No. 692,518. Patented Feb. 4, 1902.

F. S. & W. D. JACKS.

CARBURETER.

(Application filed Feb. 15, 1901.)

(No Model.) 2 Sheets—Sheet 1.

Fig. 1.

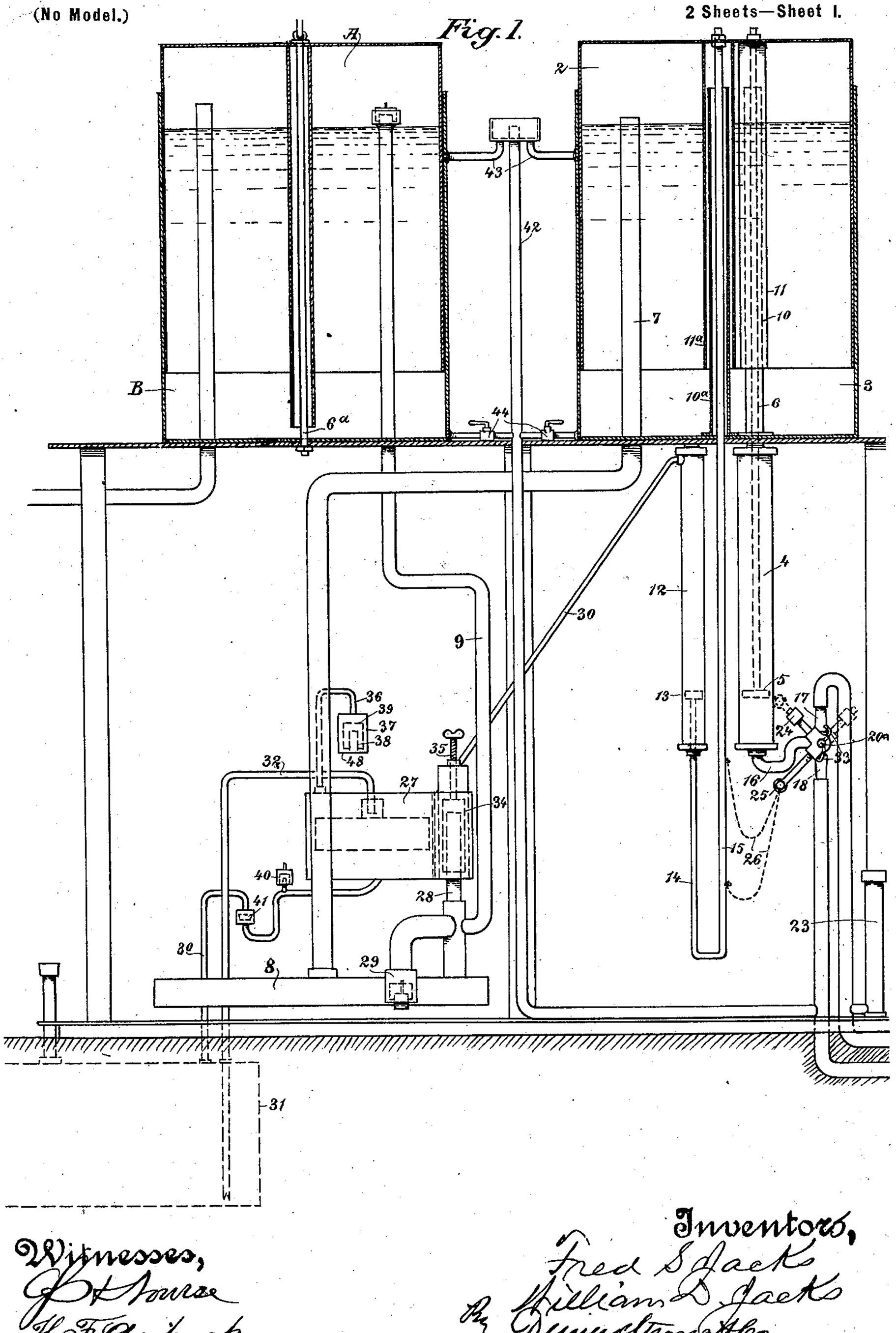

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Fig. 2.

