W. H. STEWART.

STEAM GENERATOR.

APPLICATION FILED NOV. 4, 1910.

1,041,188.

Patented Oct. 15, 1912.

2 SHEETS—SHEET 1.

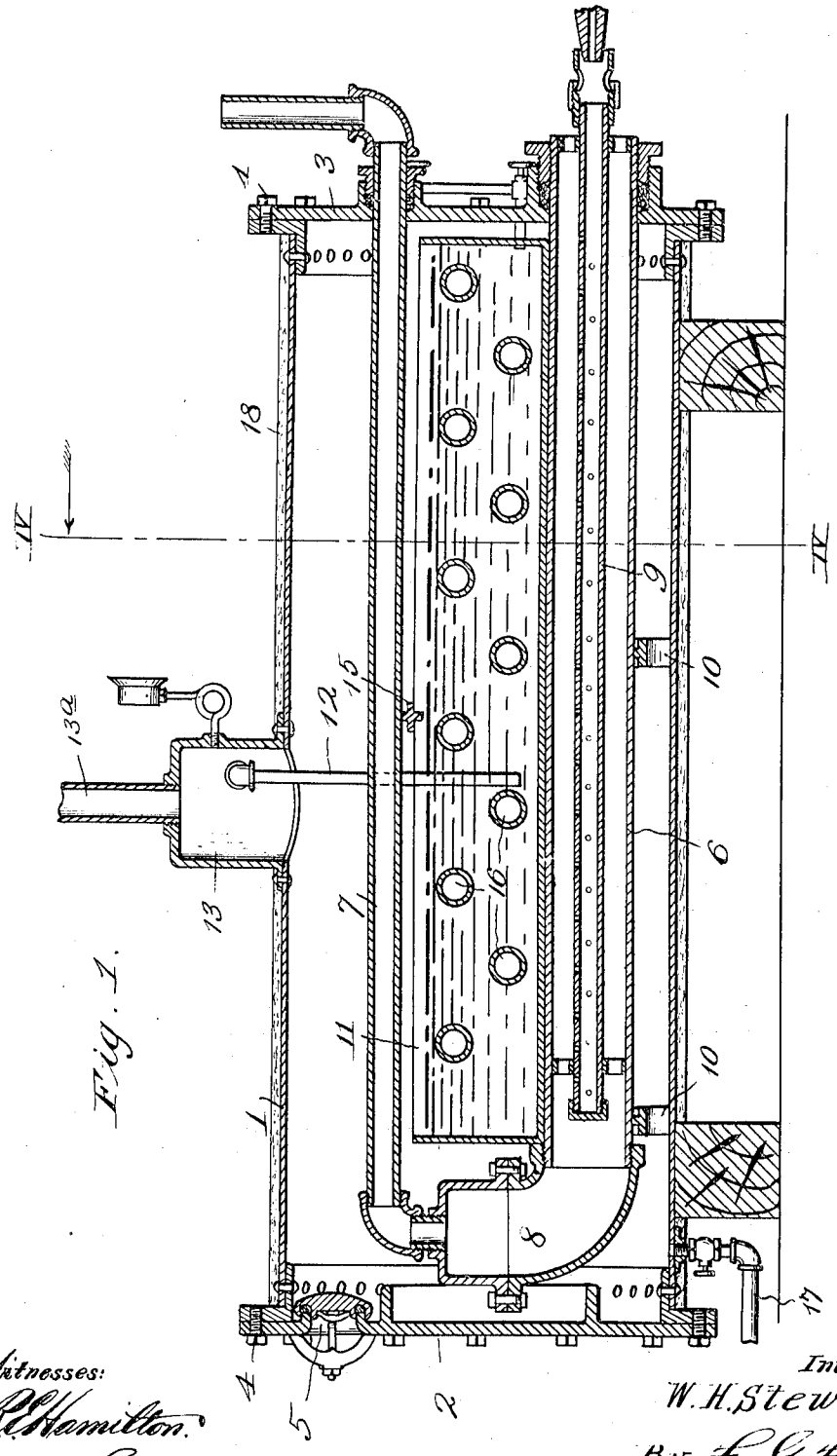

Fig. 1.

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2 SHEETS—SHEET 2.

Fig. 2.

