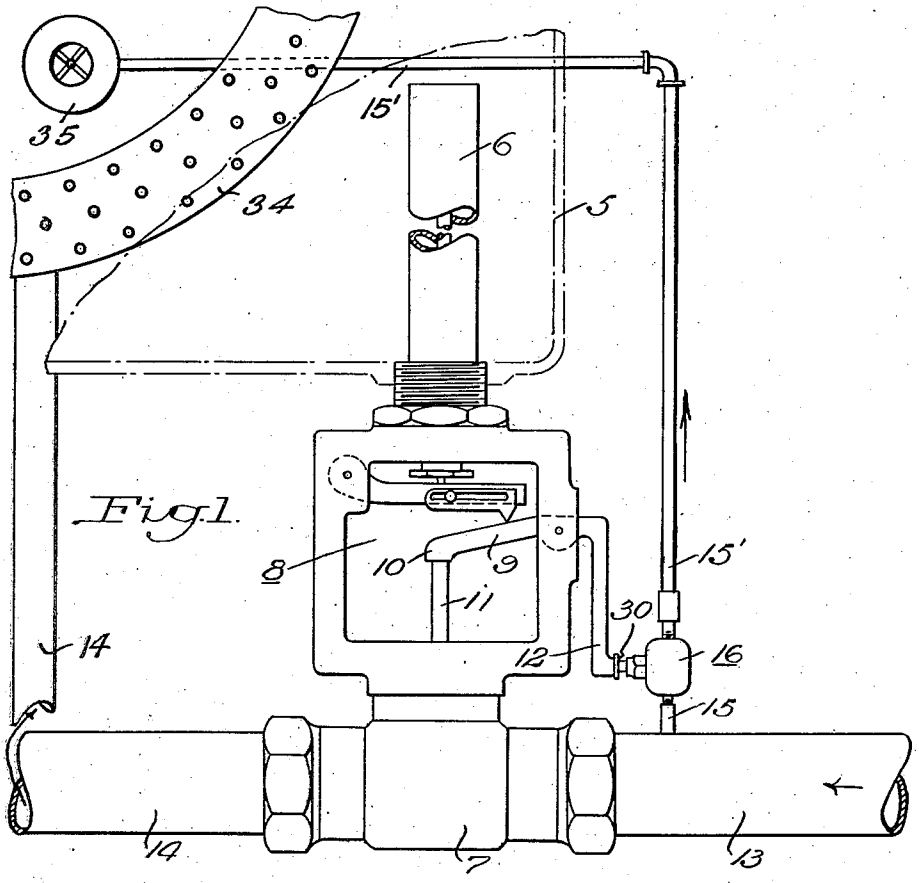


Fig. 1.

Fig. 2.

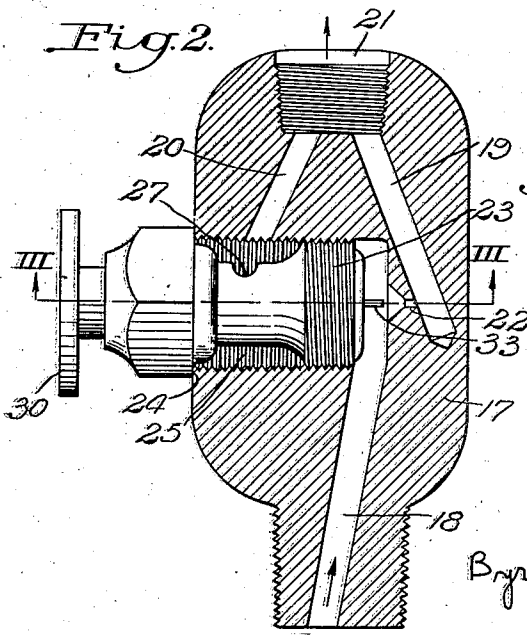
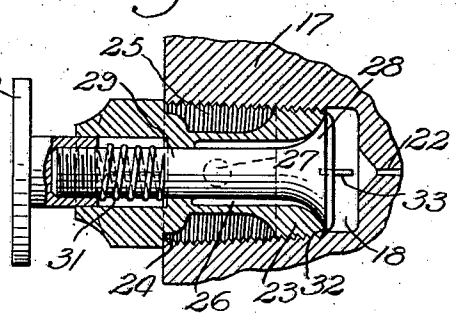


Fig. 3.



