Oct. 15, 1935. S. KLEIN 2,017,251

HOT WATER HEATER

Filed Oct. 19, 1932 2 Sheets-Sheet 1

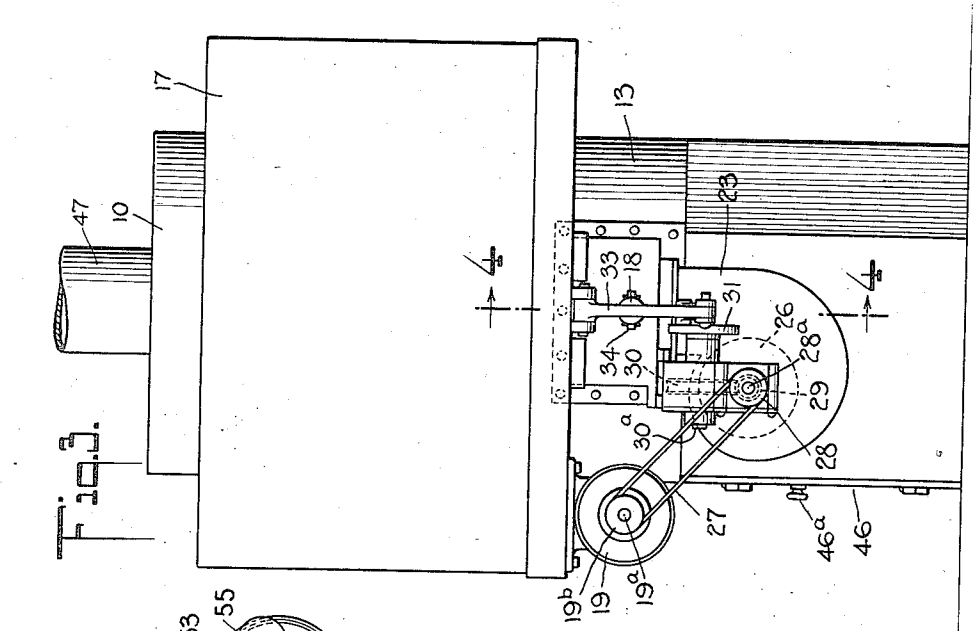


Fig. 1.

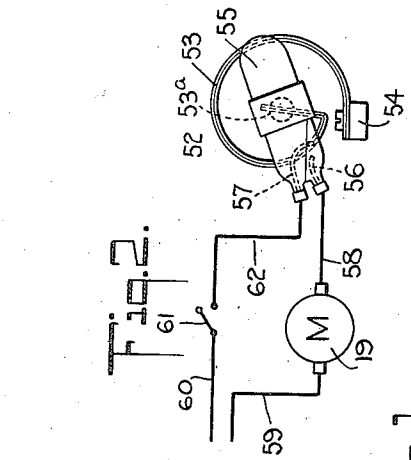


Fig. 2.

Fig. 1.

INVENTOR
Silard Klein
BY
Henry J. Locke
HIS ATTORNEY

Oct. 15, 1935. S. KLEIN 2,017,251

HOT WATER HEATER

Filed Oct. 19, 1932 2 Sheets-Sheet 2

Fig. 4.

