

No. 735,045.

PATENTED JULY 28, 1903.

G. E. WHITNEY.
STEAM GENERATOR.

APPLICATION FILED NOV. 27, 1899.

NO MODEL.

2 SHEETS—SHEET 1.

Fig. 1.

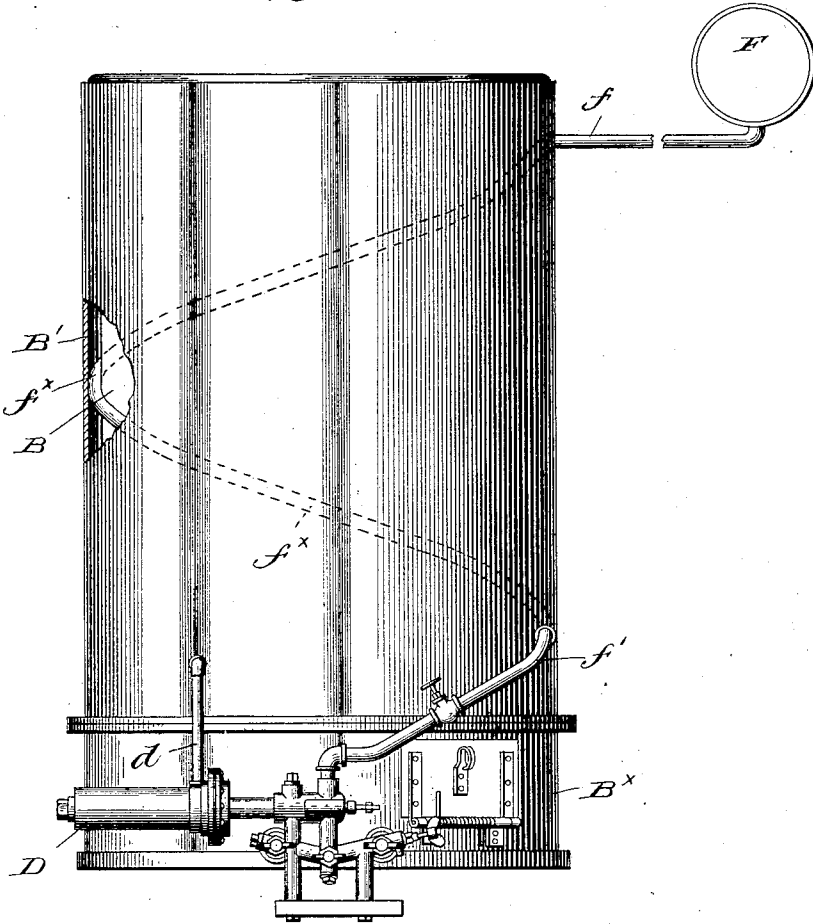
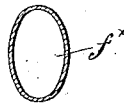


Fig. 2.



Witnesses:

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George L. Dolbear.

Inventor:

George E. Whitney.

by *Crosby & Gregory*
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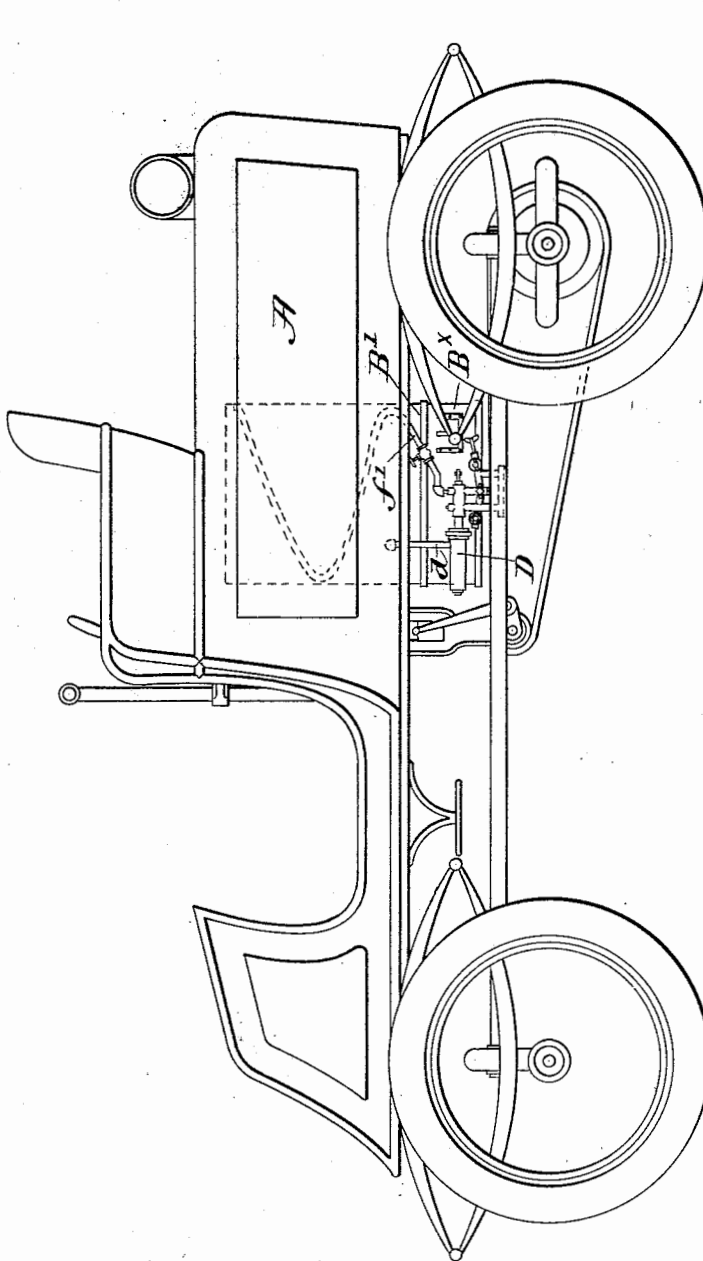
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2 SHEETS—SHEET 2.