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THERMOSTAT CONTROL OF PILOT FLAMES FOR BURNERS

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2 Claims. (Cl. 158—115)

My invention relates to the control of the supply of fuel to a pilot burner. Such pilot burners are employed where the main burner of the heater operates intermittently, and it is desired to have a pilot lighted at all times, so that when fuel is supplied to the main burner, the pilot light will cause ignition of such fuel. A small pilot light uses so little fuel that the cost of such fuel is relatively small. These small pilot lights operate very satisfactorily in connection with small burners. As the size of the burner increases, the operation of igniting the main burner becomes less smooth, unless the size of the pilot light is increased. With the increase in the size of the pilot light, the cost of the fuel for maintaining the same increases until the cost of such fuel is quite appreciable. On the other hand, if the pilot light is too small, a considerable volume of fuel issues from the main burner before ignition takes place; and "popping" results.

One object of my invention is to automatically make available the larger pilot flame for igniting the main burner without incurring the expense of a proportionately increased fuel supply. A further object of my invention is to provide valve mechanism for controlling the pilot burner and common automatic control for such valve mechanism and the valve mechanism which controls the main fuel supply.

In the drawing in which one embodiment of my invention is illustrated, it being understood that this embodiment is merely typical, and it being further understood that it is not my intention to limit my invention to this particular embodiment,

Fig. 1 is a view of combined valve mechanisms for controlling the supply of fuel to a burner and a pilot burner;

Fig. 2 is a sectional view of the valve mechanism for controlling the fuel supply to the pilot burner, and

Fig. 3 is a sectional view illustrating a detail of the valve mechanism shown in Fig. 2.

In the embodiments shown, the supply of fuel to a burner is controlled by a valve mechanism; and fuel is also supplied through a conduit to a pilot burner so that when the valve mechanism opens to permit the flow of fuel to the burner, the fuel will be ignited by the pilot flame. In accordance with my invention, the size of the pilot flame is increased at the time the fuel is supplied to the main burner; and accordingly, the main burner is lighted promptly so that no "popping" occurs. Due to the fact that a considerably augmented supply of fuel to the pilot burner is provided at the time ignition of the main burner is to take place, a considerably smaller pilot flame may be maintained in the intervals when the main burner is out. Moreover, due to the same fact, a shielded pilot burner may be employed, as for instance the well known pilot burner having a casing or shield with openings through which the flame is projected when the fuel supply is increased.

There is shown in broken lines in Fig. 1 a casing 5 which may be the casing of a water heater tank. Into this chamber projects a thermostat element 6 which responds to changes in temperature in the chamber so as to actuate a burner control valve 7. The thermostat element 6 acts upon the valve 7 through the medium of lever mechanism 8. The lever mechanism 8 comprises a lever 9 having one portion 10 in engagement with the end of the stem 11 of the valve 7 and another portion 12 arranged to actuate the valve mechanism which controls the flow of fuel to the pilot burner.

The fuel is supplied from a pipe 13; and from this pipe the fuel passes through the valve 7 to the pipe 14 leading to the main burner 34 of the heater. A branch pipe 15 leads by way of the valve mechanism 16 to a pipe 15' connected to the pilot burner 35 of the main burner.

The valve mechanism 16 is shown in detail in Figs. 2 and 3. This valve mechanism comprises a body member 17 having a passage 18 which branches, one of the branches being numbered 19 and the other being numbered 20. Both the branch 19 and 20 lead to the common discharge opening 21 into which the pipe 15' is shown threaded in Fig. 1.

