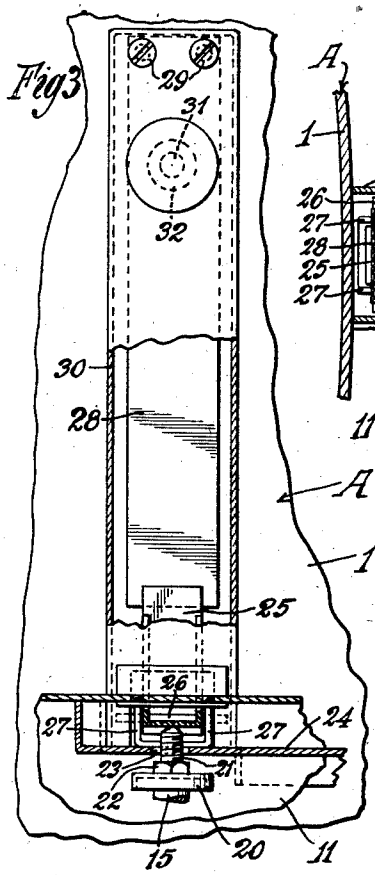
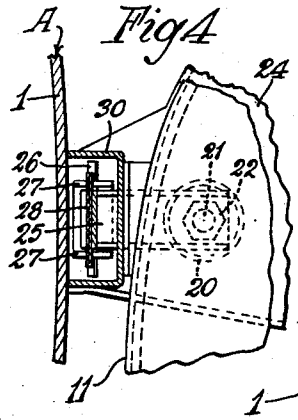
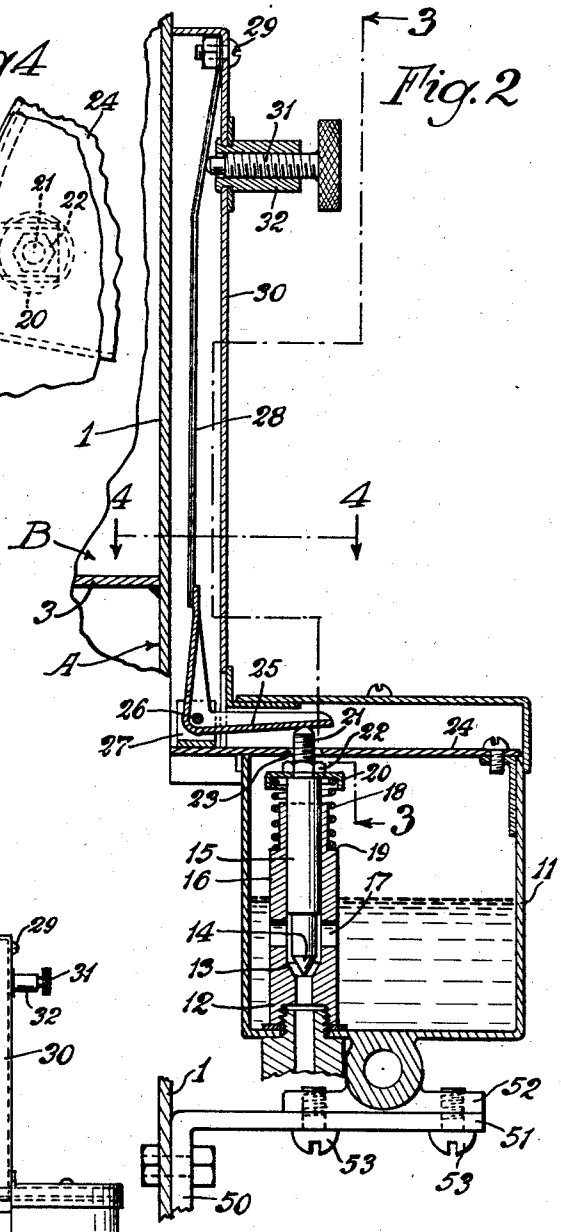
Nov. 7, 1944. J. L. BREESE 2,361,913

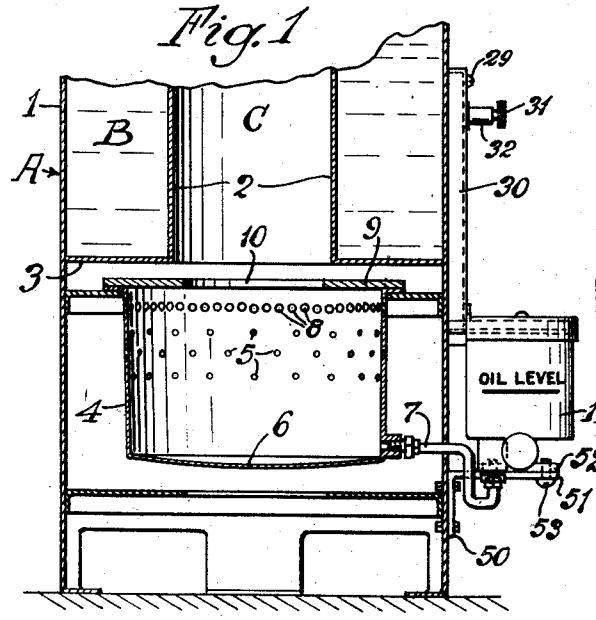
LIQUID FUEL CONTROL FOR HOT WATER HEATERS

