

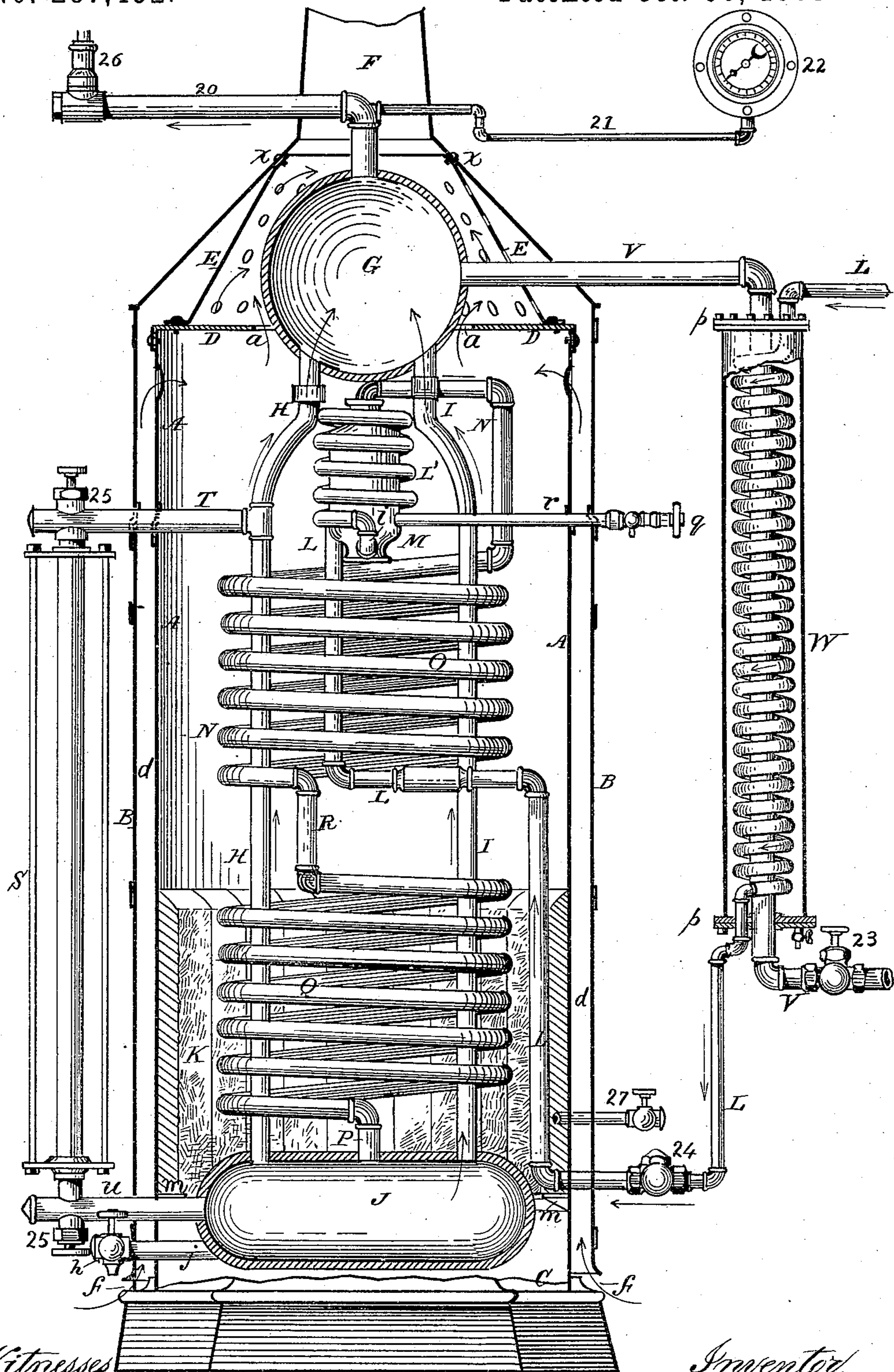
(No Model.)

G. W. McALLISTER.

# STEAM GENERATOR.

No. 287,452.

Patented Oct. 30, 1883.



Witnesses:

Harry E. Remick  
L. M. Cartwright.

*Inventor,*

Gay W. McAllister  
per C. A. Shaw  
att.

# UNITED STATES PATENT OFFICE.

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EDWARD L. YORK, AND ALDIS L. WAITE, OF SAME PLACE.

## STEAM-GENERATOR.

SPECIFICATION forming part of Letters Patent No. 287,452, dated October 30, 1883.

Application filed May 5, 1883. (No model.)

*To all whom it may concern:*

Be it known that I, GUY W. McALLISTER, of Boston, in the county of Suffolk, State of Massachusetts, have invented a certain new and useful Improvement in Steam-Generators, of which the following is a description sufficiently full, clear, and exact to enable any person skilled in the art or science to which said invention appertains to make and use the same, reference being had to the accompanying drawing, forming a part of this specification, in which the figure is a side elevation, a portion of the body, fire-pot, and casing being represented as removed or shown in vertical longitudinal section.

My invention relates to that class of steam-generators in which the water to be converted into steam is passed through a coil or helix disposed in the fire-pot or combustion-chamber; and it consists in a novel construction and arrangement of the parts, as hereinafter more fully set forth and claimed, by which a more effective article of this character is produced than is now in ordinary use.

The nature and operation of the improvement will be readily understood by all conversant with such matters from the following explanation, its extreme simplicity rendering an elaborate description unnecessary.

