Oct. 15, 1929. A. J. HENRY 1,731,624

ELECTRICALLY HEATED STEAM RADIATOR

Filed Nov. 6, 1926

Fig. 1

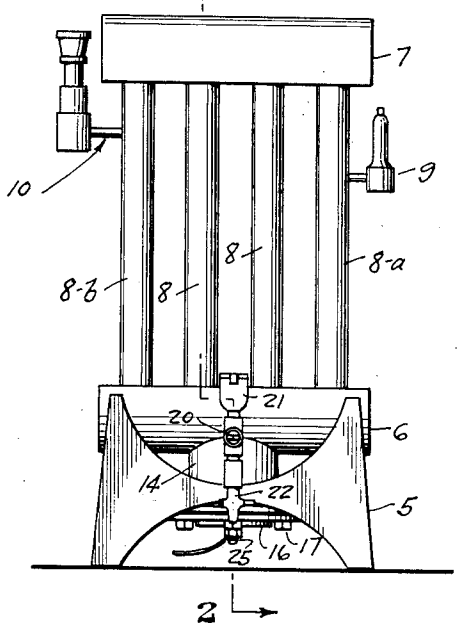


Fig. 2

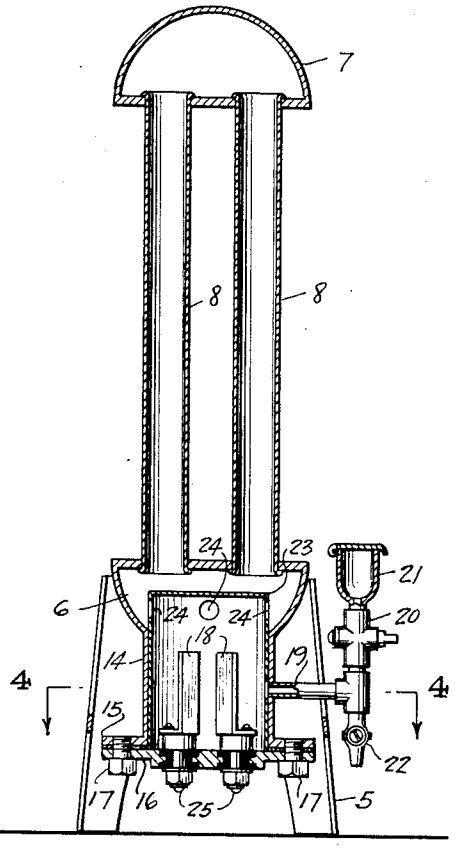


Fig. 3

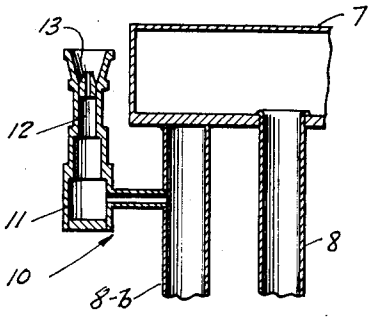
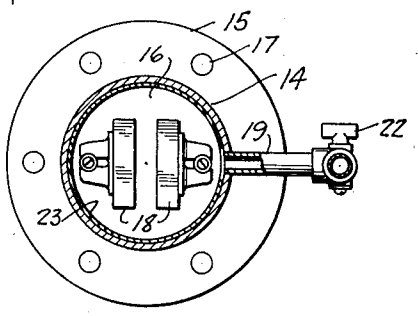


Fig. 4



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UNITED STATES PATENT OFFICE

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ELECTRICALLY-HEATED STEAM RADIATOR

Application filed November 6, 1926. Serial No. 146,683.

This invention relates to a heater for volatile liquids and pertains to a device having a heating unit which acts upon the liquid to be heated by employing the latter as a resistance element in an electrical circuit. The present invention contemplates the heating of a volatile liquid to form a gaseous vapor. Throughout the specification the word "water" is used to define such a liquid.

It is the primary object of this invention to provide a heater so arranged that upon the generation of a vapor from the liquid, the electrical current is decreased in magnitude. It is another object of this invention to provide a heater such that the amount of current flowing through the heater is inversely proportional to the amount of vapor maintained. A further object of this invention is to provide a substantially closed chamber within which the vapor generated is trapped to avoid dissipation of the fluid.

