Oct. 6, 1936. M. W. EHRLICH 2,056,263

HEATING UNIT

Filed April 16, 1934 2 Sheets-Sheet 1

FIG. 1

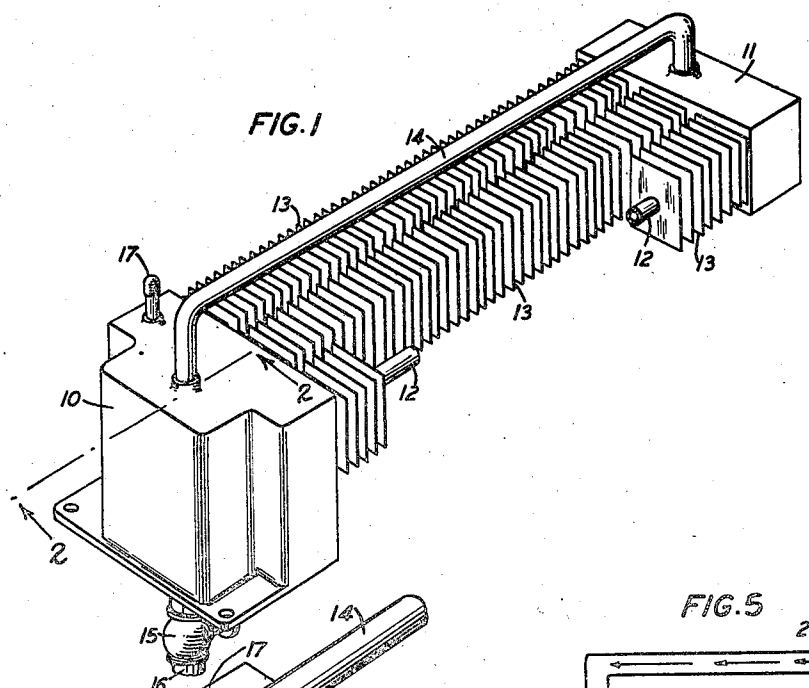


FIG. 2

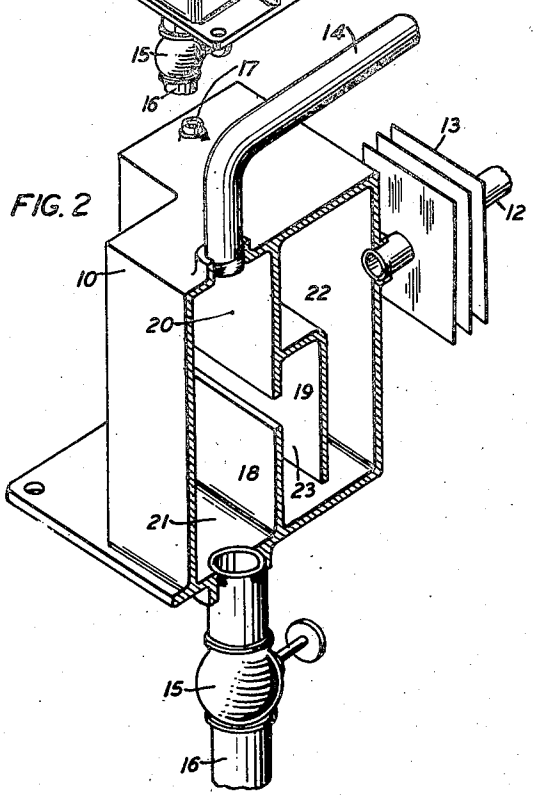
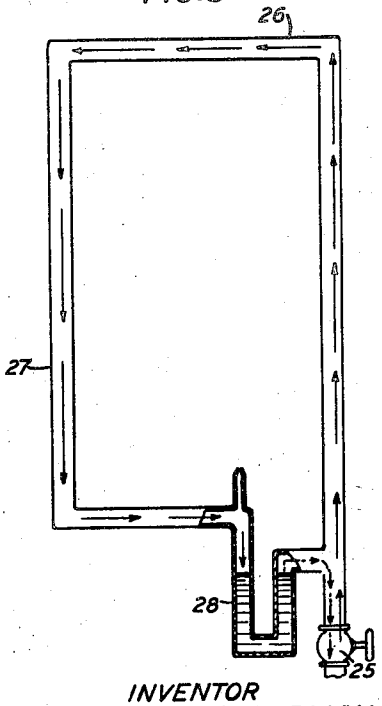


