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F. E. & F. O. STANLEY.

MEANS FOR VOLATILIZING GASOLENE.

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NO MODEL.

Fig. 1.

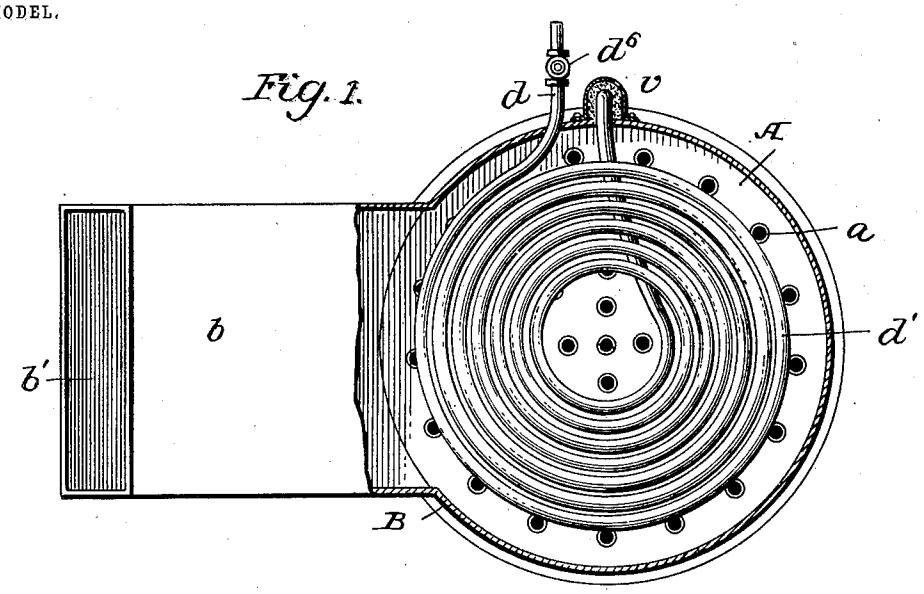
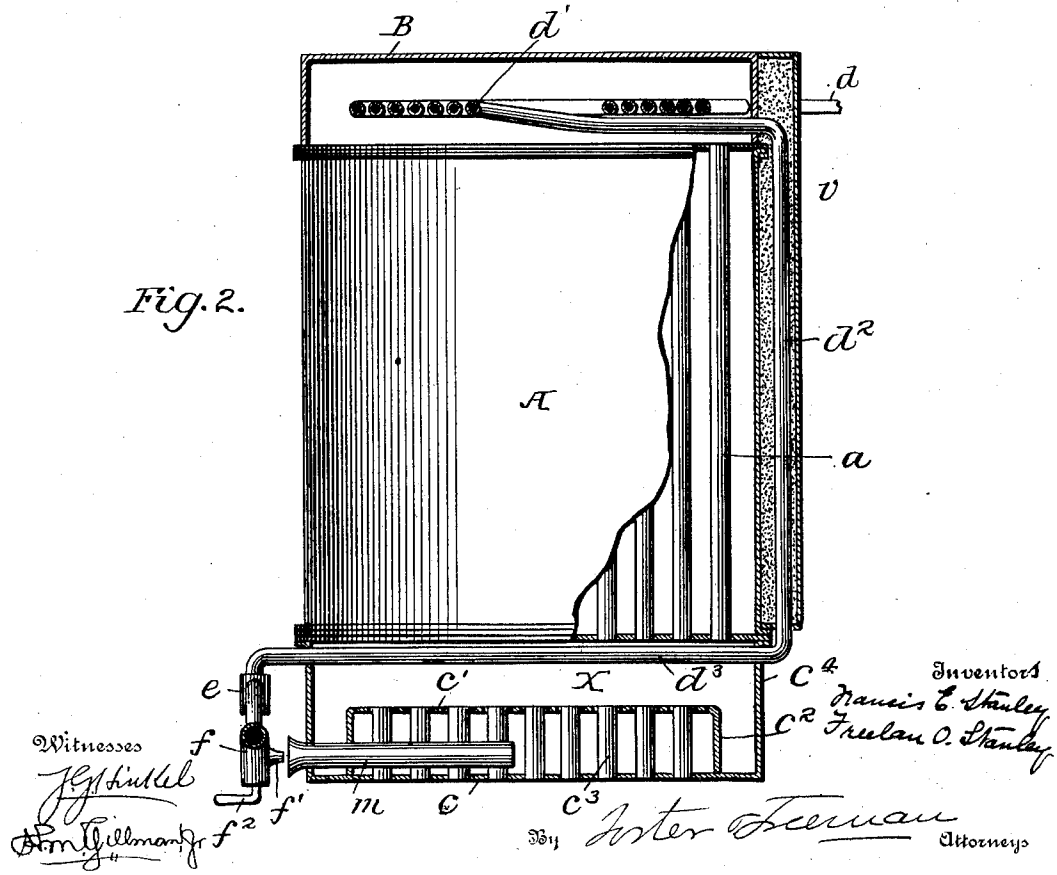


