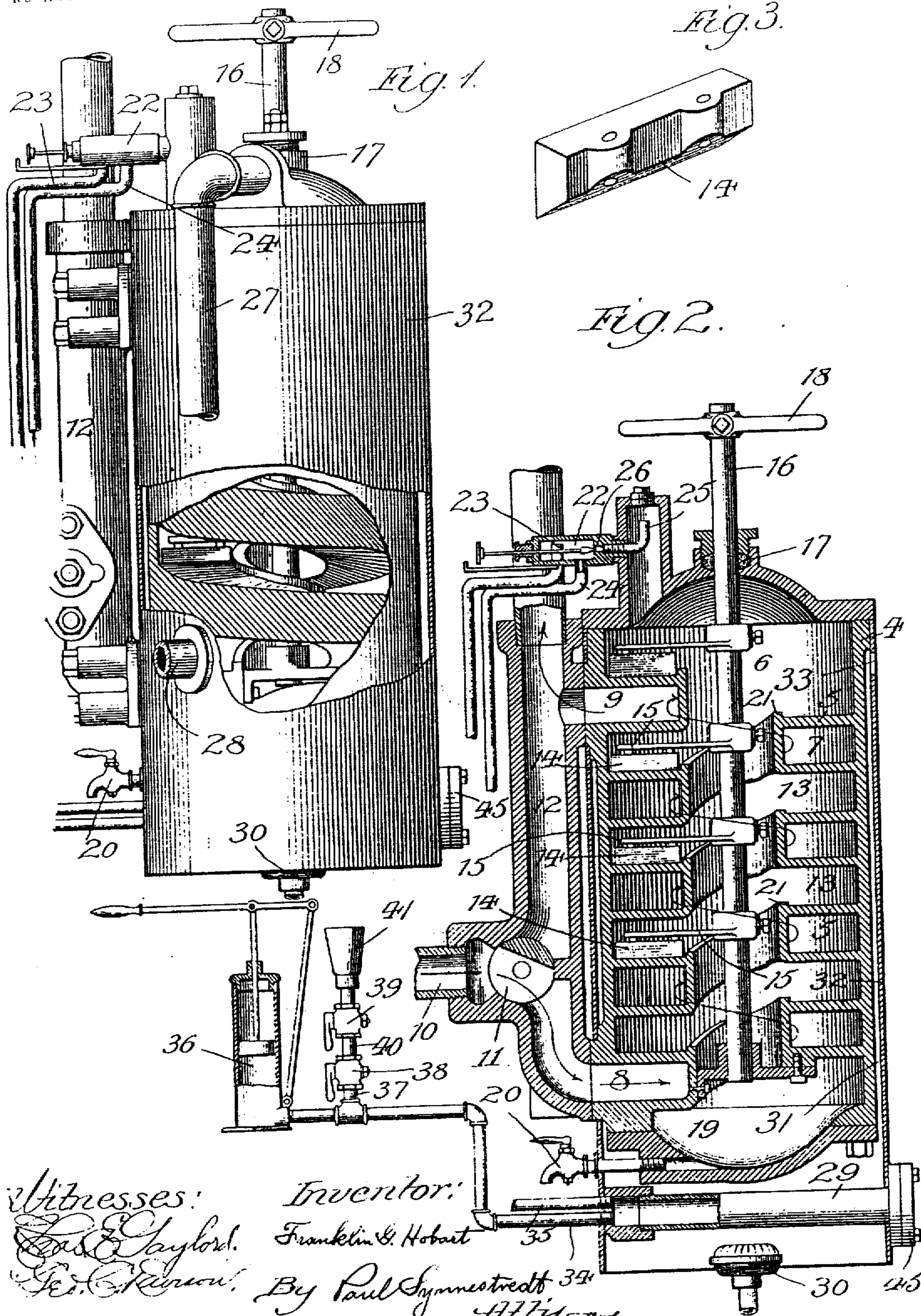


PATENTED OCT. 11, 1904.

No. 772,040.

F. G. HOBART.  
GAS GENERATOR.  
APPLICATION FILED JULY 3, 1902.

NO MODEL.



Witnesses: *Franklin G. Hobart*  
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# UNITED STATES PATENT OFFICE.

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## GAS-GENERATOR.

SPECIFICATION forming part of Letters Patent No. 772,040, dated October 11, 1904.

Application filed July 3, 1902. Serial No. 114,213. (No model.)

*To all whom it may concern:*

Be it known that I, FRANKLIN GATFIELD HOBART, a citizen of the United States of America, residing at Beloit, Rock county, Wisconsin, have invented certain new and useful Improvements in Oil-Vaporizers, of which the following, taken in connection with the accompanying drawings, is a specification.

While capable of a variety of uses, my invention has special reference to an apparatus which is designed for the purpose of producing gas from hydrocarbon, particularly from the heavier class of hydrocarbon commonly known as crude oil, and is intended for use primarily, in conjunction with hydrocarbon engines.

