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APPARATUS FOR PRODUCING BURNABLE GAS FROM LIQUID GASOLINE

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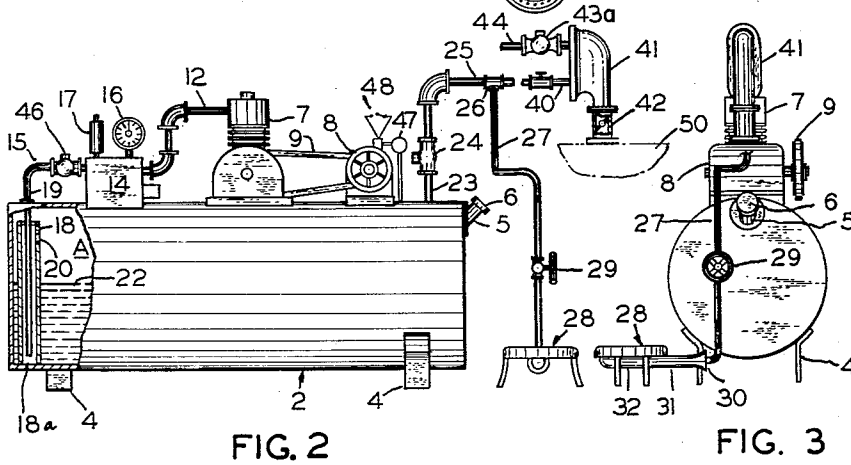
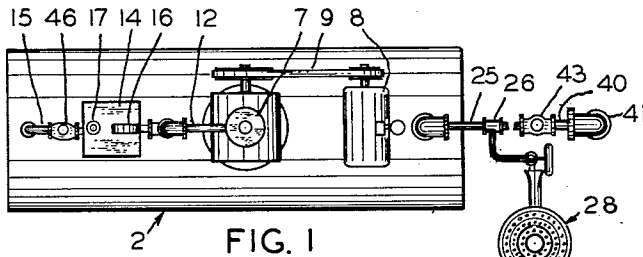


FIG. 3

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APPARATUS FOR PRODUCING BURNABLE GAS FROM LIQUID GASOLINE

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3 Claims. (Cl. 48—144)

This invention concerns an apparatus for producing burnable gas from liquid gasoline.

One of the objects of the invention is to provide a compact efficient mechanism for converting gasoline into useable gas fuel in commercial quantities so that businesses located at a distance from gas supplies may have this type of fuel available for burning and operating internal combustion engines or the like.

Still another object is to provide apparatus and mechanism for producing quantities of burnable or combustible gas from fluid gasoline or the like, to be used where combustible gas is required and in locations where such gas is not available.

Still another object is to provide a storage tank to contain gasoline together with mechanism which will force air through the gasoline in the tank so that it becomes saturated with gasoline vapor and including means for removing the gasoline vapor from the tank to supply various appliances without danger of explosion or undesired combustion.

I attain the foregoing objects by means of the apparatus, devices and parts shown in the accompanying drawing, in which—

FIGURE 1 is a plan view of one form of my apparatus. FIGURE 2 is a side elevational view thereof; and FIGURE 3 is an end elevational view thereof.

Similar numerals refer to similar parts in the several views.

In the form shown, 2 indicates a cylindrical storage tank supported by block 4 to set horizontally. This tank has a filling spout 5 which is closed by a pressure tight cap 6. On top of the tank there is an air compressor 7 of the mechanical piston operated type. This is driven by a motor 8 and connected by a belt 9 to the motor.

Air from the compressor is delivered through pipes 12 to a pressure regulating dome 14 positioned on top of the tank. This dome acts as a pressure stabilizer and converts the intermittent puffs of air from the pump 7 to provide a steady flow of air through its outlet pipe 15. An air gage 16 is connected to this dome to indicate pressure supplied and existing and a pop-off valve 17 is used to release excess air when the pressure exceeds a predetermined amount. The pipe 15 enters into the end of the tank 2 in heat exchange contact with the liquid therein opposite the end containing the filling spout 5. Preferably the air enters through inlet pipe 19 which is within a larger pipe 18 extending diametrically within tank 2 near said end. The bottom end 18a of pipe 18 is closed and air enters from pipe 19 near this closed end and flows upward to the top end of pipe 18 where it exits through hole 20 at a point above the level of the fluid gasoline 22 in tank 2. This air flow picks up gasoline vapor which produces a mixture consisting of air charged with the volatile vapors of the gasoline. This vapor may be termed "supercharged." That is, it is rich in gasoline vapor and poor in air content. Vapor of this nature will not support combustion within itself because there is not sufficient oxygen to maintain a flame which will develop sufficient heat to ignite the vapor in space A and maintain it above the ignition point.

The vapor and air mixture in space A, which is that portion of the interior of tank above the level of the liquid gasoline therein, is drawn off through supply pipe 23 and flows through an outwardly opening check valve 24 to the utility supply pipe 25.

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To illustrate the uses of this heavily charged vapor, a T fitting is shown in pipe 25 with the lower branch pipe 27 leading to a burner 28 through a control valve 29. This burner is of conventional construction and includes a nozzle 30 which directs the gas into a mixer 31 wherein air is inducted into the burner channel of body 32.