Fig. 2.



Witnesses

J. J. Little

Wm. Gillman Jr.

Inventors

Francis E. Stanley

Freelan O. Stanley

By Foster Freeman Attorneys

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UNITED STATES PATENT OFFICE.

FRANCIS E. STANLEY AND FREELAN O. STANLEY, OF NEWTON, MASSACHUSETTS.

MEANS FOR VOLATILIZING GASOLENE.

SPECIFICATION forming part of Letters Patent No. 737,879, dated September 1, 1903.

Application filed November 8, 1901. Serial No. 81,622. (No model.)

To all whom it may concern:

Be it known that we, FRANCIS E. STANLEY and FREELAN O. STANLEY, citizens of the United States, residing at Newton, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Means for Volatilizing Gasolene, of which the following is a specification.

In that class of burners for steam-generators in which a hydrocarbon liquid has been employed it has been common to volatilize or vaporize the liquid before it reached the burner by subjecting a portion of the conducting-pipe to the action of the flame of the burner or to the heat arising therefrom in the combustion-chamber. This is effective to the extent of securing the desired combustible vapor during the operation of the burner; but practical experience has demonstrated that it is not in itself sufficient to meet all conditions of service. Sometimes it is desirable to shut off the flow of vapor to the burner for a more or less extended period, leaving only a pilot-light burning, and sometimes it is desirable to extinguish the pilot-light also. Under such conditions the combustion-chamber and the conducting-pipe will frequently cool off to such an extent, owing to the admission of cold air to the burner and combustion-chamber, as to be incapable of vaporizing the liquid hydrocarbon, and when the valve controlling the flow to the burner is again opened liquid fuel will be delivered to the burner and cause more or less trouble. It is further now common to maintain the conducting-pipe hot and its contents in a vaporized condition by extending such pipe through the boiler; but this reduces the available steam-producing area and in case of leakage permits the steam or water to flow into the oil-pipe. To overcome these difficulties is the object of our present invention.

In the accompanying drawings, Figure 1 is a sectional plan showing the arrangement of the vaporizing-tube in respect to a vertical tubular boiler. Fig. 2 is a sectional elevation.

The boiler A is of a well-known type, having a series of vertical fire-tubes a and a casing or hood B over the top of the boiler, into which the products of combustion and heated air which pass up the fire-tubes enter. This casing, as shown, has a lateral extension b, having an upward opening b', out of which the products of combustion normally escape. The burner, as shown, is also of a well-known type and consists of a bottom plate c, provided with a number of perforations, and a top plate c', located a short distance above it and provided with a like number of perforations, and these plates are set in parallel horizontal planes and are secured together by a vertical side wall c^2 of circular shape, thereby forming a vapor-receiving chamber. A number of short tubes c^3 are expanded into the perforations of said top and bottom plates and constitute air-passages which pass through but do not communicate with the vapor-receiving chamber. The top plate is provided with a series of small orifices preferably arranged in groups or circles around or concentric to the tubes c^3, and the vapor will pass from the vapor-receiving chamber up through these orifices to be burned. This burner is supported by a circular shell c^4, which is secured to and depends from the bottom of the boiler, thereby providing a combustion-chamber X above the vapor-receiving chamber and below the bottom of the boiler.