FIG. 5



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FIG. 3

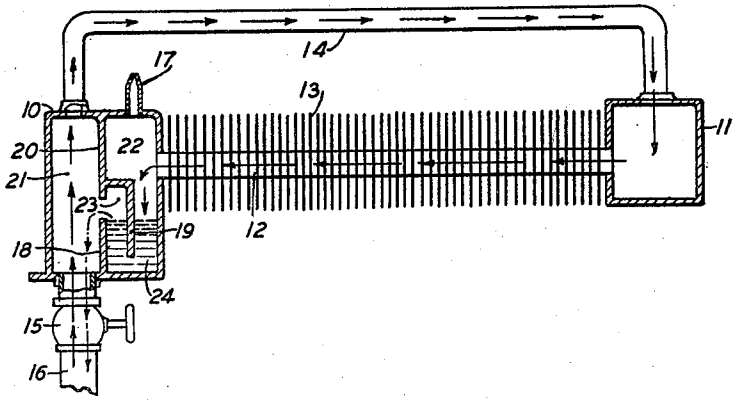


FIG. 4

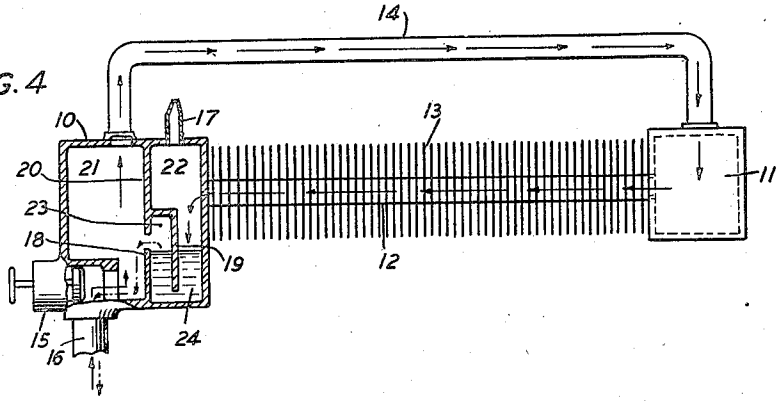
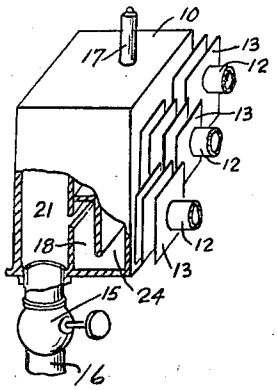


FIG. 6.



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Patented Oct. 6, 1936 2,056,263

UNITED STATES PATENT OFFICE

2,056,263

HEATING UNIT

Morris W. Ehrlich, Lyndhurst, N. J., assignor to Commodore Heaters Corporation, New York, N. Y., a corporation of New York

Application April 16, 1934, Serial No. 720,824

7 Claims. (Cl. 237—73)

This invention relates to a heating system and more particularly to a heating unit adapted for use with the so called one pipe system.

In steam heating the method of installation called the one pipe system is probably the simplest. The essential principles of the so-called one-pipe gravity steam heating system are more or less well known. That is, it is known that a central boiler unit is provided wherein steam is generated which is then transmitted through pipes to heating units, commonly termed radiators, which are located at strategic points in the building to be heated. The steam, while circulating through the heating unit, condenses, giving off its heat to the heat conducting elements of the heating unit and the water of condensation drains back down the same pipe through which the steam came. Automatic air valves are provided on each heating unit at the end opposite to the supply pipe which serve to remove air from the heating unit.

In systems of this general type one pipe connects each heating unit or radiator to the main line, thereby holding, down to a minimum, the cost of installation. However the one pipe system has certain inherent defects which result in faulty operation due to noise and waste. Thus while a one pipe system has the advantage of low first cost, it has however a high operating cost and with results which are accepted as incomplete. If these certain inherent faults common to the one pipe system could be overcome, a cheap and efficient heating system would result.

It is the object of the present invention to provide a means associated with the heating units of a one pipe system, which will eliminate the inherent faults of such a system, and make the results comparable to the expensive two pipe system, by preventing the counter-directional flow of the steam and water. That is to say, that when the steam traveling in one direction meets the water traveling in the opposite direction they buck each other thereby causing faulty and inefficient operation.

In my improved heating system, which has the efficiency of a two pipe system, but entailing only the low first cost of a one pipe job, I provide a structure integral with the heating unit which positively establishes uni-directional flow, the same as is present in the two pipe system, wherein the air and water travel ahead of the steam and in the same direction, by equalizing the pressure differential by novel means located adjacent the heating unit which provides for said unit a loop circuit.

Applicant's invention is not limited to any particular type of heating unit but inasmuch as the so-called fin type of heating unit is considered the most efficient, he has shown and described his invention in connection with that type of unit.

Further features and advantages of applicant's invention will be apparent from the following detailed description when considered in connection with the following drawings, of which:

Fig. 1 is a view in perspective partly in section of applicant's invention applied to a "fin" type heating unit.

