Nov. 2, 1937. K. BEYRODT 2,097,581

ELECTRIC STEAM GENERATOR

Filed March 31, 1936

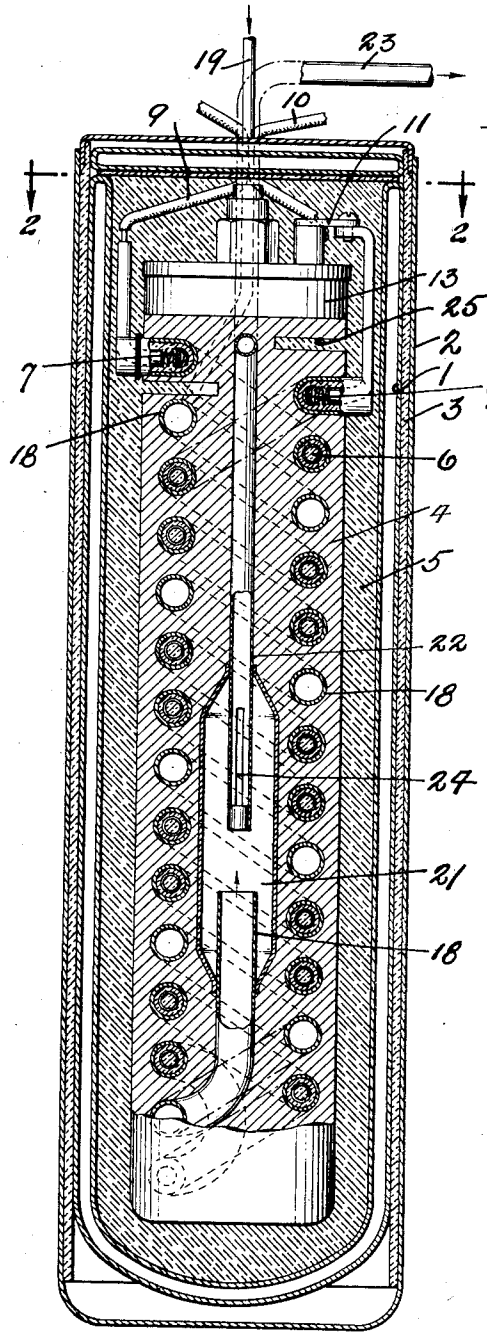


Fig. 1

Fig. 2

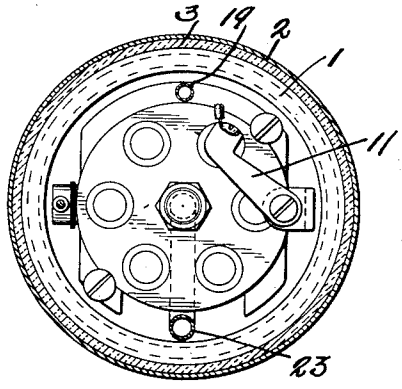
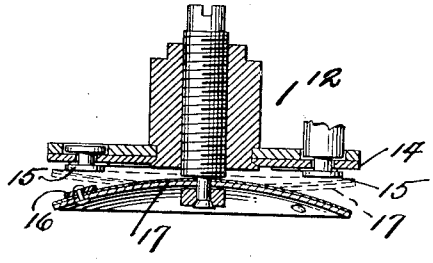


Fig. 3.



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Patented Nov. 2, 1937 2,097,581

UNITED STATES PATENT OFFICE

2,097,581

ELECTRIC STEAM GENERATOR

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Application March 31, 1936, Serial No. 71,882

3 Claims. (Cl. 219—39)

This invention relates to an improvement in electric steam generators, and has for one of its objects the provision of such an apparatus which is more efficient and quicker in operation than prior devices.

Both the feedwater inlet and steam discharge in this apparatus are at the top. This is of material advantage in avoiding bumping and surging and in speed of operation.

Means are provided for automatically maintaining a predetermined temperature setting, while the circuit for the heating unit is automatically closed whenever feed-water is supplied to the apparatus.

The apparatus as a whole is relatively inexpensive to manufacture, low in maintenance, efficient in operation and particularly well adapted for use wherever space is limited and where small or no flash capacity is required.

In the accompanying drawing where an embodiment of my invention has been illustrated:

Fig. 1 shows my invention in sectional elevation;

Fig. 2 is a section on the line 2—2 of Fig. 1; and

Fig. 3 shows the thermostatic heat control apparatus.

Referring to the drawing in detail, 1 designates a vacuum jar mounted within a metal casing 2 from which it is insulated by asbestos, felt or the like 3.

