J. STUBBERS.

HYDROCARBON VAPOR GENERATOR CONTROL.

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1,042,988.

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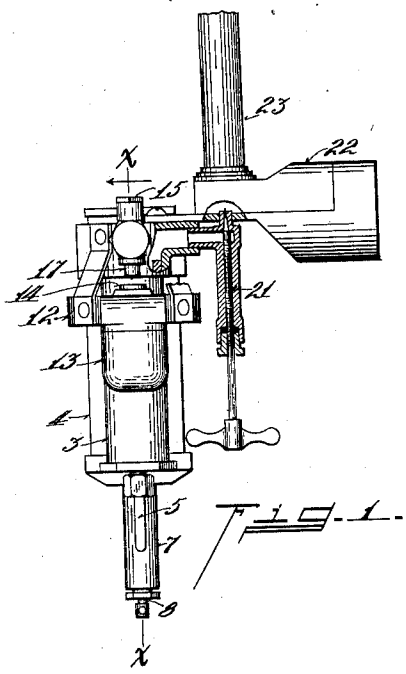
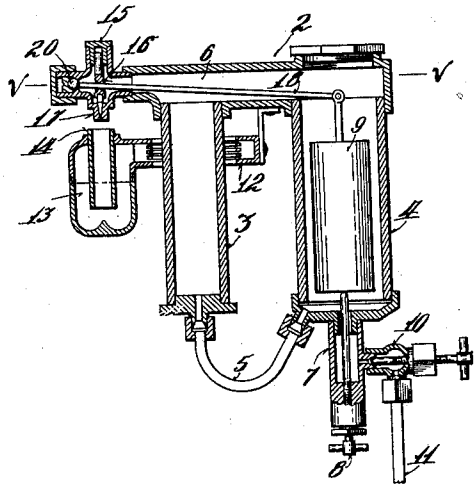


Fig. 1.



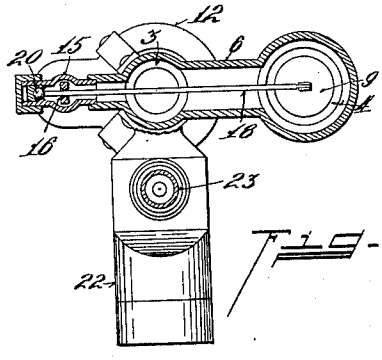


Fig. 3.

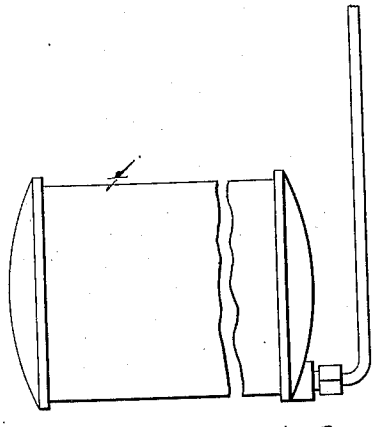


Fig. 2.

Witnesses

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HYDROCARBON-VAPOR-GENERATOR CONTROL.

1,042,988. Specification of Letters Patent. Patented Oct. 29, 1912.

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To all whom it may concern:

Be it known that I, JOSEPH STUBBERS, a citizen of the United States, residing at Covington, in the county of Kenton and State of Kentucky, have invented certain new and useful Improvements in Hydrocarbon-Vapor-Generator Control, of which the following is a specification.

My invention relates to an improved generator for hydro-carbon vapors, with means for automatically controlling the sub-burner.

One of the objects of this invention is to provide means to automatically control the sub-burner according to the amount of gas used for service, first, in order that a minimum amount of vapor may be used for generating; second, to avoid the over-heating of the generator; and third, to insure a sufficient volume of generation under all conditions.

If the sub-flame is not regulated on a generator of this type, it will be necessary to have the sub-flame amply large at all times to generate a sufficient volume of vapor, for the maximum consumption of the service system, and in providing for this, considerable allowance must be made for the contingency of the needle valve becoming clogged, and it is very essential that the sub-flame should always make as much vapor as is discharged into the service system. If this supply fell short of this requirement, the liquid gasolene would be discharged into the vapor delivery valve, which would be extremely hazardous. If, on the other hand, very little or no gas is used for service and a large flame is burning at the generator, the vapor pressure in the generator will force the liquid back into the tank, and the heat applied to the generator under these conditions will heat it to such an extent, that it is liable to be destroyed.

Another object of my invention is to provide means for automatically controlling the size of the sub-burner flame, so that its volume will be proportionate to the demands of the service-system, thus generating more or less vapor as required.

