No. 647,495. Patented Apr. 17, 1900.

R. W. JAMIESON.

STEAM GENERATOR.

(Application filed June 24, 1899.)

(No Model.)

Fig. 1.

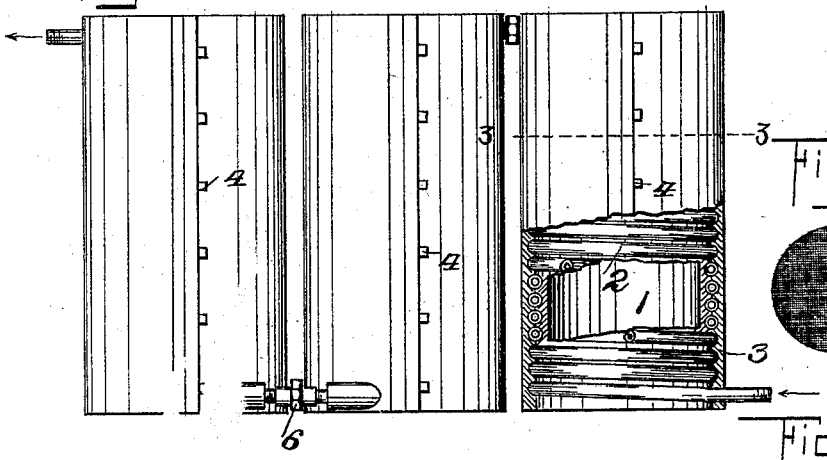


Fig. 6.

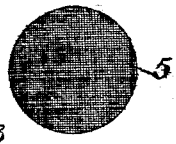


Fig. 7.

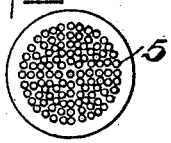


Fig. 2.

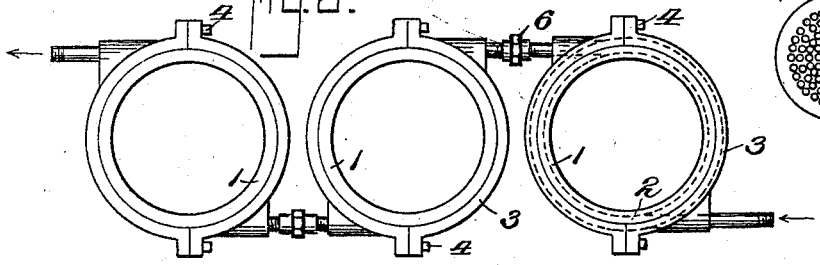


Fig. 3.

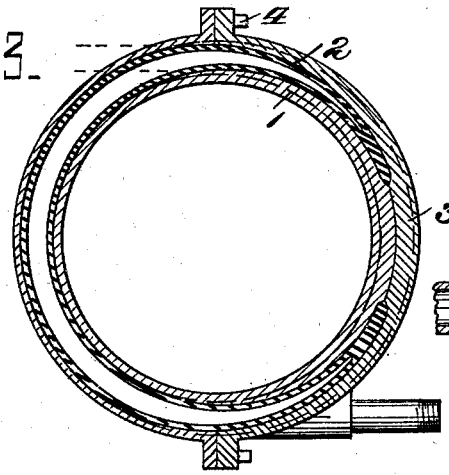


Fig. 4.

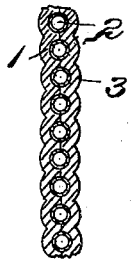
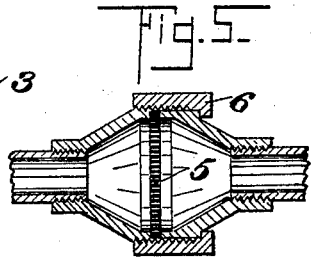


Fig. 5.



WITNESSES:

Walter B. Payne.

Thomas Durant

INVENTOR.

Robert W. Jamieson

BY

Church & Church.