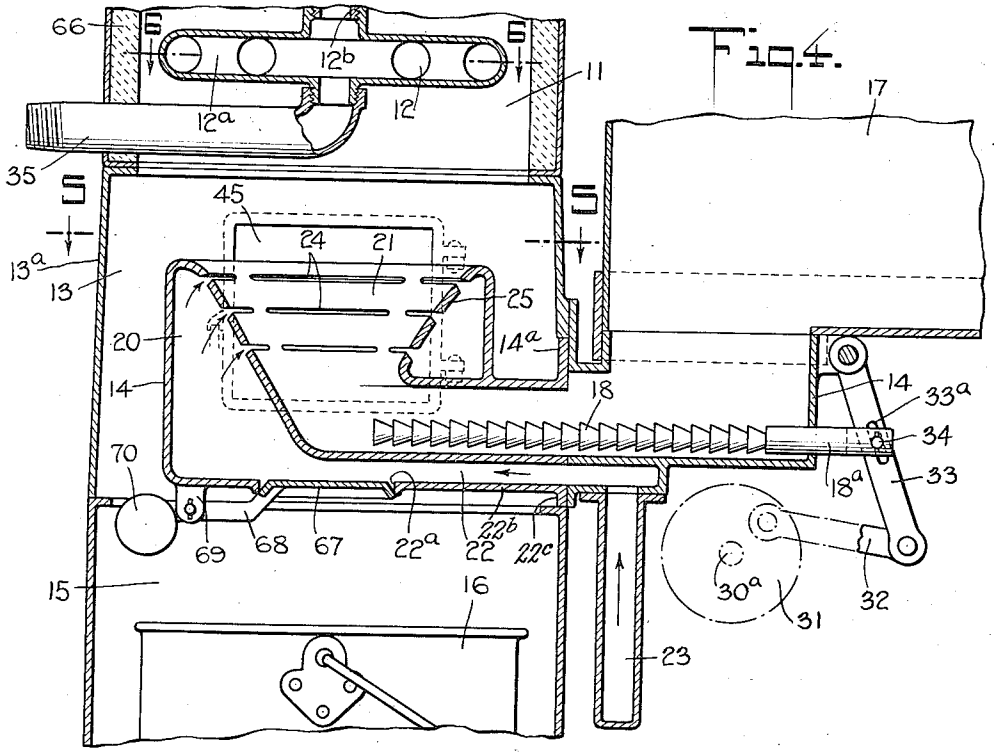


Fig. 5.

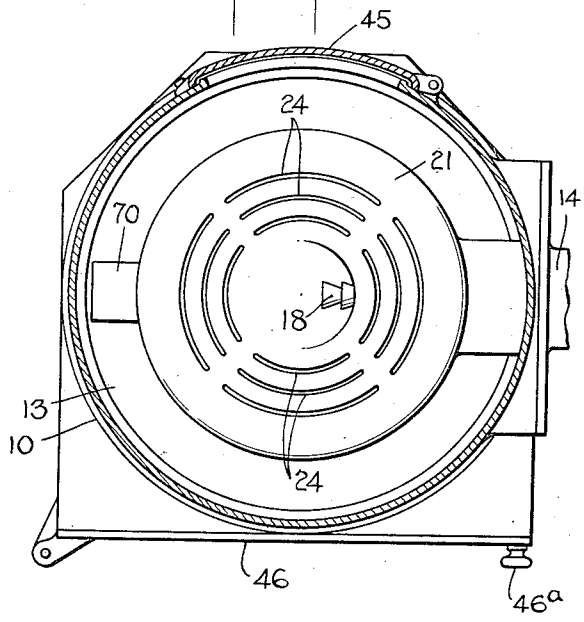
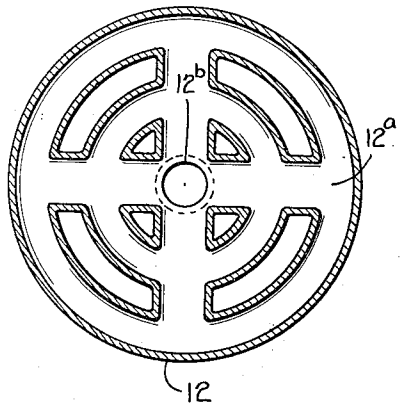


Fig. 6.



INVENTOR
Silard Klein
BY
Henry J. Locke
HIS ATTORNEY

Patented Oct. 15, 1935 2,017,251

UNITED STATES PATENT OFFICE

2,017,251

HOT WATER HEATER

Silard Klein, New York, N. Y.

Application October 19, 1932, Serial No. 638,454

1 Claim. (Cl. 122—4)

This invention relates to a unitary hot water heater and stoker for supplying solid fuel.

Pursuant to my invention, the hot water heater comprises a casing in which is enclosed a fire box and supporting means therefor unitarily embodied in the heater structure. My invention further contemplates the unitary structure of the heater casing with stoker means, preferably equipped with a hopper, for supplying solid fuel to the fire box.

The preferred embodiment of the invention comprises a casing providing a chamber for suitable coil means through which the water to be heated is passed, such casing further comprising a chamber disposed below the heating coil chamber for a fire box, preferably constructed for the combustion of solid fuel capable of being fed by a suitable stoker, usually with the provision of suitable means for supplying air to the fire box. The casing further provides for a chamber below the fire box chamber for a can or other receptacle for receiving the ashes resulting from the combustion of the fuel, the ashes being discharged from the fire box over the upper edges of the fire box, the can being advantageously positioned to receive the thus discharged ashes.

My invention further provides for the thermostatic control directly associated with the heater coil responsive to the temperature of the heated water for automatically starting and re-starting the stoker means under the condition of a predetermined minimum temperature and for interrupting the operation of the stoker means under the condition of a predetermined maximum temperature. Advantageously, the stoker is operated combinedly with the fan or other means for supplying air under compression to the fire box.

Preferably, the air supplying channel leading to the fire box is constructed as an integral part of the heater, and in particular, integrally with the walls of the casing or chamber thereof in which the fire box is located.

Preferably, the hopper is provided with suitable means for leading-off fuel or other foul gases from the interior of the hopper into the stack or flue pipe serving for the discharge of the products of combustion of the fuel.

