

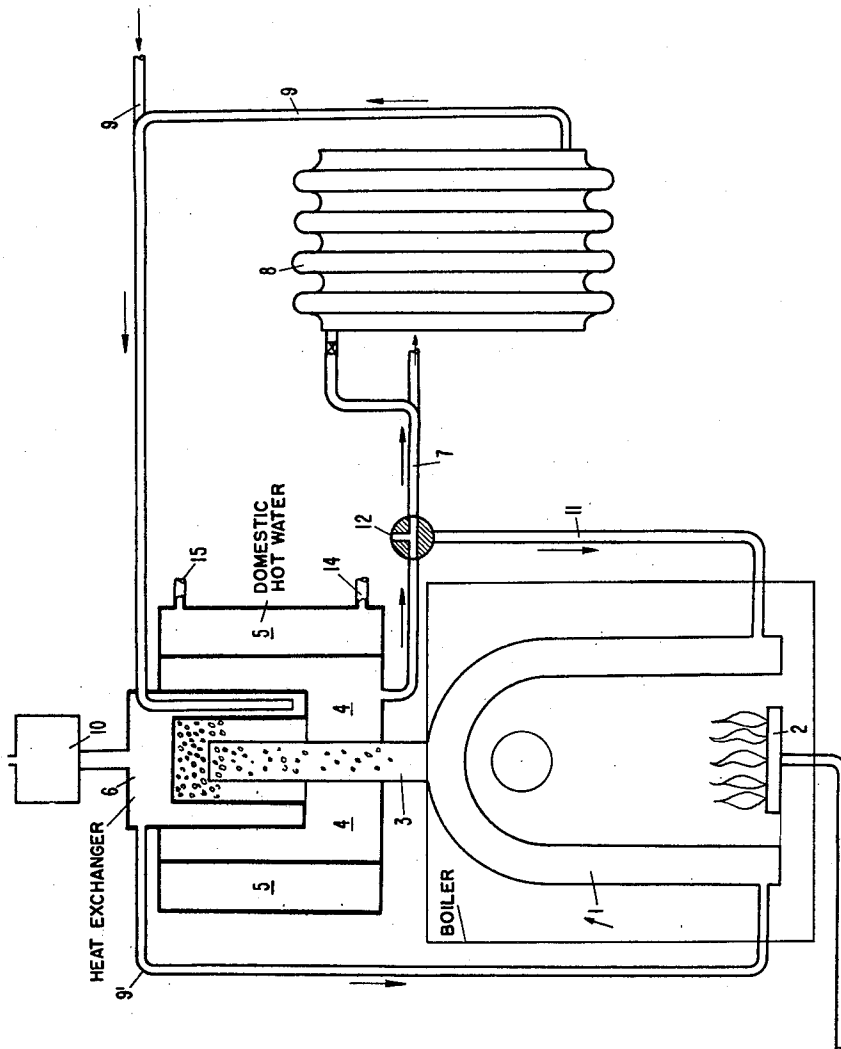
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WATER HEATING INSTALLATION

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WATER HEATING INSTALLATION

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2 Claims. (Cl. 237—56)

This invention relates to water heating installations and in particular to water heating installations suitable for the central heating of multistory buildings or of single large rooms.

Installations of this kind normally comprise a heated boiler from which a riser pipe is connected, either through a delivery chamber or directly, to a system of heating pipes and radiators. In such an installation the water may be circulated by means of a mechanical pump, but more usually the circulation is maintained by the pressure gradient arising from the differences in density in the hot water and the cooler returning water. Where such a circulation system is used, it is sometimes found that the circulation of the heating water is inadequate, particularly if there is only a small head between the heating boiler and the expansion tank forming the upper limit of the installation. This disadvantage can be overcome and circulation can be improved by heating the water to boiling point, in which case the formation of steam bubbles will greatly reduce the density of the hot water and so promote circulation. This is not, however, always desirable. There is some hazard in having a heating system of this sort in which at least some of the pipes are raised to a temperature of 100° C., and it is generally preferred that the delivery temperature in central heating systems should not exceed 80° C. In addition, if the steam should circulate through a considerable part of the system before condensing, this can result in considerable noise being produced in the system.

Furthermore, it has been found that where the boiler or water heater is operated with the water heated to a temperature of less than 100° C., water of condensation can be produced in the fire box of the boiler and this can result in a high degree of corrosion of the metal at this point. In addition, where the flue gases are cooled to a considerable extent, as in a low temperature boiler or water heater, a considerable deposit of soot may form in the chimney and difficulties may be experienced in maintaining a sufficient boiler draught.

It is an object of the present invention to provide a water heating installation for a central heating system which will produce an adequate circulation of water, even when the total heat of the system is small, without raising the temperature of the water delivered to the heating pipes and the radiators to an excessive temperature.

It is a further object of the invention to provide a system which is efficient in utilisation of fuel, and which is simple in construction and easy to maintain.

It is a still further object of the invention to provide a heating installation in which condensation of water in the fire box of the boiler or water heater will be reduced to a minimum and in which the deposit of soot in the chimney is reduced or prevented.