In the drawing, A represents the body of the generator, and B the casing or jacket. The body is cylindrical in form, and provided with the bottom C and head D. Disposed on the head there is a hollow cone-shaped foraminous top or cap, E, opening at its apex into the funnel F, the cap being connected with the body by a series of ports or flue-holes, *a*. The jacket is preferably composed of zinc, galvanized iron, or some other good non-conductor of heat, and is attached at *x* to the top of the cap E, an air-space, *d*, being left between the jacket and body, with inlet-openings *f* around the bottom.

A globular steam-dome, G, is disposed in the cap E, being supported in the head D, and projecting downwardly a short distance into the body A. This dome is connected, by means of the vertically-arranged pipes H I, with the annular water-chamber J in the lower part of the generator, the chamber protruding up-

wardly through the grate of the fire-pot K, which rests on the brackets or ledges *m*.

An induction-pipe, L, for supplying water, enters the generator opposite the chamber J, and passes upwardly to near its center, being there bent inwardly over the fire-pot, and ascending to the top of the closed vertically-arranged cylindrical heating-chamber M, where it is coiled downwardly around said chamber, forming the helix L', and entering the chamber at *i*.

Connected with the top of the chamber M there is a pipe, N, which is formed into a coil or helix, O, around the pipes I H, below the chamber M. A pipe, P, connected with the chamber J, is also formed into a coil or helix, Q, around the pipes I H, above the chamber J, the helices O Q being connected by the short vertical pipe R. A blow-off pipe, *j*, provided with the stop-cock *h*, is connected with the chamber J, and there is a test or pet cock, *g*, connected by the pipe *r* with the chamber M. A glass gage-tube, S, is arranged at one side of the body A, its upper end being connected to the pipe H by the horizontal pipe T, and its lower end to the chamber J by the pipe U.

Disposed near the body A there is a vertically-arranged tube or hollow cylinder, W, provided with closed ends or heads *p p*. A steam-education pipe, V, connected with the dome G, passes centrally through the cylinder, and around this pipe, within the cylinder, a section of the induction-pipe L is coiled, as shown. Leading from the dome G there is also an education steam-pipe, 20, provided with a relief-valve, 26, and with a pipe, 21, connecting with the indicator or steam-gage 22.

In the use of my improvement, a fire is started in the ordinary manner, in the fire-pot K, and water let into the apparatus through the pipe L, the stop-cock 23 in the pipe V being open. On entering the generator the water is first carried to the upper part of the body A, where it passes into the chamber M through the surrounding coil L'. This chamber being over the fire-pot and in the direct path of the escaping hot air, gases, and products of combustion, the heat therefrom, which would otherwise be largely wasted, is utilized to its greatest

extent in heating the water and converting it into steam. From the chamber M the steam and water pass downwardly through the helix O, pipe R, helix Q, and pipe P into the chamber J, the water being converted into steam on its passage, and the steam superheated in said last-named chamber, from which it rises through the pipes I H into the dome G, where its temperature is maintained by the hot air and products of combustion passing through the ports or flues *a*, which open through the head D in juxtaposition to the dome. The feed-water is heated before it enters the generator, on its passage through the coil in the cylinder W, by radiation from the pipe V, thereby utilizing the heat of the steam after it leaves the generator and reducing its temperature, whereby it is better adapted for use as a motor.

The jacket B is designed to prevent the waste of heat radiating from the body A, the air, which enters at *f*, being heated, and rising through the cap E and impinging on the dome G, thereby not only assisting to maintain the temperature of the steam in said dome, but aiding to keep up the draft through the funnel F.

The superposed helix O, being detachably connected with the helix Q, may be readily removed for repairs, when necessary, without disturbing the latter helix, and vice versa.

The body A is designed to be connected by nuts and bolts and cemented or air-tight joints to the head D and bottom C, but in such a manner as to be readily detachable therefrom.

A check-valve, 24, is provided to prevent the reflux of water through the pipe L, and also proper shut-off cocks, 25, at the upper and lower ends of the gage S. If, on account of a low fire or any other reason, the water is not fully converted into steam in the chamber M and helices O Q, its evaporation will be completed in the chamber J and pipes I H, the gage S indicating the amount of water in the

superheating-chamber and said pipes. The pipe *r* and cock *q* also afford a ready means of ascertaining the degree of evaporation taking place in the chamber M.

The hydrocarbon oils may be used for fuel, if desired, instead of coal, by means of proper burners and other appliances disposed in the fire-pot, the oils being introduced through the pipe 27.

Having thus explained my invention, what I claim is—

1. The improved steam-generator herein described, the same consisting of the body A, provided with the jacket B, head D, bottom C, fire-pot K, cap E, and funnel F, the induction-pipe L, chamber M, helices L' O Q, chamber J, pipes I H, dome G, relief-valve 26, and eduction-pipe V, constructed, combined, and arranged to operate substantially as set forth.

2. In a steam-generator, the dome G, in combination with the head D, pipes I H V, and cap E, constructed and arranged to operate substantially as shown and described.

3. The combination of an exterior casing or combustion-chamber, a close chamber, M, within said combustion-chamber, a spirally-coiled pipe, L', surrounding said close chamber, the upper end of said coil being connected to a water-supply pipe passing through the combustion-chamber, the lower end thereof entering the bottom of said close chamber, an eduction-pipe, N, leading from the top of said close chamber, and a coil below said close chamber connected with said eduction-pipe, substantially as described.

4. In a steam-generator, the gage S, in combination with the superheating steam-chamber J and pipes H U T L, substantially as set forth.

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Witnesses:

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