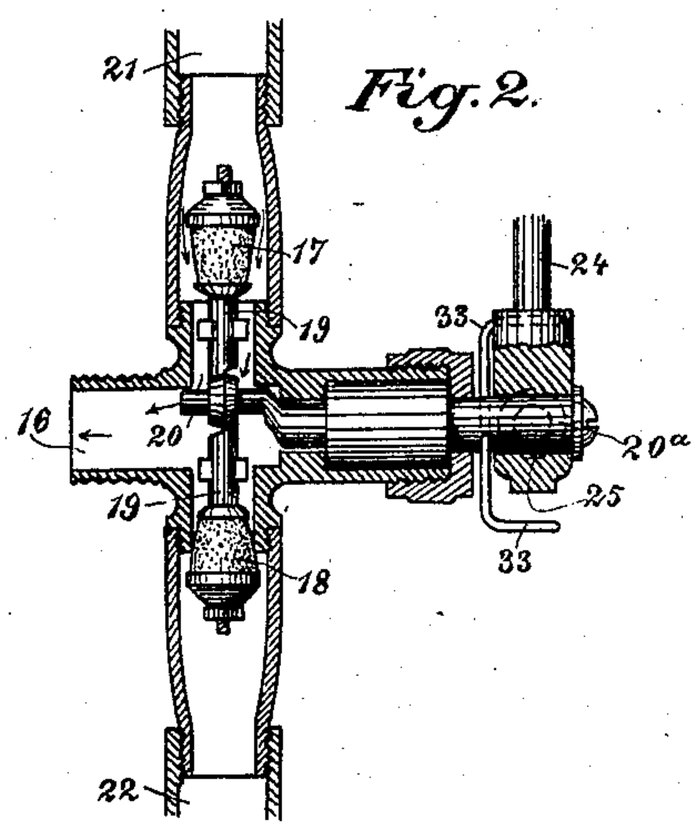
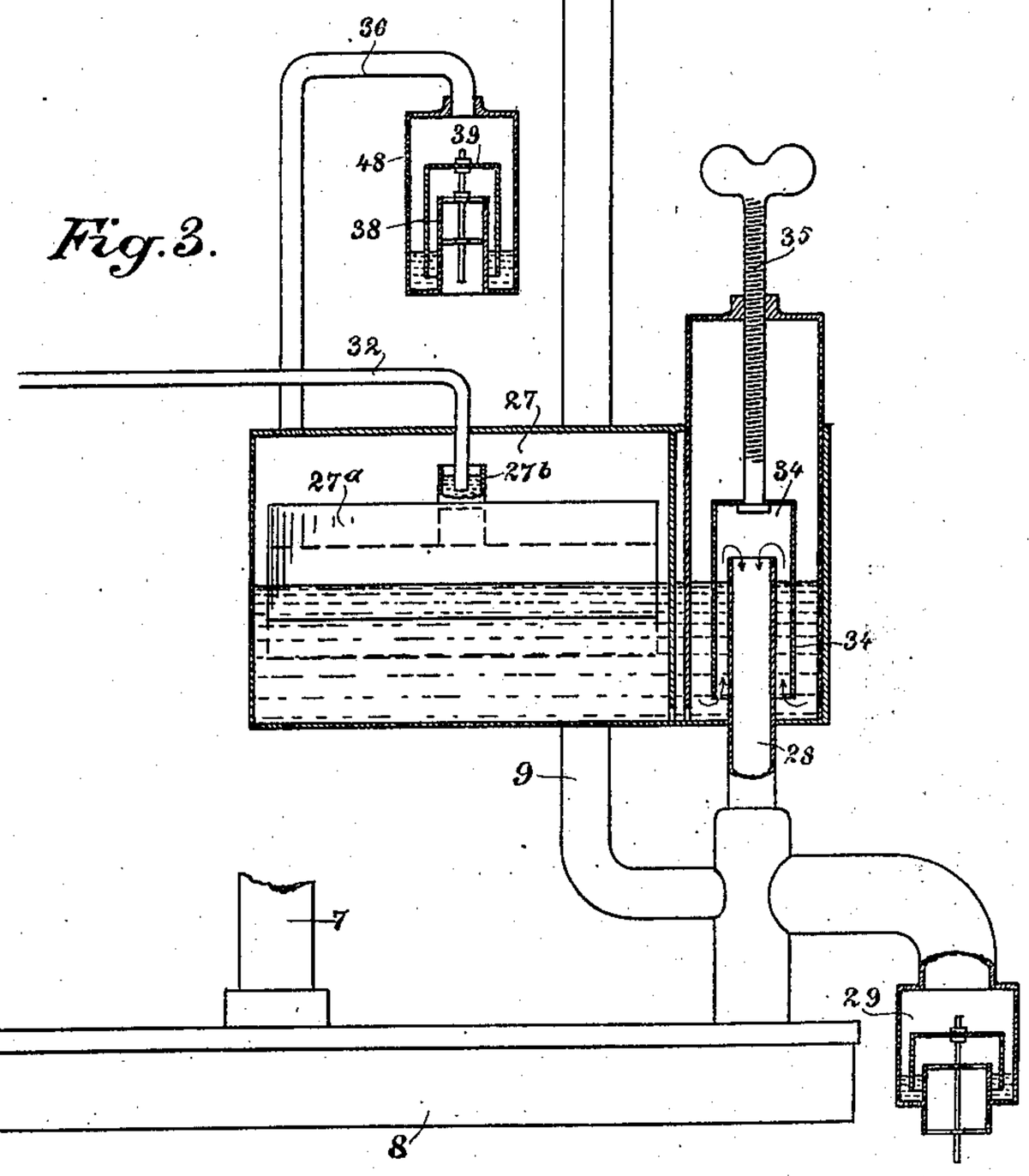


