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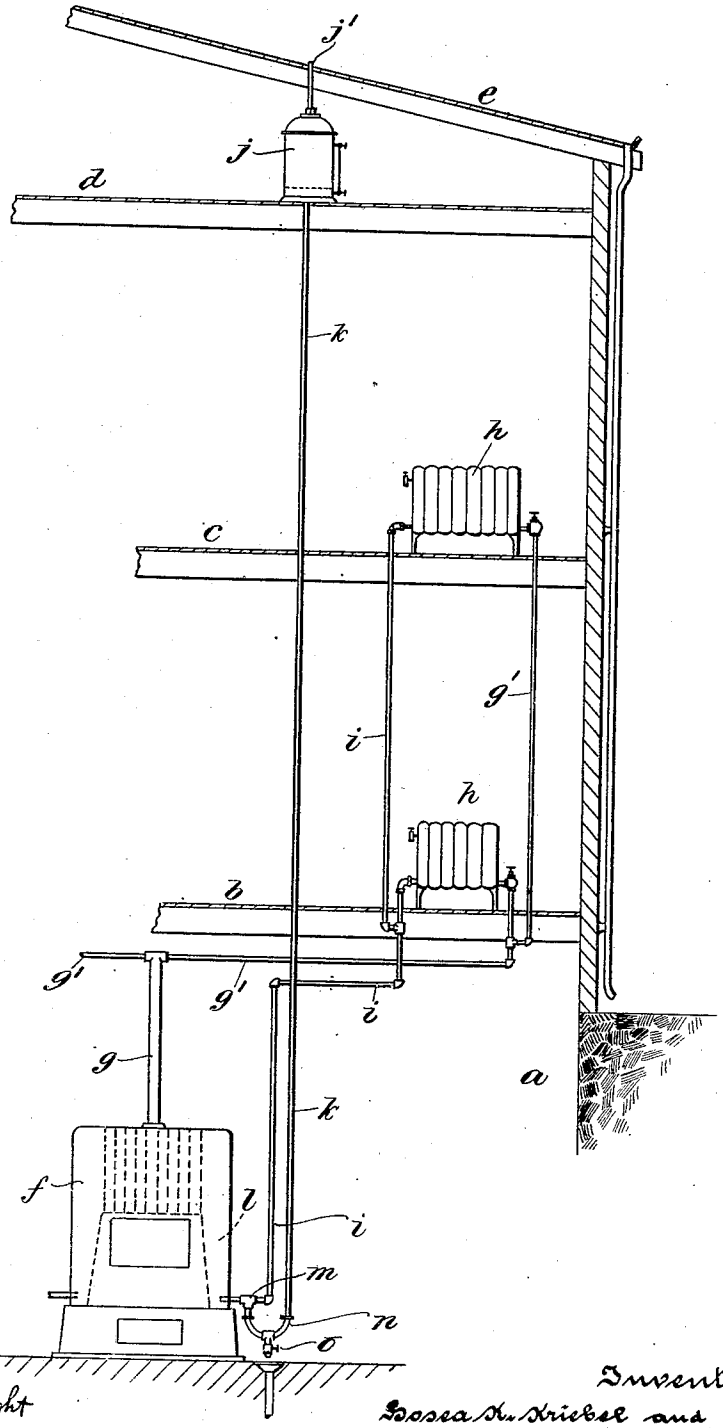
SYSTEM OF HOT WATER HEATING.

APPLICATION FILED APR. 4, 1907.

917,952.

Patented Apr. 13, 1909.



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UNITED STATES PATENT OFFICE.

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SYSTEM OF HOT-WATER HEATING.

No. 917,952. Specification of Letters Patent. Patented April 13, 1909.

Application filed April 4, 1907. Serial No. 366,251.

To all whom it may concern:

Be it known that we, HOSEA K. KRIEBEL and IRWIN Z. KRIEBEL, both citizens of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have jointly invented a certain new and useful Improved System of Hot-Water Heating, of which the following is a specification.

This invention relates to hot water heating systems and has special relation to the method of controlling the temperature as well as the expansion of water therein.

The principal object of the present invention is to provide what may be termed a permanently open tank connection in order that the system may be operated for flowing water at a very high degree of temperature with absolute safety and which will not affect the heating capacity of the radiators when relieving said system of excess of pressure.

A further object is to introduce into a system of hot water heating, between the expansion tank and the lower portion of the water leg of a boiler, a vertically arranged connection for accommodating a column of water having at all times free and unobstructed communication with atmospheric air.

A still further object is to provide water expansion controlling means whereby smallest sized piping and radiators may be utilized, thus diminishing the initial cost of installation and also reducing to a minimum the cost of operation by likewise diminishing the quantity of water necessary to flow through the system, which obviously reduces fuel expense.

Other objects will appear hereinafter.

The invention stated in general terms comprises the improvements to be presently described and finally claimed.