Filed June 26, 1942









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Patented Nov. 7, 1944

2,361,913

UNITED STATES PATENT OFFICE

2,361,913

LIQUID FUEL CONTROL FOR HOT WATER HEATERS

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Application June 26, 1942, Serial No. 448,664

4 Claims. (Cl. 236—33)

My invention relates to an improvement in liquid fuel controls for hot water heaters, and has for one purpose the provision of a liquid fuel control which responds directly to the heat of the water in the heater.

Another purpose is the provision of a simplified design of controls in which the fuel varies directly in relation to the heat of a lower portion of the tank of a hot water heater.

Other purposes will appear from time to time in the course of the specification.

I illustrate my invention more or less diagrammatically in the accompanying drawing wherein:

Fig. 1 is a vertical section with parts in elevation;

Fig. 2 is an enlarged vertical section;

Fig. 3 is a section on the line 3—3 of Fig. 2; and

Fig. 4 is a section on the line 4—4 of Fig. 2.

Like parts are indicated by like symbols throughout the specification and drawing.

Referring to the drawing, A generally indicates a hot water heater unit. It may include, for example, an outer cylinder 1, the upper portion of which serves as the outer wall for the hot water heating and storage area B. An inner cylinder 2 serves as a flue and may have at its upper end any suitable flue connections. The members 1 and 2 are connected by a tank bottom 3, which closes the tank space B. It will be understood that any suitable upper connection, not herein shown, may also be employed whereby the space B between the cylinders 1 and 2 is enclosed to serve as a hot water heating and storage tank. It will be understood that any suitable connections not herein shown may be employed for admitting cold water to the tank and for withdrawing hot water therefrom for use.

I illustrate as heating means a burner pot 4, having a plurality of primary air inlet apertures 5 in the side wall thereof and an upwardly concave bottom 6, adapted to receive a liquid fuel supply along the fuel line 7. Any suitable supply means for secondary air may be employed. I illustrate for example a plurality of secondary air inlet apertures 8 adjacent the top of the pot 4. 9 is any suitable flame ring having a central aperture 10 aligned with the interior of the inner cylinder 2.

It will be understood that liquid fuel supplied along the line 7 is vaporized within the pot by the heat of combustion and forms a primary mixture with the air admitted through the primary inlets 5. This primary mixture is completed by the secondary air supplied, for example, through the air inlets 8, and the completed mixture burns with a flame which extends substantially upwardly into the space C within the cylinder 2. The combustion taking place in the space C serves to heat the wall 2, and thus the water within the space B.

11 indicates any suitable float chamber. It will be understood that a conventional float structure may be employed, the details of which form no part of the present invention and are not shown herein. It will be understood that such a float valve structure, or any other suitable means, may be employed for maintaining a constant level of liquid fuel in the float chamber 11. However, in order to control the outflow of liquid fuel from the chamber 11 along the line 7, to the bottom 6 of the burner pot 4, I provide an outlet element 12, which includes a fixed valve surface 13, to which is opposed a movable valve 14 mounted on a valve stem 15, the valve stem being guided in and longitudinally movable in a sleeve 16, which may form part of the member 12. Fuel apertures 17 are provided in the member 12, 16, located below the normal level of the fuel within the float chamber 11.

18 is a spring tending normally to expand and to raise the stem 15, and thus to move the valve element 14 toward open position. The spring is compressed between the bottom abutment or shoulder 19 on the member 16, and the abutment ring 20 mounted on an upper reduced, screw threaded portion 21 of the stem 15 and held in position for example by the nut 22. The upper end 21 of the valve stem extends upwardly through an aperture 23 in a supporting plate 24 secured to the top of the float chamber 11. It abuts against the lower arm of a bell crank lever 25, which is pivoted, as at 26, for example upon ears 27 upwardly extending from the plate 24. The upper arm of the bell crank lever 25 abuts against the lower end of a bimetal strip 28, the upper end of which is secured, as at 29, to the interior of a housing 30, which is supported on the member 24 and may be secured, if desired, in any suitable fashion to the outer face of the wall 1 of the tank B. It will be understood that the housing 30 has no inner wall, so that the bimetal 28 is directly exposed to heat radiated from the wall 1. The bimetal may be flexed or adjusted, for example, by a set screw 31 mounted in any suitable threaded sleeve 32 of the housing 30.

