April 5, 1932. D. N. STIMMLER 1,852,906

PRESSURE AND GRAVITY AIR AND WATER RELEASE

Original Filed May 1, 1929

Fig. 1.

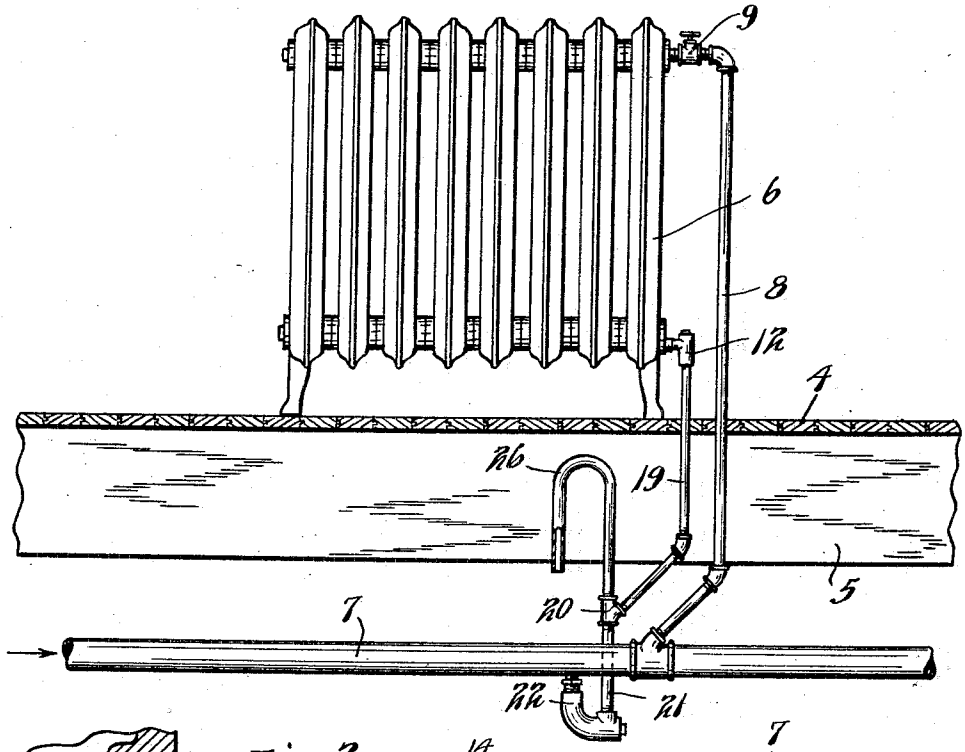


Fig. 2.

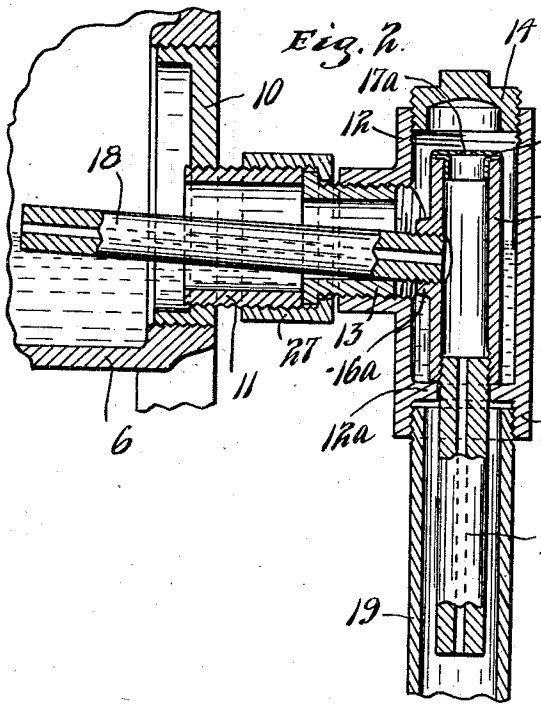
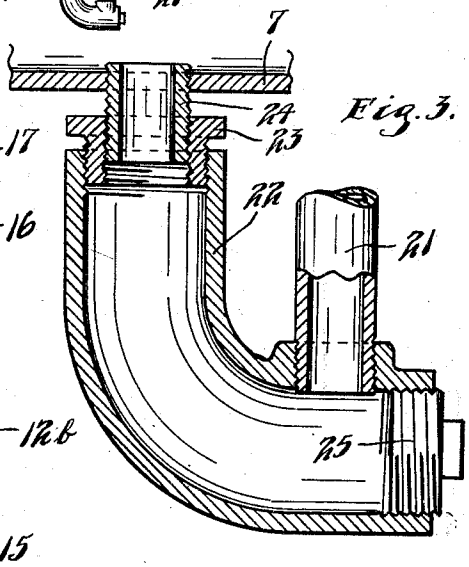