Fig. 3:



Witnesses:
James B. Booth
Ernest S. Emery

Inventor,
George E. Whitney,
by Frederick L. Emery
Att'y.

UNITED STATES PATENT OFFICE.

GEORGE E. WHITNEY, OF BOSTON, MASSACHUSETTS.

STEAM-GENERATOR.

SPECIFICATION forming part of Letters Patent No. 735,045, dated July 23, 1903.

Application filed November 27, 1899. Serial No. 738,317. (No model.)

To all whom it may concern:

Be it known that I, GEORGE E. WHITNEY, of Boston, county of Suffolk, State of Massachusetts, have invented an Improvement in Steam-Generators, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

This invention relates more particularly to that type of steam-generator wherein the boiler is heated by naphtha, kerosene, gasoline, or other suitable liquid fuel supplied to a combustion-chamber provided with one or more suitable burners, the liquid fuel being vaporized and provided with a proper quantity of air to support combustion in the chamber. Usually vaporization of the liquid fuel is produced by exposing a portion of the supply pipe or conduit to the direct heat of the burner or burners in the combustion-chamber, and such practice is open to two serious practical objections. The high temperature to which the fuel is there subjected is sometimes so high as to carbonize a portion of the fuel, and this solid matter or carbon is deposited and collects in the supply-pipe and various adjacent communicating portions of the apparatus, stopping up or clogging the orifices, so that the operation of the apparatus is seriously hampered, necessitating frequent and often expensive cleaning. If a diaphragm-controlling device for the fuel-feed is used, the latter is rapidly rendered inoperative by the carbonaceous deposit. Again, when the burners are shut off the temperature of the combustion-chamber lowers very rapidly to a point below that necessary to maintain the fuel near the burners in vaporized condition, so that when it is desired to again start the apparatus some other means must be employed to effect initial vaporization of sufficient fuel to start the burners. This is very objectionable in the case of steam-motor vehicles, which are often stopped for short intervals, for while the boiler remains hot for a long time even after the heater is rendered inoperative the fuel must be vaporized initially each time that the fuel is shut off for a stop, resulting in annoyance to the operator and loss of time.

In my present invention I have utilized the heat of the boiler to sufficiently vaporize the

fuel before it reaches the burner, so that I absolutely obviate any carbonization due to too intense heat, with the resultant objectionable features, and in addition I am enabled to shut off the fuel from time to time when desired and yet maintain a sufficient portion of fuel vaporized to at once start the burner again when desired without trouble or delay so long as the boiler retains sufficient heat to effect vaporization.

Figure 1 in elevation represents one form of liquid-fuel steam-generator with one embodiment of my invention applied thereto, and Fig. 2 is an enlarged cross-section of the fuel supply or feed pipe to be referred to. Fig. 3 is a side elevation of a motor-vehicle to which has been applied one embodiment of my invention.

