

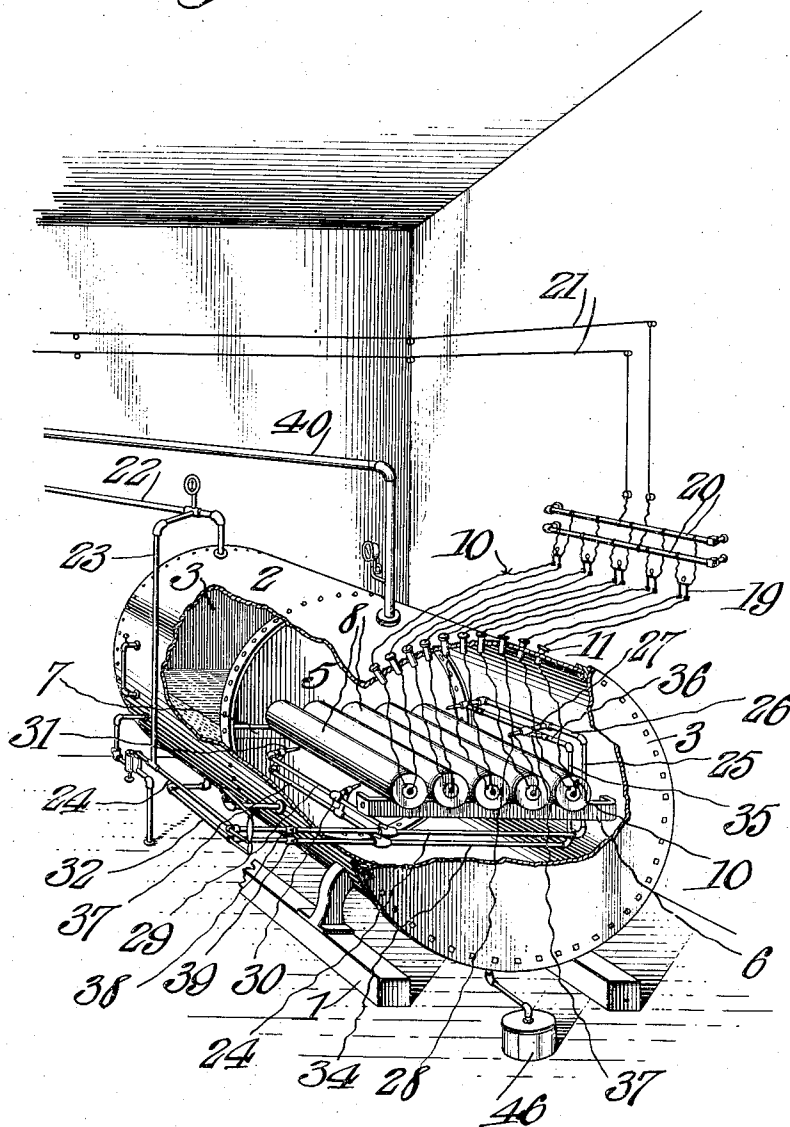
995,132.

C. E. GRIFFING.
ELECTRIC STEAM GENERATOR.
APPLICATION FILED NOV. 9, 1910.

Patented June 13, 1911.

3 SHEETS—SHEET 1.

Fig. 1.



Witnesses
[Signature]
F. J. Chapman.