In general, the invention provides for the unitary or substantially integral assembly of a casing having vertically superposed chamber portions, a heater coil disposed in an upper chamber portion, a fire-pot member disposed in a lower chamber portion, the fire-pot member having an extension projecting through the front side of the casing, and fuel feeding means supported by such extension. Such extension is provided with air passage means for the inflow and preheating of air therethrough, for the supply of the same to the ignited fuel in the fire-pot. Preferably, the fan or other air supply means and the stoker operating means are unitarily supported by such extension.

Further features and objects of the invention will be more fully understood from the following detail description and the accompanying drawings, in which

Fig. 1 is a side elevation, partly in central vertical section, of a hot water heater embodying a preferred form of the invention. The heater is shown arranged for the supply of domestic hot water, and in connection therewith is illustrated as coupled with a tank for the storage of the heated water;

Fig. 2 is a diagram of an electrical circuit embodying the fan-stoker-means operating motor and a mercury type of thermostat control switch;

Fig. 3 is a front elevation of the heater per se illustrated in Fig. 1, on an enlarged scale;

Fig. 4 is a central vertical sectional elevation on line 4—4 of Fig. 3;

Fig. 5 is a horizontal sectional elevation on line 5—5 of Fig. 4; and

Fig. 6 is a horizontal sectional elevation on line 6—6 of Fig. 4.

Referring to the illustrated embodiment, the casing 10 comprises as an integral construction the upper chamber 11 for the reception and mounting of the heating coils 12, the intermediate chamber 13 for the reception and integral mounting therein of the combined fire box and stoker housing 14, and the lowermost chamber 15 for the reception of a can 16 or equivalent for receiving ashes.

The combined fire-box and stoker housing 14 comprises a wall portion 14a, which serves dually as a part of the fuel feeding passage of the stoker housing and as a part of the heater casing 10.

Preferably, the stoker means comprises a hopper 17 which is constructed as integral, or substantially integral with the combined fire box and stoker housing 14.

The illustrated stoker 18 is shown of the reciprocating type, and actuated during the stages of its controlled operation by an electric or other suitable motor 19, preferably employed to jointly supply air to the fuel, as appears more fully hereinafter.

Preferably, the combined fire box and stoker casing 14 is constructed to have integrally therewith a chamber portion 20, which substantially

encloses the fire box 21, the in-lead air passage 22 and also the outer connecting air passage 23, the path of travel of the air being shown by the indicated arrowed lines.

The lower wall portion 22b has a right-angled outer wall portion 22c which serves also as a part of the wall of the heater casing 10.

Advantageously, the supply of the air to the ignited fuel is had by slots 24, perforations or other recesses passing through the wall 25 of the fire pot proper 21.

The air fan is indicated at 26 and shown driven from the motor shaft 19a by means of the indicated pulley 19b and the interconnecting belt 27, pulley 28, mounted on the shaft 28a on which is provided a worm 29 meshing with the worm gear 30 mounted on the shaft 30a on which the eccentric or equivalent cam means 31 is mounted. The link 32 is connected to the actuated lever 33 and in turn to the stoker means 18, as by means of the pin 34 carried by the head 18a of the stoker, which pin is received within the slot 33a of the lever 33.

The heater coils are mounted in the chamber 11 and connected to the hot water line in any suitable manner. As illustrated, the heater coil 12 is of multiple vertically superposed type. The inflow pipe 35 connected to the lowermost coil unit 12a, preferably having the multiple flow chamber construction illustrated in Fig. 6, each multiple coil unit being connected by a riser section 12b to the upper succeeding multiple coil unit, etc., the lead-out pipe 36 being suitably connected to the hot water piping system, in this instance embodying the pipe 37, hot water storage tank 38, etc., as is understood by those skilled in the art. The inflow pipe 35 is shown connected by the nipple 39 to a lowerly portion of the hot water storage tank 38. The nipple 40 serves to connect with the hot water piping system for the supply of the heated water. The return pipe is indicated at 41 connected, in this instance, by the nipple 42 with the interior of the hot water storage tank 38.

The door 45 is provided in the wall portion 13a of the intermediate chamber 13, to afford inspection and cleaning of the fire-pot, and other purposes, as will be apparent. The door 45 may also be located in its vertical height to afford access to the chamber 11 and therein enclosed heater coils 12.

It will be observed that the door 45 is disposed on a side of the heater casing 10 other than the front side on which the combined fire-pot and air channel member 14 extends exteriorly of the chamber 13.

A door 46, having a handle 46a, may be provided for the lowermost, i. e., ash compartment 15, see Fig. 1. The stack 47, or other flue pipe for the discharge of the products of combustion, communicates with the interior of the casing through the top opening thereof 48. A damper is indicated at 49.

