J. F. HICKERSON.

WATER HEATING SYSTEM.

APPLICATION FILED APR. 27, 1909.

958,121.

Patented May 17, 1910.

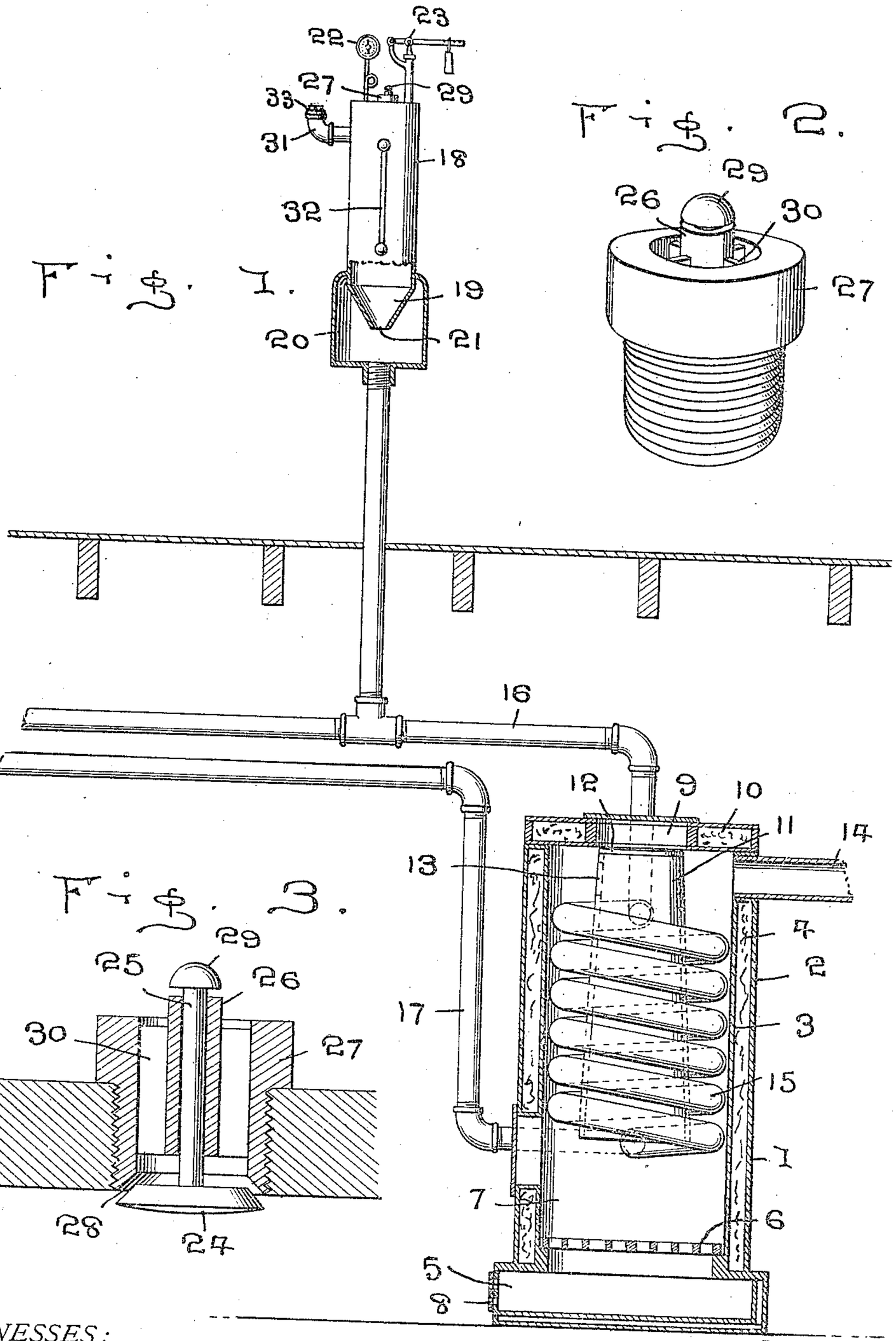

Fig. 1.

Fig. 2.

Fig. 3.

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JACOB FRANK HICKERSON, OF McCOMB, OHIO.

WATER-HEATING SYSTEM.

958,121. Specification of Letters Patent. Patented May 17, 1910.

Application filed April 27, 1909. Serial No. 492,543.

To all whom it may concern:

Be it known that I, JACOB FRANK HICKERSON, a citizen of the United States, residing at McComb, in the county of Hancock and State of Ohio, have invented certain new and useful Improvements in Water-Heating Systems; and I do hereby 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.

My invention relates to new and useful improvements in water heating devices, and my object is to provide means for applying the heating device in connection with radiators for heating purposes or to heat storage tanks or the like, for preventing the water therein from freezing.

A further object is to provide a suitable expansion tank for the heater.

A further object is to provide means for regulating the expansion or contraction of the water and air and thus eliminate the pounding or clacking of the valves in the heating system and a still further object is to provide means for regulating the pressure in said tank.

Other objects and advantages will be hereinafter referred to and more particularly pointed out in the claims.

In the accompanying drawings forming part of this application, Figure 1 is a diagrammatic view of the heating appliance showing parts thereof in section. Fig. 2 is a perspective view of an intake valve for the expansion tank, and, Fig. 3 is a vertical sectional view thereof.