One of the embodiments of my invention having great utility is a steam radiator which is illustrated in the accompanying drawing, in which:

Fig. 1 is a front elevation of a complete radiator; Fig. 2 is a section as seen on the line 2—2 of Fig. 1 on an enlarged scale; Fig. 3 is a vertical section as seen showing a fragment of the radiator showing the relief valve; and Fig. 4 is a section as seen on line 4—4 of Fig. 2.

Referring with more particularity to the drawing, 5 indicates the base of a radiator. This base may be of any preferred construction so as to support the radiator proper above the floor. The body of the radiator consists of a lower head or chamber 6, which is herein illustrated as of semi-cylindrical form, and a similarly shaped upper head 7. The heads or chambers communicate through radiator pipes or conduits 8. One of the pipes indicated by 8^a, has an air valve 9 of the usual radiator type mounted thereon. Pipe 8^b communicates with the lower head 6 and is blind at the upper end as best shown in Figure 3. A relief valve 10, is mounted thereon.

The valve 9 is of a character which is commonly used with radiators and permits air to be discharged from the radiator as the latter fills with steam, the valve closing upon the hot steam attempting to pass therethrough. The valve 10, is a relief valve and is connected by a lateral tube to the pipe 8^b. It has a chamber 11, and a discharge duct 12 in which there is an aperture plug 13. The aperture through the plug 13 is open at all times so that the relief valve is open.

Depending from the lower head 6 is a cylindrical well 14. The lower end of the well has a flange 15 extending outwardly. This flange has bolt holes which are tapped. The well is closed at the bottom by a plate 16 secured to the flange 15 by means of bolts 17. Mounted upon the plate 16 and insulated therefrom are posts carrying carbons 18. These posts are arranged to be connected to an electrical circuit. Connected to the well is a filler tube 19 communicating with a valve 20 and having a cup 21. This cup and valve are for the purpose of introducing water to the well. There is a drain cock 22. Disposed within the well so as to house the carbons is a circulation cap 23. This cap is telescopically mounted within the cylindrical portion 14, and has ports 24 so that fluid may pass in and out of the chamber.

The radiator is operated in the following manner. Water is introduced into the well by opening the valve 20 and pouring the water into the cup 21. The well is filled to a height such as indicated by the dotted line in Fig. 2. The posts 25 are connected to a source of electrical energy so that the current flows through the water between the carbons. This causes the water to heat and finally steam is generated. The steam passes upwardly and out through the cap 23 filling the heads and pipes 8 and displacing the air through the valve 9. Finally, the entire radiator is filled with steam. Some of the steam passes into the pipe 8^b, will finally enter the chamber 11 and as the circulation is obstructed, steam will condense, the chamber 11 filling with condensed water and serving as seal to hold back the escape of steam. However, if the pressure rises sufficiently, the steam can force itself through the water seal. As steam is generated, the liquid is transformed into steam, thereby lowering the water level in the well

and increasing the electrical resistance, resulting in a decrease in the current. The device operates automatically to decrease the current so that only a sufficient amount is flowing to maintain the radiator body full of steam.

There is a condensation due to transfer of heat. This condensation flows into the well and is again changed to steam. The steam formed between the carbon electrodes increases the resistance and decreases the current flow so that the electric current is proportional to the amount of steam generated. Furthermore, the condensation is proportional to the difference in temperature between the atmosphere and the temperature of the steam. As this condensation runs back into the heater and fills the well to a higher level, the amount of current is increased so as to reconvert the condensate into steam.

It is obvious that various changes may be made in the arrangement of the parts and the shapes thereof, without departing from the spirit of the invention, the drain cock 22 may be placed in the plate 16 so that the well may be completely drained of water. The heater may be used for the generation of steam which may be dissipated such as in a vapor both because after the generation of a determined amount of steam from a given amount of water placed in a well, the current automatically is reduced, and finally is shut off, by reason of the absence of the water between the carbon. Steam is generated rapidly at the beginning of the operation, so that it will rapidly fill a selected space and thereafter the current is gradually cut down and the amount of steam generated becomes less and less.

What I claim is:

A radiator comprising the combination of a bottom chamber and a top chamber joined by a plurality of heat radiating conduits, an upright conduit communicating with said bottom chamber and closed at the top, a relief valve connected thereto, a well depending from the bottom chamber, spaced electrodes upstanding in said well, and the means for introducing water into said well.

In witness that I claim the foregoing I have hereunto subscribed my name this 21st day of October, 1926.

ARTHUR J. HENRY.