

(No Model.)

F. M. BROWN.
STEAM GENERATOR.

No. 264,819.

Patented Sept. 19, 1882.

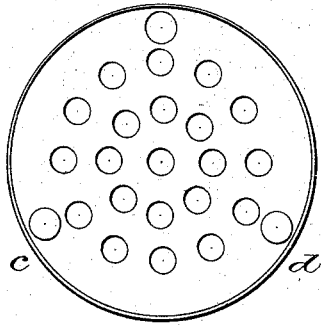


Fig. 4.



Fig. 3.

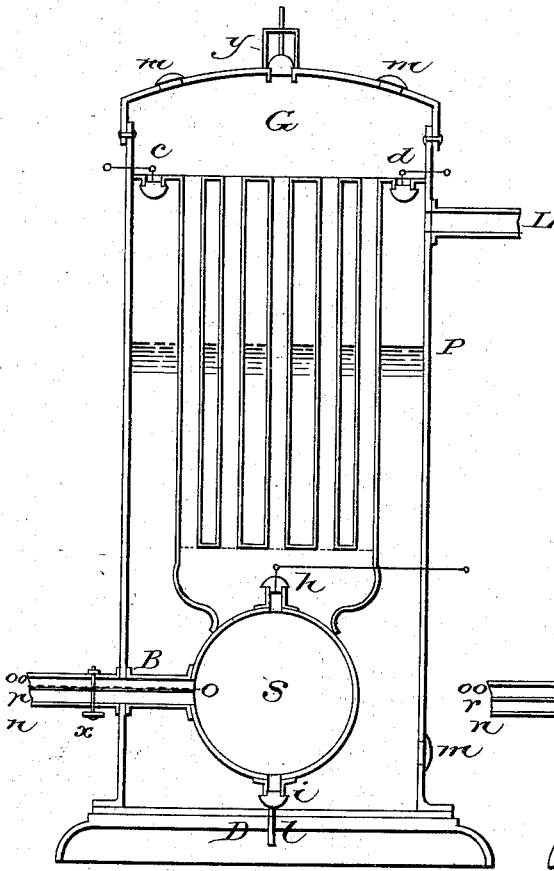


Fig. 2.

Witnesses:

James R. Carret
J. A. Thayer.

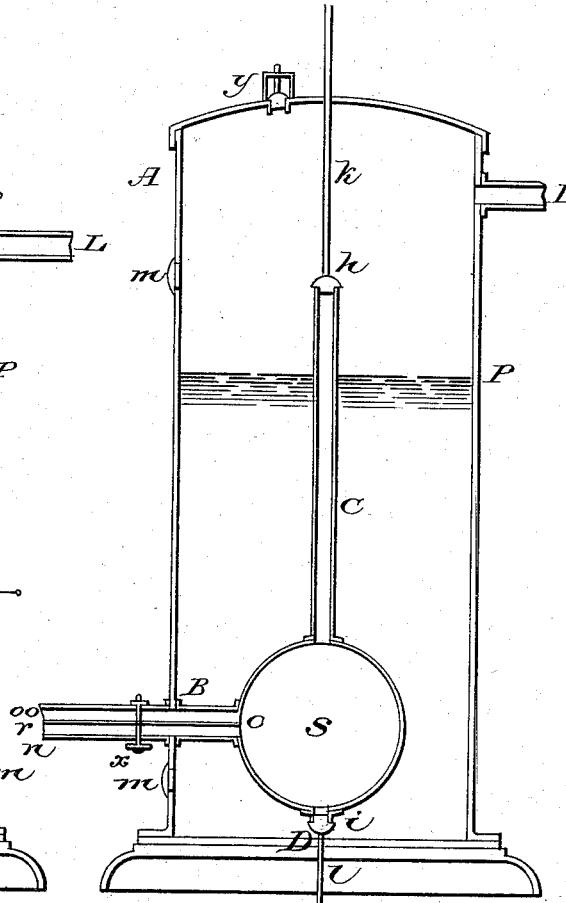


Fig. 1.

Inventor:

Fredrick Montrose Brown
By Joseph A Harris
Attorney.

