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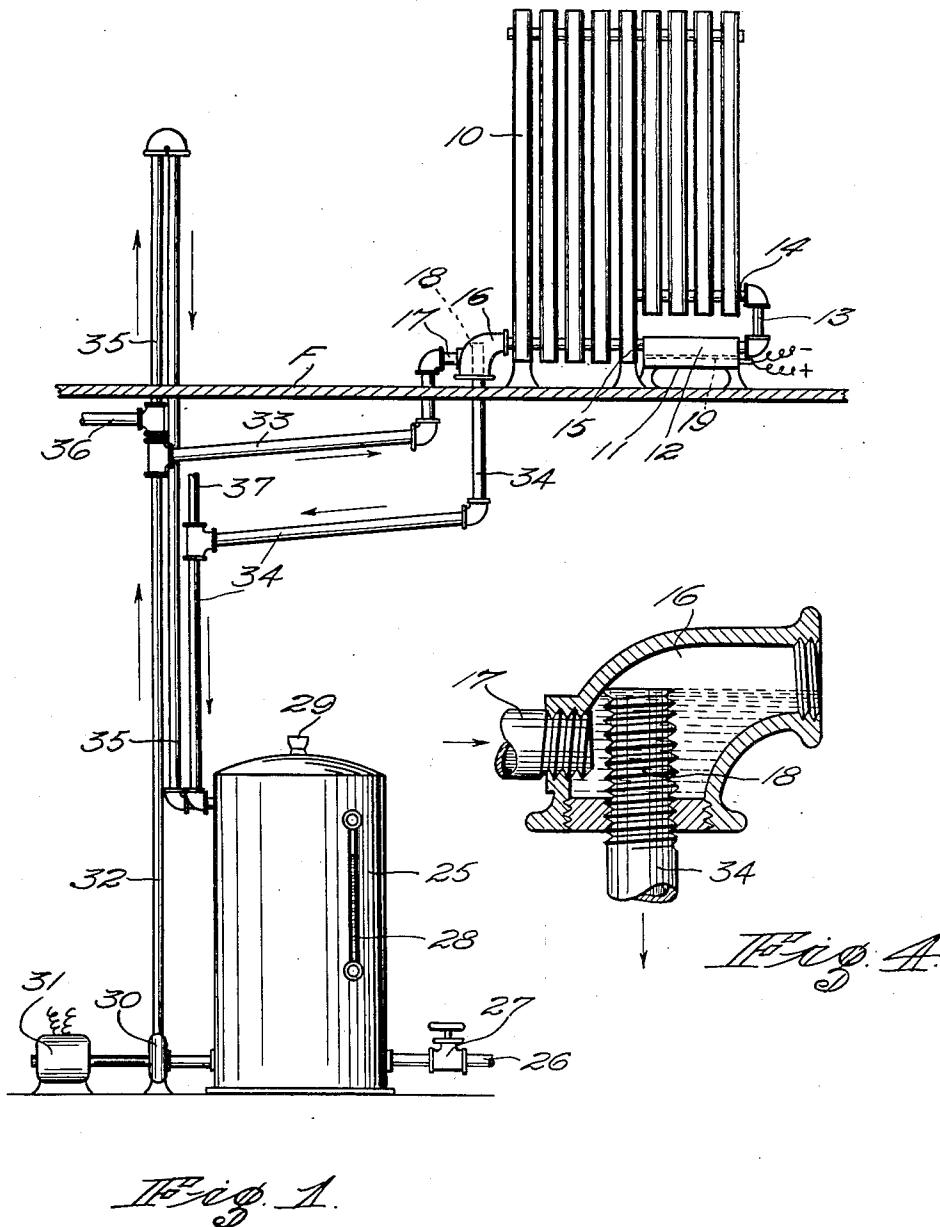
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1,980,299