Fig. 3.



INVENTOR.
DANIEL N. STIMMLER.
BY HIS ATTORNEYS.
Williamson & Williamson

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UNITED STATES PATENT OFFICE

DANIEL N. STIMMLER, OF MINNEAPOLIS, MINNESOTA

PRESSURE AND GRAVITY AIR AND WATER RELEASE

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It is the object of the present invention to provide a novel and improved air and water release device which, although particularly adapted for use in connection with steam radiators for so-called steam vapor heating systems, is also capable of use in other connections where combined air and water releasing devices are desired.

To this end, the invention consists in the novel parts and novel combinations of parts, hereinafter defined in the claims and described in the following specification, made in connection with the accompanying drawings, wherein like reference characters refer to the same or similar parts throughout the various views, and, in which,

Fig. 1 is a vertical section through the floor of a house equipped with a steam vapor heating plant and illustrating the application of the present device;

Fig. 2 is a vertical section through the air and water release valve of the present invention as applied to a radiator, and

Fig. 3 is a vertical section through the water trap of the present invention as applied to a steam main.

Referring to the drawings, the floor 4 of a room supported by suitable floor joists 5 is illustrated, and supported on the floor 4 is a steam radiator 6 of standard type. The steam main for a one pipe steam vapor heating system, is designated by the numeral 7 and is disposed, in accordance with the usual practice, below the floor joists 5. A steam supply pipe 8 runs upwardly from the main 7 to the upper end of the radiator 6, and a control valve 9 is disposed in the pipe 8 to control the supply of steam to the radiator. In accordance with the present invention, the radiator 6 at its lower end is provided with a plug 10 within which a nipple 11 is eccentrically disposed, the nipple 11 being preferably situated as close to the bottom of the radiator 6 as is conveniently possible. A small vertical drum 12 is secured to the nipple 11 as by a union consisting of the flanged nipple 13 and the draw nut 27. The drum 12 runs upwardly from the nipple 13 for a short distance and is closed at its upper end by a removable plug 14. The drum may be extended for a short distance below the nipple 13 and closed adjacent its lower end by a web 12*a* within which a short vertical tube 15 having a constricted opening therethrough, is mounted, the tube 15 running downwardly for a short distance from the web 12*a*. Secured to the upper end of the tube 15 and situated within the drum 12, is a small tubular member 16 which extends to a point above the nipple 13 and is closed at its upper end by a cap 17 having a small air opening 17*a* therein, which affords communication between the top portion of the drum 12 above the nipple 13 and the tubular member 16. The tubular member 16 has a bossed opening 16*a* disposed downwardly from the top of the member, and a short substantially horizontally disposed tube 18 is secured in the bossed opening 16*a* and runs laterally therefrom through the nipples 13 and 11 to the interior of the radiator 6. The radiator end of the tube 18 is slightly upwardly inclined, the inclination therein being slightly exaggerated for observation in Fig. 2 of the drawings. The opening in the tube 18 is preferably of the same size as the opening in the tube 15, and the tube 18 will afford communication between the radiator and the tubular member 16 at a point disposed a short distance below the level of the air opening 17*a* in cap 17.