The first of the objects of my invention is the construction of an apparatus comprising a novel arrangement of heating surfaces over which the liquid flows, and upon which it is vaporized by the action of heat carried along in a suitable heat passage extending under these surfaces.

A further object of my invention is the provision of an apparatus of the type specified, in which are disposed a main vaporizing chamber, a plurality of shelves or folds of a shelf arranged about the main chamber, branch chambers above the shelves, in communication with the main chamber, a plurality of scrapers disposed upon the heating surfaces of said shelves, and a device constructed to actuate the scrapers, such device extending through the chamber, and outside of the casing whereby it will be readily accessible, and can be operated while the gas generator is in use.

The above as well as other such objects as may hereinafter appear, I attain by means of a construction which I have illustrated in preferred form in the accompanying drawings, in which,

Figure 1, is a side elevation with a portion broken away, showing an apparatus embodying my improvements.

Figure 2, is a vertical section of the apparatus, and

Figure 3, is a perspective view of one of

the scrapers which I employ in conjunction with my improved apparatus.

In carrying out my invention, I provide a casing 4, which is preferably of cylindrical shape, and may be provided upon its interior with a plurality of heating surfaces, arranged as shelves, or the single spirally arranged shelf marked 5, the shelf projecting part way inward from the interior surface of the casing 4, toward the center thereof, but leaving a space in the center which constitutes a main chamber, which I have marked 6. Below each turn of the spiral shelf 5, (treating the heating surfaces as a plurality of shelves) there is disposed a heat passage 7, which has an inlet 8, and an outlet 9, and through which, when the device is used in conjunction with a gas engine, are conveyed the products of combustion from the engine exhaust entering at 10, there being provided at 11 a regulating valve whereby such product of combustion from 10 may be caused to pass altogether through the passage 8, 7, and 9, or else may be allowed to go partly through such passage, and partly upward through the passage 12, or altogether through the passage 12, the passage 8, 7, and 9, being cut off.

Above each lap of the heating surface 5, there is a branch chamber which is in open communication with the main chamber 6. The scrapers 14, which are connected by arms 15, with a vertical shaft 16, extending outside the casing, are designed to clean off the heating surfaces of the several laps of the shelf 5, and gradually work the deposit thereon, downward into the chamber 19, at the lower end from which the liquid portions may be drawn off through the valve 20, and solid matters may be taken out through the hand hole. Preferably the rod and scrapers move bodily through their bearings, but the bearing heads of the arms 15, of course, may slide on the rod 16, in case the shelf is inclined.

In the preferred form of my invention, the heat passage 7, and the shelves above it are arranged helically upon the inside of the casing 4, and form thus practically a continuous passage from 8 to 9, upon which there is a



continuous shelf 5, that by its turns about the center, produces a construction having in effect a plurality of superposed shelves as shown, each of the same having an upturned lip 21, to retain the liquid upon the shelf during the vaporizing operation. Otherwise, the incline may be broken by vertical portions so as to form a series of steps or separate shelves; and these shelves may be horizontal instead of inclined, when desired.

As a means for introducing the hydrocarbon oil into the device, I provide a reservoir 22, which has an overflow pipe 23, and a supply pipe 24, and a feed tube 25, controlled by a feed valve 26, as shown. Oil being pumped up through the pipe 24, and kept at a constant level by means of the overflow pipe 23, can thus be drawn by the suction of the engine piston through the valve 26, and feed tube 25, as rapidly as it is required for use, into the upper end of the interior of the casing 4. It falls upon the shelf 5, and runs down the same, until it is completely vaporized, or reaches the bottom, the residue if any, collecting in chamber 19. The feed tube 25, extends upward and above the level of the oil in the reservoir 22, and the oil will be drawn into the chamber inside the casing 4, by the suction of the engine, as required, the engine suction pipe being connected at 27, as shown in Figure 1, and the air inlet being at 28, as shown in the same figure.

In order to start the apparatus, I provide a retort 29, which is located underneath the generator casing 4, and has a burner 30, below it, which is supplied from an oil reservoir or other source of supply, so that when the burner 30 is lighted, it will heat the retort 29, as well as the main body of the casing 4, the products of combustion and heated gases and air from the burner 30, passing upward through the annular space 31, between the exterior of the casing 4, and the jacket 32, with which the same is provided, finding an outlet through a plurality of openings 33.

The retort 29, is provided with an inlet pipe 34, and an outlet pipe 35, the latter of which connects to the explosion chamber of the engine cylinder and is controlled by a suitable valve. The inlet pipe 34, comes from the air pump 36, and connected to the pipe 34, there is a tube 37, which has in it two valves 38, and 39, with a nipple 40 between them, and a funnel 41, above. Hydrocarbon liquid can be put in the funnel 41, and thus be admitted to retort 29, even if there be pressure within the retort, by opening the valve 39, to the nipple 40, the valve 38 being closed, and then closing the valve 39, and opening the valve 38. The liquid which has been measured into the nipple 40, and let into the pipe 34, and the retort 29, is vaporized by the heat, when it can be mixed with the air from the tube 36, and form a gas which passes through the pipe

35, and into the engine cylinder to start the engine.

