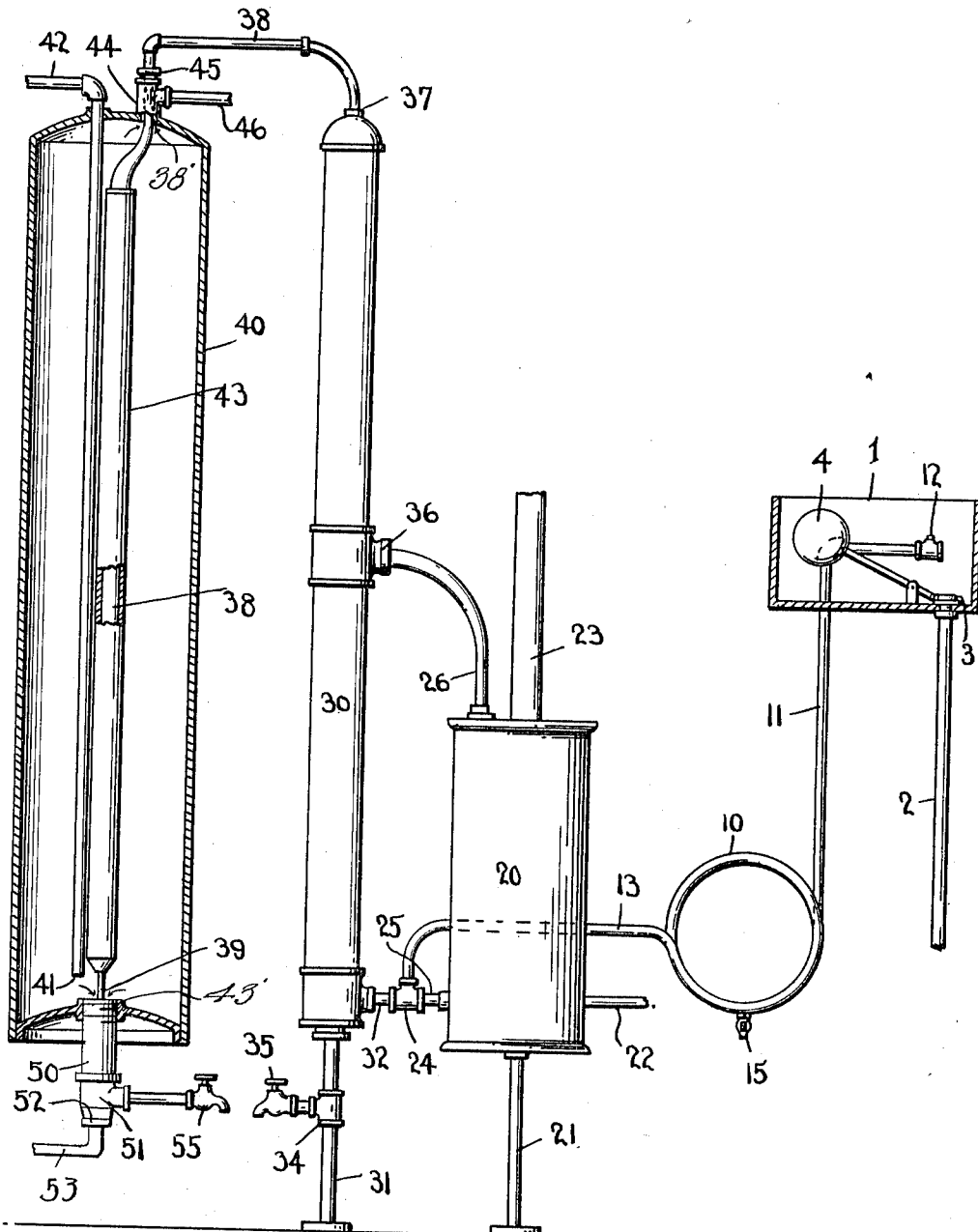


D. W. & F. R. DALEY.
HOT WATER SYSTEM.
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Inventors

Witnesses

L. B. James
E. H. H. H. H.

D. W. Daley &
F. R. Daley

By *A. B. Wilson & Co.*
Attorneys

UNITED STATES PATENT OFFICE.

DENNIS WILLIAM DALEY AND FRANK RICHARD DALEY, OF PARKERSBURG, WEST VIRGINIA.

HOT-WATER SYSTEM.

1,061,359.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that we, DENNIS WM. DALEY and FRANK RICHARD DALEY, citizens of the United States, residing at Parkersburg, in the county of Wood and State of West Virginia, have invented certain new and useful Improvements in Hot-Water Systems; and we do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to water heaters, and more especially to stand boilers; and the object of the same is to produce an improved system for heating the water in a domestic hot water tank by means of steam generated in a stand boiler and passed through and condensed within said tank. This and other objects are carried out by constructing the system in the manner hereinafter more fully described and claimed, and as shown in the drawings which illustrate the system in diagrammatic elevation, partly in section.

