July 3, 1951 M. G. BURWELL 2,559,110

WATER HEATER AND BURNER HOUSING THEREFOR

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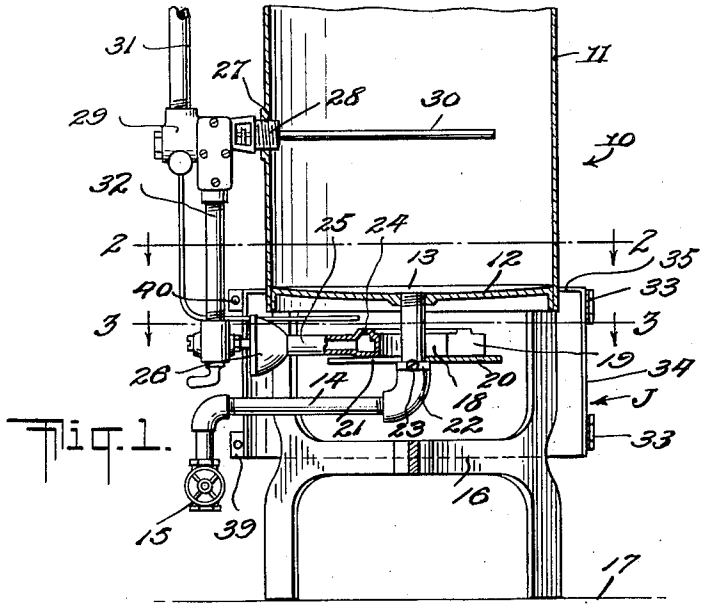


Fig. 1.

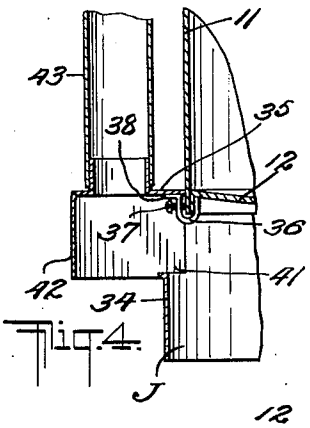


Fig. 4.

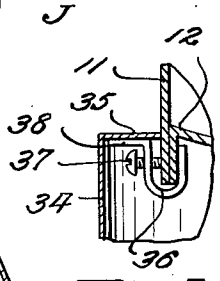


Fig. 5.

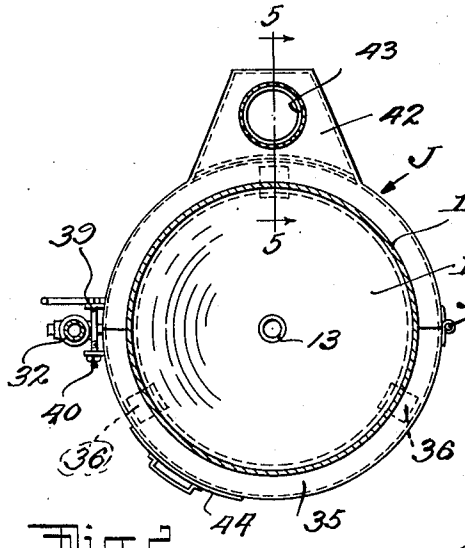


Fig. 2.

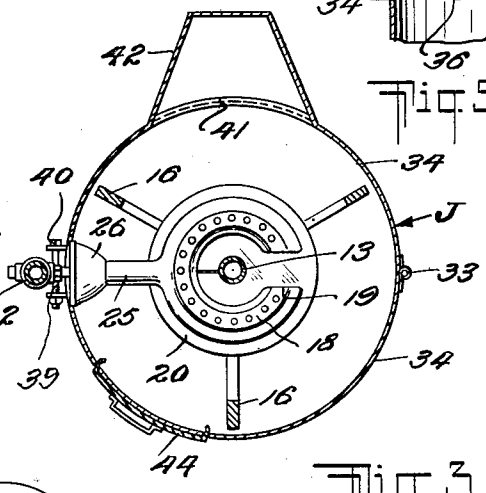


Fig. 3.

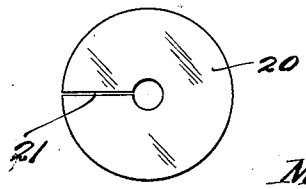


Fig. 6.

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WATER HEATER AND BURNER HOUSING THEREFOR

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2 Claims. (Cl. 122—14)

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This invention relates to water heaters, and more particularly to automatically controlled water heaters especially constructed for residential usages.

