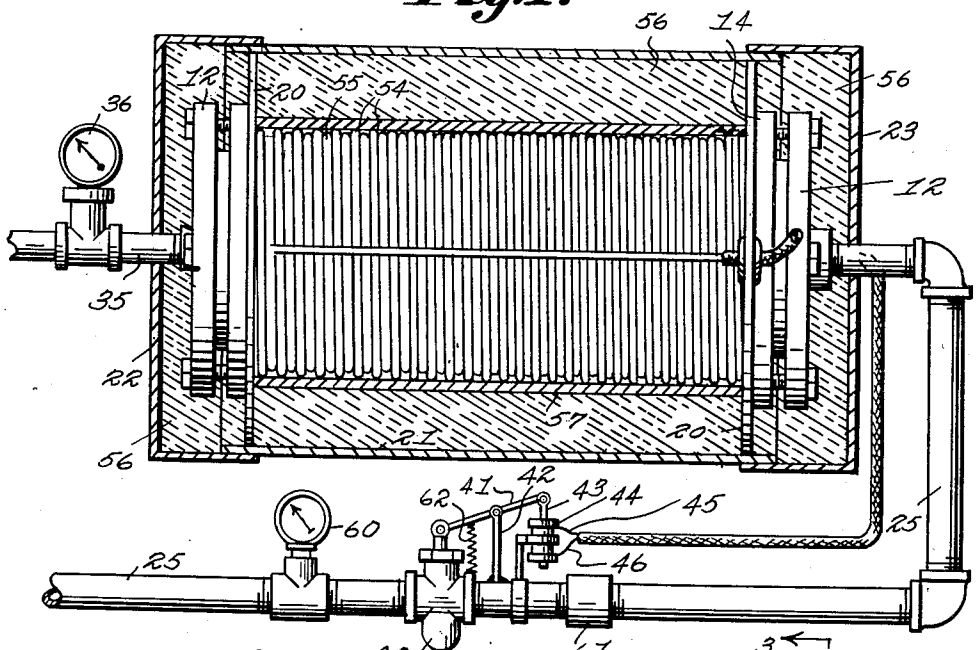
April 25, 1950 M. N. WAGNER 2,505,656

INSTANT STEAM GENERATOR

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Fig. 1.



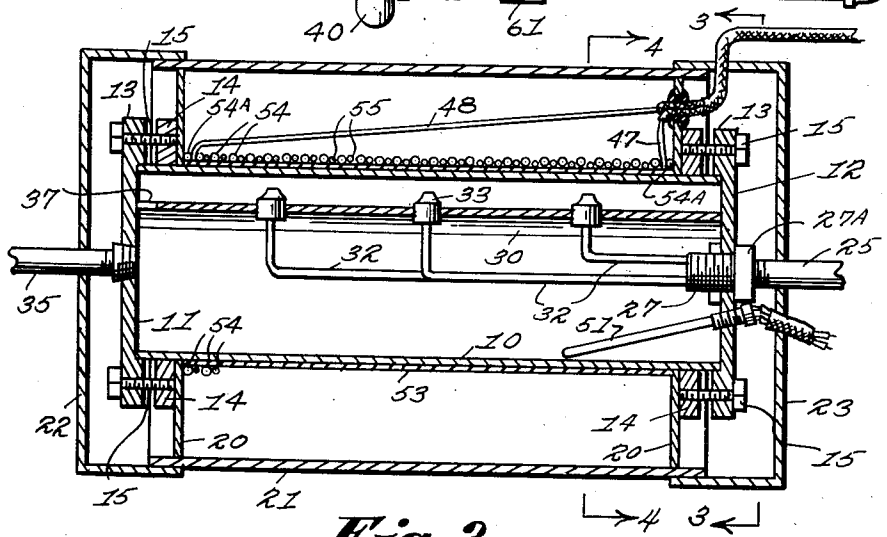


Fig. 2.

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Fig. 3.