UNITED STATES PATENT OFFICE.

FREDERICK MONTROSE BROWN, OF WARREN, RHODE ISLAND, ASSIGNOR
OF ONE-HALF TO JOSEPH A. HARRIS, OF BOSTON, MASSACHUSETTS.

STEAM-GENERATOR.

SPECIFICATION forming part of Letters Patent No. 264,819, dated September 19, 1882.

Application filed November 16, 1881. (No model.)

To all whom it may concern:

Be it known that I, FREDERICK MONTROSE BROWN, a citizen of the United States, residing at Warren, in the county of Bristol and State of Rhode Island, in the United States of America, have invented a new and useful Improvement in Steam Boilers and Generators, of which the following specification, taken in connection with the drawings making a part of the same, is a full, clear, and exact description thereof.

My invention relates to an improvement in and a means for materially altering the construction of steam boilers and generators by distributing the heat into and through the water without radiating it in the usual manner through the outside iron plate, but imparting it directly to the water by means of an apparatus constructed within the boiler for generating heat, exploding in a suitably-constructed vessel or reservoir placed inside the boiler certain compounds resulting from the mixture of light or liquid hydrocarbons with atmospheric air; or employing any composition of explosive mixture, or suitable compounds possessing the constituents of carbon, hydrogen, and oxygen in proper and suitable proportions, to furnish, when ignited or exploded, the required heat for generating steam, thereby effecting a great saving of fuel, insuring greater safety, much reducing the space and size of the boiler, effecting a saving of labor and expense in care and attention of the same, and greatly increasing the efficiency of steam, the same being designed for use with motors.

The novelty is here shown in a simple form of boiler or iron structure of suitable dimensions, in which is placed a suitably-constructed vessel or reservoir proportioned to the size of the boiler or structure, and the required consumption of the steam or gas produced, and into which is injected by suitable and convenient means proper and suitable compounds or explosive agents, which, upon being so introduced into the reservoir, are caused to be exploded within the same by means of an electric current suitably arranged; or the compound

may be of such a nature as to produce a spontaneous combustion within the reservoir when injected without the aid of an electric current, these operating in connection with pipes and valves so as to practically combine boiler and heater and impart additional properties to the steam.

In the drawings I have represented an ordinary upright boiler as being the more simple form of showing the principle; but any other form of steam-boiler may be arranged to exhibit my invention. To adapt and construct the same would require changes of arrangement which any competent constructor would understand, but would not involve any change of principle. I however also show the improvement in a tubular boiler, where the tubes will always serve the purpose of absorbing or retaining and conducting a portion of the heat developed, the remainder being imparted through the valves either to the steam or the water at such times and in such quantities to either as may be desired, in the first instance superheating the steam and imparting to it greater expansive force, and in the other imparting an additional heat directly to the water, when desired.

Referring to Figure 1, A represents the boiler or structure.

S is the vessel or reservoir located at a safe and convenient place within the boiler, strongly constructed, and secured to it by bolts or suitable fastenings, and having the connections hereinafter described.

B is a nozzle or induction pipe, which passes through the side of the boiler and into the reservoir S, being firmly secured to them both, and is provided with two suitable channels or inlets, *r* and *n*, the former admitting to the reservoir by a pump or suitable means a proper quantity of atmospheric air, and the latter by suitable or convenient means is connected with a pump or suitable appliance for supplying through said inlet *n*, to said reservoir a sufficient and proper quantity of petroleum or other composition of explosive mixture designed to be employed, or to combine with a sufficient

and proper quantity or volume of air in said vessel or reservoir S.

The line *o o o* represents the electric current or wires by means of which the charge or successive charges of explosive compound may be fired within the reservoir.

The capacity of the two inlets *r* and *n* may be regulated or controlled by means of screw-valves at *x*, in addition to other means provided for admitting at the proper time or times to the reservoir the proper relative quantities of said compound and air for explosion therein.