Another object of the invention is to provide means governed by the consumption of the vapor for automatically transferring the liquid hydro-carbon from the reservoir into the generator, so as to keep the same constantly supplied at the proper level.

Another object of my invention is to provide the generator with a float controlling the vapor valve leading into the sub-burner, so that the height of the liquid in the generator regulates the position of the valve, and also to provide means, whereby the hydro-carbon vapor is automatically supplied to the sub burner for the generator proportionately to the requirements of the service system.

Another object of my invention is to provide an improved type of generator sub-burner, mixer and vapor valve.

It is broadly the object of the invention, however, to provide means for automatically controlling the supply of hydro-carbon vapor to the sub-burner, through changes of the liquid level in the generator.

It is also broadly the object of the invention to produce an apparatus of the character indicated, in which a minimum flame will be maintained at the sub-burner, with means for automatically increasing the flame proportionate to the number of service burners in commission at a given time, and decreasing the same to the minimum, when the service burners are shut off, said controlling means being also functional in automatically furnishing an appropriate supply of liquid hydro-carbon from the reservoir to a generator somewhat removed therefrom.

Other features of the invention are more fully set forth in the description of the accompanying drawings, forming a part of this specification, in which:—

Figure 1 is a front elevation of the generating apparatus partly in section. Fig. 2 is a section on line x, x, Fig. 1. Fig. 3 is a plan section on line v, v, Fig. 2.

1 represents an inclosed reservoir tank, preferably located under ground in proximity to the basement of the building, where the generator is to be placed. This tank is to be filled through an externally opened conduit, not shown, and an air pressure, say of twenty pounds, is maintained in said tank above the liquid level.

2 indicates the generator apparatus, preferably composed of two independent cylindrical chambers 3, 4, having a liquid communication through pipe 5 at the bottom, and a vapor communicating conduit 6 at the upper end of the cylinder. The chamber 4 which is the float chamber, has a downward extension 7, in which is adjustably supported a stem 8, the upper end of which pro-

jects into the chamber 4 and serves as a limiting support for the float 9, and by means of which said float can be raised or lowered, for purposes to be hereinafter described.

10 represents a valve communicating with tube 7, and 11 a pipe leading from said valve to the lower portion of said tank 1.

12 represents an annular sub-burner, surrounding the upper portion of the generator proper or cylinder 3.

13 represents a mixing chamber formed upon one side of the sub-burner and communicating therewith.

14 represents a tube, screw threaded into the neck of the mixer 13 and open at both ends for convenient removal in cleaning the mixer, the lower end of the tube lying below the line of communication between the mixer and sub-burner.

15 represents a vapor valve formed at the end of conduit 6, and having a passage-way axially alined therewith.

16 represents a plunger needle valve controlling the valve nozzle 17, which is alined with and occupies a position just above the upper end of tube 14, in position for delivering vapor and entraining air downwardly into said mixer. The plunger needle valve 16 is vertically movable to control the area of the vapor discharge nozzle 17.

18 represents a rod in the conduit 6, one end of which is connected to the float 9, the other end of which has a ball bearing 20, supported in the outer end of the valve 15, the plunger valve 16 being connected to said rod 18, between said ball fulcrum and its point of attachment to the float.

21 represents a needle valve connecting with the upper end of the generator, for delivering vapor into a mixer 22, whereby vapor and air are entrained into the service pipe 23, leading to the service burner. The tube 14 is functionally a fuel inlet member for the sub-burner 12, and being alined adjacent to the needle valve 15, vapor with entrained air is admitted or delivered in a mixed condition into the said fuel inlet and conveyed to the sub-burner.

The tank 1 is properly filled with a liquid hydro-carbon, leaving a space for a superimposed air cushion or pressure chamber maintained, say under twenty pounds normal pressure, the generator being then heated by any suitable means and the valve 10 opened and the liquid forced into the chambers 3, 4, to about the level of the sub-burner. The sub-burner is then lighted and generation is started with the service-burners closed. The float 9 is regulated by the stem 8 to such a position, that it will rest upon the upper end of the stem 8, under conditions of minimum sub-flame, opening the nozzle 17 just sufficiently to supply the sub-burner with the volume of mixed air and vapor necessary to maintain a minimum flame at the sub-burner. Under these conditions, that is, the service burner being closed, and a minimum flame maintained at the sub-burner, there is a maximum volume of vapor stored in the upper portion of the generator, which will hold the liquid at the predetermined level therein. Assume that three of the service burners are put into commission, the result will be to lessen the vapor volume in the generator, allowing the gasolene to rise, which will raise the float so as to automatically raise needle valve 16, admitting a volume of vapor into the sub-burner adequate to increase the size of the sub-flame burner sufficiently to generate the required volume of vapor to supply the three service-burners, which will stop the gasolene from rising further. If three more service-burners are placed in commission, the operative elements will automatically adapt themselves to the different requirements, that is, the requirements of the service-burners, the requirements of the sub-burner for increased generation, and the requirements of the generator and float chamber as to the liquid level therein. If the service lights are then shut off, the maximum volume of vapor above the gasolene in the generator will again be established, forcing the liquid back into the tank until the float again rests on the stem 8, reducing the area of valve 17 suitably to maintain a minimum flame at the sub-burner. By screwing the stem 8 downwardly far enough, the distance through which the float may move will be increased, so that when the vapor pressure becomes high enough to drive the fuel back, the float may sink low enough to close the valve 17. However, the rod 8 is upwardly adjusted so that when the float is in its lowermost position the valve 17 will be opened just enough to maintain a minimum flame at the sub-burner at times when the service burners are out of commission, and as the service-burners are lighted the float will be operated and the valve 17 opened sufficiently to supply vapor proportionately to the requirements of the number of the service burners in commission.

