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A. M. BROWN

2,041,815

HEATING SYSTEM

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Fig. 1.

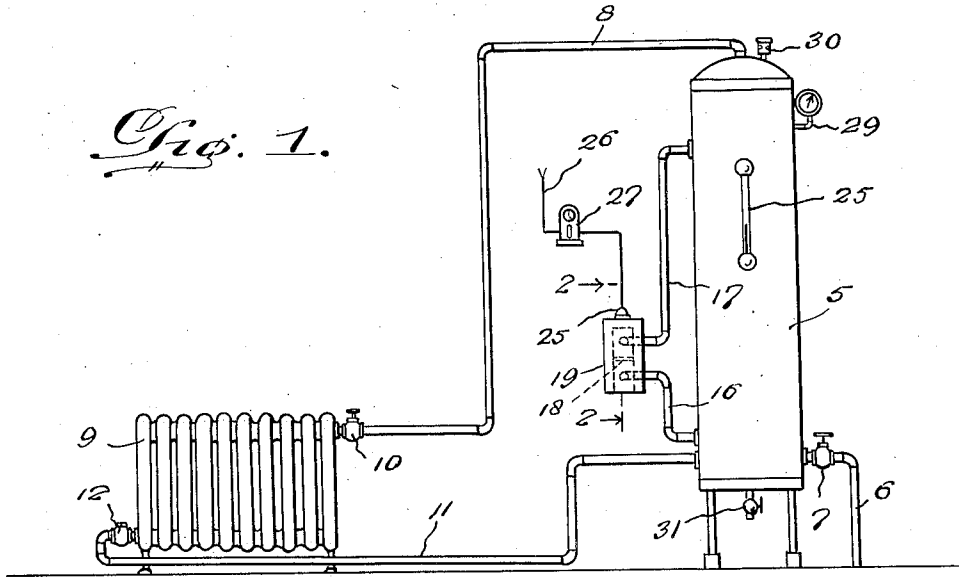


Fig. 2.

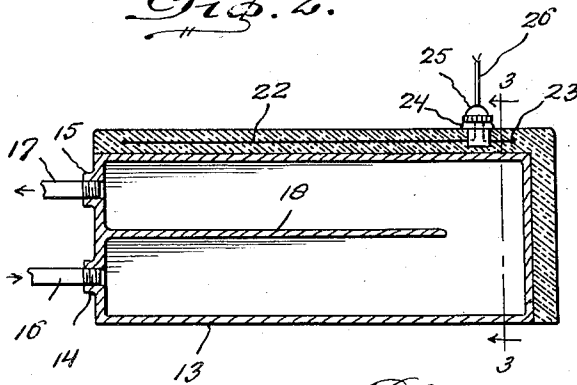


Fig. 3.

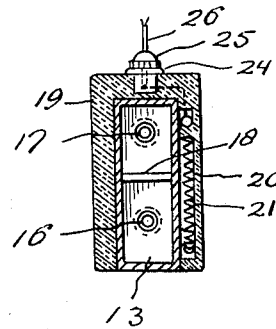
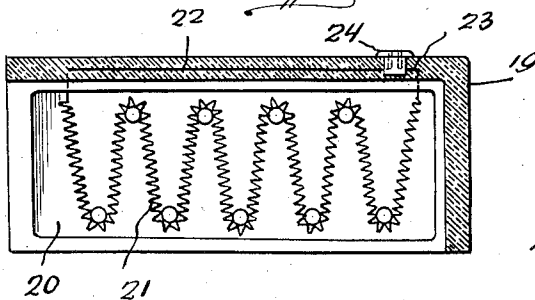


Fig. 4.



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HEATING SYSTEM

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3 Claims. (Cl. 219—38)

This invention relates generally to steam or hot water heating systems, and has more particular reference to an improved steam or hot water generator for such systems.