Fig. 2 is a sectional view on line 2—2 of Fig. 1.

Fig. 3 is a plan view, partly in section of the heating unit shown in Fig. 1.

Fig. 4 is a longitudinal sectional view of a modified form of heating unit in which the control valve is integral with the header.

Fig. 5 is a schematic diagram illustrating the flow of steam and water.

Fig. 6 is a modified form of heating unit in which one of the tubes of the heating unit forms the upper part of the loop.

Referring now to the drawings, applicant, for the purpose of illustration, has shown his invention applied to the fin type of heating unit which forms the subject matter of his copending application, Serial #598,621, filed March 14, 1932.

In Fig. 1 a heating unit having a pair of headers or manifolds 10 and 11 are interconnected by means of the tubes 12, said tubes having thereon a plurality of heat radiating fins 13. Connecting the headers 10 and 11 above the plane of the tubes 12, is the pipe 14. For convenience of description the headers 10 and 11 may be termed inflow and return headers, respectively. A control valve 15 is located between the headers 10 and the supply pipe 16, an air valve 17 is located on the header 10 to allow the air in the unit to be eliminated. As shown in Fig. 2 the header 10, is provided on its interior with a plurality of partitions or baffles 18, 19, and 20; these baffles together with the walls of the header 10 form the main chambers or compartments 21 and 22, and the auxiliary chamber 23. The header 10, and its associated chambers act as an intercepting and separating trap, the chamber 21 being connected to the supply pipe 16 and the upper loop pipe 14 connected thereto, the chamber 22 being vented by the valve 17.

As shown in Fig. 3, the steam in the supply pipe 16 passes thru the open valve 15, enters the chamber 21, and due to the baffles 18 and 20 the steam rises to the top of the chamber 21 and

enters the pipe 14. After passing thru the pipe 14, the steam enters the header 11, and passes into the heat conducting pipes 12. The steam now condenses in the pipes 12, in which the water and air flow ahead into the chambers 22 and 23. Here the air and the water are separated, the air passing out of the valve 17, and the water 24 flowing down and accumulating under the baffle 19 in the chamber 22. This cycle of flow as shown by the arrows, continues until the heating requirements have been met and the air valve 17 closed. The steam in the pipes 12 continues to condense thereby raising the water level in the chambers 22 and 23 until it flows over the edge of the baffle 18, into the chamber 21 and down thru the supply pipe 16, into the boiler.

As shown schematically in Fig. 6, applicant provides a complete loop circuit, in which the steam passes thru the valve 25 up into the pipe 26 and down pipe 27, where it condenses and flows as water into the trap or separator 28 where the air is expelled thru the valve, the water overflowing the baffle and passing to the boiler.

In Fig. 4 the control valve 15 is made integral with the header casting 11.

In Fig. 6 applicant has utilized one of his heat radiating tubes to form the upper loop in place of the pipe 14. Applicant's invention may also be applied to a heating coil which has no header, the loop of pipe connecting as shown in Fig. 5.

While applicant has shown and described a common control valve, it is to be understood that in some installations the valve may be eliminated and automatic means provided.

What applicant has shown and described is an improved heating system in which the heating unit is in the form of a loop, said loop having a vented intercepting and separating trap, which provides uni-directional flow of the heating medium within the loop circuit, but having only one common connection for the inflow and outflow of the heating medium.

The term "heating unit" used by applicant is intended to cover any ferrous or non-ferrous heater or convector.

While the applicant has shown and described the preferred form of his invention, it is to be understood that various modifications and changes may be made without departing from the spirit of the invention and is only limited by the scope of the appended claims.

What is claimed is:

1. A heat convector comprising in combination a plurality of horizontally extending pipes arranged in different planes in staggered relation, each of said pipes having a plurality of convection fins on its exterior, said pipes communicating with an inflow header at one end and a return header at their other end, said inflow header being divided by a wall into a steam compartment and a water compartment, the uppermost pipe communicating with the steam compartment and the other pipes communicating with the water compartment, the wall dividing said compartments having a space to provide communication between the compartments, and an imperforate baffle in said water compartment sealed to said dividing wall above said space and extending downwardly past said space, said baffle terminating short of the bottom of said compartment.

2. A heat convector comprising in combination a plurality of horizontally extending pipes arranged in different planes in staggered relation, each of said pipes having a plurality of convection fins on its exterior, said pipes communicating with an inflow header at one end and a return header at their other end, said inflow header being divided into a steam compartment and a water compartment, the uppermost pipe communicating with the steam compartment and the other pipes communicating with the water compartment, the wall dividing said compartments having a space to provide communication between the compartments, a baffle in said water compartment adjacent said space and spaced from the bottom of said water compartment, the space between said baffle and the portion of said dividing wall about the first mentioned space being sealed, a vent in said water compartment and a steam supply pipe communicating with said steam compartment.