Preferably, the hopper 17 is provided with a door 17a shown hinged at 17b, a portion 17c of the top of the hopper 17 being stationary and preferably provided with a vent opening 50 communicating with one end of the pipe 51, the other end 51a communicating with the stack or flue pipe 47; the location of communication is preferably posterior of the location of the damper 49 to thereby afford effective communication at all times between the upper portion of the interior of the hopper 17 with the stack or flue pipe 47, whereby flue or foul gases which may chance to enter or to be collected within the hopper 17 are directed into the stack or flue pipe 47, this function being particularly effective when the hopper door 17a is in its closed position.

Preferably, the operation of the stoker is controlled automatically by the temperature of the water. As one form of such control, see Fig. 2, I have illustrated a thermostatic switch 52 of the mercury type, and as indicated, embodies bimetallic strips 53, the fixed ends of which are mounted on a suitable support 54, the movable ends 53a of which are connected to and support the tube 55 containing mercury. The terminals 56, 57 are mounted to project through the walls of the glass tube 55, as is well understood by those skilled in the art.

As one form of circuit connection, the terminal 56 is connected by the conductor 58 to a terminal of the motor 19, its opposite terminal being connected by the conductor 59 to a terminal of the source of electrical energy, the other terminal of which is connected by the conductor 60 through the hand switch 61, conductor 62, to the terminal 57 of the thermostatic switch.

Preferably, the thermostatic switch 52 is enclosed in a casing, see 63, Fig. 1, and provided with an indicating pointer 64 associated with an appropriate temperature marked scale 65.

If desired, the chamber 11, enclosing the heater coils 12, may be lined with suitable heat insulating material, such as the indicated lining 66.

Preferably, the combined fire-pot and air channel member 14 is provided with suitable discharge means for the removal of dust and other foreign material collected in the air passage portion 22; a preferred form of such discharge is illustrated as comprising the closure plate 67 held by the free end portion of a lever 68, shown pivotally mounted on the ears 69, and overweighted by the overweight ball 70. By manipulating the overweight ball 70 to cause the same to move upwardly, the closure member 67 is swung downwardly, thus permitting dust and other foreign material to be discharged through the discharge opening 22a. The peripheral edges of the closure member 67 are preferably tapered to provide for self-sealing engagement of the same with the wall edges of the opening 22a.

From the above, it will appear that my invention comprises as a combined unitary structure, a heater having a chamber for the heater coils, an intermediate chamber for the fire-pot, the fire-pot member providing for the feeding of a solid fuel, preferably by a stoker, and further providing for the inflow of air for supporting the combustion of the ignited fuel.

In the preferred forms of the invention, the heater casing further provides for a lowermost chamber for the collection of the ash resulting from the combustion of the solid fuel. Preferably, the lowermost chamber is of suitable capacity and contour for the reception of an ash can or other receptacle.

The contour of the heater may be such as desired, the illustrated circular contour being of structural advantage.

The locations and detail construction of the parts of the stoker per se, hopper per se, fan per se, actuating mechanism per se, etc., may be selected as preferred.

From the above, it appears that my invention results in a unitary assembly in a hot water heater of heating coils and a source of heat by the combustion of solid fuel and fuel feeding means, the

aforesaid being correlated in structure to attain decreased material and assembly costs and also attaining high efficiency in transformation of heat units furnished by the fuel into heat units delivered to the water.

As above set forth, the heated water may be for the supply of so-called domestic hot water, or the heated water may serve to furnish heat for rooms or other enclosures as a part of a hot water heating system.

As also appears, my invention comprises the correlated assembly of heating coils, a supply of solid fuel, feeding means for feeding solid fuel to suitable fuel combustion means, and thermostatic means responsive to a variable minimum temperature for effecting the operation of the fuel feeding means and also responsive to a variable maximum temperature for discontinuing the operation of the fuel feeding means.

Whereas I have described my invention by reference to specific forms thereof, it will be understood that many changes and modifications may be made without departing from the spirit of the invention.

I claim:

In a hot water heater, a casing constituted by top, intermediate and bottom sections in vertically superposed and communicating relation, the intermediate section being supported on the bottom section and the top section being supported on the intermediate section, the top section having arranged therein a plurality of water sections provided with inlet and outlet connections, the intermediate section having an opening therein, a stoker unit arranged in the intermediate section and including a fire box and fuel and air passages thereto, said air passage including a chamber about said fire box, said passages extending through the opening of said last-named section and the walls of said passages having provisions for closing said opening and to thus form a part of the intermediate section wall, the bottom section being arranged to receive ashes discharged from the fire box, and the bottom wall of said chamber having a normally closed cleanout opening delivering to said bottom section.

SILARD KLEIN.