The elements comprising this system are a float box 1, a trap 10, a heater 20, a boiler 30, and a domestic hot water tank 40—all by preference made entirely of metal and none of them possessing peculiarities of construction further than as hereinafter pointed out.

Broadly speaking the purpose of the present invention is to take cold water from the city mains or source of supply, branch the service pipe so that one leg of it feeds the tank and the other delivers into a box having a valve controlled by a float so as to shut off the flow through this leg when the box becomes too full; then take the water from the box through a check valve and heat it by means yet to be explained so as to generate steam, and finally to pass this steam throughout a condensing tube within the tank so that the condensed steam can be drawn off as distilled water, and in the act of condensing it will heat the water, within said tank. In carrying out this general idea, we find that the boiler and the tank must be flushed occasionally because of the fact that the sediment accumulates therein, and one feature of the present invention is a special stand or support for the boiler as will be explained below.

Coming now more particularly to the details which are by preference employed, the

float box 1 is supplied from the city mains through a service pipe 2, the inlet being controlled by a valve 3 which is automatically closed by a float 4 when the latter rises sufficiently high, or in other words when the water in the boiler 30 reaches as high a level as is necessary for the successful operation of the system.

The trap 10 consists substantially of a pipe coiled in one or more convolutions, one leg 11 leading upward to a check valve 12 disposed in the float box 1 directly above the inlet valve 3 so that the purest of the water in the box is supplied to the inlet leg 11; and the other leg 13 leading horizontally away from the coil as shown.

The heater 20 is mounted on a suitable stand 21 and in the present instance is fed by gas through an inlet pipe 22 which leads to a burner (not shown), and the products of combustion pass out a smoke flue 23. The outlet leg 13 of the trap 10 leads to a T-coupling 24, from the head of which an inlet pipe 25 leads into the lower portion of the heater, and the outlet pipe 26 leads out of the upper portion of the heater in the usual manner.

The boiler 30 as shown in the drawings is an upright cylindrical member mounted on a stand 31 which in the present case is made tubular and communicates with the interior of the boiler at its bottom, and in this stand is a T-coupling 34 provided with a flush cock 35 which when opened permits the sediment within the boiler to run out. This detail we consider one of the features of our invention, inasmuch as the upright pipe 31 serves both as the stand and as the draw off outlet, when provided with the flushing cock 35. The T-coupling 24 above mentioned is connected by a pipe 32 with the lower end of the boiler, and the outlet pipe 26 from the heater is connected with the boiler at about its midlength at the point 36, there being a free circulation of water upward through the heater and out its outlet pipe 26, then into the boiler at the point 36, downward therein, and finally through the pipe 32, T-coupling 24, and pipe 25 into the heater again. From the upper end of the boiler at its point 37 considerably above the point 36 (which latter is about opposite the float box) a steam line pipe 38 leads to the tank yet to be described.

The domestic hot water tank 40 is a large

upright cylinder suitably supported on a stand not necessary to illustrate because it involves no feature of our invention, and it is supplied by one leg or branch 42 of the service pipe from the city mains as above suggested, this pipe turning downward within the tank and opening thereinto at a point 41 near its lower end. Contiguous to the supply pipe 42 and throughout most of the length of the tank is disposed a condensing tube 43, throughout whose length extends the steam line pipe 38 from the boiler 30. The outlet from the tank is by means of a T-coupling 44 of ample size, one arm of which is let into an opening 38' in the head of the tank as shown and the other arm of which receives a stuffing box 45 which closes this arm but permits the passage through the stuffing box and the head of the T-coupling of the steam line pipe 38; and the shank of the T-coupling is connected with the supply pipe 46 which leads to the house fixtures. This we consider a feature of our invention, because a single outlet in the head of the tank is utilized both to let the warm water flow out of it to the fixtures and to permit the steam to flow into it and to and throughout the length of the condensing tube 43. Another feature of our invention in this connection is at the bottom of the tank, in which we form a single opening 43' to receive a nipple or short pipe section 50, to whose lower end is secured one arm of a T-coupling 51, whose other arm has a stuffing box 52, so that the outlet 39 at the lower end of the steam line pipe 38 can pass directly through the pipe section 50 and T-coupling 51 and deliver the condensed steam in the shape of distilled water as shown at 53. The shank of the T-coupling 51 carries a flush cock 55, and when this is opened the sediment within the tank can be drawn off. Thus it will be seen that we use a single opening in the bottom of the tank for both purposes. The trap 10 will also preferably have a drain or flush cock 15 as shown, so that from time to time the sediment which may accumulate therein can be drawn off.