The operation of my invention is as follows:—Oil being admitted through the feed valve 26, and the engine having been started by means of the retort already described, the exhaust from the engine is caused by means of the valve 11, to flow downward through 8, and around the heat passage 7, under the shelves 5, and out through the passage 9, to the outlet. The shelves or the continuous spiral shelf 5, are thereby heated, and act to vaporize the oil. This vapor mixes with the air in the main chamber in the center, and is drawn out through the suction pipe 27, to the engine cylinder.

By the helical arrangement shown, the oil is caused to gradually run down the spiral surface to the bottom of the chamber, and as the sediment or waste product collects on the heating surfaces, the scrapers 14, can be rotated by means of the shaft 16, and the handle 18, to clean off the deposit, the movement being a reciprocating or oscillating one about the center, such as will gradually work the waste products downward into the chamber 19, from which they can be drawn off, or out of which they may be cleaned through the hand hole.

Though I have shown in the drawings a continuous helical shelf, it is evident that this helix need not be continuous, but may continue for a part of a turn and then drop vertically to the next succeeding helical portion.

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

1. A heating apparatus comprising a chamber containing a shelf-like projection from the side, a continuous closed heating passage extending under the projection and means to heat said passage, means for supplying liquid to be vaporized upon said projection, a scraper thereon and an outlet for said vapor, substantially as described.

2. In a vaporizing apparatus, a chamber provided on its inner surface with a continuous integral helically arranged shelf, and a continuous closed heating passage under said shelf, means for passing heated fluids through said passages and an outlet for vapor from the chamber.

3. In a vaporizer a chamber having projecting from the inner surface thereof a continuous helical closed pipe with a top designed to retain liquid thereon, and means to supply heating fluid to said pipes.

4. A vaporizer comprising a casing having upon the interior thereof a plurality of superposed turns of a shelf extending inwardly from the wall, a continuous closed chamber provided beneath said shelf, an inlet and an outlet for introducing hydrocarbon liquid upon said shelf, and means for heating the



shelf by a flow of hot gas through said passages.

5. In a vaporizer the combination of a chamber having upon its inner wall a continuous helically arranged pipe having a top of form to retain liquid, and rotary means for scraping the surface thereof.

6. A vaporizing chamber having formed integrally with its wall a helical shelf with a liquid-retaining top and a flange upon the inward projecting side of the top surface, a continuous passage-way under said shelf, and a rotary scraper to clean the shelf.

7. A vaporizing chamber having arranged around the sides thereof a continuous helically arranged shelf, a closed passage-way under said shelf, and an upwardly projecting flange on the inner edge of the shelf, and means to heat said passage.

8. In a vaporizer a chamber having a continuous helical shelf projecting from the inner walls with flattened surfaces on top and means to retain the liquid thereon, combined with a centrally disposed longitudinally movable shaft in said chamber and a series of scrapers mounted on said shaft and operating upon the shelf, substantially as described.

9. In a vaporizer a chamber having a continuous helical shelf projecting from the inner walls with flattened surfaces on top and means to retain the liquid thereon, combined with a centrally disposed longitudinally movable shaft in said chamber and a series of scrapers mounted on said shaft and operating upon the shelf, said chamber being provided with means for heating the shelf and with a regulatable inlet for supplying hydrocarbon to the shelf to be vaporized.

10. The combination of a carbureter designed to be heated by the exhaust gases from the engine, a closed oil chamber in said carbureter, a retort disposed under said oil chamber and means to simultaneously heat both

the retort and the oil chamber, an oil inlet to the retort and a connection to the engine, whereby the engine may be started by the vapor from the retort, and will thereupon continue to supply itself with vapor by heating the carbureter.

11. A vaporizer comprising a cylindrical casing upon the interior wall whereof is formed a helical projection extending inward less than half way across said casing, leaving a main chamber in the center, a heat passage formed under said helical projection, means to heat the passage, means for supplying hydrocarbon liquid to the upper surface of said helical projection, and a gas outlet for said casing.

12. A vaporizer comprising a casing upon the interior wall whereof is formed a helical projection, a heat passage formed under said helical projection, means to heat the passage, means for supplying hydrocarbon liquid to the upper surface of said helical projection, and a gas outlet and air inlet for said casing.

13. A vaporizer comprising a casing upon the interior wall whereof is formed a helical projection, a heat passage formed under said helical projection, means for supplying hydrocarbon liquid to the upper surface of said helical projection, a gas outlet for said casing, a passage connecting the source of heat supply to said helical heat passage, another passage connecting the source of heat supply to the atmosphere, and a heat valve controlling both of said passages, substantially as described.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

FRANKLIN GATFIELD HOBART.

In presence of—

C. J. MITCHELL,  
E. O. POWERS.