Aug. 6, 1929. L. I. ALDRICH 1,722,997

DOMESTIC OIL BURNER

Filed June 23, 1924

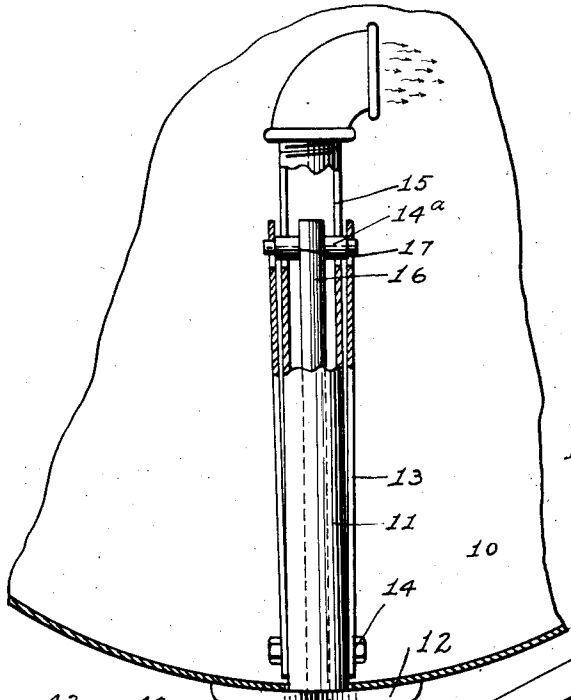


Fig. 1.

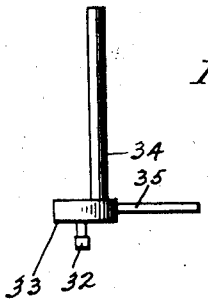


Fig. 5.

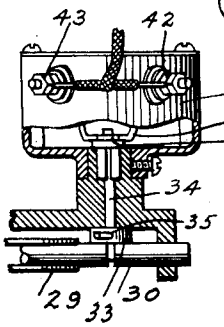


Fig. 4.

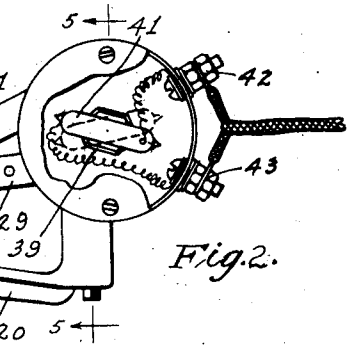
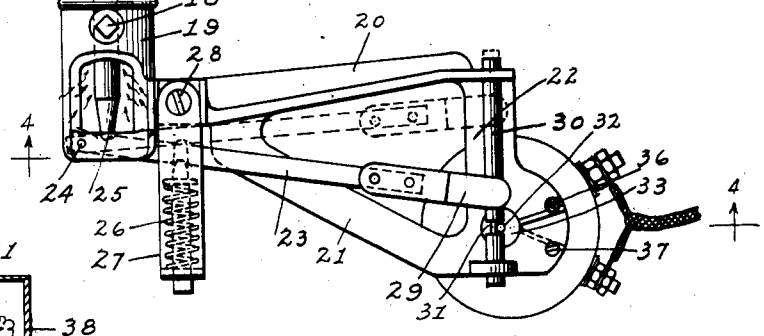


Fig. 2.



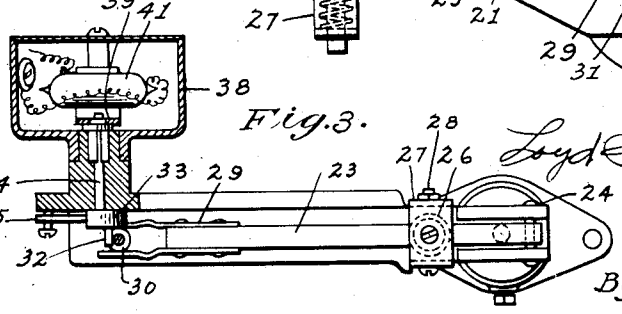


Fig. 3.

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UNITED STATES PATENT OFFICE.

LOYD I. ALDRICH, OF PEORIA, ILLINOIS, ASSIGNOR TO PREFERRED OIL BURNERS, INC., OF PEORIA, ILLINOIS, A CORPORATION OF ILLINOIS.

DOMESTIC OIL BURNER.

Application filed June 23, 1924. Serial No. 721,724.