Automatic hot water systems employed primarily for residential use are open, as commonly constructed, to certain objections. Among these objections may be mentioned extreme costs and, in lower priced equipment, the inability of the heaters to produce hot water in considerable volume. Large volume automatic hot water heaters are known to be quite costly. In an effort to reduce such costs, the art has employed what is known as the "side arm" type of heater in which an auxiliary heating coil is arranged in a small casing exteriorly of a water holding drum, the coil being connected at its ends with the interior of the drum, and an automatically controlled fuel burner is utilized to heat the coil. Such a "side arm" type of burner, while cheaper to produce than the larger built-in type of automatic heaters, is objectionable in that the water heated thereby accumulates in relatively small volumes in the tops of the associated water-heating drums, so that there is no substantial volume of hot water available from such heaters for immediate use. Moreover, in both of these accepted types of hot water heaters repair and replacement costs are high, and when leaks occur it is often necessary to replace an entire system with another, as repairs are deemed to be too costly to justify economically the making thereof. Accordingly, it is an object of the present invention to provide an improved and simplified automatic hot water system in which installation and maintenance costs are substantially lower than those of conventional water-heating systems.

It is another object of the invention to provide an attachment for standard non-automatic hot water-heating systems of the type employing a vertical drum having a fuel burner arranged below the same, my improved attachment serving to render such a heating system readily automatic in its operation, one possessing a large volume for the storage or retention of hot water, and one which may be readily adapted and easily installed in association with such a system.

In the accompanying drawing, forming a part of this specification and in which similar characters of reference denote like and corresponding parts throughout with several views thereof:

Fig. 1 is a vertical sectional view taken through a hot water-heating system constructed in accordance with the present invention.

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Fig. 2 is a horizontal sectional view taken through the system on the plane indicated by the line 2—2 of Fig. 1.

Fig. 3 is a similar view on the plane disclosed by the line 3—3 of Fig. 1.

Fig. 4 is a detail vertical view disclosing the venting outlet for the burner fumes of the system.

Fig. 5 is a detail sectional view disclosing one of the drum-carrying supporting clips for the removable jacket of my improved heating system.

Fig. 6 is a detail plan view of the adjustable burner-carrying and heat-reflecting disc of the system.

One of the most economical and widely used systems for producing and maintaining hot water in residential buildings comprises a vertical drum supported at its lower end on a floor mounted base in which is positioned a gas or other fuel burner for directing heat on the bottom of the tank to heat water contained in the tank. While this system is effective and economical, it is not automatic in its functioning, and it is necessary at intervals to adjust manually a valve governing the operation of the fuel burner. When automatic systems are employed, the same are much more costly to procure, maintain and repair than the simple manually controlled type, and one of the factors which causes the higher cost for the automatic equipment is the necessity for designing such equipment to conform with safety building code requirements involving the installation and venting of such automatic equipment. In complying with many of such building codes, it is unnecessary to vent the burner fumes of a manually controlled burner to the atmosphere, whereas with the automatically controlled burner, that is, one whose operation is responsive to the temperature of the water undergoing heating, such venting is mandatory. Therefore, in accordance with the present invention, provision is made for producing inexpensive water-heating means having an automatically controlled burner and wherein provision is made for complying with rigid code requirements governing the installation of automatic equipment.

Thus, as shown in the accompanying drawing, a standard metallic water-heating drum 10 of the kind employed in the less expensive manually operated systems is utilized. Such drums customarily provide a cylindrical outlet wall 11 and top and bottom end walls. In this instance the bottom wall 12 only is shown, the rest of the

construction being conventional. Depending axially from the bottom wall 12 is the pipe member 13 of a drainage line 14 in which is arranged a control valve 15. The drum as a whole is mounted on a standard floor-positioned bench 16, the latter serving, as usual, to support the drum above the floor line 17. It will be understood that the top of the drum is connected with standard water-conducting pipe lines, not shown, for introducing water into and leading the same from said drum. The construction so far specifically described is conventional and is found in most non-automatic residential hot water-heating systems.

To provide for the automatic regulation of the system, the present invention comprises a burner 18 which is of the standard ring type except that in its preferred form, the burner 18 is slotted, as at 19, so that it may be positioned around the pipe member 13 without detaching the latter from the bottom of the drum 10.

Preferably, the burner rests on the upper surface of the disc 20 which is preferably of sheet metal. This disc is also slotted, as at 21, so that it may be slipped around the pipe member 13 without disturbing its connected relationship with the drum 10. If desired, the bottom of the disc 20 may be formed with a hub or collar 22 carrying a set screw 23, whereby to maintain the disc at various positions of vent adjustment on the member 13. The burner is provided with a multiplicity of fuel outlet ports 24 in its upper surface and also includes a neck 25 which terminates forwardly in an air introducing and mixing shell 26.