Referring to the drawings in which similar reference numerals designate corresponding parts throughout the several views, 1 indicates the heater or furnace, which is preferably formed with an outer and inner wall 2 and 3, between which is placed a suitable filling 4 to retain heat, the lower end of the heater having an ash receptacle 5, while immediately above the ash receptacle is provided a grate 6 to form a fire pot 7, the forward portion of the ash receptacle 5 having a damper 8 therein, through which air is introduced into the heater.

The fuel is introduced into the heater 1 through an opening 9 in the cover 10 of the heater and is entered into a magazine 11, which magazine extends vertically of the heater and terminates at a point above the fire pot 7 and by providing a lid 12 for the upper end of the magazine 11 and placing a port 13 in the wall of the magazine adjacent its upper end, the heat and products of combustion will pass upwardly through the magazine as well as to the outside thereof and if soft coal is used, that portion of the coal within the magazine will be coked before being deposited in the fire box and as the port 13 is adjacent the flue 14, the smoke and soot will be removed without coming in contact with the parts of the device contained within the heater.

Extending from the lower to a point adjacent the upper end of the magazine 11 is a coil of pipe 15, the upper end of the coil being attached to a flow line 16, while the lower end of the coil is attached to a return pipe 17 and as the cooler water enters the lower end of the coil, it will become thoroughly heated before reaching the upper end thereof and being discharged into the flow line as the heat entirely surrounds each section of the coil.

In air tight heating systems of this class, it becomes necessary to provide means for compensating for the expansion of the water and to this end I provide an expansion tank 18, which is located above the highest point at which the heated water is to be conveyed, the lower end of the expansion tank having a conical terminal 19, the apex of which extends into a chamber 20 and is provided with a reduced opening 21, the object in providing said terminal and chamber being to regulate the expansion or contraction of the water and cause the water and air to work gradually through the expansion chamber, thus avoiding the pounding noise commonly encountered in hot water heating systems. The expansion tank is also provided at its upper end with a gage 22, which will indicate the pressure on the expansion tank at all times and the upper end of the tank is also provided with the usual or any preferred form of escape valve 23, which will open when pressure in the tank has reached a certain degree, thus relieving the pressure within the tank and heating system.

As this form of system is practically air tight, the cooling of the water in the tank will cause a vacuum in the pipes and thereby prevent the water from readily entering the radiators and to overcome this objectionable feature, I provide a valve 24 at the upper end of the tank adapted to be closed by the pressure in the tank and opened when a

vacuum is caused therein, said valve being provided with a stem 25, which extends through a socket 26 carried by a bushing 27, the lower end of which bushing is threaded into an opening in the upper end of the expansion tank. The valve 24 is adapted to engage a seat 28 at the lower end of the bushing 27 and when so seated, is held seated thereon by the pressure in the expansion chamber, but as soon as the pressure on the valve is released and a vacuum in the expansion tank created, the valve will be immediately lowered to admit air into the tank, the downward movement of the valve being limited by means of a head 29 at the upper end of the stem 25, while air is admitted through the bushing, openings for this purpose being provided by attaching the socket 26 to the bushing by means of ribs 30.

Water is introduced into the inlet pipe 31 adjacent the upper end of the expansion tank 13 and a sufficient quantity of water employed to fill all of the system and partially fill the expansion tank, a glass gage 32 being provided to ascertain when the expansion tank is sufficiently filled with water. When sufficiently filled, a plug 33 is introduced in the top of said inlet pipe 31, thereby preventing foreign matter and air from entering the tank through this inlet. The fuel is then placed in the heater 1 and as the water in the coil 15 becomes heated, the expansion will cause the same to pass into the flow line pipe and through the heating system attached thereto, while the cool or unheated water will flow through the return pipe into the coil and be thoroughly heated, thus causing a circulation through the heating system and it will be readily seen that as the heat entirely surrounds the coils of the pipe within the heater, the water may be very quickly heated. It will likewise be seen that should the water become somewhat chilled or cooled, the contraction thereof will create a vacuum and cause the radiators to improperly work, but by providing my improved intake valve, this objectionable feature is overcome, and it will further be seen that by providing the conical terminal with a reduced opening, the contraction or expansion of the water and air will be gradual and the noise caused by sudden contraction or expansion, eliminated. This rattling noise which really is the only objectionable feature of a hot water system and for which purpose the expansion tanks are supplied to most systems, although they seldom accomplish the result, is entirely foreign from applicant's system. This result is attained by supplying the expansion tank at its lower portion with a chamber into which the terminal of the tank, conical in shape and having a small opening, extends. The water under a high pressure will flow very rapidly into the chamber and under ordinary circumstances into the tank at the same rate, thereby causing the usual rattling noise, but in applicant's device the conical shaped terminal with a small opening allows the water to pass from the chamber to the tank gradually, thereby obviating the noise.

What I claim is:

1. A device of the class described, comprising a tank having a closed top and a depending lower portion, conical in shape, having a reduced opening therein, a member carried by and surrounding the lower portion of said tank and forming with said cone-shaped end, a chamber adapted to communicate with a water circulating system, and means to regulate the pressure in said tank.

2. A device of the class described, comprising a tank having a closed top and a reduced lower portion with an aperture therein, a member carried by and having said reduced lower portion extending therein to form a top for said member, said reduced lower portion with said member composing a chamber adapted to communicate with a water circulating system, and means to regulate the pressure in said tank.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JACOB FRANK HICKERSON.

Witnesses:
R. W. McCamey,
J. A. Groves.