This extra air inducted is needed to support combustion and make the burner function properly. If sufficient extra air is not supplied the flame blows itself out because the temperature at the point of combustion does not maintain the inflowing gas at a temperature above the ignition point.

The other branch of the pipe 25 beyond T fitting 26 illustrates a use of the gas produced by this device for operating an internal combustion engine. Pipe 40 leads to a mixing chamber 41. This is connected to a butterfly throttle valve 42 to the engine manifold 43. The chamber 41 is supplied with an inwardly opening check valve 43a. This valve and pipe 44 opening into the atmosphere is sized to supply the correct amount of extra air needed to form a combustible mixture with the vapor entering through pipe 40. Suction from the engine manifold causes the air and the gas to mix and form a proper combustible mixture before entering the manifold and other engine parts.

In order to prevent gasoline from flowing out of tank 2 and back into the compressor and its associated part I provide a check valve 46 connected between the dome 14 and the air inlet pipe 15. Thus, air in the area A cannot back up into the pump 7 or any of the other parts, such as gage 16 or relief valve 17.

In operation tank 2 is filled with fluid gasoline up to the level of the bottom of spout 5. Motor 8 is started and pressure built up within the tank to the limit determined by the setting of pressure release or "pop-off" valve. The heavily charged gases are then drawn off through pipe 23 and used in either the burner 28 or engine manifold 50 supplied with additional air from pipe through check valve 43a. A pressure regulator 47 may be electrically connected to a pressure operated switch 48 on motor 8 so that when a desired pressure has been reached the motor will not operate. Since this is a conventional hook up and means for controlling the operation of a motor operating an air pump no details are thought to be necessary. This is not the essence of the invention. The salient features of this device include the various parts shown which cause the air to flow into the storage tank 2 and come in contact with fluid gasoline therein so as to produce a super-saturated air gasoline vapor mixture in the area within the tank above the fluid gasoline therein. The important features also include the inlet check valve 46 and the outlet check valve 24. These are necessary to handle the gasoline vapor and maintain the air pressure as desired. The inlet check valve 46 prevents air or vapor from going back from the tank 2 into the dome 14 and on into the compressor. The outlet valve 24 prevents pressure that may occur in the outlet pipe 23 or 27 from going back into tank 2. In the latter case flame might enter the tank and cause temporary combustion. These check valves are necessary for safety and correct operation of the device.

I claim:

1. A device for producing a burnable gas and air mixture from a liquid hydrocarbon comprising, a horizontally disposed cylindrical liquid hydrocarbon storage tank including a supporting block, a filling spout provided at one end of said tank above the liquid level thereof, a pressure tight cap demountably secured to said spout, an air compressor, means for driving said compressor, a pressure regulator connected to said tank adapted to control the energy to said driving means in response to the

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pressure in said tank, a pressure regulating dome connected to the output from said compressors, means connecting the output from said dome to an inlet pipe of said tank, said inlet pipe located at one end of said tank, said connecting means including a check valve limiting flow to a direction from said dome to said tank, a vertically disposed larger pipe in heat exchange contact with the liquid in said tank terminating in a closed bottom at the bottom of said tank and enclosing the downwardly extending open-ended portion of said inlet pipe, said larger pipe including an exit hole in the top portion directed radially outwardly of said larger pipe and located above the liquid level in said tank, a supply pipe connected into said tank at the other end thereof above the liquid level and adapted to be connected to the device to be supplied with the gas and air mixture, and a check valve in said supply pipe adapted to limit flow to a direction from said tank to the device to be supplied.

2. A device for producing a burnable gas and air mixture as set forth in claim 1 wherein said exit hole is positioned in said larger pipe so as to provide a jet stream of compressed air over the surface of the liquid in said tank so as to produce a super-saturated air gasoline vapor mixture in the area within the tank above the fluid gasoline therein.

3. A gaseous fuel producing unit comprising, a horizontally positioned elongated tank partially filled with a volatile liquid fuel; an air-vapor mixing area in the tank between the top thereof and the liquid fuel surface; a compressed air inlet at the top of the tank and at one

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end thereof; a compressed air system connected to said air inlet and including an air compressor, a pressure regulator, and a check valve; a vertically extending open ended air inlet pipe inside the tank and connected to said air inlet; a vertically extending pipe integral with the tank and of substantially larger inner diameter than the outer diameter of the air inlet pipe and inside which said inlet pipe is disposed; said larger pipe having a closed bottom and extending above the liquid fuel surface to a point adjacent the top of the tank; an air exit opening in said larger pipe located above the liquid level in said tank; said air inlet pipe and said larger pipe thereby providing a compressed air path therebetween to said mixing area which is in heat exchange relation with the liquid fuel; a supply pipe connected into said tank at the other end thereof above the liquid fuel level which is adapted to be connected to the device to be supplied with the gas and air mixture; and a check valve in said supply pipe which only permits flow of the air-vapor mixture out of said tank and through the supply pipe.

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