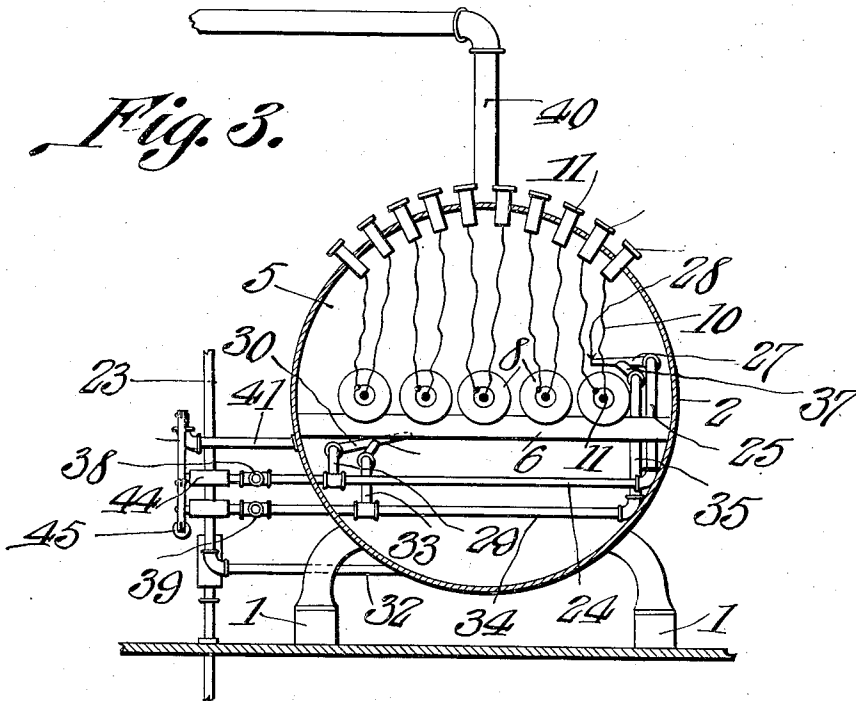
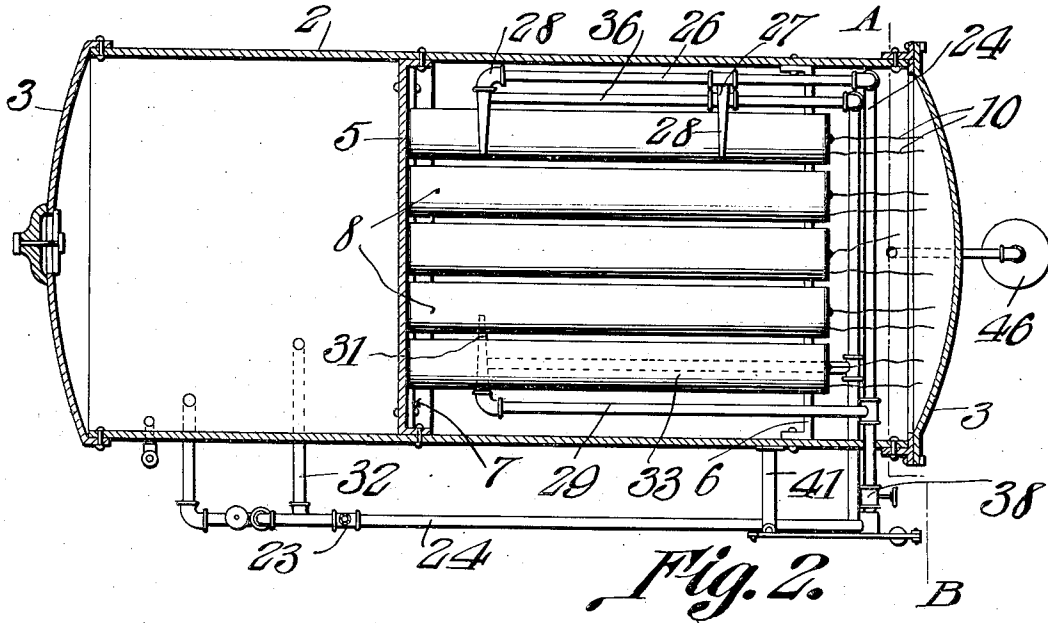
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3 SHEETS—SHEET 2.



Witnesses

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3 SHEETS-SHEET 3.