3. A heat convector comprising in combination a plurality of horizontally extending pipes each having convection fins arranged on its exterior, a header at one side of said pipes, said header having partitions on its interior to divide the same into a steam chamber and a water chamber, one of said partitions extending vertically from the bottom of said header and another extending from the top of the header in alignment with the first mentioned partition but spaced therefrom to provide for overflow from said water chamber, a baffle in said water chamber and to one side of the space between said partitions, said baffle being spaced from the bottom of said water compartment, the space between the said baffle and the space between the partition which extends from the top of the header being sealed, a steam supply pipe connected to the bottom of said header and in communication with said steam chamber, one end of said pipes being in communication with said steam chamber and the other end being in communication with said water chamber whereby steam supplied to said steam chamber will pass through said chamber and said pipes to said water chamber, a valve in said steam chamber and a vent in said water chamber.

4. A heat convector comprising in combination a horizontal pipe having a plurality of convection fins arranged on its exterior, an inflow header at one side of said pipe and a return header at the other side, said pipe being in communication with each of said headers, the inflow header having partitions on its interior to divide the same into a steam chamber and a water chamber, one of said partitions extending vertically from the bottom of said header and another extending from the top of the header in alignment with the first mentioned partition but spaced therefrom to provide for overflow from said water chamber, a steam supply pipe connected to the bottom of said header and in communication with said steam chamber, a steam transfer pipe connected at one end to the top of said header and in communication with the interior of said steam chamber and connected to and in communication with the other header at its other end, steam supplied to said steam chamber by said steam supply pipe passing through said chamber and said transfer pipe to the other header and the steam and condensate passing from said other header through said first mentioned pipe to the water chamber in said inflow header, a valve in said supply pipe and a vent in said water chamber, and a baffle in the water chamber of said inflow header adjacent the space between said partitions and spaced from the bottom of said water compartment, the space between said baffle

and the portion of said partitions above the space between the partitions being sealed.

5. A heat convector comprising in combination a horizontal pipe having a plurality of convection fins arranged on its exterior, an inflow header at one side of said pipe and a return header at the other side, said pipe being in communication with each of said headers, the inflow header having partitions on its interior to divide the same into a steam chamber and a water chamber, one of said partitions extending vertically from the bottom of said header and another extending from the top of the chamber in alignment with the first mentioned partition but spaced therefrom to provide for overflow from said water chamber, a baffle in said water chamber and to one side of the space between said partitions, said baffle being spaced from the bottom of said water chamber, the space between said baffle and the portion of said partitions above the space between the partitions being sealed, a steam supply pipe connected to the bottom of said header and in communication with said steam chamber, a steam transfer pipe connected at one end to the top of said header and in communication with the interior of said steam chamber and connected to and in communication with the other header at its other end, steam supplied to said steam chamber by said steam supply pipe passing through said chamber and said transfer pipe to the other header and the steam and condensate passing from said other header through said first mentioned pipe to the water chamber in said inflow header.

6. A heat convector comprising in combination a plurality of horizontally extending pipes arranged side by side each having a plurality of convection fins arranged on their exteriors, an inflow header at one end of said pipes and a return header at the other side, said pipes being in communication with each of said headers, the inflow header having partitions on its interior to divide the same into a steam chamber and a water chamber, one of said partitions extending vertically from the bottom of said header and another extending from the top of the header in alignment with the first mentioned partition but spaced therefrom to provide for overflow from said water chamber, a baffle in said water chamber and to one side of the space between said partitions, said baffle being spaced from the bottom of said water chamber, the space between said baffle and the portion of said partitions above the space between the partitions being sealed, a steam supply pipe connected to the bottom of said header and in communication with said steam chamber, a steam transfer pipe connected at the top of said header and in communication with the interior of said steam chamber and connected to and in communication with the other header at its other end whereby steam supplied to said steam chamber by said steam supply pipe will pass through said chamber and said transfer pipe to the other header and the steam and condensate passing from said other header through said first mentioned pipes to the water chamber in said inflow header.

7. A heat convector comprising in combination a plurality of horizontally extending pipes arranged in different planes in staggered relation, each of said pipes having a plurality of convection fins on its exterior, said pipes communicating with an inflow header at one end and a return header at their other end, said inflow header being divided by a wall into a steam compartment and a water compartment, the wall dividing said compartments having a space to provide communication between the compartments, and an imperforate baffle in said water compartment sealed to said dividing wall above said space and extending downwardly past said space, said baffle terminating short of the bottom of said compartment.

MORRIS W. EHRLICH.