As shown in Fig. 2, the drum 12 below the web 12*a* is provided with a downwardly extending, internally threaded flange 12*b* to which a drain pipe 19 is secured. The tube 15 empties into the pipe 19. The pipe 19 runs downwardly through the floor 5 and is secured at its lower end to a Y-branch fitting 20 disposed a short distance above the main 7. A short vertical pipe 21 leads downwardly from the fitting 20 and is secured at its lower end to a trap 22 of half U-shape. The trap 22 is disposed below the main 7 and the upper end of the trap is connected to the lower side of the main by means of a bushing 23 and a nipple 24. The pipe 21 leads into the lower end of the trap 22, and preferably a removable clean-out and drain plug 25 is provided in the lower end of the trap. An inverted U-shaped pipe 26 runs upwardly from the

Y-fitting 20 and has its open end disposed a short distance above the main 7.

The ordinary steam vapor heating system runs under a normal steam pressure of from one to two ounces per square inch and rarely, if ever, runs over a higher pressure than four ounces per square inch. It follows from this that a column of water of comparatively short height can be used to seal an opening in a steam main, such as the main 7, of the steam vapor system above described. Under normal circumstances, when the valve 9 to the radiator 6 is closed and steam under the ordinary pressure used, is supplied through the main 7, water will stand in the radiator 6 at about the level indicated in Fig. 2, and water will fill the trap 22 and the pipe 21 to a short distance above the main 7. The height of the column of water formed in the trap 22, and pipe 21 will, of course, depend on the pressure of steam in the main 7, the pressure formed by the column of water exactly balancing the pressure in the main 7. When the pressure caused by the column of water so formed exceeds the pressure of steam in the main 7, a certain amount of water will flow into the main 7 until an equilibrium is reached. When the valve 9 is opened, steam will be supplied from the main 7 through the pipe 8 to the radiator 6. Part of this steam will condense to raise the level of the water in the radiator 6 above the radiator end of the tube 18. There will also be a certain amount of cold, dead air in the radiator 6 which will oppose the steam admitted to the radiator, and prevent the radiator from quickly heating up unless this cold, dead air is removed. As the water in the radiator rises to a point above the open end of the tube 18, the water will run through the tube in a substantially horizontal direction and will be discharged into the member 16. The cap 17 on the tubular member 16, will stand above the high level of water in the radiator, the tube 18 being sufficiently large to carry off enough water in the radiator to prevent the level thereof ever being sufficiently high to reach the level of the cap 17. As water drains through the tube 18 into the tubular member 16, this water will run downwardly through the restricted opening in the tube 15 to drain into the pipe 19. As the two tubes 15 and 18 have approximately the same sized openings therethrough and as the tube 18 is horizontally disposed, while the tube 15 is vertically disposed, it will be seen that the water will run downwardly from the tubular member 16 through the tube 15 faster than the water can be supplied to the tubular member 16 from the tube 18. As the water runs through the tube 15, it, due to its adhesive and cohesive properties, will completely fill the opening in the tube at spaced points, to act like a series of pistons in a cylinder to create a suction effect on the air in the tubular member 16. Accordingly, as the water runs downwardly in the tube 15, air will be sucked downwardly with the water, to pull the cold air from the radiator through the nipples 11 and 13, and upper portion of drum 12 downwardly through opening 17*a* in cap 17 into the tubular member 16.

The excess water and cold air in the radiator 6 will thus be drained off and exhausted from the radiator through the tube 15 into the pipe 19. The air so exhausted, will run downwardly through the pipe 19 and fitting 20 and upwardly through the U-shaped pipe 26 to be exhausted therefrom at the air discharge opening therein. As was above stated, when a sufficient height of water accumulates in the trap 22, fitting 20, and pipes 19 and 26 to over balance by its pressure the pressure of steam in the main 7, part of this water will run into the main 7 until an equilibrium is reached. As steam continues to be supplied to the radiator 6, the water condensing in the bottom of the radiator will be hot water and this water, while it is still hot, will be carried back into the main 7, so that the heat in the water will not be lost. It is found in actual practice that after steam has been applied to the radiator 6 for some time, that the water returned to the main 7 after the steam has condensed in the radiator, will be but a few degrees below the boiling point of water. The present device, accordingly, economizes on the quantity of fuel necessary to run the heating plant.

