

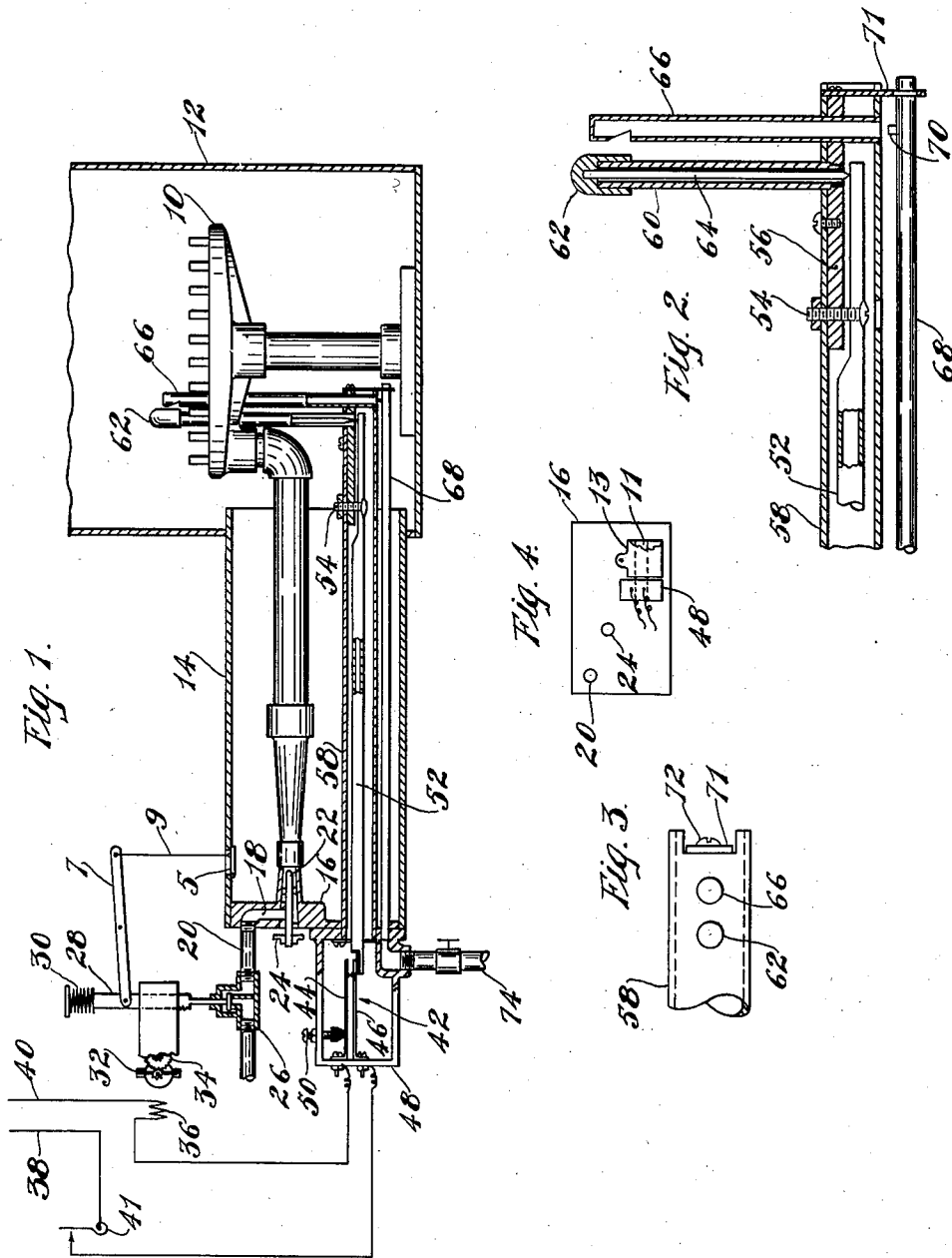
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N. T. BRANCHE ET AL

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SAFETY PILOT MECHANISM FOR GAS BURNING APPARATUS

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INVENTORS
 NELSON T. BRANCHE
 V. O. BEAM.
 BY *Charles A. Lind*
 ATTORNEY

UNITED STATES PATENT OFFICE

NELSON T. BRANCHE AND VILYNN O. BEAM, OF TOLEDO, OHIO, ASSIGNORS TO SURFACE COMBUSTION CORPORATION, OF TOLEDO, OHIO, A CORPORATION OF NEW YORK

SAFETY PILOT MECHANISM FOR GAS BURNING APPARATUS

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This invention relates to safety pilot mechanism for gas burning apparatus and has for its object to provide a simple and reliable pilot mechanism which shall have special utility in connection with gas burning apparatus comprising a relatively long horizontally-disposed air box closed at one end, and open at its other end, the open end being adapted for positioning in the ash-pit door opening of a domestic house heating furnace wherein a gas burner is positioned in place of the ordinary coal grates.