The nature, characteristic features and scope of the invention will be more fully understood from the following description taken in connection with the accompanying drawings forming part hereof, and in which there is illustrated partly in elvation and partly in section a view of a system of hot water heating installed in accordance with the invention.

In the drawings there is illustrated more or less diagrammatically, so much of a building as is necessary to show the application of a hot water heating system in accordance with the invention, in which the cellar is designated *a*, the first and second floors *b*, and *c*, the attic *d*, and the roof *e*. In the cellar is located a boiler *f*, and leading therefrom is a flow pipe *g*, having branches g^1, that lead to and supply the radiators *h*, with hot water which circulates therethrough and is returned to the water leg of the boiler *f*, by the return pipes *i*.

Located within the attic *d*, or above the highest point of the circulating system, is an expansion tank *j*, provided with an overflow connection j^1, for instance to the roof *e*. Connected to and depending from the base of the tank *j*, is a vertically arranged water expansion pipe *k*, which communicates with the lower part of the water leg *l*, of the boiler *f*. This pipe *k*, is shown as being connected to the return pipe *i*, at its point of penetration of the water leg of the boiler. In making this connection use is made of a T-fitting *m*, depending from which is a short section between which and the pipe *k*, is a return bend comprising a substantially U-shaped pipe *n*, forming a trap provided with a cock *o*, for drawing off water when desired. As shown in the drawings, the substantially U-shaped pipe is so arranged that sediment from the radiators and return pipes or conduits passes within that part of the cock *o*, that depends from the U-shaped pipe and thus permits water from the water leg of the boiler to flow in unobstructed manner to the expansion pipe. Obviously sediment collected may also be readily removed. It may be remarked that the greater the drop of the U-shaped pipe the higher the water temperature may be in the heating system before it will disturb the column of water in the expansion pipe. This water expansion pipe is what may be termed a permanently open tank connection. In other words, there is at all times free and unobstructed communication between the heating system and atmospheric air by way of the boiler through the pipe *k*, and this connection affords means for accommodating a normally dead column of water from cellar to roof which in no-wise interferes with the regular circulation of the system at temperatures below or above 212 degrees. In this connection the return bend *n*, serves as a trap and permits water at or considerably above the boiling point

to be flowed through the system without pushing the dead colum of water through the expansion tank.

In practice it has been demonstrated that by this arrangement smallest sized piping and radiators may be used which obviously means the use of smaller quantities of water. The smaller the quantity of water the quicker it can be heated and delivered and likewise less fuel is necessary for heating the water. Aside from this fact, there is considerable saving upon the installation of the system.

In use there is normally present in the system above described a column of water from the base of the water leg *l*, of the boiler *f*, to the level shown by dotted lines in the expansion tank *j*. This column of water exerts a certain amount of pressure upon the circulating system that readily adapts itself and instantly responds to varying changes in the same. For instance, in replenishing the system from the city service, should the valve used in such cases for closing the supply not work properly an excess amount thereof would raise the column of water in the pipe *k*, and pass up through tank *j*, to the roof. In the event of excessive pressure in the boiler the column of water will be raised through the pipe *k*, to the roof, thus relieving the system of over pressure. However, the radiators are not affected by this relief of pressure and still retain their due amount of hot water. In this way the system of heating remains intact, yet is relieved of excessive pressure. It is to be observed in this connection that the expansion tank is in no-wise connected to, and works entirely independent of the radiators, or radiator connections, but in contra-distinction thereto, is connected to the lowest possible point of the water leg of the boiler. The merit of this will be noticed in that the column of water above described is not affected by the circulation in the heating system, but that the weight of this column of water to all intents and purposes acts as a safety valve to the system.

We are aware that floats and check valves have been used upon expansion tanks to permit temperature of the water in the system to rise to 212 degrees. We are further aware that various regulating devices have been placed between the radiators and expansion tank to accomplish the same purpose. But we are not aware that a permanently open tank connection coupled to the base of the water leg of a boiler by means of a return bend forming a trap and independent of the radiators or radiator connections have ever been used for the purpose set forth and herein described.

We do not intend by the use of the above language or words to limit our invention further than the prior state of the art may require, but—

Having thus described the nature and objects of our invention, what we claim as new and desire to secure by Letters Patent is:

In a hot water heating system, a boiler, supply and return conduits communicating therewith and constituting a circulating system, an expansion tank located above the highest point of the circulating system, an expansion pipe communicating with the expansion tank, provided at its lower end with a substantially U-shaped pipe communicating with the return conduit adjacent the boiler and a waste-cock depending from said U-shaped pipe, said waste-cock having a sediment receiving space between its outlet and the bend of said U-shaped pipe, substantially as and for the purposes set forth.

In testimony whereof we have hereunto signed our names.

HOSEA K. KRIEBEL.
IRWIN Z. KRIEBEL.

Witnesses:
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