Fig. 3.



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UNITED STATES PATENT OFFICE.

FRED S. JACKS AND WILLIAM D. JACKS, OF SAN FRANCISCO, CALIFORNIA; SAID WILLIAM D. JACKS ASSIGNOR TO SAID FRED S. JACKS.

CARBURETER.

SPECIFICATION forming part of Letters Patent No. 692,518, dated February 4, 1902.

Application filed February 15, 1901. Serial No. 47,440. (No model.)

To all whom it may concern:

Be it known that we, FRED S. JACKS and WILLIAM D. JACKS, citizens of the United States, residing in the city and county of San Francisco, State of California, have invented an Improvement in Carbureters; and we hereby declare the following to be a full, clear, and exact description of the same.

Our invention relates to an apparatus which is designed for the manufacture of gas from hydrocarbon or like liquids from which the inflammable gas or vapor can be produced.

It consists of the parts and the constructions and combinations of parts, which we will hereinafter describe and claim.

Figure 1 is an elevation of the machine, parts shown in section. Fig. 2 is a vertical section through the valves controlling the flow of water. Fig. 3 is a detail of the generator and its connections.

As shown in the present drawings, A is a gasometer-bell adapted to rise and fall in a tank B, containing water, in which the lower open end of the tank A is submerged and which forms a seal in which the bell A rises and falls as the gas is increased or diminished within it.

2 is a pump, which consists of a hollow cylinder closed at the top and open at the lower end, said cylinder being adapted to rise and fall within a tank 3, its lower end being submerged beneath the water contained in the tank 3. In line beneath the center of the tank 3 is a hollow cylinder 4, in which a plunger 5 fits, and the plunger-rod 6 extends from the plunger or piston 5 up through a tubular connection 10 with the bottom of the cylinder 3, and its upper end is connected with the top of the bell 2, so that when the piston is forced up by pressure it raises the bell 2, and when allowed to fall the bell will sink by gravitation. By means of a suction-pipe 7, to be hereafter described, air and gas are drawn into the bell 2 from the carbureter 8, with which the pipe connects, and when the bell sinks the gas is forced out through the same pipe into the carbureter, and thence through a conducting-pipe 9 into the gasometer-bell A. A tube 10 surrounds the plunger-rod 6, this tube extending above the surface of the water in the tank 3, and a second tube 11 of larger diameter has its upper end fixed to the top of the bell 2 and extends down over the tube 10, forming a seal or lock to prevent any gas escaping around the plunger-rod. Parallel with and adjacent to the cylinder 4 is an air-pump cylinder 12, having within it a plunger 13, and the rod 14 is connected by a cross arm or bar with a rod 15, which extends up through the tank 3 and is connected with the top of the tank in a similar manner to the rod 6. It also has similar inclosing tubes 10^a and 11^a to act as a seal.