Within this jar 1 is mounted a metal mass 4 extending approximately from top to bottom of the jar and heat insulated therefrom by powdered magnesia or other suitable material 5.

6 designates a heating unit in the form of a double helix of resistance wire cast into the metal mass 4. The two ends of the heating element terminate at or adjacent the upper end of the metal mass as shown at 7 and 8, a conductor 9 leading from outside the apparatus being connected to 7, while conductor 10 from outside the apparatus is connected through the fuse 11 and the thermostatic switch 12 of Fig. 3 to the end or terminal 8. The fuse 11, it will be understood, is a safety device preventing excessive temperature rise in the apparatus. If the thermostatic switch 12 for example should stick closed, when the apparatus under these conditions reaches a predetermined temperature, the fuse 11 will melt and open the heating circuit.

The thermostatic switch 12 is mounted in a box 13 at the top of the metal mass 4, and comprises a disc 14 mounting a plurality of contacts 15 cooperating with contacts 16 on a bimetal disc 17 when the disc buckles to the position shown in dotted lines in Fig. 3. This is a commercial control device, and it will be understood when the disc 17 is in the full line position of Fig. 3 the circuit to the heating element is open, and that when the disc is in the dotted line position of Fig. 3 the circuit to the heating element is closed.

Cast into the metal mass 4 is water tubing 18. The inlet end of this tubing, designated 19, extends into the metal mass near the top thereof and extends helically of the metal mass to the lower end thereof. The lower end of the tubing is bent back upon itself and terminates in a chamber 21 in the center of the metal mass. This chamber has a larger cross-sectional area than the tubing, reducing the velocity of the steam passing upwardly through the tubing to the chamber so that water contained therein can drop to the bottom of the chamber to be evaporated. 22 designates a discharge pipe or tubing extending from the chamber 21 upwardly through the metal mass 4 to a point near the top thereof, where it is bent outwardly and upwardly, finally being brought out through the top of the vacuum jar where it is designated 23.

The lower end of the tubing 22 is closed, steam entering the tubing through side slots 24, changing the direction of flow of the steam and further insuring against water passing to the steam outlet.

Adjacent the top of the apparatus I reduce the heat conducting area of the metal mass 4 by grooving the same as shown at 25 and filling the groove with asbestos or other suitable heat insulator.

It will be appreciated from the foregoing that my invention provides an electric steam generator in which the feedwater is supplied to the evaporating surface at the top of the apparatus, the water flowing downwardly by gravity through a hotter and hotter part of the apparatus. This in conjunction with the reduced heat conducting area just mentioned tends to reduce bumping and surging.

It will be understood also that the thermostatic control herein described is arranged so that the metal mass will be maintained at a predetermined temperature and so that the circuit to the heating element will be closed whenever feedwater is supplied to the apparatus.

It will be understood that changes may be made in the details of construction and arrangement of parts within the purview of my invention.

What I claim is:—

1. An electric steam generator comprising in combination a metal mass having a heating ele-

ment and water evaporating tubing disposed helically thereof and embedded therein, said metal mass being provided internally adjacent its lower end with a chamber of larger cross section than said tubing, the said tubing adjacent its lower end being bent back upon itself and terminating in said chamber, an extension of said tubing extending upwardly from said chamber to the upper end of the apparatus to provide a steam outlet.

2. An electric steam generator comprising in combination a metal mass having a heating element and water evaporating tubing disposed helically thereof and embedded therein, said metal mass being provided internally adjacent its lower end with a chamber of larger cross section than said tubing, the said tubing adjacent its lower end being bent back upon itself and terminating in said chamber, an extension of said tubing extending upwardly from said chamber from a point above the bottom of the chamber to the upper end of the apparatus to provide a steam outlet, the lower end of this extension being closed and slots being provided in the sides of the tubing for the entry of steam thereinto.

3. An electric steam generator comprising in combination a metal mass provided with tubing and with an electric heating element disposed helically about the metal mass adjacent each other, the tubing and heating element being embedded in the metal mass, terminals at the upper end of the metal mass for the heating element, the lower end of the tubing being bent back upon itself to extend upwardly of the metal mass, terminating in a chamber provided internally of the metal mass, an extension of said tubing extending from the upper part of said chamber through the mass to the exterior of the apparatus, and a temperature control device mounted at the top of the metal mass adapted to maintain the metal mass at a predetermined temperature and to close the circuit of the heating element when feedwater is supplied to the apparatus.

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