Having described my invention, I claim:—

1. In a device of the class described, a generator, a sub-burner, a mixer connected to the sub-burner, a valve communicating with the generator for entraining air and vapor into the mixer, and float actuated means for operating said valve, and means to prevent said valve from closing entirely.

2. A hydro-carbon vapor generating apparatus comprising two chambers communicating at the top and bottom, means for supplying liquid hydro-carbon thereto, a sub-burner, a valve communicating with the upper portion of said chambers and adapted to control the supply of vapor to the sub-

burner, a float in one of said chambers, and a lever operatively connected to said valve and float.

3. In a device of the class described, two chambers communicating at the top and bottom, a sub-burner for one of said chambers, a float in the other chamber, a valve communicating with one of said chambers for controlling the supply of vapor to the sub-burner, and means operatively connecting said float and valve.

4. In a device of the class described, two chambers communicating at the top and bottom, a sub-burner for one of said chambers, a float in the other chamber, a valve communicating with one of said chambers for controlling the supply of vapor to the sub-burner, means operatively connecting said float and valve, and a hydro-carbon reservoir communicating with the lower portion of said chambers.

5. In a device of the class described, two chambers communicating at the top and bottom, a sub-burner for one chamber, a float in the other chamber, a needle valve communicating with one of said chambers for controlling the supply of vapor to the sub-burner, means connecting said float and needle valve for simultaneously moving them in the same direction, a hydrocarbon tank communicating with said chambers, and means for adjustably supporting the float, whereby a minimum flame may be maintained at the sub-burner when the service burners are shut off.

6. In a device of the class described, a generator, a sub-burner therefor, a float chamber, a float therein, means connecting said generator and float chamber at the top and bottom, a hydro-carbon tank communicating with said chambers, a valve communicating with one of said chambers above the point of highest liquid level therein, for controlling the flow of vapor from said generator to the sub-burner, means operatively connecting said float and valve for opening and closing the valve as the float is respectively raised or lowered, and means for adjustably supporting the float, enabling a minimum flame to be maintained at the sub-burner when the service burners are shut off.

7. In a device of the class described, a generator, a sub-burner therefor, a valve communicating with the generator for supplying vapor to the sub-burner, a float actuated by the liquid level in the generator, and means operatively connecting said float and valve, whereby they are simultaneously moved in the same direction as the liquid level varies.

8. In a device of the class described, a liquid hydro-carbon tank, a generator, a sub-burner, a valve for controlling the supply of vapor to the sub-burner, a member adapted to float on the liquid hydro-carbon, means actuated by said member for operating said valve as the liquid level varies, and means for adjustably supporting the float to maintain the valve slightly open when the service system is out of commission whereby a minimum flame may be maintained at the sub-burner.

9. In a device of the class described, a generator, a sub-burner having a fuel inlet-member, a vapor conduit from the generator, a needle valve therein adjacent said fuel inlet member for delivering vapor and entraining air into the sub-burner, and a float actuated by the liquid level in the generator operatively connected to said needle valve.

10. In a device of the class described, a generator, a sub-burner therefor, a vapor and air mixer connected to the sub-burner, a vapor conduit in communication with the upper portion of the generator, a needle valve controlling the outlet of said vapor conduit and arranged adjacent to said mixer, and means connected to said needle for adjusting it and automatically actuating it by the varying liquid levels in the generator, for automatically controlling the size of the sub-flame and the quality of the fuel mixture.

In testimony whereof, I have hereunto set my hand.

JOSEPH STUBBERS.

Witnesses:
OLIVER B. KAISER,
EMMA SPEUER.