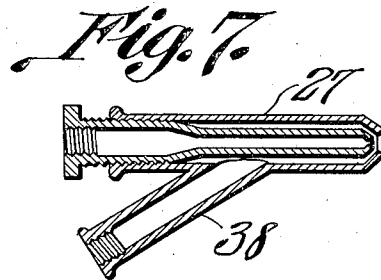
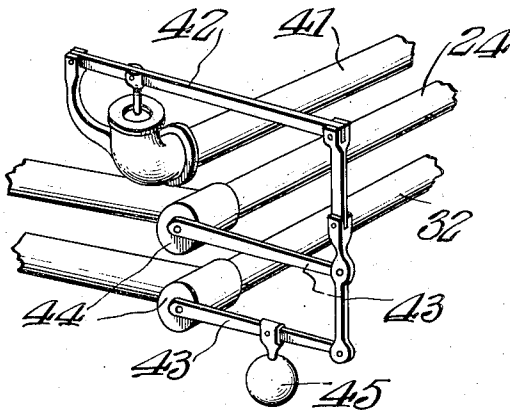
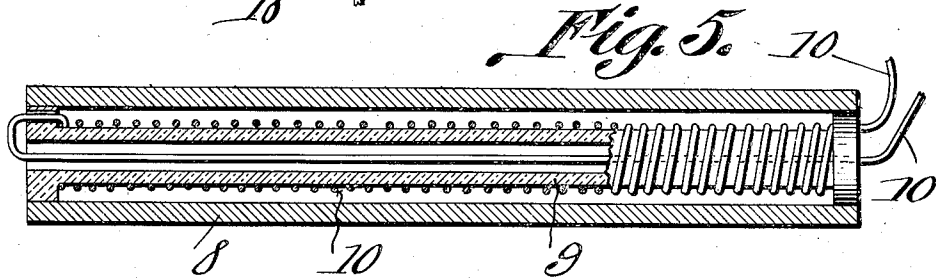
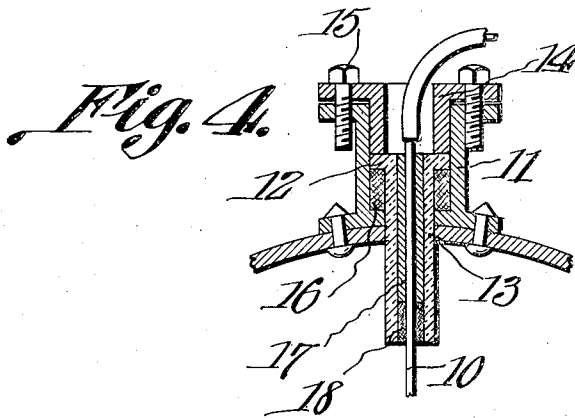


Fig. 6.

Witnesses

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UNITED STATES PATENT OFFICE.

CHARLES E. GRIFFING, OF SALT LAKE CITY, UTAH, ASSIGNOR TO THE GRIFFING ELECTRICAL STEAM BOILER CO., OF BIRMINGHAM, ALABAMA.

ELECTRIC STEAM-GENERATOR.

995,132.

Specification of Letters Patent. Patented June 13, 1911.

Application filed November 9, 1910. Serial No. 591,481.

To all whom it may concern:

Be it known that I, CHARLES E. GRIFFING, a citizen of the United States, residing at Salt Lake City, in the county of Salt Lake and State of Utah, have invented a new and useful Electric Steam-Generator, of which the following is a specification.

This invention has reference to electrical steam generators and its object is to provide a device of this class in which steam may be generated at less expense than with an ordinary boiler.

In accordance with the present invention there is provided a boiler in which are located electric heaters and this boiler may also contain a compartment for water and the water driven against the electric heaters in the form of a spray is rapidly converted into steam which may be utilized for any suitable purpose.

The invention will be best understood from a consideration of the following detailed description taken in connection with the accompanying drawings forming a part of this specification with the understanding however that the invention is not limited to the exact details of structure shown and described since the invention is capable of various modifications without departing from the salient features thereof.

