Nov. 15, 1932. H. I. PIATT 1,887,514

EMERGENCY CONTROL FOR OIL BURNERS

Filed Dec. 31, 1930

Fig. 1.

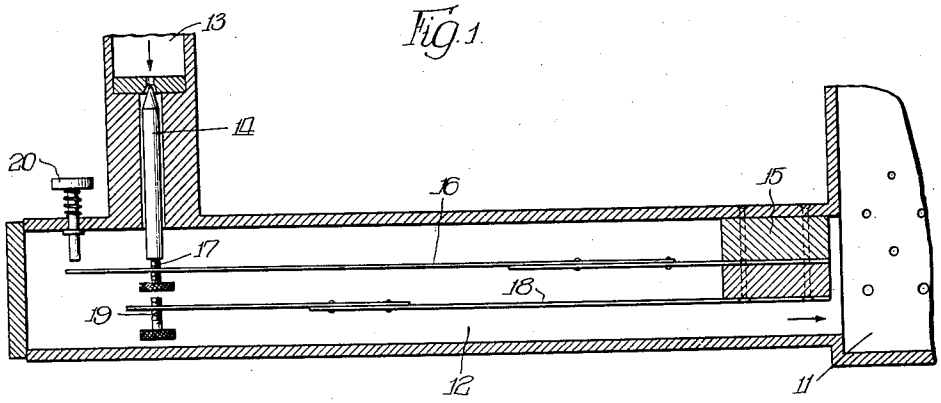


Fig. 2.

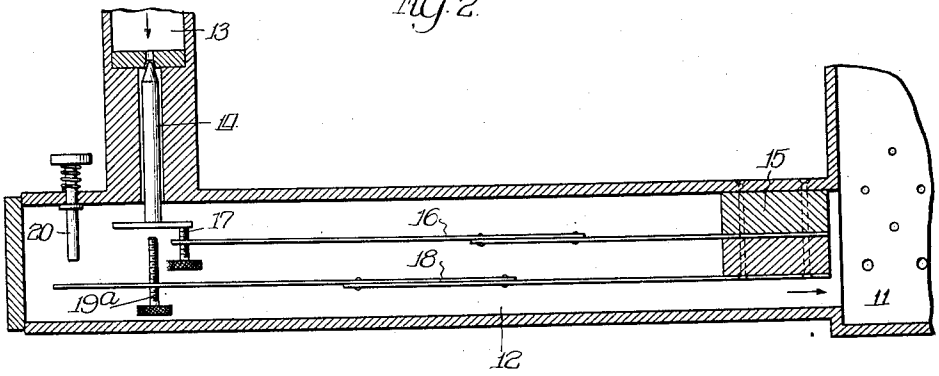
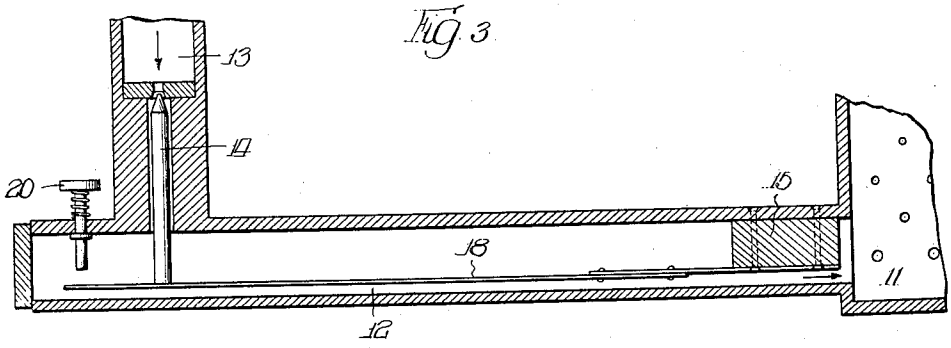


Fig. 3.



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UNITED STATES PATENT OFFICE

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EMERGENCY CONTROL FOR OIL BURNERS

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The present invention relates to that general type of safety devices for liquid fuel burners which operate to shut off the supply of fuel in the event the flame becomes unintentionally extinguished or in case the supply of fuel to the burner exceeds the capacity of the burner to properly consume the same.