It will be understood that the spring 18 tends to move the valve 14 towards open position and to permit fuel to flow through the apertures 17 and along the line 7 to the bottom 6 of the burner pot 4. When the water in the tank B is cold, the bimetal 28 is flexed toward the left, referring to the position of the parts as shown in Fig. 2, permitting a maximum flow of liquid fuel. This flow may be adjusted manually by rotation of the set screw 31. As the temperature of the water in the tank B increases, the lower end of the bimetal 28 flexes toward the right, referring to the position of the parts in Fig. 2, and through the bell crank lever depresses the valve 15 and moves it toward closed position. In practice it may be advisable to so adjust the parts that the valve will never be completely closed, although the setting or adjustment of the parts depends upon the needs of the particular heater with which it is used.

It will be understood, however, that the rate of flow of liquid fuel to the pot is varied in response to changes in the temperature of the water in the tank B, and thus to changes in the temperature of the exterior of the tank wall 1.

The assembly herein shown may be secured to the tank in any manner desired, but I illustrate a bracket 50 mounted on the exterior of the housing 1 and including an outwardly extending arm 51 preferably substantially horizontal. The float chamber 11 may be directly supported thereupon, preferably in such fashion that it can be slipped in and out. I may for example employ a bottom flange or plate 52, mounted on or associated with the chamber 11, which may slide on or over the bracket arm 51 and which may be held against undesired movement, for example, by securing members 53.

It is, of course, advantageous to have a snug fit between the housing 30 and the wall of the tank 1, and any suitable additional securing means may be employed, for example any suitable strap not herein shown for holding the housing 30 against a face of the tank 1. In the form herein shown, however, it is thought that a sufficiently close connection may be obtained by the structure shown at the bottom of Figs. 1 and 2.

It will be realized that, whereas I have described and shown a practical and operative device, nevertheless many changes may be made in the size, shape, number and disposition of parts without departing from the spirit of my invention.

I claim:

1. In a unitary liquid fuel control for a hot water heater having a generally upright water enclosing wall, a control unit and means for mounting it as a unit on said wall, said unit including a float chamber, a housing unitary with the float chamber, a liquid fuel pipe extending from the float chamber to a burner, a movable valve member adapted to control the flow of liquid through said fuel pipe, yielding means tending normally to move said valve member toward one limit of its movement, and means in said housing, adapted to move said valve member against said yielding means in response to predetermined temperature conditions of the upright wall, including a lever, pivoted in said housing, having one arm cooperating with said movable valve member and having another arm, and a bimetallic strip, unitary with said arm, located generally vertically above the float chamber and in close proximity to the face of said upright wall.

2. In a unitary liquid fuel control for a hot water heater having a generally upright water enclosing wall, a control unit and means for securing it as a unit to said wall, said unit including a float chamber, a liquid fuel pipe extending from the float chamber to a burner, a movable valve member adapted to control the flow of liquid through said fuel pipe, yielding means tending normally to move said valve member toward one limit of its movement, and means adapted to move said valve member against said yielding means in response to predetermined temperature conditions of the upright wall, including a bimetallic strip located generally vertically above the float chamber and in close proximity to the face of said upright wall.

3. In a unitary liquid fuel control for a hot water heater having a generally upright water enclosing wall, a control unit and means for securing it as a unit to said wall, said unit including a float chamber, a liquid fuel pipe extending from the float chamber to a burner, a movable valve member adapted to control the flow of liquid through said fuel pipe, yielding means tending normally to move said valve member toward one limit of its movement, and means adapted to move said valve member against said yielding means in response to predetermined temperature conditions of the upright wall, including a bimetallic strip located generally vertically above the float chamber and in close proximity to the face of said upright wall, and housing means about the upper portion of said float chamber and about said bimetallic strip, said housing means having an open side adapted to be closed by said upright wall when the control unit is mounted on said wall.

4. In a unitary liquid fuel control for a hot water heater having a generally upright water enclosing wall, a control unit and means for mounting it as a unit on said wall, said unit including a float chamber, a housing unitary with the float chamber, a liquid fuel pipe extending from the float chamber to a burner, a movable valve member adapted to control the flow of liquid through said fuel pipe, yielding means tending normally to move said valve member toward one limit of its movement, and means in said housing, adapted to move said valve member against said yielding means in response to predetermined temperature conditions of the upright wall, including a lever, pivoted in said housing, having one arm cooperating with said movable valve member and having another arm, and a bimetallic strip, unitary with said arm, located generally vertically above the float chamber and in close proximity to the face of said upright wall, and means for adjusting the response of said bimetallic strip to temperature changes.

JAMES L. BREESE.