Referring to the drawing, Fig. 1 is a vertical section through a gas burning apparatus of the type above referred to and showing the place relation of the present invention therewith, the furnace being diagrammatically indicated as are also certain parts of the controlling mechanism; Fig. 2 is an enlarged fragmentary sectional view of the pilot burner end of the safety pilot mechanism; Fig. 3 is a fragmentary plan view of the mechanism shown in Fig. 2, and Fig. 4 is an end elevation on a reduced scale of the head at the front end of the air box.

In the drawing, 10 indicates a main gas burner positioned within a heating furnace generally indicated at 12. Opening on and extending laterally from the furnace is an air supply box or casing 14 at the outer end of which is a head 16 having formed therein a chamber 18 into which gas from a supply pipe 20 is introduced for passage through a suitable mixing tube which delivers to the main burner 10, the flow of gas into the tube being controlled by any suitable valve generally indicated at 22 and the entry of air into the tube being controlled by a shutter 24.

In the fuel line 20 is a fuel valve 26 which is controlled by a reciprocable plunger 28 acted on by a spring 30 which tends to depress the plunger to close the valve. 32 is an induction motor which through the medium of a reducing gear train 34 acts on the reciprocable plunger to open the valve. 36 indicates the stator winding of the motor and 38 and 40 the main power leads. Flow of current is controlled by a room thermostat 41 and a pilot-actuated switch generally

indicated at 42. When the room thermostat calls for heat the motor 32 will be actuated to open the fuel valve 26 provided the switch 42 is closed. The casing is also provided with a damper 5 operable by the plunger through the medium of lever 7 and link 9 the arrangement being such that the damper opens when the gas valve opens and vice versa.

The pilot-actuated switch 42 embodies two flexible leaves 44 and 46 secured at adjacent ends to a bracket or stirrup 48 which in turn is secured to the casing closure 16. A set screw 50 permits adjustment of the gap between the free terminals of the leaves. The lower leaf 46 is adapted to be moved into contact with the upper leaf 44 and thus close the switch by upward movement of the long arm of a lever 52 fulcrumed on the head of a screw 54 which is adjustably supported by a block 56 within an elongated tubular support or arm 58 secured at one end to the stirrup 48. The lever 52 is preferably a tube in the interest of rigidity and lightness.

Screwed into the block 56 is a tube 60 having its top closed by a cap 62, this tube forming a housing for a rod 64 one end of which is seated on the short arm of the lever 52 and the other end of which is in thermal engagement with the cap or button 62 at the top of the tube 60. This rod has a relatively high coefficient of thermal expansion as compared with its housing 60 and consequently when heated will expand and turn the lever 52 on its pivot thereby causing the long lever arm to close the switch 42. The housing 60 is preferably of chrome steel and the thermal rod 64 of phosphor bronze or nickel chrome steel.

66 is a pilot burner for heating the housing cap 62. This burner is carried by the tubular support 58 and is supplied with gas through a pipe 68 having a jet nozzle 70 through which gas is projected into the burner in a manner to entrain primary air. The flame from the pilot burner impinges on the button from which heat is conducted to the thermal rod 64. The pipe 68 is supported exteriorly of the tubular support 58, it being supported at one end by a hanger 71 set into a cut-out in the end of the tube 58 as indi-

cated in Fig. 3, this hanger being shown as secured by a screw 72 which is screwed into the block 56 within the tube. The hanger is therefore prevented from lateral displacement thereby always maintaining the jet nozzle 70 of the gas pipe 68 in alinement with the pilot burner. The other end of the pipe 68 is secured to the stirrup 48 which latter is provided with a passage for connection with a gas supply pipe 74.

By positioning the thermal rod 64 within a housing and transmitting heat to it through the cap or button 62 against which the pilot light impinges not only is the efficiency of thermal element maintained unimpaired by preventing carbon deposits thereon but it is not so readily influenced by the heat from the main burner, this arrangement being an important feature of the invention.

As indicated in Fig. 4, the front head 16 for the casing 14 is provided with a horizontally disposed slot or opening 11 of greater length than the width of the stirrup 48, that portion of the slot not covered by the stirrup being normally covered by a hinged flap 13 which by being swung to one side offers a peep hole for ascertaining if the pilot is burning.