Heretofore the common expedient has been to provide a valve trip mechanism including a bucket or other container into which excess oil from the burner is by-passed, the weight of the oil in the bucket being utilized to release the trip and close the admission valve. This old emergency provision is open to the objection that, when operated by the extinguishing of the flame or by the flooding of the burner, the normal operation of the furnace can only be restored by emptying the retainer, resetting the trip mechanism, and re-igniting the oil in the burner,—a very messy proceeding and one which, if the emergency shut off occurs in the nighttime or when the householder is absent, permits the house to remain without heat and become thoroughly chilled before the fact is noted and normal condition restored.

By my invention, I substitute for the weight actuated valve trip mechanism a thermostatic actuation of the oil admission valve, which thermostat is under the control of the burner heat, whereby the closing of the oil inlet valve is temporary only where the flooding of the burner is due to an over supply, and normal conditions are restored as soon as the excess amount of oil has been consumed, and when the flame in the burner has become extinguished, the valve remains closed until the burner is relighted.

My invention has the further advantage that its operation is positive, not only being subject to the negative action of gradually decreasing temperature in the burner after the flame is extinguished, but also subject to the positive cooling effect of the accumulating oil, the action being promptly responsive to the conditions present.

In order that the invention may be readily understood, in the accompanying drawing and in the specification following I have set forth the same by way of illustration in preferred and modified form.

In the drawing,

Fig. 1 is a diagrammatic longitudinal section through the feed channel to the burner illustrating one form of the invention;

Fig. 2 is a similar view illustrating another form; and

Fig. 3 is a similar view illustrating a further modification.

Having particular reference to Fig. 1, an oil burner is represented at 11 with which communicates by a passage 12 an oil supply passage 13, the admission of oil being controlled by the needle valve 14 which seats against the direction of flow.

Mounted at 15 adjacent the flame area of the burner is a thermostat 16 of the bi-metallic type, the free arm of which extends beneath the valve 14 and is provided with an adjustable tappet 17 disposed axially in line with said valve. This thermostat serves to control the inlet valve under normal conditions of operation and is hereinafter referred to as the "normal" thermostat. Its construction is such that as the temperature in the burner rises the thermostat arm bends upwardly to close the valve 14 and as the temperature lowers the arm bends downwardly to open the valve 14. The adjustment of the tappet 17 defines the range of temperatures at the burner under normal conditions.

A second more powerful thermostat 18 is mounted at 15 beneath the thermostat 16 and but slightly above the bottom of the passage 12. The free end of the thermostat 18 carries an adjustable tappet 19 beneath and in axial alignment with the tappet 17 of the thermostat 16. The construction of the thermostat 18 is such that it operates inversely to the thermostat 16. That is to say, the maintenance at the burner of temperatures within the range controlled by the thermostat 16 tends to bend the thermostat 18 downwardly and to maintain the same free of intererence with the thermostat 16 and its action upon the valve 14, whereas a decrease in temperature below the minimum for which the thermostat 16 is adjusted causes the thermostat 18 to bend upwardly, its tappet 19

pressing against the tappet 17 and overcoming the tendency of the thermostat 16 to open the valve. This thermostat 18 only comes into operation under abnormal conditions and for this reason is hereinafter called the "emergency" thermostat. It becomes operative when the flame becomes extinguished or when the supply of oil is in excess of the capacity of the burner to consume the same.

It will be readily understood that where an excess of oil is fed to the burner the combustion and consequent generation of heat is interfered with and the temperature within the burner lowers. Likewise if the flame is extinguished the temperature will lower even more rapidly. In such circumstances the responsive action of the normal thermostat 16 would be such as to permit the valve 14 to open even more widely and supply additional oil,—an obvious disadvantage. Under such abnormal conditions the emergency thermostat 18 comes into operation, and under the lowering temperature it overcomes the normal thermostat and closes the valve in spite of the tendency of the normal thermostat to open it.

Not only does the emergency thermostat 18 begin to bend upwardly and to close the valve under the negative influence of a lowering of temperature in the burner when the flame in the burner becomes extinguished or when the efficiency of the flame is decreased by an over supply of oil, but in order to secure an affirmative action upon the thermostat in the case of flooding, the location of the emergency thermostat 18 is such that it is reached and chilled by the oil backing up in the supply passage 12, so that when the oil reaches such maximum level, the reaction of the thermostat 18 is accentuated and the immediate complete closing of the valve 14 is assured.