Conventionally, the drum 10 is formed near its base with threaded openings 27 for the reception of "side arm" type of controls. In the present invention I utilize the lower of these openings to receive the threaded stem 28 of an automatic gas flow controlling valve 29. Such a valve customarily includes a rod 30 containing temperature-responsive elements, the rod 30 extending into the interior of the tank 10 so that it may be immersed in the water contained within said tank. As the water varies in temperature, the heat-responsive elements of the rod 30 elongate or contract in a well understood manner to operate the valve 29, providing for increased or diminished flow of a gaseous fuel to the burner 18. Gas from any suitable source of supply enters the valve 29 by way of the pipe line 31, and, after passing through the valve 29, travels by way of a pipe line 32 to the mixing shell 26 of the burner where the fuel is admixed with atmospheric oxygen and delivered to the burner for combustion purposes.

To comply with the requirements of most municipal building codes in the matter of venting the fumes of an automatically controlled burner to the atmosphere, the present invention provides a jacket indicated at J in the drawing. In its preferred form the jacket comprises a pair of sheet metal sections which are hinged together as indicated at 33. Each section includes an arcuate vertical wall 34 and an internal horizontal upper wall 35 which at its inner edge bears on the outer surface of the wall 11 of the drum 10, as disclosed more particularly in Fig. 1. The bottom of the jacket is open to the atmosphere. To support the jacket in its operating position around the bottom of the drum 10 so that it provides an enclosing chamber or wall structure for the gas burner equipment, use is made of a plurality of U-shaped clips 36. Each of these clips is formed with a threaded opening for the reception of a set screw 37 by means of which the clips, prior to the application of the jacket J to the heater, may be secured to the depending flange of the drum 10 provided by the adjoining surfaces of the cylindrical wall 11 and the bottom of the wall 12 thereof. Each of the clips includes an outturned lug 38 on which the upper walls 35 of the jacket are adapted to be arranged. To hold the sections of the jacket together, the said sections may be provided in opposing relation to the hinge 33 with outwardly projecting apertured ears 39 which receive removable threaded elements 40 for fastening the separable ends of the jacket together, clamping the same around the bottom of the drum.

At one side, as shown more particularly in Figures 3 and 4, one of the jacket sections has its side wall apertured, as at 41, and disposed in registration with an open-bottomed casing extension 42 from the top of which extends a venting pipe 43 for carrying burner fumes to a chimney or to any other structure leading to the atmosphere. It will be noted that the jacket and its component parts may be applied to the drum 10 after the latter has been set up for use and the burner mechanism associated therewith. This feature enables my attachment to be readily adapted to non-automatic hot water heaters now in use. It also is of importance in making all parts readily accessible for repair or replacement purposes. If desired, one section of the jacket may be formed with a door opening covered by a removable closure 44 to provide convenient access to the burner 18.

From the foregoing it will be seen that I have provided novel, efficient and economical means for accomplishing the objects of my invention enumerated herein. While I have described a single preferred embodiment of my improved heater, nevertheless it will be understood that the construction is subject to certain structural variations or modifications without departing necessarily from the spirit and scope of the same as the invention has been expressed in the following claims.

I claim:

1. A package-type burner unit for application to a vertically arranged hot water tank having a bottom wall bounded by an outer vertically depending marginal flange, a drainage pipe extending downwardly from the bottom wall of the tank, and a standard supporting said tank in elevated relation to a floor surface, said unit comprising an annular jacket casing including a plurality of hingedly united semi-circular sections, said sections being joined to one another for relative swinging movement between an open position permitting application of said casing to the standard-supported tank and a closed position in encircling relation to the tank; clamp means detachably connected with the marginal flange of the tank for supporting said casing in a closed position in depending relation to the lower end of the tank, said casing defining with the bottom wall of the tank an open-bottom heating chamber; and a split ring fuel burner positioned within said heating chamber in encircling relation to the drainage pipe of the tank and disposed in vertically spaced relation to the bottom wall of the tank for directly heating the latter.

2. A package-type burner unit for application to a vertically arranged, standard-supported hot

water tank having a bottom wall bounded by a vertically depending marginal flange and a drainage pipe extending downwardly from the bottom wall of the tank, said unit comprising an annular cylindrical jacket casing including a plurality of hingedly united arcuate sections arranged for relative swinging movement between a first open position permitting application of said casing to a standard-supported tank and a second closed position in encircling relation to the lower end of the tank, said casing, when occupying its closed position around the lower end of the tank, defining with the bottom wall thereof an open bottom heating chamber for the reception of a fuel burner positioned in vertically spaced relation to the bottom wall of the tank, one of the sections of said casing being formed with a laterally offset portion defining an internal duct communicating with the heating chamber at one end and terminating at its opposite end in a flue pipe connection disposed alongside of the lower end of the tank; clamp means for detachable connection with the marginal flange of the tank and arranged to support said casing in its closed position in depending relation to the lower end of the tank; and a split ring fuel burner positioned within said heating chamber in encircling relation to the drainage pipe of the tank and in

vertically spaced relation to the bottom wall of the tank for transmitting heat directly to the bottom wall of the tank.

MAUREL G. BURWELL.

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