ATTORNEYS.

UNITED STATES PATENT OFFICE.

ROBERT W. JAMIESON, OF ROCHESTER, NEW YORK.

STEAM-GENERATOR.

SPECIFICATION forming part of Letters Patent No. 647,495, dated April 17, 1900.

Application filed June 24, 1899. Serial No. 721,746. (No model.)

To all whom it may concern:

Be it known that I, ROBERT W. JAMIESON, of Rochester, in the county of Monroe and State of New York, have invented certain new and useful Improvements in Steam-Generators; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming a part of this specification, and to the reference-numerals marked thereon.

My present invention has for one object to provide a generator for producing steam or vapor from a liquid by bringing the latter into contact with a surface heated to a high degree of temperature, and has for its further object to provide a means whereby such portions of the liquid as has assumed a spheroidal or globular state may be broken up and subdivided and the entire liquid vaporized and superheated.

To these and other ends my invention consists in certain improvements in construction and combination of parts, all of which will be clearly described, and the novel features pointed out in the claims at the end of this specification.

In the drawings, Figure 1 illustrates a side elevation of a generator constructed in accordance with my invention, with a portion shown in section. Fig. 2 is a top plan view of the same; Fig. 3, a horizontal sectional view in the line 3 3 of Fig. 1; Fig. 4, an enlarged vertical sectional view through a portion of the side of the generator, showing a modified form of construction; Fig. 5, a sectional view through a union or coupling, and Figs. 6 and 7 plan views of a vapor-subdivision plate arranged within the coupling.

Similar reference-numerals in the several figures indicate similar parts.

In the present form of the invention I have shown the generator as consisting of a series of flues or cylindrical chambers adapted to be heated in any convenient manner, as either by direct contact with a flame or by being arranged as flues or chimneys through which the heated gases or products of combustion may be passed. Each cylinder consists of an inner portion or body 1 of metal, provided with a spiral groove or recess extending around its exterior and adapted to receive the convolutions of a helical tube or pipe 2. A jacket or covering 3, provided with a similar helical groove upon its interior surface, is constructed in sections, which latter are secured together by bolts 4, thus embedding the tubing between the metallic walls, and by forming the helical grooves in the core 1 and jacket 3 a more perfect contact between the tube and the casing is secured, and by employing a highly-conductive metal, such as copper, the heating of the latter by conduction is more easily obtained, and by bolting the jacket-sections in position, as shown, the latter may be held securely in position and the tube forced into close contact with the surface of the grooves formed in both the drum and jacket.

In generators of this class the liquid is vaporized by being forced upon a highly-heated surface, causing a part of the liquid to flash into steam immediately and the remainder to be converted into minute spheres or globules, which latter only vaporize with difficulty and impart to the steam a dampness or moisture, impairing its efficiency. To completely vaporize these particles, it is necessary to break or subdivide them, and for this purpose I interpose in the circuit a finely-divided screen or perforated plate 5, through which the steam in the tube passes, forcing with it the spherical particles of liquid, causing them to be broken up and sprayed upon the heated surface of the tube beyond, when they will be readily converted into vapor. These plates or screens may be arranged in any convenient manner throughout the circuit, and in my present construction I have for convenience in cleaning and handling located them within the couplings or unions 6, employed as connections between the several duplicate sections of the generator; but it will be understood that a similar arrangement might be employed at any point in the circuit in case only one section of the generator is used. The couplings 6 are enlarged slightly, as shown particularly in Fig. 5, and the screen or perforated plate 5 is constructed so that the sum of the areas of the aperture is equal to the cross-sectional area of the tubing, thereby reducing the friction in the circuit to a minimum. This arrangement of the parts permits easy access to the screen either to re-

place it or for the purpose of removing any deposit or sediment. By this construction I am enabled to use a comparatively-light gage of tubing, and by embedding it completely between the outer and inner walls of the casing a very high degree of temperature may be obtained without injury to the tubing through oxidation. The casing may be made comparatively light and the inner and outer portions formed with corrugations, as shown in Fig. 4, to increase the heating-surface.