HEATING SYSTEM

Filed May 1, 1933

2 Sheets-Sheet 1



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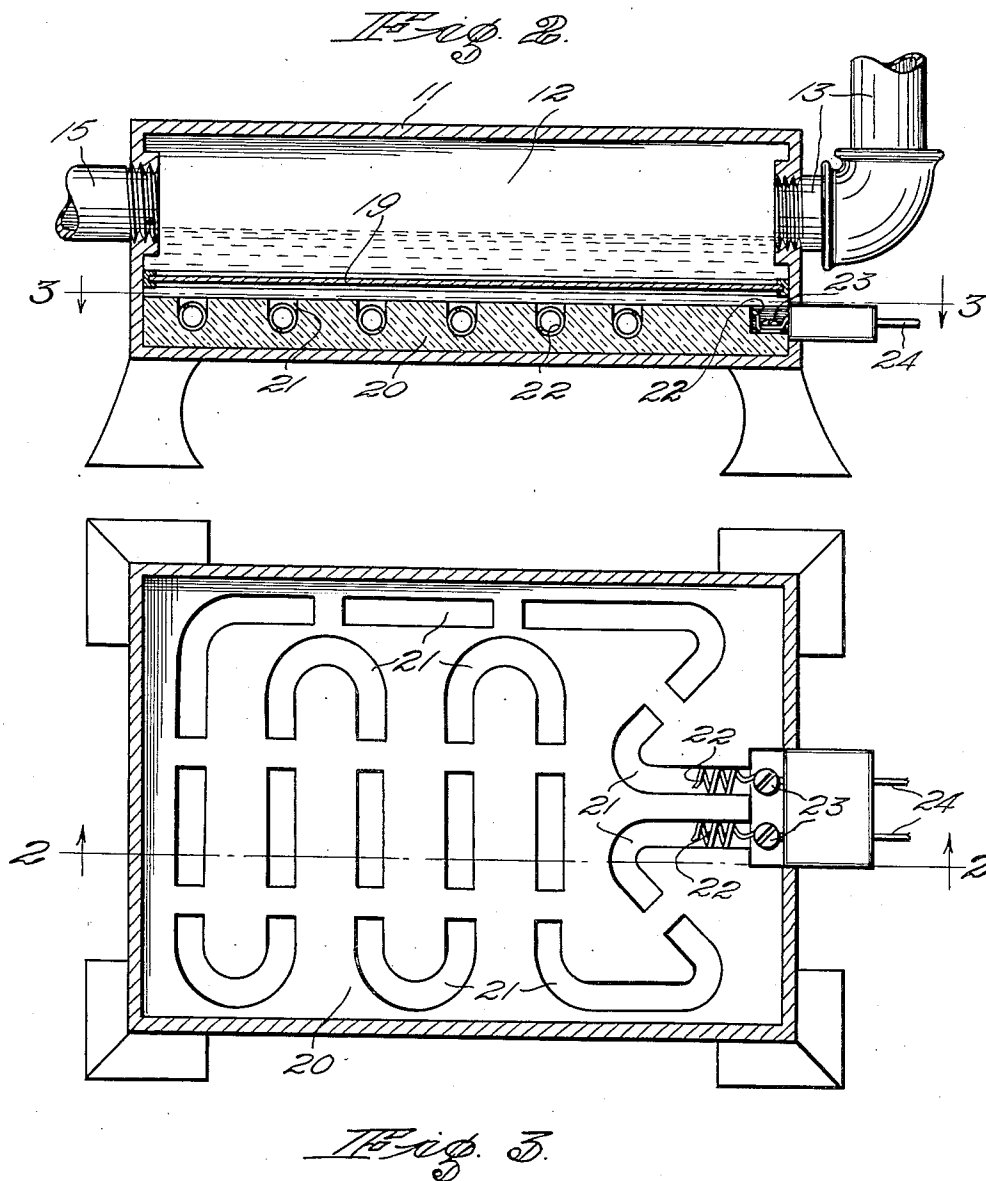
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UNITED STATES PATENT OFFICE

1,980,299

HEATING SYSTEM

George C. Smith, Hamilton, Ontario, Canada

Application May 1, 1933, Serial No. 663,699

10 Claims. (Cl. 237—16)

This invention relates to improvements in steam or vapor heating systems and consists of a radiator in the room to be heated having in conjunction an electrically heated water reservoir fed by means of a pump drawing from a storage tank in turn fed from a water source, and means for maintaining the water in the reservoir at a given level.

One important object of the invention is to generally improve steam or vapor heating systems.

Another important object is to provide a steam or vapor heating system in which a plurality of radiators may be heated together, or selectively by either manual or automatic control means.

A third important object is to provide a heating system of the class specified which may be controlled entirely by automatic means.

A fourth important object is to reduce the cost of steam or vapor heating.

A fifth important object is to provide a system of the class described which will be simple, effective, and inexpensive to manufacture and install.

With the above and other objects in view as will be hereinafter apparent, the invention consists in general of certain novel details of construction and combinations of parts hereinafter fully described, illustrated in the accompanying drawings and specifically claimed.

In the accompanying drawings like characters of reference indicate like parts in the several views, and:

Figure 1 is a diagrammatic elevation of a steam or vapor heating system constructed in accordance with this invention;

Figure 2 is an enlarged cross-sectional side elevation of the electrically heated reservoir taken on line 2—2 of Figure 3;

Figure 3 is an enlarged sectional top view of the reservoir taken on line 3—3 of Figure 2; and

Figure 4 is a median sectional detailed side view of the intake and overflow fountain.