5 More particularly, the present invention relates to heating systems for buildings wherein the generated steam or hot water is stored in a tank having water circulatory connections with the radiators of the system so that the steam or hot water continuously circulates by gravity (thermal) circulation. It has been proposed, in systems of this kind, to provide the stand boiler or storage tank of the system directly with an electric heater, but the use of an expensive heater and the consumption of considerable current was required to heat the water or generate the steam directly in the stand boiler or storage tank. Accordingly, the present invention aims to improve upon systems of this kind by providing a relatively small water back external to and having water circulatory connections with the stand boiler or storage tank, in combination with an improved and simplified form of electric heater associated with said water back whereby the hot water or steam may be expeditiously generated with a minimum consumption of current.

Other objects and features of the invention will become apparent from the following description when considered in connection with the accompanying drawing, in which:

Figure 1 is a diagrammatic elevation of a heating system embodying a steam or hot water generator constructed in accordance with the present invention.

35 Figure 2 is a vertical longitudinal sectional view through the water back and electric heater of the steam or hot water generator, and taken substantially on line 2—2 of Figure 1.

40 Figure 3 is a transverse sectional view on line 3—3 of Figure 2; and

Figure 4 is a view similar to Figure 2 with the water back removed.

Referring more in detail to the drawing, 5 indicates an ordinary stand boiler or storage tank to the bottom of which is suitably connected a water supply pipe 6 controlled by a valve 7. Leading from the top of the boiler or tank 5 is a steam or hot water outlet pipe 8 which conducts the steam or hot water to the radiators of the system, one of which is shown at 9. The connection of pipe 8 with the radiators will of course be at the top of the latter as usual, at which point there may be provided the usual control valve 10. A further pipe 11 leads from the bottoms of the radiators to the bottom of stand boiler 5 and is

provided with the usual check valve 12 at the point of connection thereof with each radiator. The pipes 8 and 11 thus form steam or water circulatory connections between the storage tank or boiler 5 and the radiators of the system, only one of the radiators being illustrated for purposes of simplicity.

The present invention contemplates the provision of electrical means of a simple and efficient nature for heating the water supplied to tank or boiler 5 so as to expeditiously generate steam or hot water with a minimum consumption of current. As shown, the present steam or hot water generator consists of a conventional water back 13 consisting of a flat hollow metallic shell provided at one end with a pair of spaced superposed nipples 14 and 15 respectively connected by pipes 16 and 17 with the lower and upper portions of boiler or storage tank 5. The pipes 16 and 17 thus form circulatory connections between the boiler or tank 5 and the water back 13. Said water back 13 may be provided with a central longitudinal baffle 18 extending from the wall provided with the nipples 14 and 15 and at a point between the latter toward the opposite end wall so as to cause circulation of the water the entire length of the water back as it passes therethrough from the cold water inlet pipe 15 to the hot water or steam outlet pipe 17. This insures maximum heating efficiency in connection with an electric heater having a heating element or resistor located at one or both sides of the water back for the entire length of the latter as will presently be described.

The electrical heater for the water back 13 consists of a hollow body 19 molded of fire clay or other suitable heat and electric insulating material so as to snugly fit over and encase the top, sides and one end of said water back as shown clearly in Figures 2 and 3, the body 19 being left open at the bottom to facilitate placing of the same over the water back and being left open at one end to avoid interference with the pipes 16 and 17. A side wall of the body 19 is provided in its inner face for substantially the entire width and length thereof with a recess 20 in which is positioned an electrical heating element or resistor 21 preferably consisting of a zig-zag coil terminating near the top of recess 20 at opposite ends of the latter where its terminals are connected with conductors 22 and 23 embedded in the top wall of body 19 and attached to the terminals of an attachment plug receptacle 24 also embedded in said top wall of body 19. Thus, current for the resistance element 21 may be supplied there-

to from an ordinary house wiring system through the medium of an attachment cord having a plug 25 on one end adapted to be plugged into the receptacle 24. Such attachment cord is indicated at 26 in Figure 1, and as is also shown in this figure, a suitable thermostat 27 may be included in the attachment cord 26 or in the circuit of the electric heater to throw the same into operation when the temperature within any room where a radiator 9 is located falls below a predetermined point, and to throw said heater out of operation when such temperature rises above a predetermined point. Such controls are conventional and need not be described in more detail.