I claim as my invention—

1. In an instantaneous vapor-generator, an externally-heated vapor-conductor provided with partitions or partial division-walls therein through which the vapor and unconverted liquid which has assumed a spheroidal state will be compelled to pass by the generated pressure, the apertures in the partitions having, collectively, an area substantially equal to that of the conductor.

2. In an instantaneous vapor-generator, an externally-heated vapor-passage provided with restricted orifices arranged at intervals within the passage, through which the steam or generated gases will force the unconverted liquid under pressure and cause its further subdivision, said orifices having collectively an area substantially equal to that of the passage.

3. In an instantaneous vapor-generator, the combination of a heated vapor-passage, of a plurality of couplings arranged between its extremities and each having a series of restricted orifices therein.

4. In a steam-generator, the combination with a heated steam-passage, of an atomizer arranged within the passage and adapted to be operated by the generated steam or gases passing through the circuit and operating to finely divide the unconverted particles of liquid remaining in the passage, the apertures of said atomizer having, collectively, an area substantially equal to that of the passage.

5. In a vapor-generator the combination of an externally-heated liquid-passage having a plurality of removable couplings or unions intermediate its extremities, with a screen or perforated partition arranged within each coupling.

6. In a vapor-generator, the combination with a coiled liquid-pipe, of an internal heat-conducting core or casing within the coil and a separate external jacket surrounding the said coil and removably secured thereon.

7. In a vapor-generator, the combination with an internal drum or core and an external casing or jacket, of a pipe arranged between the casing and jacket and an atomizing device arranged within the pipe.

8. In an instantaneous vapor-generator, the combination with an internal drum or core provided upon its exterior with a helical groove or recess and an external jacket having a similar corresponding groove or recess of a helically-wound tube lying in the groove and embedded between the walls of the interior drum and the jacket.

9. In an instantaneous vapor-generator, the combination with an internal heat-conducting drum or core provided upon its exterior with a helical groove or recess and an external jacket having a similar corresponding groove, of a helically-wound tube lying in the groove between the walls of the drum and jacket and an atomizer located within the tube.

10. In an instantaneous vapor-generator the combination with an internal heat-conducting drum or core provided with a helical recess or groove extending around its exterior and an outer sectional jacket having similar grooves, of a tube wound in the spiral grooves of the inner drum and inclosed by the outer jacket, and having a removable coupling or union interposed between its extremities and an atomizing device located in the coupling.

11. In a vapor-generator, the combination with an internal heat-conducting drum or core provided with a helical groove and an outer sectional casing or jacket having a similar groove, of a tube lying in the groove and embedded between the walls of the inner drum and the jacket.

12. In a vapor-generator, the combination with an internal drum or core provided with a helical groove and an outer sectional casing or jacket having similar corresponding grooves, of a helically-wound tube lying in the grooves between the core and jacket and means for clamping the jacket-sections to secure the tube.

13. In an instantaneous vapor-generator, a vapor-conductor adapted to be heated and having interposed in its length at intervals atomizing devices through which the vapor is forced by its own pressure and operating to break up and subdivide unconverted liquid in the vapor which has assumed a spheroidal state.

14. In an instantaneous steam-generator, the combination of a series of coils each having an internal heat-conducting core and an external jacket, couplings connecting the adjacent ends of the coils and screens or atomizers arranged in the couplings and operating to break up or subdivide the unconverted liquid forced by the generated vapor from one coil to the next.

15. In an instantaneous steam-generator the combination with a vapor-conductor adapted to be heated and having interposed in its length at intervals chambers larger than the area of the pipe and atomizers or screens therein adapted to break up or subdivide unconverted liquid which has assumed a spheroidal state.

ROBERT W. JAMIESON.

Witnesses:
G. WILLARD RICH,
WALTER B. PAYNE.