Water under pressure is admitted into the lower part of the hydraulic cylinder 4 through a pipe 16, and the water is admitted and exhausted by means of valves 17 and 18, which are connected by their stems 19 with an eccentric 20, which is rotatable and operates so that when one valve is opened the other is closed. One of these valves, as 17, controls the inlet through a pipe 21 from any source of supply. The other, as 18, controls the outlet through a pipe, as at 22. These valves are situated one upon each side of a central opening in the valve-chamber, which connects with the supply-pipe 16, leading to the cylinder 4, as previously described.

23 is an air-chamber to steady the pressure and relieve the shock of water as it enters and leaves.

The shaft 20^a of the eccentric 20 extends out through one end of the central portion of the device containing the eccentric 20 and has upon it the loosely-turnable arms 24 25. The arm 25 is connected by chains 26 with the rod 15, one of these chains extending upwardly above the center line of the shaft and the other downwardly.

The operation will then be as follows: If the piston or plunger 5 is at the bottom of its cylinder 4, the inlet-valve 17 will be opened and the outlet-valve 18 closed by the turning of the eccentric sufficient to produce these results. The water under pressure passing through the admission-pipe 21, thence through the passage in the upper part of the valve-chamber, and thence out through the pipe 16 enters the bottom of the cylinder 4 and forces the plunger 5 upwardly. This acts through its rod 6 to lift the bell 2 and produce a vacuum within it above the water. The vacuum

thus produced continues through the pipe 7 and into the carbureter 8, and this draws the liquid from the measuring-tank 27, through a passage 28, into the carbureter-chamber 8, at the same time an air-inlet valve at 29 is opened, so that a suitable proportion of air may pass in through this valve and into the carbureter. The upward movement of the bell acts upon the rod 15, thus forcing the plunger of the air-pump 13 up, and air is forced out through a pipe 30, leading to the gasolene-tank 31. The pressure upon the gasolene in this tank thus produced acts to force the gasolene up through a pipe 32 and into the measuring-tank 27, thus providing a charge in the measuring-tank for each operation of the mechanism. When the plungers have reached the limit of their upward movement, the upper chain 26 will be drawn taut and will act upon the arm of the eccentric and turn it until one of the arms 24, having a weight upon it, will have passed the center. As these arms turn loosely upon the shaft 20^a, they will not act to move the shaft or to change the position of the valves 17 and 18 until the weighted arm 24 falls and strikes one of the pins 33, which project from the eccentric-shaft. The weight striking this pin will then suddenly turn the eccentric and reverse the position of the valves, closing the valve 17 and opening the valve 18. This shuts off a supply of water through the pipe 21 and opens a discharge from the pipe 16 through the pipe 22. The weight of the bell 2 or any additional weight which may be placed upon it then causes the plunger 5 to sink and with it the bell. The water in the cylinder 4 will be forced out through the discharge-pipes, as before described, and the gas which has been drawn through the pipe 7 by the upward movement of the bell 2 will now be forced back through the carbureter 8, thence through the pipe 9, and into the gasometer-bell A. Each reciprocation of the parts of the apparatus will produce a similar action, and the amount of gas in the gasometer will be renewed at each operation.