According to the present invention, a water heating installation is provided which comprises a boiler in which water may be heated to the boiling point, a riser pipe through which the heated water and entrained steam may be carried from the boiler into a delivery container, a heat exchanger located in or adjacent to the delivery container, the heat exchanger being arranged in such a manner that the temperature of the water being returned to the boiler for re-heating is increased, whilst the temperature of the boiling water with entrained steam passing upwardly in the riser pipe is reduced before such water is delivered to the heating pipes and radiators.

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By use of this arrangement, circulation in a central heating system can be promoted by the rapid rise of the boiling water and entrained steam from the boiler through the riser pipe to the delivery chamber. The heat exchanger associated with the delivery chamber then reduces the temperature of the water being delivered to the heating pipes and radiators to an acceptable level and this heat is utilized to pre-heat the water returned from the heating system to the boiler. By this means no loss of heating efficiency results in the system according to the invention, but a considerable increase in the rate of water circulation is achieved.

In order that the invention may be clearly understood, an embodiment thereof will now be specifically described, by way of example only, with reference to the accompanying drawings which show a diagrammatic section of a system according to the invention.

In the water heating installation shown in the drawing, a boiler 1, which may conveniently be in the form of a bell or dome, is heated by a source of heat 2 which may conveniently be a gas or oil burner. A riser pipe 3 connects the upper region of the boiler 1 to a delivery container 4, the top of the riser pipe 3 being disposed in the upper region of the delivery container 4. From the delivery container 4 lead circulation pipes 7 to the radiators 8, the pipes 7 and radiators 8 representing a central heating system.

In the upper region of the delivery container 4 is a heat exchanger 6 through which flows cooled water from the return flow pipe 9 from the central heating system. The heat exchanger is disposed about the upper region of the delivery container and is arranged to surround the discharge opening of the riser pipe 3 to form a bell or dome-shaped chamber opened only at its bottom and arranged so that the boiling water and steam passing up the riser pipe 3 are discharged into it in the region of its upper end. If preferred, the heat exchanger could be constructed as a jacket about the upper region of the riser pipe 3 or as a still further alternative, the heat exchanger 6 can be in the form of a coiled pipe surrounding the riser pipe.

From the heat exchanger 6 a return flowby or return conduit 9' leads back to the boiler 1. The expansion tank 10 arranged at the highest point of the installation may also conveniently be connected to the heat exchanger 6.

If desired, a further water jacket or reservoir 5 may be disposed about the delivery container 4 so that its contents will be heated by the hot water delivered to the delivery container 4. The water in this hot water container 5 may provide a domestic hot water supply, the container 5 conveniently being connected to taps by means of the pipes 14 and 15.

The heating installation operates as follows: Water is heated in the boiler 1 and passes up the riser pipe 3. The water can be heated to the boiling point so that a mixture of hot water and steam bubbles moves up the riser pipe. The low density of this mixture of boiling water and steam bubbles promotes the rapid circulation of water throughout the entire system. As the boiling water and steam emerge from the upper end of the riser pipe 3, they come into contact with the walls of the heat exchanger 6 and are, as a result, cooled to delivery temperature of about 80° C. The delivered water which flows out from the container 4 through the circulation pipe 7 to the radiators 8 is, therefore, at about this temperature. As the water circulates through the central heating system it is cooled until, when it returns through the pipe 9, it may for example be at a temperature of about 40° C. This water passes into the heat exchanger 6 in which it is raised to a temperature of about 60° C. before being returned to the boiler.

While I have described herein and illustrated in the

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accompanying drawings what may be considered a typical and particularly useful embodiment of my said invention I wish it to be understood that I do not limit myself to the particular details or dimensions described and illustrated; for obvious modifications will occur to a person skilled in the art.

What I claim as my invention and desire to secure by Letters Patent, is:

1. In a closed system heating installation, the combination comprising a boiler for heating a circulating liquid, a delivery container disposed above said boiler, a riser pipe between said boiler and said container having a discharge end disposed in an upper portion of said container and carrying the heated liquid at a low density from said boiler to said container, circulation pipe means extending from the bottom of said container to radiator means and carrying the heated liquid thereto, return pipe means extending from the radiator means and carrying cooled liquid therefrom, a heat exchanger carried by said container and receiving the cooled liquid from said return pipe means, a return conduit leading from said heat exchanger to said boiler for carrying the circulating liquid thereto, said heat exchanger having a recessed bottom portion defining a cavity, said cavity having a bottom open-

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ing communicating with said container, said riser pipe extending into the cavity in spaced relationship thereto, said discharge end of said riser pipe being disposed adjacent the closed end of the cavity whereby the heated liquid discharging from the riser pipe flows in heat exchange relation with the cooled liquid in said heat exchanger and thereby effect circulation through the closed system with a pumping action.

2. The combination as recited in claim 1 wherein a reservoir containing water adapted to be used as a domestic hot water supply surrounds said delivery container and is in heat exchange relationship therewith whereby water in said reservoir is heated by heated liquid in said delivery container.

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