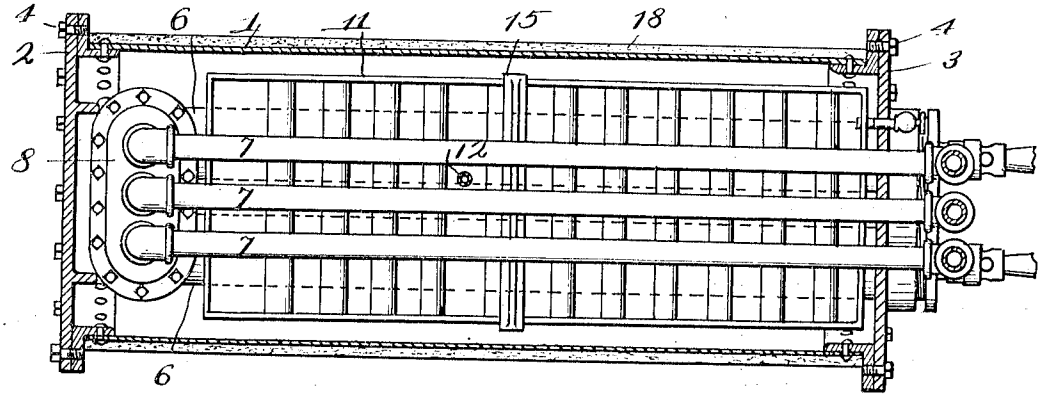


Fig. 3.

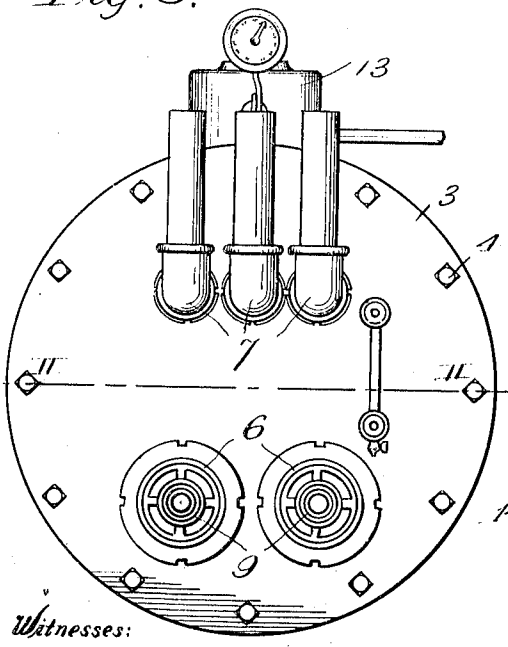
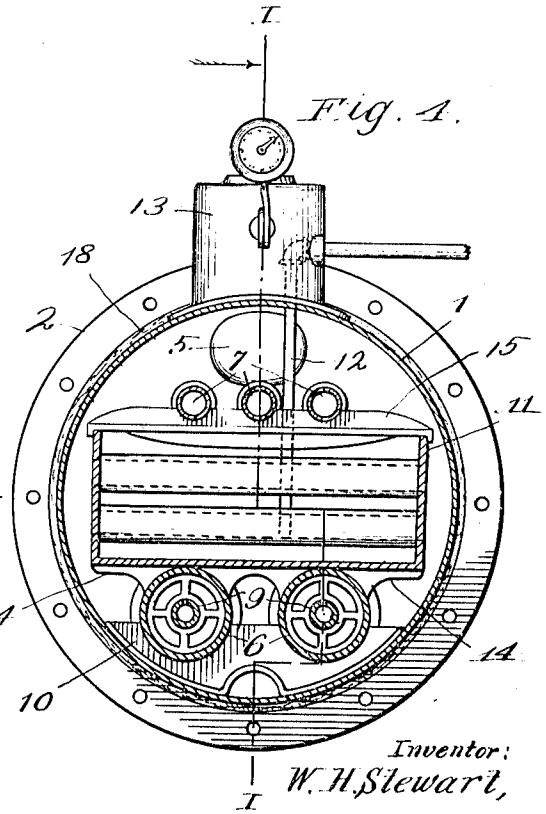


Fig. 4.



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UNITED STATES PATENT OFFICE.

WILLIAM H. STEWART, OF KANSAS CITY, KANSAS.

STEAM-GENERATOR.

1,041,188. Specification of Letters Patent. Patented Oct. 15, 1912.

Application filed November 4, 1910. Serial No. 590,771.