The pipe 28, leading from the measuring-tank 27, extends up into the tank to a point which is above the level of the liquid therein, and its upper end is open. A second pipe 34, closed at the upper end and of larger diameter, fits down over this pipe 28, extending to near the bottom of the tank, and this forms a passage between the two, so that any pressure upon the surface of the liquid caused by direct pressure or by vacuum through the carbureter will cause the liquid to flow up in the pipes 28 and 34, and thence down through 28 to the point of discharge. The pipe 34 may be raised or lowered by means of a screw 35, connecting with its upper end and turnable in a suitable threaded nut, as shown. Thus the discharge end of the pipe 34 may be raised or lowered with relation to the bottom of the measuring-tank. A check-valve is connected with the measuring-chamber through a pipe 36, extending out of the top of the chamber and bending over, so as to connect with a chamber 37. Within it is a tube 38, extending upwardly through the bottom, and an inverted inclosing tube 39, similar to that previous described. Within the chamber 37 and submerging the mouth of the tube 39 is mercury or other suitable liquid which will form a seal through which any surplus pressure will force the air or gas. A similar seal is connected with the air-pipe 30, as shown at 40, and this serves to regulate the pressure of air within the pipe 30 and in the gasolene-tank 31.

41 is a check-valve in the pipe 30 to prevent the return of air when the pressure through the pipe 30 is reduced. This check-valve may be similar to the valves above described or of any suitable or well-known character, and a similar valve is connected with the air-inlet pipe 29, as shown.

An overflow-pipe is located at 42, contiguous to the tanks B and 3, and a pipe 43 connects the tanks B and 3, and through this the water is allowed to pass from one chamber to the other in case the water rises higher in either one than the other. Drain-cocks are connected with the waste-pipe, as shown at 44, for the removal of surplus water from the tanks or the overflow 42.

Any suitable or well-known form of carbureter may be employed. In the present arrangement we have shown a carbureter as having spirally-disposed plates 46 in the form of a coil or coils extending between the top and bottom of the carbureter-chamber, and in the space between these coils are loosely wound ropes or equivalent masses of fibrous absorbent material 47. The inlet-pipe may deliver into the outer part of the coil, as shown, and the outlet-pipe discharge from the center, so that the air drawn through the hydrocarbon in the carbureter is continually brought into contact therewith and fully saturated in passing through. The supply of water for the tank 3 is kept up by such leakage as passes the piston 5 of the cylinder 4, and as the tube 10 connects with the top of the cylinder this water will be delivered from its upper end into the tank. The pipe 43 will convey water from 3 to B and keep B supplied, and the surplus will discharge through the overflow-pipe 42. Both gasometer and pump-bells A and 2 are guided in their rise and fall by vertical central rods or equivalent tubes, as at 6 or 6^a. The passage of the gasolene or equivalent hydrocarbon through the carbureter and its vaporization cause such a reduction of temperature that freezing and stoppage will take place unless there is some means to prevent it. This means is provided in our device by the tank 3, containing a large body of water which raises the temperature of the vapor or gas which is drawn through it by the upward movement of the bell 2, and when this gas is forced through the carbureter and into the gasome-

ter by the downward movement of the bell 2 its slower movement and contact with the water and the slight compression will prevent its becoming detrimentally cold. The measuring-tank has within it a float 27^a, and a tube 27^b extends upwardly from the float, open at the top and closed at the bottom. This tube contains mercury, and the end of the fixed conducting-pipe 32 extends into the tube 27^a. When the float has risen so that the mouth of the tube is submerged in the mercury, further supply to the measuring-tank and carbureter is cut off, and when the float is lowered by the discharge of gasolene from the measuring-tank to the carbureter the mouth of the pipe 32 will be exposed, so that the liquid will flow through it into tube 27^b and overflow into the tank 27 until the mouth of 32 is again submerged in the mercury. This action measures the charges supplied to the carbureter, the flow from the tank to the carbureter taking place through the siphon-pipes 28 and 34, as previously described.

48 is a vacuum relief-valve connecting with tank 27 to admit air as the liquid flows out to the carbureter.

When the flow of gasolene through the pipe 32 from the reservoir 31 is stopped by the mercury seal above described, the pressure in the reservoir through the air-pipe 30 is regulated by a relief-valve at 40.

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

1. In a carbureter the combination of a gasometer adapted to rise and fall within a liquid seal, a pump including a bell and a tank with a liquid seal within which said bell may rise and fall, a carbureter adapted to contain a hydrocarbon liquid, a constantly open suction-pipe extending therefrom to the bell of the pump, means for positively elevating said last-named bell and thereby producing a vacuum in it above the water and also in said pipe, whereby gas is drawn into the bell through said pipe, which latter returns the gas to the carbureter when the bell descends, and pipe connections between the carbureter and the bell of the gasometer.