In its present embodiment the invention consists of the radiator 10 comprised of conventional sections which communicate at the top and bottom by means of conventional couplings, a contiguous group of these sections at one end of the radiator being terminated short of the others at the bottom in order to accommodate the combined reservoir and heater unit, indicated in general by 11, beneath their lower extremities. The outermost end of reservoir 12 is connected by means of the pipe 13 to the lower endmost radiator conductor coupling 14 of the shortened

portion of the radiator, while the innermost end of the reservoir is similarly connected to a radiator coupling 15 of the portion of the radiator that is of normal low reach.

On the opposite endmost radiator coupling of the longer radiator portion is a fountain 16 receiving a feed pipe 17 and also an overflow stand pipe 18. The fountain may, for the purpose of simplicity and convenience, be in the form of an elbow, as shown.

The reservoir has for a floor a copper heat conductor plate 19. This plate separates the reservoir from a lower compartment of the unit 11 containing the electric heater which, when energized, is adapted to heat the water in the reservoir through the conductivity of the plate 19. The said heater may be of any well known type, but for example is shown as consisting of the porcelain bed plate 20 along the tortuous channel 21 of which is woven the helically coiled resistance wire 22 whose ends are connected to the screw terminals 23 to which are also connected the feed wires 24 extending to the line.

The radiator, as usual, and together with the reservoir and heater unit is mounted on the floor of an upper story of a building, it being understood that although but one radiator is shown and specified any number of such radiator units may be supplied with this system, and in any number of rooms in the building to be heated thereby.

In a lower section of the building, as for instance the basement, is a storage tank 25 connected to a water source or the building service by the pipe 26 in which is a valve 27 for opening and closing the supply to the tank. By this means the tank is supplied and replenished with water, and the tank is provided with visible means, preferably in the form of the gauge or water glass 28, for ascertaining the quantity of water therein.

In the top of the tank is a blow-off valve 29 which permits egress but no ingress of air. Thus when the tank is filling the air displaced by the water is exhausted through this valve, but as the tank empties a partial vacuum is created above the water line.

A rotary force pump 30, driven by the electric motor 31, pumps the water from the tank through pipes 32, 33 and 17 into the fountain 16 which supplies the reservoir 12. The overflow water passes down through the stand pipe 18 and connecting pipe 34 back into the top of the tank above the water line which is maintained always lower than the entrance of the latter mentioned pipe.

Thus, during the operation of the system the water finds its proper level in the reservoir 12 and is constantly maintained at that relatively shallow depth as determined by the height of the stand pipe 18.

There being no air pressure in the tank 25, but rather a partial vacuum, obviously all excess water from the fountain, regardless of the rapidity at which it is pumped, is free to return to the tank unchecked solely under the influence of gravity.

A pipe 35 extends from the pipe 32 upwardly to a point in the building above the highest level of water in the system, from whence it returns and empties into the pipe 34 so that all water in the pipe 35 returns to the tank, thus relieving excess pressure of the pump on the water supply.

With the electric heater energized, as fast as the water in the reservoir boils and creates steam which fills and heats the radiator it is steadily replenished from the fountain, all excess water including condensation, and any air happening to be in the circulating system, being returned to the tank thus completing the cycle. When more than one radiator is used in the system they are piped to the main pipes 32 and 34 as at 36 and 37 respectively.

In use both the heater and the motor are turned on or off at once either manually or by automatic (thermostatic) control, and in the case of a multi-radiator system supplied from a common tank and pump each radiator obviously can be individually controlled.

There has thus been provided a simple and efficient device of the kind described and for the purpose specified.

It is obvious that minor changes may be made in the form and construction of the invention without departing from the material spirit thereof. It is not, therefore, desired to confine the invention to the exact form herein shown and described, but it is desired to include all such as properly come within the scope claimed.

Having thus described the invention, what is claimed as new, is:

1. In a vapor heating system, a radiator, a reservoir in vapor circulating communication with the radiator, a fountain communicating with the radiator, a storage water tank below the radiator, a pipe leading from said tank to the fountain, a powered pump introduced in said pipe, an overflow pipe leading from the fountain back to said tank, said overflow pipe adapted to maintain a fixed water level in the fountain, the water level in the fountain governing that in the reservoir, and a heater for converting the water in the reservoir to steam for the radiator steam supply.