I have herein shown the steam-generator as comprising an upright boiler, the shell B (see dotted lines) being inclosed in a suitable jacket B', a combustion-chamber and suitable burners of the type customarily employed with generators of this class and ordinarily burning a mixture of vapor and air being provided in the base portion B^x of the boiler. Any suitable tank or receptacle F, Fig. 1, for liquid fuel is connected with the burners by a supply-pipe *f*, the fuel-feed being controlled in any desired manner, and herein I have shown a diaphragm-controlling device D, the diaphragm (not shown) controlling the fuel-inlet valve, a spring acting on one side of the diaphragm and the pressure within the boiler acting on its opposite side by or through the pipe *d* in well-known manner. I utilize the heat of any portion of the boiler of sufficiently-high temperature preferably to vaporize the fuel, and herein I have shown the fuel-supply pipe *f* as passed in spiral form, as at *f*^x, (see dotted lines,) around the shell of the boiler between it and the jacket B' to extend in close proximity to the water-space therein, so that the fuel is vaporized when it passes through the pipe *f*' to the inlet-valve. After the apparatus has been once started up and the boiler thoroughly heated the boiler-water, which absorbs and retains the heat, is adapted to maintain the fuel within the supply-pipe in a heated and vaporized condition, and it will be manifest that the fuel can be altogether shut off from the burner, so that the

steam and the combustion-chamber may become quite cool without losing the effect of boiler heat in maintaining a sufficient portion of the fuel vaporized in readiness to again start the burner when desired. In the arrangement herein shown I prefer to somewhat flatten the portion of the fuel-supply pipe passed between the boiler shell and jacket, thereby to add to the area of the pipe presented to the boiler and to retain the proper cross-sectional area of the pipe even in the narrow clearance-space in which it is located. The heat thus applied to the fuel is not enough to carbonize any part of it, so that there will be no clogging or stoppage of passages or valves from that cause.

In Fig. 3 I have shown a typical form of steam-motor vehicle A equipped with my improved form of steam-generator in a manner which will be apparent to those skilled in the art.

Various other arrangements of the fuel supply or feed pipe may be made to utilize the boiler heat to effect the desired result in accordance with my invention, for I have shown one practical embodiment thereof without attempting to illustrate the various changes or modifications thereof which might be devised without departing from the spirit and scope of my invention.

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

1. In a motor-vehicle a steam-boiler, a liquid-fuel burner therefor, and a spiral fuel-supply pipe for said burner arranged to convey its contents close to the water in said boiler to cause vaporization of such contents by the heat of said water.

2. In a motor-vehicle, a steam-boiler, a liquid-fuel burner therefor, and a spiral fuel-supply pipe for said burner arranged in close proximity to the boiler-shell, to substantially embrace the water-space therein to cause vaporization of its contents by the heat of the boiler-water.

3. In a motor-vehicle a vertical steam-boiler, a liquid-fuel burner therefor, and a fuel-supply pipe traversing substantially the length of said boiler and in close proximity to the steam and water spaces therein, to cause contents of said pipe to be heated and vaporized by the heated water and steam when present in the boiler and by heated water alone when steam is absent.

4. In a motor-vehicle a steam-boiler, a liquid-fuel burner therefor, and a spiral fuel-supply pipe encircling the axis of said boiler

and the water-space therein and arranged to bring its contents into close proximity with the water in said boiler to be vaporized thereby.

5. In a motor-vehicle a vertical steam-boiler, a liquid-fuel burner therefor, a source of liquid-fuel supply, a supply-pipe leading from said source to said burner, and traversing substantially the length of the water-space of said boiler and arranged to bring its contents into close proximity to the water in said boiler to be vaporized thereby, and means to feed the fuel through said pipe during absence of steam in said boiler.

6. The combination with a boiler and burner for burning a mixture of vapor and air of a continuous oil-supply pipe leading to the burner and a heater for the pipe, independent of the burner but heated thereby, consisting of a substance that will absorb and retain the heat and adapted to maintain the fluid in a vaporized condition in the oil-pipe after the cooling of the steam and the parts of the apparatus other than said heater, and a valve in said pipe between the heater and the burner, substantially as described.

7. In a motor-vehicle a boiler, a burner therefor, constructed to burn fuel-vapor, a source of liquid-fuel supply, a conduit leading therefrom to said burner, means to feed the fuel through said conduit to said burner, and conduit-heating fuel-vaporizing means, independent of the burner but heated thereby, consisting of a substance that will absorb and retain the heat and adapted to maintain fluid in said conduit, in a vaporized condition after the cooling of the steam and parts of said apparatus other than said heating means.

8. In a motor-vehicle a boiler, a burner therefor constructed to burn fuel-vapor, a source of liquid fuel-supply, a vaporizing-conduit leading therefrom to said burner, said conduit being arranged relative to the water-space of said boiler so as to conduct the contained fuel close to and to be heated and vaporized by the heated water in said boiler, thereby to furnish fuel-vapor for said burner when parts of the apparatus other than the parts immediately contiguous to the water-space have cooled.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

GEORGE E. WHITNEY.

Witnesses:

LAURA S. MANIX,
FREDERICK L. EMERY.