To all whom it may concern:

Be it known that I, WILLIAM H. STEWART, a citizen of the United States, residing at Kansas City, in the county of Wyandotte and State of Kansas, have invented certain new and useful Improvements in Steam-Generators, of which the following is a specification.

My invention relates to improvements in steam-generators, and one of my objects is to obtain equal expansion throughout the length and circumference of the generator-shell, and avoid rupture thereof by undue expansion at one or more points.

Another object is to obtain greater evaporative efficiency with a given amount of fuel than heretofore, so that high pressure steam may be generated for commercial purposes more economically than by the methods now in general use.

A further object is to overcome priming and its consequent danger to the engine drawing its supply of steam from the generator.

Another object is to keep the interior of the generator-shell free from incrustation and the attendant evils thereof.

I attain the foregoing objects by keeping the feed-water free of contact with the generator-shell and the fire tubes therein, and discharging said water directly into a receptacle within the shell. Thus relieved of the cooling effect of the customary surrounding body of water, radiation from the fire-tubes at the highest possible temperature uniformly heats the air in the generator to a high degree, and insures rapid evaporation of the water in the receptacle.

Referring now to the accompanying drawings which show the preferred embodiment of my invention, Figure 1 is a vertical longitudinal section of the generator on line I—I of Fig. 4. Fig. 2 is a horizontal longitudinal section on line II—II of Fig. 3. Fig. 3 is a front elevation of the generator. Fig. 4 is a transverse section on line IV—IV of Fig. 1.

1 designates the tubular shell of the generator closed at its ends by heads 2 and 3, removably-secured in position by screws 4. Head 2 is provided with a manhole 5, whereby access may be had to the interior of the generator.

As shown in the drawings, the generator is internally fired, the means for this purpose comprising a pair of large fire-tubes 6, leading inward through head 3, a plurality of small fire-tubes 7, leading outward through header 3, a manifold 8, connecting the fire-tubes 6 and 7, and burners 9, extending into the large fire-tubes 6.

Fire-tubes 6, are spaced above the bottom of shell 1, by saddles 10, which also assist header 3 in supporting said fire-tubes.

11 designates a receptacle for the feed-water supplied thereto through a pipe 12, preferably entering the generator through the steam-dome 13, thereof. Receptacle 11 is supported by a plurality of brackets 14, resting upon the fire-tubes 6. As shown, receptacle 11 is open at its top, and the upper portions of its sides are braced by a bridge 15, which also supports the small fire-tubes 7. A plurality of tubes 16, extend transversely through the receptacle for the passage of steam to accelerate evaporation of the feed-water.

17 designates a valve-controlled outlet pipe for drawing off the condensed steam which collects in the generator when fuel to burner 9 is cut off.

18 designates an insulating covering for the exterior of shell 1, to prevent loss of heat from the interior steam surface thereof.

Receptacle 11, containing the feed-water, being located about centrally of the chamber formed by shell 1, and heads 2 and 3, is surrounded by high temperature, steam which also passes through tubes 16, and insures rapid conversion of the feed-water into steam, maintained at high temperature by direct radiation from the fire-tubes. The large steam space between the surface of the feed-water and the steam outlet 13ª, prevents siphoning of the feed-water through said outlet. All impurities separated from the feed-water are precipitated to the bottom of the receptacle, instead of incrusting the shell or collecting on the fire-tubes and interfering with the radiation of heat therefrom.

Having thus described my invention what I claim, and desire to secure by Letters Patent, is:

1. A generator embracing a steam-chamber, a water receptacle within said steam chamber, communicating with a source of supply and opening into the chamber to discharge steam therein, and a heater within said steam chamber free of contact with the water.

2. A generator embracing a steam-chamber, a water receptacle within said chamber,

and surrounded on all sides by steam-space and opening at the top to discharge steam into said space, and evaporating means within said chamber.

3. A generator embracing a steam chamber, a water receptacle within said chamber, tubes extending through said receptacle, and evaporating means in said steam chamber.

4. A generator embracing a steam-chamber, fire-tubes leading into said steam chamber, fire-tubes leading from said steam chamber, and a water receptacle resting on the first-mentioned fire-tubes.

In testimony whereof I affix my signature in the presence of two witnesses.

WILLIAM H. STEWART.

Witnesses:
F. G. FISCHER,
E. C. LILLIAN.