With our system constructed in the manner described, its operation is as follows: Water flows from the city mains through the branch 42 of the service pipe into the tank and fills the same. Water also flows through the branch 2 of the service pipe into the float box 1 whose valve 3 is open when its float 4 is down, and rises in the box until it flows through the check valve 12, and through the inlet leg 11 to the trap 10. From this it passes through the outlet leg 13 to the T-coupling 24 whence it passes both through the pipe 32 into the boiler 30 and through the pipe 25 into the heater 20, rising in both these elements and in the outlet pipe 26 to about the point 36, at which time the

water level is opposite that in the float box 1, so that as the water flows in the float 4 rises and finally the inlet valve 3 is closed thereby. If now a fire be started within the heater, the water as it is heated passes upward through the pipe 26 and into the boiler 30 at the point 36, then descends and passes out from the bottom of the boiler to the bottom of the heater, and thus continues to circulate; soon the water becomes warm enough to generate steam, and the steam cannot get back through the trap 10, but even if it should do so it is checked by the valve 12. However, the steam rises above the point 36 and passes out the point 37 into the steam line pipe 38 whence it flows to the tank 40, and downward through the condensing tube 43 which of course is cool by reason of its being surrounded by the volume of cold water within the tank. This therefore condenses the steam, and the products of condensation are or may be drawn off at the point 53 in the shape of distilled water. In the act of condensing, the steam heats the water within the tank 40, and this water may be drawn off through the supply pipe 46 at any of the fixtures within the house system. From time to time the flush cocks 35, 55 and 15 are opened to drain or flush the boiler, tank and trap respectively. When the interior of the tank needs repairs, it is an easy matter to disconnect the T-coupling 44 or the pipe section 50 and draw out of the openings 38' and 43' in the heads of the tank both the steam line pipe 38 and the condensing tube 43, as our arrangement permits the telescopic disposition of these elements and yet requires but a single opening in each head of the tank.

What is claimed as new is:—

1. The combination with an upright tank having a cold water inlet and openings in its upper and lower ends; of a hot-water outlet pipe in the uppermost opening and connected with the house fixtures, a stuffing box also in this pipe, a pipe section in the lowermost opening, a flush cock connected with this section, a stuffing box connected therewith, a steam line pipe leading through the uppermost stuffing box, throughout the length of the tank, and out through the lowermost stuffing box, and means for supplying steam thereto and drawing off distilled water therefrom.

2. The combination with an upright tank having a cold water inlet and openings in its upper and lower ends; of a hot-water outlet pipe in the uppermost opening and connected with the house fixtures, a stuffing box also in this pipe, a pipe section in the lowermost opening, a flush cock connected with this section, a stuffing box connected therewith, a steam line pipe leading through the uppermost stuffing box, throughout the length of the tank, and out through the

lowermost stuffing box, a boiler and a heater in circuit with each other and connected with the source of water supply, connections between the upper end of the boiler and said steam line pipe at the upper end of the tank, and means for drawing off distilled water at the lower end of said tank.

3. The combination with an upright tank having a cold water inlet and openings in its upper and lower ends; of a T-coupling having one arm engaging the uppermost opening and its shank connected to the house fixtures, a stuffing box in the other arm of this coupling, a pipe section engaging the lowermost opening, a T-coupling into one arm of which this pipe section leads, a stuffing box in its other arm, a flush cock connected with the shank, a steam line pipe leading through the uppermost stuffing box, throughout the length of the tank, and out through the lowermost stuffing box, and means for supplying steam thereto and drawing off distilled water therefrom.

4. The combination with an upright tank having a cold water inlet and openings in its upper and lower ends; of a T-coupling having one arm engaging the uppermost opening and its shank connected to the house fix-

tures, a stuffing box in the other arm of this coupling, a steam line pipe leading through the stuffing box, throughout the length of the tank, and out through the lowermost opening, and means for supplying steam thereto and drawing off distilled water therefrom.

5. The combination with an upright tank having a cold water inlet and openings in its upper and lower ends; of a pipe section engaging the lowermost opening, a T-coupling into one arm of which this pipe section leads, a stuffing box in its other arm, a flush cock connected with its shank, a steam line pipe leading through the uppermost opening, throughout the length of the tank, and out through the pipe section and stuffing box, and means for supplying steam thereto and drawing off distilled water therefrom.

In testimony whereof we have hereunto set our hands in presence of two subscribing witnesses.

DENNIS WILLIAM DALEY.
FRANK RICHARD DALEY.

Witnesses:
C. A. BORO,
RALPH THAYER.