The tube 18 will be made of such bore that it will always act to carry off sufficient water as the steam condenses in the radiator, so that the lever of water in the radiator can never reach a level corresponding to the height of the upper end of the tubular member 16. Accordingly, the opening 17*a* may be considered as being disposed above the high water level of water in the radiator 6, and no drops of water can accumulate on top of the cap 19 to stop up the opening 17*a*. When the water in the radiator reaches a level below the point where the water will completely fill the bore in the tube 18, both water and air will be carried by the pipe 18 into the tubular member 16. The plug 25 can be removed when necessary to clean out the trap 22 or to drain the main 7 as well as the pipes 19, 26 and 21. Access to the tubular member 16 for cleaning purposes may be readily had by removal of the plug 14 and the cap 17. It will be understood that any number of radiators can be drained into the pipe 19. It will also be understood that a number of traps 22, pipes 21, 26 and 19, may be connected to the main 7, if so desired.

With the present construction, water can be readily drained from the radiator and as the water is drained, a certain amount of the coldest air in the radiator will be exhausted from the radiator with the water. Accord-

ingly, the radiator may be quickly heated up when steam is first turned on and very little resistance will be offered to the admission of the stream into the radiator. The heat of the water drained from the radiator will be saved and the present device, therefore, acts as a fuel saver. The parts of the device are few and the construction is simple. The device is capable of other uses than in connection with a steam vapor heating system.

It will, of course, be understood that various changes may be made in the form, details, arrangement and proportions of the various parts without departing from the scope of the present invention.

What is claimed is:

1. An air and water release device for use with steam radiators and the like comprising a small drum adapted to be vertically disposed and having a connecting portion adapted to be connected to the lower end of a radiator to communicate therewith and having an upper portion above said connecting portion, a hollow member disposed in said drum and having an air opening therein above said connecting portion, said hollow member having a small water drainage opening therein below the upper part of said connecting portion and adapted to communicate with the radiator, said drum being closed at its lower end and a tube mounted in said hollow member and running downwardly from adjacent the lower end thereof through the closed lower end of said drum.

2. An air and water release device for use with radiators and the like comprising a small drum adapted to be vertically disposed and having a connecting portion adapted to be connected to the lower end of a radiator to communicate therewith and having an upper portion above said connecting portion, a hollow member disposed in said drum and having an air opening therein above said connecting portion, a tube adapted to communicate with the interior of a radiator below the level of said air opening in said hollow member and leading to said hollow member below the upper part of said connecting portion, said drum being closed at its lower end and a tube mounted in said hollow member and running downwardly from adjacent the lower end thereof through the closed lower end of said drum.

3. The structure defined in claim 2, said first mentioned tube at its end connecting with said hollow member being slightly lower than at its end adapted to communicate with the interior of the radiator.

4. An air and water release device for use with steam radiators and the like comprising a vertical drum having a connecting portion adapted to be connected to the lower end of a radiator to communicate therewith and having an upper portion above said connecting portion, a hollow member disposed in said drum and having an air opening therein above said connecting portion, a water drainage pipe secured to said member below the upper part of said communicating portion and adapted to project into the radiator at a point above the lower part of said communicating portion, said drum being closed at its lower end, and a vertical tube closing the lower end of said member and running downwardly therefrom through the closed lower end of said drum, said vertical tube having an opening therein of approximately the same size as the opening in said water drainage pipe.

In testimony whereof I affix my signature.

DANIEL N. STIMMLER.