2. In a carbureter, the combination of a gasometer-bell, a liquid-containing tank in which it is adapted to rise and fall, a second liquid-tank and a constantly-operating bell therein, a cylinder in line with the last-named bell and having a piston connected with the latter, fluid-pressure admitted to the cylinder to positively elevate said second-named bell and thereby create a vacuum above the water in the tank thereof, a constantly open suction-pipe leading into said second-named bell and a carbureter connected with the opposite end of said pipe whereby gas is drawn into the bell as the latter rises and is forced back into the carbureter through the same pipe as the bell descends, and a pipe connection between the carbureter and the bell of the gasometer.

3. In a carbureter the combination of a gasometer and a pump each including a water-tank and a rising-and-falling bell, means for positively operating the bell of the pump, a carbureter, a suction-pipe between it and the bell of the pump, a pipe connection between the carbureter and the bell of the gasometer, a hydrocarbon-tank and a measuring-tank between it and the carbureter.

4. In a gas-machine, a carbureter, a hydrocarbon-tank, a measuring-tank interposed between the two, a pipe through which the hydrocarbon is delivered from the tank to the measuring-chamber, an automatically-actuated pumping mechanism and connections whereby air is drawn through the charge in the carbureter, a gasometer and connections whereby the gas thus produced is forced into the carbureter, an air-pump operated in unison with said pumping apparatus, connection between said air-pump and the hydrocarbon-containing tank whereby a charge of hydrocarbon is forced from the tank to the measuring-chamber at each complete reciprocation of the pump, and passages through which the charge is delivered into the carbureter.

5. In a gas-machine, a gasometer, a pumping device, a carbureter, pipes connecting with the pumping device and with the gasometer whereby gas is first drawn from the carbureter into the pump and then forced into the gasometer, a hydrocarbon-containing tank, a measuring-chamber interposed between it and the carbureter, a pipe through which hydrocarbon is delivered to the measuring-chamber, an air-pressure pipe and pump by which air is forced into the carbureter to deliver a charge into the measuring-chamber, an air-inlet pipe connecting with the carbureter and valve whereby air is drawn into the carbureter to mix with the hydrocarbon by each upward movement and suction of the pump, said valve being closed and communication opened with the gasometer when the pump descends.

6. The combination with the gasometer, of a carbureter, a pumping device consisting of a bell, a water-tank within which its mouth is submerged, and mechanism by which it is caused to alternately rise and fall, a pipe from the carbureter leading through the water in the tank, by which the gas is first drawn into the bell from the carbureter and then forced back through this same pipe, and a pipe connecting with the carbureter to conduct the gas therefrom to the gasometer.

7. The combination in a gas-machine of a gasometer, an air-pumping device, a carbureter and pipes connecting it with the pump and the gasometer, with controlling devices, a measuring-tank through which hydrocarbon liquid is supplied in stated charges to the carbureter, a reservoir, a pipe connecting it with the measuring device, and a liquid seal

carried by a rising-and-falling float in the measuring-tank, into which seal the end of the feed-pipe dips.

8. In a gas-machine, a carbureter, a hydrocarbon-liquid reservoir, a measuring-tank having a float adapted to rise and fall therein, a liquid seal carried upon the float, a pipe leading from the reservoir and dipping into the liquid seal, and an automatic discharge from the measuring-tank to the carbureter, whereby the passage from the reservoir to the measuring-tank is opened by the discharge of the tank, and is cut off when the tank is filled.

9. The combination in a gas-machine of a gasometer, a carbureter, a main air-pumping device connected with the carbureter and gasometer, a hydrocarbon-liquid reservoir, a supplemental air-pump with pipe leading therefrom to the reservoir, a conducting-pipe, a measuring-tank and seal interposed between the reservoir and the carbureter, and a relief-valve in the air-pressure pipe.

In witness whereof we have hereunto set our hands.

FRED S. JACKS.
WILLIAM D. JACKS.

Witnesses:
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JESSIE C. BRODIE.