I may here say that in general the proper proportions have been found to be twelve parts air, by volume, to one of carbureted hydrogen, or eight parts, by volume, of air to one of common coal-gas; but other chemical means may be employed to produce a compound which upon ignition will be followed by a complete combustion. Differences in the chemical constituents of the gas or compound employed will probably require variations in supplying the necessary proportions of atmospheric air; or the compound may be of such a nature as to explode spontaneously when injected. The total heat of the explosion produced could be calculated theoretically from the composition of the explosive mixture employed by the aid of established data obtained from scientific experiments or according to well-known formulas. The expansive force of the steam or gases produced by this method will not depend upon the size of the reservoir in which the explosion takes place; but the degree and number of explosions produced per minute would regulate or be a measure of the heat, and consequently of the power of the generated product. Necessarily small explosion-reservoirs would be used. The pumps by which the air and compound are inducted may be operated by any suitable means and controlled by hand at any convenient point.

h and *i*, Fig. 1, are two eduction-valves, suitably constructed and arranged to open when the heat or pressure from any cause exceeds the prescribed limit, the former allowing the product of combustion to enter and mix with the steam above the water-line *p*, thereby greatly increasing its properties of expansion and pressure, and the latter allowing the products of combustion to pass into the heated water in the boiler. Each of the valves is provided with jointed connecting-rods *k* and *l*. They are supported or held firmly in position by suitable means, and may each have suitable appliances, if required, to cause them to close.

To provide for the proper ignition of the explosive mixture within the reservoir, the electric wires *o o* may be passed from a convenient battery through small apertures or suitable passages in the induction-pipe B to a suitable or convenient point of explosion within the boiler, and so arranged as to fire the charges inducted in rapid succession, thus

supplying a constant combustion in the reservoir S.

m m m are hand-holes for gaining access to the valves.

C and D are pipes connecting reservoir and valves.

L is the steam-pipe.

Fig. 2 shows the apparatus in a tubular boiler arranged so as to radiate any portion of the heat into and through the tubes by means of the valve *h*.

Similar letters in the drawings are intended to refer to similar parts.

c and *d*, Fig. 2, are induction-valves (provided with suitable connecting-rods and kept firmly in position by suitable means) for admitting any desired quantity of the heated air or gas in the chamber G to pass down into the steam for the purpose of superheating the same. Screens or iron plates with holes may be arranged to surround each valve shown in the drawings.

y is a safety-valve.

Fig. 3 represents a section of nozzle B, showing inlets *n* and *r* and the aperture for admitting the electric current *o o*. Fig. 4 represents a view of the top tube-sheet, showing the position of the valves *c d*.

I do not confine myself to the construction or arrangement of the several parts of the apparatus as here described and shown, for the improvements which constitute my invention can be applied to any form or style of boiler; but I desire to include any apparatus or boiler which employs a vessel or reservoir within it to contain explosive compounds to generate and develop combustion within the same by explosion or a succession of explosions, radiating heat into and through the water, thus practically combining heat-generator and boiler and imparting additional properties of expansion and force to the steam so generated.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. The within-described apparatus or organisms in combination, consisting of a boiler or vessel, A, for containing water, a reservoir, S, within said boiler for receiving air and explosive compounds in proper proportions for explosion therein, eduction-valves *h* and *i*, and the induction pipe or nozzle B, passing through the side of the boiler and into said reservoir, provided with inlets for supplying air and explosive compounds, and arranged to admit an electric current for igniting the charges within said reservoir, all operating substantially as and for the purposes specified.

2. In a tubular steam-boiler, the arrangement for exploding igneous compounds within the same, and using products of combustion, consisting of reservoir S, nozzle B, chamber G, and valves *h*, *i*, *c*, and *d*, constructed and operating substantially as and for the purposes described.

3. The improvement in the art of generating

steam by the use of inflammable compounds introduced and exploded within a reservoir contained in a steam-boiler for producing heat, and also consisting of mixing the gases or products of combustion from said reservoir with the water in said boiler and the steam generated therefrom, as herein described.

In testimony that I claim the foregoing I

have hereunto set my hand and seal this 7th day of November, A. D. 1881.

FREDERICK MONTROSE BROWN. [L. S.]

Witnesses:

ISABEL F. HARRIS,
S. G. BROWN.