As previously indicated, the tubular member or arm 58 and the gas pipe 68 are secured to the stirrup 48 and the parts 60 and 66 are in turn supported by the tubular member 58. These elements, therefore, constitute a unit construction. This unit construction is placed in the casing 14 prior to the positioning of the main burner 10 on its support and conversely may be removed from the casing after said burner has been removed from its support. The slot 11 is of such dimensions that by proper angling of the arm 58 the parts 60 and 66 mounted thereon can be passed through the slot 11.

It will be noted that the pilot burner is of substantial length, the outlet thereof being positioned to discharge against the rod abutment or cap 62, and the lower end thereof being open. It will be readily appreciated that the gas discharged from the jet nozzle 70 and the air entrained by the gas from said nozzle will mix in the tube constituting the pilot burner and hence such tube serves also as a mixing tube. The provision of an open ended pilot burner within the furnace 12 is an important feature of the invention for the following reasons: Due to the fact that the main burner 10 is supplied with gaseous mixture through a relatively long supply tube, there will obviously be a considerable volume of such mixture in the supply tube subject to explosion immediately following shutting off of the said burner, such explosion being due to creep-back of flame from said burner into the supply tube. The pressure generated within the furnace by such explosion will frequently extinguish an ordinary pilot, that

is, a pilot to which gaseous mixture is supplied by a tube terminating outside of the furnace or outside of the casing 14 in the present case, it being understood that such mixture is formed by the air entraining action of a jet of gas set to discharge into such tube. The momentary pressure generated within the furnace due to explosion as aforesaid is of course effective on the discharge end of such pilot and tends to reverse the flow of the gaseous mixture flowing to the pilot. The result is that such pilot is extinguished. In the present case, however, such momentary pressure due to explosion as said will have no effect on the pilot since it is open at both ends to such pressure. Nor will such explosion have any effect on the gas issuing from the jet nozzle 70 since the pressure of the gas in the supply tube 68 is amply sufficient to prevent any momentary reversal of flow. From the foregoing it will be readily appreciated that the provision of an opened pilot burner is of great practical importance to the present invention.

What is claimed is:

1. The combination with a gas burning appliance comprising a gas burner and a conduit for supplying secondary air thereto, of a safety-pilot mechanism comprising an elongated support extending longitudinally within the conduit and terminating adjacent the burner, a pilot for the burner secured to and projecting upwardly from said support, a gas-supply pipe secured to and extending longitudinally of said support, and a gas-jet-orifice nozzle forming the outlet from said pipe, said nozzle being set to discharge into the inlet end of said pilot across an intervening air space.

2. In combination, a gas burner, a secondary air supply conduit adjacent one end of which the burner is positioned, a pilot for the burner, a thermal element heated by the pilot, a lever actuable by said element for controlling the flow of gas to said burner, said lever being of a length greater than that of said conduit and extending beyond that end of the conduit most remote from the burner, and a longitudinally extending housing within the conduit wherein the lever is pivotally supported, the housing being removable from the conduit through the outer end thereof and being supported at that end.

3. In combination, a gas burner, a secondary air supply conduit adjacent one end of which the burner is positioned, a pilot for the burner, a thermal element heated by the pilot, a lever actuable by said element for controlling the flow of gas to said burner, said lever being of a length greater than that of said conduit and extending beyond that end of the conduit most remote from the burner, and a longitudinally extending housing within the conduit wherein the lever is pivotally supported, the housing being removable from

the conduit through the outer end thereof and being supported at that end, said housing also supporting said thermal element.

4. In combination, a gas burner, a secondary air supply conduit adjacent one end of which the burner is positioned, a pilot for the burner, a thermal element heated by the pilot, a lever actuatable by said element for controlling the flow of gas to said burner, said lever being of a length greater than that of said conduit and extending beyond that end of the conduit most remote from the burner, and a longitudinally extending housing within the conduit wherein the lever is pivotally supported, the housing being removable from the conduit through the outer end thereof and being supported at that end, said housing also supporting said thermal element and pilot.

5. In combination, a gas burner, a secondary air supply conduit adjacent one end of which the burner is positioned, a pilot for the burner, a thermal element heated by the pilot, a lever actuatable by said element for controlling the flow of gas to said burner, said lever being of a length greater than that of said conduit, and a longitudinally extending support within the housing to which the lever is pivoted and by which the thermal element and pilot are supported, said support being removable from the conduit through the outer end thereof.

6. In combination, a damper-controlled air-supply conduit, a burner positioned at one end of said conduit, means at the other end of said conduit for controlling the admission of fuel to the burner, a pilot for the burner, a thermal element heated by the pilot, a lever operable by said element, said lever being of a length to extend beyond that end of the conduit most remote from said burner, and means controlled by the lever for controlling the aforesaid means.

In testimony whereof we affix our signatures.

NELSON T. BRANCHE.
VILYNN O. BEAM.