The liquid hydrocarbon contained in a tank (not shown) is conveyed along a pipe d under suitable pressure, and said pipe d enters the hood or casing B and is connected to one end of a coil d', supported within the casing to be in the path of the products of combustion or heated air as the same passes from the fire-tubes to the place of escape. The other end of the coil d' is connected to a pipe d^2, which extends down alongside the boiler and is connected at its lower end to a vaporizing-pipe d^3, which, as shown, may extend across the combustion-chamber X and is connected to a valve-casing e, which has depending from it a short pipe the lower end of which is connected with a valve-casing f, having a delivery-nozzle f' at one end, which is provided with a shut-off valve f^2. The nozzle f' discharges into a tube m, which extends into the vapor-receiving chamber. The pipe

d^2 will preferably be inclosed in a casing v, with a surrounding jacket e to prevent radiation of heat. Other means, however, may be employed to restrict radiation of heat from the contents of the pipe d^2. The pipe d is provided with a valve d^6, which controls the supply of liquid hydrocarbon.

In starting burners such as described when the boiler is cold it is customary to use a special heater to vaporize the liquid hydrocarbon in the supply-pipe in order that vapor only may be delivered to the burner, and such will be necessary in the present case. After the main burner has once started and steam has been generated the coil d' in the casing B will become highly heated, and as there is a considerable length of pipe in the coil and corresponding large heating area the liquid fuel will become vaporized before it reaches the pipe d^2, and as the latter is protected from undue radiation of its heat and owing to the degree to which it is heated the vapor will not be so liable as heretofore to condense under ordinary conditions in the pipe d^3. Supposing, then, that the automatic shuts off the supply of vapor to the main burner and it remains shut off for several minutes, as is frequently the case when coasting down long grades, when the throttle is again opened and steam-pressure in the boiler reduced to permit the automatically-controlled valve to again open vapor will at once flow to the burner, because the heat of the boiler shell and tubes and of the burner-casing will heat the air flowing upward and in contact with the coil d', which will thus be preserved at a temperature to vaporize the contents, especially as the latter in such case are held stationary in the coil when the flame is cut off or greatly reduced. If the pilot-light remains burning after the main burner is extinguished by the action of the automatic, the flow to the burner is so limited that the contents of the coil have ample time to become vaporized, even if the temperature of the coil is greatly reduced. The same results will follow when the main burner is extinguished by closing the valve f^2—as, for instance, when it it desired to make a stop for sometime—and in this case the pilot-light may also be extinguished, and when the valve f^2 is again opened the main burner may be lighted with a match.

We have illustrated a special type of burner and a special type of boiler and hood simply because they are well known; but we do not limit the use of our present invention to boilers and burners of the type illustrated. The essential features of our invention are that the vaporizing-coil shall be subjected to the heat of the products of combustion after they have performed their function of heating the water in the boiler and to the air heated by passing upward through the burner and boiler.

Obviously the pipe d, coil d', pipe d^2, and pipe d^3 could be a continuous pipe bent to make the coil and the necessary turns, and when we have used the word "connected" in relation to the parts we mean connected by a joint or by being integral one with the other.

Without limiting ourselves to the details of construction and arrangement shown, we claim—

1. The combination with the boiler, vapor-burner provided with a mixing-tube, intermediate combustion-chamber, nozzle opposite the mixing-tube, and hood over the boiler, of a vaporizing-coil extended within the hood above the flues of the boiler to be heated by gases passing upward through said flues, and a pipe-section extending between the burner and bottom of the boiler communicating with the coil and arranged to conduct the vapor from the coil across the burner and to the nozzle, substantially as set forth.

2. The combination with a boiler, a vapor-burner having a mixing-tube and nozzle, a combustion-chamber and a hood into which the products of combustion flow after imparting heat to the water in the boiler, of a vaporizing-coil in the hood communicating with the oil-supply pipe and arranged to be heated by the products of combustion passing from the boiler-flues, a pipe-section extending through the combustion-chamber and connected with the nozzle, and a pipe-section connecting one end of the coil with the pipe in the combustion-chamber to supply the nozzle with vapor generated in the coil, substantially as set forth.

3. The combination with a boiler, a burner, nozzle and casing supporting and communicating with the nozzle, a combustion-chamber and a hood into which the products of combustion flow after imparting heat to the water in the boiler, of a vaporizing-coil arranged in the hood to be heated by the products of combustion, a pipe supplying oil to said coil, a pipe extending through the combustion-chamber and connected to the nozzle-casing, a pipe outside the boiler connecting one end of the coil with the pipe in the combustion-chamber, and means to restrict radiation of heat from the outside pipe, substantially as set forth.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

FRANCIS E. STANLEY.
FREELAN O. STANLEY.

Witnesses:
J. W. BACON,
C. A. HARRINGTON.