My invention relates to domestic oil burners and more particularly to a thermal control means therefor.

The object of my invention is in the provision of a thermal safety control mechanism for domestic oil burners.

Another object of my invention is in the provision of a special stack thermostat adapted to control the operation of the conventional oil burner.

A further object of my invention is in the provision of a specially formed stack thermostat having a cooling means for portions thereof, said cooling means insuring a more positive action of the device as well as a more practicable structure.

Referring to the drawings:

Fig. 1 is a front elevation of the stack thermostat partially in cross section.

Fig. 2 is an enlarged detail in plan showing the position and operation of the mercury tube in the stack thermostat.

Fig. 3 is a sectional view taken on the line 4—4 of Fig. 2.

Fig. 4 is a view partially in section taken on the line 5—5 of Figure 3.

Fig. 5 is an enlarged detail of a portion of the stack thermostat.

My present application is directed particularly to a special stack thermostat for use however in connection with any type of domestic oil burner.

Numerous means for controlling the operation of oil burners have been devised, and as a matter of fact the art discloses the so called stack thermostats for controlling the operation of oil burners.

It might be said at this time that this type of control for burners includes a thermostatic member located in the stack, although this particular location is not absolutely necessary but admittedly preferable. Thermostatic controls of the type described, regulate the burner directly or indirectly as the case may be from combustion conditions within the fire or combustion chamber.

In Fig. 1, I have shown my special stack thermostat. At 10 is shown partially the stack wherein the thermostat is located. An open pipe 11 projects a substantial distance within the stack and is attached thereto by means of a bracket 12. The pipe 11 has a kunckle screw threaded upon its inner end and projecting in the direction of the draft of the furnace. Two metal strips 13 are attached as at 14 to the pipe 11, these metal strips being preferably of brass, although any metal having a large coefficient of expansion might well be used. The metal strips 13 engage at their other ends a lug 14^a projecting through the pipe 11 and slidable longitudinally in slots 15 formed therein. A steel rod 16 is positively attached at 17 to the cross lug 14^a and projects substantially the entire length of the pipe 11. Pinned as at 18 to the projecting end of the pipe 11, is a bracket 19 fashioned in a manner to be described to support the lever and contact portions of the thermostat. This bracket 19 is made up of the supporting arms 20 and 21 as well as a cross piece 22. A lever 23 is pivoted at 24 in the bracket 19, said lever abutting as at 25, the projecting end of the rod 16 near its pivoted end and also having spring tensioned relation with the rod 16 by means of the coil spring 26 which is supported in an operative position in the bracket 27, which is attached as at 28 to the bracket 19 or rather the supporting arm 20 thereof.

The lever 23 has mounted upon its outer end the spring tensioned lips 29 which are adapted to engage in a frictional manner the transverse rod 30 which is slidably mounted in the supporting arms 20 and 21. This transverse rod 30 has a recessed portion 31 which is adapted to engage a tooth 32 upon an eccentric 33 with the result that movement of transverse rod imparts similar movement to the tooth and eccentric 33. The eccentric 33 as well as the tooth 32 form a part of the electrical contact mechanism now to be described.

The eccentric has a rod 34 projecting therefrom and as a matter of fact through the cross piece 22 which acts as a support for the contact mechanism. As has been said before, the movement of the transverse rod 30 imparts similar movement to the tooth 32 with the result that the eccentric 33 is rotated, the amount of this rotation being limited by means of an arm 35 projecting upwardly therefrom, said arm having its range of movement limited between the lugs 36 and 37 which, as a matter of fact define the contacts in the electric portion. The electrical contact portion of the present thermostat is made up of a housing 38 containing therein a supporting bracket 39 at-

tached as at 40 to the projecting end of the rod 34, said bracket being fashioned to support the conventional mercury contact tube 41. This mercury tube 41 is of conventional design but for the purpose of more clearly bringing out its operation, it may be said that this tube is of glass and contains therein a sufficient amount of mercury to close the circuit between two contact points within the tube, when said tube is tilted in the proper direction.

In other words, if the tube is tilted so that the mercury fills the gap between the opposed contacts, the circuit is made but if it is tilted in the opposite direction, the electric circuit is open. The binding posts 42 and 43 indicate the electric connection with other portions of the burner to be described.