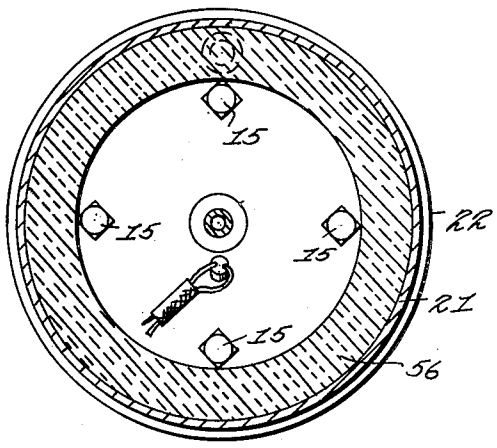


Fig. 4.

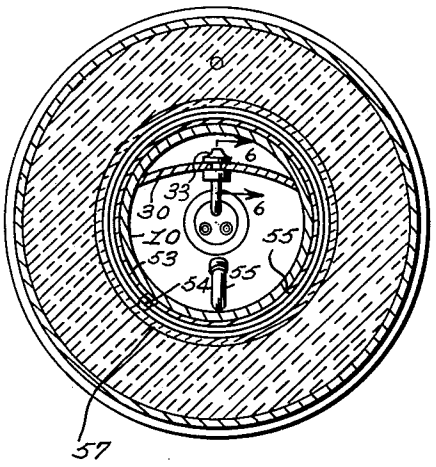


Fig. 5.

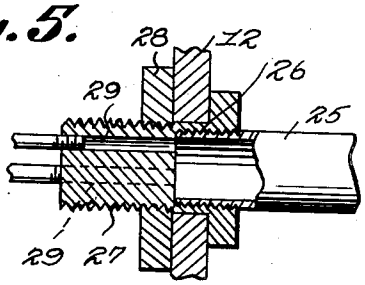
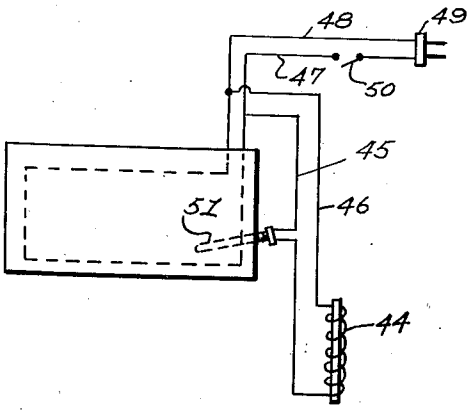
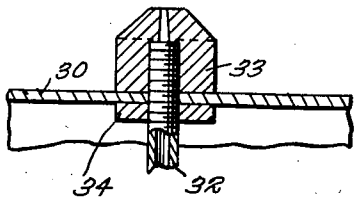


Fig. 6.

Fig. 7.





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INSTANT STEAM GENERATOR

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Application April 30, 1948, Serial No. 24,372

3 Claims. (Cl. 219—38)

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This invention relates to a steam generator.

An object of the invention is the provision of a steam generator which not only produces steam instantly but the generation is automatically controlled for maintaining a steady flow of the steam for cleaning or treating various parts of automobiles, for sterilizing dairy equipment, for heating pressing irons or for use in any establishment when water and electricity is available, the steam generated in a boiler aiding in controlling the flow of water to the generator in accordance with the pressure developed therein.

A further object of the invention is the provision of a steam generator in which nozzles spray a fine mist of water against a cylindrical metal surface heated by an external resistance wire, the flow of the water under pressure to the nozzle being initiated by a valve incorporated in a supply and actuated by an electric means in a circuit which is controlled by a mercury switch projecting into the generator.

The invention is best understood from a consideration of the following detailed description in connection with the accompanying drawings forming part of the specification, nevertheless, it is to be understood that the invention is not confined to the disclosure but is susceptible of such changes and modifications as shall define no material departure from the salient features of the invention as expressed in the appended claims.