The passage 18 is connected with the branch 19 by a restricted port 22. The flow of fuel from the passage 18 to the branch 20 is controlled by a valve whose stem is arranged to be reciprocated by the portion 12 of the lever 9. A threaded bore extends inwardly from the side of the casing to communicate with the passage 18. A valve housing 23 is screwed into this bore; and has a shoulder 24 which is brought against the rim of the bore to seal the same when the housing is screwed into position. Between the shoulder 24 and the inner portion of the housing 23, the outer diameter of the housing is reduced so as to form an annular chamber 25. Within the housing 23 is a bell-shaped chamber 26 which communicates with the chamber 25 through an opening 27. A valve proper 28 is arranged to open and close the open end of the bell-shaped chamber 26. The valve proper 28 is provided with a stem 29 which extends

through the outer end of the housing 23. A head 30 is secured to the outer end of the stem 29. Between the head 30 and a shoulder on the housing 23 is arranged a coil spring 31 which tends to move the head 30 outwardly, thereby closing the valve proper 28 against its seat 32. If desired, a pin 33 may be carried by the valve proper in alinement with the port 22, so that whenever the valve stem 29 is reciprocated the port 22 will be cleansed by the pin 33.

If it be assumed that the temperature in the chamber 5 has fallen sufficiently so that the thermostat element 6 sets the lever mechanism into operation, the valve 7 is opened by the pressure of the portion 10 on the end of the stem 11. At the same time the portion 12 presses the stem 29 of the valve mechanism 16 inwardly. Fuel flows through the passage 18; and since the valve proper 28 is off its seat, flow of fuel takes place through the chamber 26 and opening 27 into the chamber 25. The passage 20 opens into the chamber 25; and accordingly, a considerably increased flow of fuel takes place through the pipe 15' to the pilot burner. Accordingly, the increase in the size of the flame of the pilot burner is synchronized with the flow of fuel to the main burner. It will be apparent, therefore, that a very small amount of fuel is necessary to keep the pilot flame lighted during the time that the main burner is not in operation. Whenever the pilot burner is called upon to ignite the main burner, however, the size of the pilot flame is considerably increased; and, therefore, this burner operates efficiently to ignite the main burner without "popping".

It will be understood that while leaving a suitable amount of clearance between the portion 10 and the valve stem 11, the increase in the supply of fuel to the pilot burner may take place slightly prior to the opening of the valve 7. Accordingly, my improved arrangement is applicable to a variety of different conditions, since it may be adjusted so as to increase the flow of fuel to the pilot burner coincident with the opening of the valve 7 or slightly prior to the opening of this valve. The term "synchronized", as applied in the specification and claims, to the flow of fuel to the pilot burner and to the main burner is to be understood as covering broadly the delivery of fuel to the pilot burner in timed relation with the delivery of fuel to the main burner, whether coincident therewith or not.

While I have illustrated and described one specific form of valve mechanism for controlling both the supply of fuel to the main burner and to the pilot burner, it will be understood that the invention is not restricted to the particular construction and arrangements shown, but may be variously modified within the contemplation of the invention and under the scope of the following claims.

I claim:

1. In combination, a main burner, a pilot burner therefor, valve mechanism for controlling the supply of fuel to the main burner, valve mechanism for controlling the supply of fuel to the pilot burner, common actuating means for both valve mechanisms, said last mentioned valve mechanism including a valve casing, a main passage, a by-pass passage, a by-pass passage cleaning pin, and a member movable relative to the valve casing to control the supply of fuel to the pilot burner to flash the pilot and to simultaneously effect telescoping of said pin with its by-pass passage to clean the same upon operation of said member to flash the pilot when the valve mechanism for the main burner is operated to supply fuel thereto.

2. In combination, a main burner, a pilot burner therefor, valve mechanism for controlling the supply of fuel to the main burner, valve mechanism for controlling the supply of fuel to the pilot burner, common actuating means for both valve mechanisms, a thermostat for controlling said common actuating means, said valve mechanism for the pilot burner comprising a main passage, a by-pass passage, and a by-pass passage cleaning pin telescoping with the by-pass passage of the valve mechanism to clean the same when the valve mechanism operates to flash the pilot and the valve mechanism for the main burner is actuated to supply fuel to the main burner, said cleaning pin being free of said by-pass passage when the valve mechanisms are actuated to shut off the supply of fuel to the main passage and the main burner.

WALTER L. SHIVELY.