The burner being cold, whether by reason of inactivity due to lack of demand for heat due to warm weather or temporary inactivity due to having been flooded, it becomes necessary to overpower the emergency thermostat 18 in order to permit the opening of the valve 14 and a supply of oil to the burner for resumption of operations. To effect this, I provide a manually operable plunger 20 bearing upon the free end of the normal thermostat 16 and through its tappet 17 upon the tappet 19 of the emergency thermostat 18, whereby pressure upon the plunger 20 will open the valve 14, thus supplying oil to the burner which, when lighted, will restore normal operations, bending the emergency thermostat downwardly out of dominating contact with the normal thermostat 16.

In Fig. 2 the construction is precisely the same save that the emergency thermostat 18 bears by its tappet 19^a directly upon the lower end of the valve 14 so as to control the said valve independently of the normal thermostat 16 rather than by dominating the same. In this form of construction the manually operable plunger 20 acts directly upon the emergency thermostat 18 and not through the normal thermostat 16. The operation is precisely the same.

In Fig. 3 a further modified form of construction is shown from which the normal thermostat 16 is omitted and in which the flow of oil is controlled by a manually set valve, not shown. In this form of construction there is no normal control of the oil supply by a thermostat, but in the event the supply of oil by the manually set valve is in excess of the capacity of the burner to consume or in case the flame becomes extinguished, then and only then the emergency thermostat 18 comes into operation upon a lowering of the temperature in the burner to close the valve 14.

I claim:

1. An emergency control for fluid fuel burners comprising, in combination with a burner, a fuel supply therefor, and a fuel inlet valve, of temperature actuated means to actuate said valve in a closing direction including a thermostat subject to the heat of the burner and acting under normal conditions to supply more or less fuel as the heat decreases or increases within a predetermined range, an emergency thermostat subject to the heat of the burner and so disposed with respect to said valve as to remain inoperative under normal or high temperatures and to close the valve at a temperature below a predetermined minimum, and manually operable means to overpower the emergency thermostat at will to permit said valve to open.

2. An emergency control for fluid fuel burners comprising, in combination with a burner, a fuel supply therefor, and a fuel inlet valve, of temperature actuated means to actuate said valve in a closing direction including a bi-metallic thermostat subject to the heat of the burner and acting under normal conditions to supply more or less fuel as the heat decreases or increases within a predetermined range, an emergency bi-metallic thermostat subject to the heat of the burner and so disposed with respect to said valve as to remain inoperative under normal or high temperatures and to close the valve at a temperature below a predetermined minimum, the emergency thermostat dominating the normal thermostat, and manually operable means to overpower the emergency thermostat at will to permit said valve to open.

3. An emergency control for fluid fuel burners comprising, in combination with a burner, a fuel supply therefor, and a fuel inlet valve, of temperature actuated means to actuate said valve in a closing direction including a bi-metallic thermostat subject to the heat of the burner and acting under normal conditions to supply more or less fuel as the

heat decreases or increases within a predetermined range, an emergency bi-metallic thermostat subject to the heat of the burner and so disposed with respect to said valve as to remain inoperative under normal or high temperatures and to close the valve at a temperature below a predetermined minimum, the emergency thermostat dominating the normal thermostat, and manually operable means to overpower the emergency thermostat at will to permit said valve to open, said emergency thermostat so located as to be reached and chilled by the fuel upon flooding of the burner.

4. An emergency control for fluid fuel burners comprising, in combination with a burner, a fuel supply therefor, and a fuel inlet valve, of temperature actuated means to actuate said valve in a closing direction including a thermostat subject to the heat of the burner and acting under normal conditions to supply more or less fuel as the heat decreases or increases within a predetermined range, and an emergency thermostat subject to the heat of the burner and so disposed with respect to said valve as to remain inoperative under normal or high temperatures and to close the valve at a temperature below a predetermined minimum.

5. An emergency control for fluid fuel burners comprising, in combination with a burner, a fuel supply therefor, and a fuel inlet valve, of temperature actuated means to actuate said valve in a closing direction including a bi-metallic thermostat subject to the heat of the burner and acting under normal conditions to supply more or less fuel as the heat decreases or increases within a predetermined range, an emergency bi-metallic thermostat subject to the heat of the burner and so disposed with respect to said valve as to remain inoperative under normal or high temperatures and to colse the valve at a temperature below a predetermined minimum, and manually operable means to overpower the emergency thermostat at will to permit said valve to open, said emergency thermostat so located as to be reached and chilled by the fuel upon flooding of the burner.

In testimony whereof I have hereunto subscribed my name.

HOWARD I. PIATT.