In the drawings:

Figure 1 is a longitudinal vertical section through the main housing of the generator showing the turns of a resistance coil insulated from each other by an asbestos rope,

Figure 2 is a longitudinal vertical section of the generator showing the interior arrangement of the generator,

Figure 3 is a transverse vertical section taken along the line 3—3 of Figure 2,

Figure 4 is a transverse vertical section taken along the line 4—4 of Figure 2,

Figure 5 is an enlarged vertical section of the connections between a pipe and tubes supplying water to nozzles,

Figure 6 is an enlarged vertical section of the nozzles and supporting plate for said nozzles, and

Figure 7 is a side view of the complete generator unit and a wiring diagram therefor.

Referring more particularly to the drawings, 10 designates a cylinder of brass which forms the main body of a steam generator. The ends of

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the cylinder are closed by cover plates 11 and 12. Each plate has an annular shoulder 13 engaging over the adjacent ends of the cylinder. A ring 14 is brazed to the outer wall of said cylinder and inwardly of the shoulders. Bolts 15 are threaded into passages in the shoulders and rings for drawing the closures up tight on the ends of the cylinder to provide a leak proof seal. A second ring 20 having less thickness than the rings 14 but of greater diameter is received on the cylinder 10 adjacent each end thereof. Each ring 20 is in abutting relation with the inner face of one of the adjacently disposed rings 14. A cylindrical housing 21 is supported by the outer peripheries of the rings 20 to provide a circumferential chamber around the cylinder 10. Cup-shaped caps 22 and 23 are mounted on the opposite ends of the housing 21.

An inlet pipe 25 for supplying water to the generator is threaded at 26 into a distributor 27 which is threaded into a central passage in the closure 12 (Figure 5). A nut 28 is screwed on the distributor and is backed up to the inner wall of the closure for retaining said distributor in position. The distributor has a plurality of longitudinal passages 29 opening into the inner end of the pipe 25. The distributor has a flange 27a engaging the outer wall of the closure 12.

A curved supporting plate 30 (Figures 2, 4 and 6) is secured at one end to the cover plate 12 of the cylinder 10 and is provided with passages 37 for the escape of the steam generated above said plate. A pipe 32 is threaded at one end into each of the passages 29. The other ends of the pipes are threaded into nozzles 33 and mounted in openings in the plate 30. Nuts 34 are screwed onto the pipes tight against said plate for retaining the nozzles in position. A discharge pipe 35 communicates with the interior of the cylinder 10 and is threaded into a central passage in the closure 11. A steam pressure gage 36 is incorporated in the pipe 35.

A valve 40 incorporated in the pipe 25 is operated by a lever 41 pivoted on a bracket 42. The lever has one end pivotally attached to an armature 43 actuated by a magnetic coil 44. Wires 45 and 46 extended from said coil are in circuit with the respective wires 47 and 48 which lead to a plug 49 adapted to be received by an electric outlet of a building. A manually actuated switch 50 cooperates with a mercury switch 51 for closing the circuit to the coil 44. The switch 51 is incorporated in the wire 45 and maintains the circuit to the coil 44 open until the cylinder 10 is heated sufficiently when the

expanding mercury will cause closing of the switch and the armature will open the valve 40.

A sheath of mica 53 surrounds the external surface of the cylinder 10 and a rope 54 formed of asbestos is wound on the mica and the turns of the rope are spaced sufficiently apart to receive the turns of a resistance wire 55 therebetween to prevent the turns of the wire from becoming short-circuited, since the turns of wire and rings 20 are formed of metal a turn 54a of the rope is applied initially and finally to the adjacent rings to prevent short-circuiting at these points. The wire 48 is connected to the outer end of the coil 55 while the inner end of the wire 47 is attached to the other end of said coil.

The circumferential chamber between the mica sheath 53 and the shell or housing 21 is filled with insulating materials 56, such as glass fibers. A sheet 57 of asbestos is wrapped around the coils of the rope 54 and the coils of the wire 55 before the insulation 56 is applied. The metal caps 22 and 23 of the main housing are also filled with the fiber glass.