In the drawings:—Figure 1 is a perspective view of the generating tank and water reservoir with the connecting parts, the shell of the reservoir and tank being broken away to show the interior thereof. Fig. 2 is a sectional plan view of the generating tank and the water reservoir. Fig. 3 is a section on the line A—B of Fig. 2. Fig. 4 is an enlarged sectional view of one of the stuffing boxes through which the conductors enter the generating tank. Fig. 5 is an enlarged detail view of one of the heating tubes and inclosed coil tube, parts being in section. Fig. 6 is a detail view in perspective of the regulator of the generating tank. Fig. 7 is a longitudinal sectional detail view of the injector.

Referring to the drawings there is shown a foundation or suitable support 1 on which there is mounted a shell or tank 2 having steam tight heads 3. Within the shell 2 and rigidly secured thereto is a steam-tight head or diaphragm 5 dividing the shell 2 into compartments one of which is adapted to hold the water to be turned to steam and

will hereinafter be known as the water reservoir, and the other containing the means for generating the steam and will hereinafter be known as the generating tank.

Within the generating tank are bars 6, 7, adapted to support a series of metal tubes 8 preferably with comparatively thick walls and in these tubes are housed coil tubes 9 of porcelain or other non-conducting refractory material. The ends of the tubes 9 are formed with annular flanges or shoulders adapted to fit snugly against the inner wall of the tube 8 when the tube 9 is placed therein. Each tube 9 is surrounded by a helix 10 of suitable resistance wire such as is commonly employed in electric heaters, the turns of the helix being separated so as to prevent short circuits. One end of the wire 10 extends through the flange or head at one end of the tube 9 and the other end of the wire 10 extends through the flange or head at the other end of the tube 9 and is carried back to the first end of the tube 9 through the interior thereof so that the terminals of the wire 10 are at the same end of the tube 9 and from thence are continued to the shell of the boiler where they are carried through a stuffing box best shown in Fig. 4. The stuffing box comprises a tubular member 11 fast to the exterior of the boiler shell and within this member 11 is the flanged end 12 of a tube 13 extending into the boiler through a suitable perforation in the shell thereof. The end 12 of the tube 13 is engaged by a gland 14 secured in place by bolts 15 while in the space between the head 12 and the end of the member 11 next to the boiler shell there is housed packing 16 rendering this portion of the stuffing box steam tight. Surrounding the conductor 10 where passing through the tube 13 is packing material 17. Where the conductor 10 extends through the tube 13 the insulation may be removed therefrom and a packing of asbestos cement indicated at 18 is introduced into the tube 13 for a short distance from the inner end thereof. The remainder of the tube may then be filled with solder or lead constituting the remainder of the packing 17. The tube 13 is preferably made of porcelain and thereby constitutes an insulator for the bared portion of the conductor 10. It is found that with the stuffing box described it is impossible for steam to leak while a perfect insulation is provided

for the conductor. Of course there are as many tubes 8 with the inclosed heaters as may be found expedient and a like number of conductors 10 entering and leaving the generating chamber through the stuffing boxes 11. The ends of the conductors 10 exterior to the boiler shell are carried to switches 19 connected in turn to bus-bars 20 to which are connected power leads 21 coming from a suitable source of electric current, such as a dynamo, but such source is not illustrated in the drawings. Each heater inclosed in a tube 8 has its own conductors controlled by a switch 19 so that any or all the heaters may be put into or cut out of service as desired.

Connected to a suitable source of air pressure, not shown, is a pipe 22 leading into the water reservoir and branched off from the pipe 22 is another pipe 23 leading to another pipe 24 entering the generating tank through a suitable stuffing box. Within the generating tank the pipe 24 is provided with a riser 25 and a horizontal section 26, the latter being a little above and parallel with the tubes 8. Connected with the section 26 are suitable ejectors 27 forming part of sprayers 28.