Perhaps it would be well now to bring out the operation of the stack thermostat per se. Conditions within the combustion chamber directly affect the portion of the thermostat which projects within the stack with the result that increased temperature acts upon the metal strips 13 to expand same, the result being that an outward movement of the rod 16 permits movement of the lever 23 in the direction of the dotted line figure shown in Fig. 2. This movement of the lever through the engagement of the spring tension lips 29 upon the transverse rod 30 simultaneously moves the transverse rod in the same direction as the lever. The movement of the rod 30 through the tooth 32, eccentric 33 and rod 34, also tilts the mercury tube 41 to change the electrical circuit therein. As a matter of fact, the effect of heat upon the strips 13 operating through the various levers, tilts the mercury tube and breaks or rather opens the electrical circuit therethrough.

Similarly a decrease in temperature results in a contraction of the metal strips 13 and the consequent reverse movement of the lever 23, shaft 30, and mercury bulb, to again close the circuit in said bulb.

Stack thermostats heretofore have been used. Usually there being utilized an outer metal cylinder having a large coefficient of expansion and an inner rod having a lesser coefficient of expansion, this rod being usually carbon. The effect of constant heat not only tends to distort the shape of such a thermostat, but also the intermittent operation wear down the rod members until they become unoperative. The present structure has a cooling means whereby only the metal strips are exposed to a great extent to the intense heat within the stack.

The draft in the stack produces a considerable cooling air draft through the open pipe or rather substantially open pipe 11 with the result that the steel rod 16 and pipe itself are kept comparatively cool. Again the continuously intermittent operation due to the variations in heat cannot wear down said portions. Another means, namely the frictional connection between the lips 29 and transverse rod 30 relieves any stress upon the electrical portions that might come from too great an expansion in either direction of portions of the stack thermostat. It may well be seen that after the transverse rod has been moved sufficiently to make or break the contact in the mercury tube, that its movement will be stopped in either direction by the abutment of the arm 35 with the lugs 36 and 37, however, the lever or rather spring tensioned lips thereof, can move as far as they desire thereafter. Again it may be noted that no matter what the position to which the lever is moved to make or break the contact, that the initial movement of the lever in the opposite direction will immediately make or break the electrical connection as it may be without retracing its entire former movement.

As previously stated, the object of devising a stack thermostat, which is adapted to induce a cool air draft therethrough is to prevent the distortion and breakage of the portions within a draft tube because of the intense heat therein, at various times. With the present arrangement, although the hollow tube 11 is subjected upon its outside to variable temperatures, nevertheless the cool air draft passing therethrough, never permits the inside to attain the same degree of temperature as it would under a condition of no additional cooling means.

What I claim is:

1. In a device of the class described, in combination, a thermostat including a hollow tube having slotted apertures therein, metal strips fixedly attached at their outer ends to the outside of said tube and having their opposite ends joined by means of a cross lug passing through the apertures in the tube, a rod disposed within the hollow tube and engaging said cross lug at its inner end, opposed contact points, an oscillating contact arm, and a sliding frictional lever connection between the rod member and contact arm.

2. In a device of the class described, in combination, opposed contact points, a contact lever adapted to oscillate therebetween, a thermostatic member including a hollow tube disposed in a draft member in a position to be affected by a variable heat condition, thermal metal strips attached to the outside of said tube, a lever connection including a rod member disposed in said hollow tube for transmitting the movement of said metal strips to said contact lever.

3. In a device of the class described, in combination, a combustion chamber, a thermostatic member disposed with relation thereto, in a manner to be affected by temperature changes therein, said thermostatic

member including one thermal element positioned in a manner to be directly affected by combuston conditions and a second element adapted to be cooled by an outside draft member.

4. The combination with a combustion chamber, of a thermostatic element disposed for contact with the heated products of combustion from the combustion chamber, means actuated by the thermostatic element including an endwise movable element having a portion extending along side of said thermostatic element, and a combined housing and cooling conduit enclosing that portion of the endwise movable member which is along side of the thermostatic member and isolating it from the heated products of combustion.

5. The combination with a combustion chamber, of a thermostatic element disposed for contact with the heated products of combustion from the combustion chamber, means actuated by the thermostatic element including an endwise movable element having a portion extending along side of said thermostatic element, and a combined housing and cooling conduit enclosing that portion of the endwise movable member which is along side of the thermostatic member and isolating it from the heated products of combustion, said conduit having one end open to the atmosphere and its opposite end open to the zone of the heated products of combustion and constituting a draft tube for drawing atmospheric air therethrough to cool the endwise movable element.

In testimony whereof I affix my signature.

LOYD I. ALDRICH.