In operation, current is supplied to the resistance element 21 and the latter heats one side of the water back 13 substantially throughout the area thereof so as to efficiently heat the water within said water back. As the water becomes heated in the water back, it will pass therefrom through pipe 17 into the upper portion of boiler or tank 5, additional water flowing into the water back from the bottom of tank or boiler 5 by way of pipe 16. This continuous heating and circulation of water continues as long as the heater is in operation, and by providing the necessary resistance element, the water may be heated in water back 13 so as to be generated into steam. In that case, the steam will be discharged by way of pipe 17 into the top of boiler or tank 5. Regardless of whether the heating medium generated is steam or hot water, it will pass from the top of boiler 5 by way of pipe 8 to the several radiators of the heating system, being cooled in passage through such radiators and ultimately returning to the bottom of boiler or tank 5 by way of pipe 14. As soon as the temperature in the room reaches the desired point, the thermostat 27 will automatically render the heater inoperative, and when such temperature lowers to a predetermined point said thermostat will again place the heater in operation.

It will be seen that the present invention provides a very simple and cheap means for generating steam and hot water embodying an electric heater of inexpensive construction which may operate efficiently on a minimum amount of current. Also, this invention involves no expensive modification of the ordinary hot water boiler or storage tank which is employed, and particularly requires no stand boiler or storage tank of special construction.

When the device is employed as a steam generator, the boiler or tank 5 will be provided at a suitable point between the top and bottom thereof with a water gage 25 to facilitate maintenance of water within said boiler or tank 5 at a desired level. Also, a gage 29 may be provided to indicate the steam pressure within tank or boiler 5, while said tank or boiler 5 may be provided at the top

with a suitable safety pressure release valve 30 to permit the escape of steam in case the pressure thereof unduly rises within the top of boiler or tank 5. 31 indicates a drain cock provided at the bottom of boiler or tank 5 for an obvious and ordinary purpose. Obviously, the present invention avoids an attempt to directly heat the large body of water within the tank or boiler 5 and by use of a heater in connection with a relatively small water back having circulatory connections with the tank or boiler 5, a comparatively simple and inexpensive electric heater may be utilized with efficient results and a minimum current consumption. Minor changes are contemplated in the specific details illustrated and described, such as fairly come within the scope of the invention as claimed. For instance, the provision of a resistance element 21 at both sides of body 19 would involve mere duplication, and would fall within the spirit of the present invention.

What I claim as new is:

1. A steam or hot water generator for heating systems, comprising a water back in the form of a flat hollow metallic shell having means at one end to facilitate circulatory connections between the same and a storage tank, and an electric heater for said water back including a hollow body of insulating material provided with an internal resistance element along at least one side and snugly fitted over and encasing said water back.

2. A steam or hot water generator for heating systems, comprising a water back in the form of a flat hollow metallic shell having means at one end to facilitate circulatory connections between the same and a storage tank, and an electric heater for said water back including a hollow body of insulating material provided with an internal resistance element along at least one side and snugly fitted over and encasing said water back, said heater body being open at the bottom and one end to facilitate placing of the same over the water back and to provide clearance for the circulatory connections at one end of said water back.

3. A steam or hot water generator for heating systems, comprising a water back in the form of a flat hollow metallic shell having means at one end to facilitate circulatory connections between the same and a storage tank, an electric heater for said water back including a hollow body of insulating material provided with an internal resistance element along at least one side and snugly fitted over and encasing said water back, a plug receptacle embedded in the top wall of said heater body, and conductors embedded in said heater body and connecting the terminals of said resistance element with the terminals of said plug receptacle.

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