2. In a vapor heating system, a radiator, a reservoir in vapor circulating communication with the radiator, a fountain communicating with the radiator, a storage water tank below the radiator, a pipe leading from said tank to the fountain, a powered pump introduced in said pipe, a suction pipe leading from the fountain back to said tank, said suction pipe adapted to maintain a fixed water level in the fountain, the water level in the fountain governing that in the reservoir, and a heater for converting the water in the reservoir to steam for the radiator steam supply.

3. In a vapor heating system, a radiator, a reservoir in vapor circulating communication with the radiator, a fountain communicating with the radiator, a storage water tank below the radiator, a pipe leading from said tank to the fountain, a powered pump introduced in said pipe, an over-

flow pipe leading from the fountain back to said tank above the water level thereof, a valve in said tank above the water level thereof permitting egress but not ingress of air, said overflow pipe adapted to maintain a fixed water level in the fountain, the water level in the fountain governing that in the reservoir, and a heater for converting the water in the reservoir to steam for the radiator steam supply.

4. In a vapor heating system, a radiator, a reservoir in vapor circulating communication with the radiator, a fountain communicating with the radiator, a storage water tank below the radiator, a pipe leading from said tank to the fountain, a powered pump introduced in said pipe, an overflow pipe leading from the fountain back to said tank above the water level thereof, a valve in said tank above the water level thereof permitting egress but not ingress of air, said overflow pipe adapted to maintain a fixed water level in the fountain, the water level in the fountain governing that in the reservoir, a pipe leading from the first mentioned pipe upwardly to a point above the water level in the fountain and reservoir and returning downwardly to the overflow pipe, and a heater for converting the water in the reservoir to steam for the radiator steam supply.

5. In a vapor heating system, a radiator, a reservoir in vapor circulating communication with the radiator, a fountain communicating with the reservoir, a storage water tank below the radiator, a pipe leading from said tank to the fountain, a powered pump introduced in said pipe, an overflow pipe leading from the fountain back to said tank, said overflow pipe adapted to maintain a fixed water level in the fountain, the water level in the fountain governing that in the reservoir, and a heater for converting the water in the reservoir to steam for the radiator steam supply.

6. In a vapor heating system, a radiator, a reservoir in vapor circulating communication with the radiator, a fountain communicating with the reservoir, a storage water tank below the radiator, a pipe leading from said tank to the fountain, a powered pump introduced in said pipe, a suction pipe leading from the fountain back to said tank, said suction pipe adapted to maintain a fixed water level in the fountain, the water level in the fountain governing that in the reservoir, and a heater for converting the water in the reservoir to steam for the radiator steam supply.

7. In a vapor heating system, a radiator, a reservoir in vapor circulating communication with the radiator, a fountain communicating with the reservoir, a storage water tank below the radiator, a pipe leading from said tank to the fountain, a powered pump introduced in said pipe, an overflow pipe leading from the fountain back to said tank above the water level thereof, a valve in said tank above the water level thereof permitting egress but not ingress of air, said overflow pipe adapted to maintain a fixed water level in the fountain, the water level in the fountain governing that in the reservoir, and a heater for converting the water in the reservoir to steam for the radiator steam supply.

8. In a vapor heating system, a radiator, a reservoir in vapor circulating communication with the radiator, a fountain communicating with the reservoir, a storage water tank below the radiator, a pipe leading from said tank to the fountain, a powered pump introduced in said

pipe, an overflow pipe leading from the fountain back to said tank above the water level thereof, a valve in said tank above the water level thereof permitting egress but not ingress of air, said overflow pipe adapted to maintain a fixed water level in the fountain, the water level in the fountain governing that in the reservoir, a pipe leading from the first mentioned pipe upwardly to a point above the water level in the fountain and reservoir and returning downwardly to the overflow pipe, and a heater for converting the water in the reservoir to steam for the radiator steam supply.

9. In a vapor heating system, a radiator, a water reservoir in vapor circulating communication with the radiator, a heater in the reservoir for evaporating water held therein, means for constantly supplying water to the reservoir during the operation of the heater, and an over-

flow drain leading from the reservoir to remove excess supply water and maintain water level of the reservoir substantially constant.

10. In a vapor heating system, a radiator, a reservoir in vapor circulating communication with the radiator, means for supplying water to the reservoir, said reservoir and radiator having coplanar water levels, a heater in the reservoir for vaporizing the water therein, and means to maintain the water level in the reservoir at a substantially constant height during the operation of the system irrespective of evaporation of the water, said last mentioned means including a supply device constantly feeding water to the reservoir and a waste device drawing off excess water from the reservoir during the operation of the system.

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