Branched off from the pipe 24 within the generating chamber is another pipe 29 which is parallel with and a little below the tubes 8 on the side thereof remote from the pipe 26. The pipe 29 carries ejectors 30 forming part of sprayers 31.

Leading from the bottom of the water reservoir is a water feed pipe 32 entering the generating tank through a suitable stuffing box. Within the generating tank the pipe 32 is provided with a riser 35 and a horizontal section 36 to which latter are connected short pipes 37 leading to the sprayers 27. Branched off from the pipe 32 is another pipe 33 within the generating tank and this pipe is connected to the sprayers 31 in like manner as the pipe 36 is connected to the sprayers 27.

In Fig. 7 a sprayer 27 is illustrated and the branch pipe is indicated at 38 where connected to the sprayer.

Assuming that current is flowing over the leads 21 and that a suitable number of the switches 19 are closed, then a like number of the heaters in the tubes 8 are raised to a suitable temperature, this temperature depending upon the character of the conductors 10 within the heating tubes 8 and the current flowing therethrough. The tubes 8 may be raised to a temperature approaching or quite up to incandescence. Also assuming that compressed air is flowing through the pipe 22 it will pass to the nozzles 28 and 31 and by the outflow of air water is forced through the pipe 32 from the water chamber and is directed in the form of a spray against the tubes 8 on either or both the upper and lower

surfaces thereof. The inlet of air and water to the pipes 24 and 32 where within the generating chamber is controlled by respective valves 38 and 39 in these pipes so that the flow of air and water may be readily regulated or started or stopped as desired. The spray issuing from the nozzles may be converted into super-heated steam or gas provided the tubes 8 are sufficiently heated and this may be utilized by being conducted to the point of utilization through a pipe 40 leading from the generating chamber.

In order to prevent too great a pressure within the generating chamber there is provided a pipe 41 leading from the side of the generating chamber and controlling a lever 42 which in turn is connected to valve arms 43 of valves 44 controlling the flow of fluid through the pipes 24 and 32 where directed into the generating chamber. These valves 44 are independent of the controlling valves 38 and 39. One of the valve arms 43 may carry an adjustable weight 45 by means of which the pressure under which the valves will close may be regulated.

Beneath the generating tank is a steam trap 46 emptying into a suitable well beneath the boiler. This trap may be of any suitable pattern as may be other parts which are shown but not described and which are such as are used in connection with any ordinary boiler.

If but a small amount of steam is desired then one or more but not all of the tubes 8 may be heated. If the full capacity of the boiler is desired, then all the tubes are utilized, this being possible through the switches 19 whereby one or two or more of the tubes may be included in the circuit as found desirable.

What is claimed is:—

1. In a generator of the class described a tank provided with a diaphragm dividing the tank into compartments, one of which constitutes a reservoir for air and water under pressure, and the other a generating tank, separate valved means for controlling the escape of air and water respectively into the generating tank to produce a spray, and electric heaters in the generating tank in the path of spray thrown thereinto.

2. In combination with a generating tank, a series of electrically charged conductors, a stuffing box having an inclosed non-conductive tube, a gland bearing against the tube, a conductor leading through said tube, a non-heat-conducting packing at the lower end of the tube and a packing of solder or like material at the upper end thereof.

3. In a generator of the class described, in combination with a suitable generating tank, a water and air supply tank, separate means for conducting said water and said air to said generating tank, means for spraying said water and air into said tank, for gen-

erating steam from said spray, and means for automatically regulating the flow of water and air into said tank.

5 4. In a generator of the class described, a tank, electric heaters therein, a source of compressed air, and means for producing by air pressure a spray of water and directing the same against the electric heaters.

In testimony that I claim the foregoing as my own, I have hereto affixed my signature 10 in the presence of two witnesses.

CHARLES E. GRIFFING.

Witnesses:

G. B. BLAKELY,
SAM RANEY.