A pressure gage 60 is incorporated in the water supply pipe 25. When the pressure of the water in pipe 25 is insufficient to spray water through the nozzles 33 against the steam pressure in the cylinder 10, a pump (not shown) will be employed to maintain the required pressure. A check valve generally designated by the numeral 61 and included in the pipe 25 to permit the flow of water to the nozzles 33 will prevent pressure in the cylinder 10 from forcing the water toward the source. A spring 62 tends to maintain the valve 40 closed.

The operation of my device is as follows: When the switch 50 is closed, the resistance wire 55 will heat the cylinder 10. The mercury switch 51 will then close the circuit to the coil 44 and the valve 40 will be opened permitting water to flow to the nozzles 33. In view of the fact that no pressure exists in the cylinder 10 water will be sprayed on to the inner wall of said cylinder. However, as the pressure of the steam increases in the cylinder, the flow of water to the nozzles will be cut off until the pressure drops in said cylinder.

It is to be borne in mind that the quantity of steam discharged from the cylinder 10 is so regulated that the output of steam may be maintained at a uniform rate. The spring 62 and the solenoid actuating the valve 40 will cooperate to maintain the uniformity of the flow of water to the cylinder 10 for a uniform production of steam. Cutting off the flow of steam will automatically stop the flow of water because the steam pressure will be greater than the water pressure at this time, although the valve 40 will be maintained open by the switch 51. When the temperature is lowered sufficiently in the cylinder 10 by the opening of the switch 50, the valve 40 will close.

The ring 14 serves a double purpose. It not only prevents the ends of the cylinder 10 from expending under high pressures and temperatures but it provides an anchorage for the closures 11 and 12. the closures may be removed readily by the release of the bolts 15.

In view of the fact that the baffle 30 is secured at one end to the cover 12, said baffle together with the pipes 32, nozzles 33, distributor 27 and the switch 51 may be removed as a unit from the cylinder 10. It will be appreciated that it will be necessary to remove the cap 23 from the housing 21 before it will be possible to unscrew the bolts 15 which retain the plate 12 sealed to an end of the cylinder 10.

It will be appreciated that other insulating materials may be employed in place of the mica sheath 53 and the asbestos rope 54. Numerous materials may be used in mixture form to provide a bed to prevent short circuiting of the wires 55.

What is claimed is:

1. An instantaneous steam generator comprising a cylinder formed of brass, closures for the end of said cylinder, a non-conducting sheath on the cylinder, a resistance wire wound on the sheath, a rope formed of asbestos wound on the sheath with the turns thereof disposed at opposite sides of the turns of the wire, a packing of non-conducting materials surrounding the wire and rope, a housing enclosing the packing, means for electrically energizing the wire for heating said cylinder, means spraying the interior heated wall of the cylinder with a fine mist of water to create steam and means conducting the steam away from the cylinder.

2. An instantaneous steam generator comprising a cylinder formed of brass, closures for the end of said cylinder, a non-conducting sheath on the cylinder, a resistance wire wound on the sheath, a rope formed of asbestos wound on the sheath with the turns thereof disposed at opposite sides of the turns of the wire, a packing of non-conducting materials surrounding the wire and rope, a housing enclosing the packing, means for electrically energizing the wire for heating said cylinder, means spraying the interior heated wall of the cylinder with a fine mist of water to create steam, a valve controlling the flow of water to the spraying means, a magnetic means for causing opening of the valve, a resilient means closing said valve, a thermostatic switch actuated in accordance with the temperature in the cylinder and a circuit in which is incorporated the switch and magnetic means.

3. A steam generator comprising a brass cylinder, an electric resistance heating coil on the exterior wall of the cylinder, means insulating the coil from said cylinder, plates closing the ends of the cylinder, a distributor for water secured to one of the plates, a water supply connected to the distributor, a baffle having one end attached to the first-mentioned plate and projecting longitudinally through the cylinder, nozzles carried by the baffle, pipes connecting the nozzles with the distributor, said nozzles, pipes, baffle, distributor and first mentioned plate being removable as a unit from the cylinder, means supplying an electric current to the heating coil, a valve controlling the flow of water to the distributor, a thermostatic switch in the cylinder, a magnetic means for causing opening of the valve, and an electric circuit including the magnetic means and the thermostatic switch.

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