

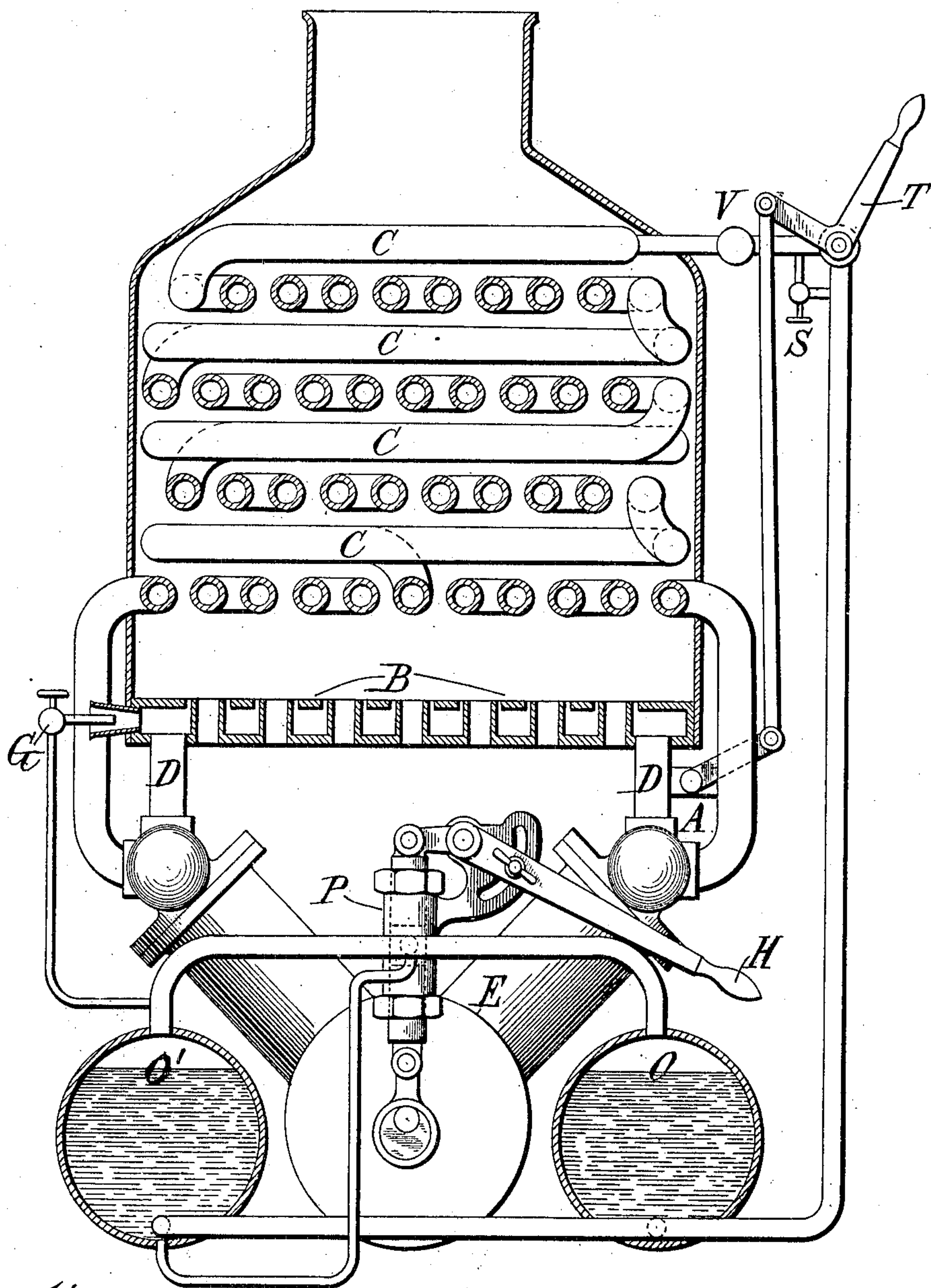
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PATENTED NOV. 19, 1907.

M. W. HALL.

APPARATUS FOR GENERATING AND UTILIZING POWER IN ENGINES
AND SELF PROPELLED VEHICLES.

APPLICATION FILED OCT. 5, 1901.



Witnesses.

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Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, MILAN W. HALL, a citizen of the United States, residing in the borough of Manhattan, city, county, and State of New York, have invented certain new and useful Improvements in Apparatus for Generating and Utilizing Power in Engines and Self-Propelled Vehicles, of which the following is a specification.

10 This invention relates to fluid pressure generators and motors, and to power propelled vehicles, and provides certain improvements therein which will be hereinafter fully set forth.

15 In its preferred form the invention provides a reservoir for holding liquid hydrocarbon or other volatilizable medium, an expansion chamber or compartment for gasifying such medium, a connection between the source of supply of such medium and said chamber, means for regulating the feed of such medium to such chamber, means for automatically, and means for manually, producing such feed, a heater for heating the volatilized hydrocarbon or the vapors of such medium, a motor or engine driven by such vapors, a burner for such vapors, a connection between the exhaust of said motor and such burner, means for controlling said engine, means for simultaneously controlling said feed, means for independently controlling said feed, means for independently feeding said burner from said chamber, means for independently feeding said burner from said reservoir, means for forcing air through the liquid in said reservoir to saturate the air, and means for feeding said saturated air to said burner, and means for controlling such feed, and a pump driven by said engine for maintaining pressure in said reservoir, and means for regulating the feed from said pump.

45 The liquid hydrocarbon is preferably forced under pressure, past a regulating valve, into the vaporizing chamber, where it is rarefied by heating, and from which it is fed to the cylinder of the motor, from the exhaust of which it is fed to the burner of the heater, by which the exhaust hydrocarbon gases after being utilized to drive the motor are consumed as fuel in the heater. The engine operates the pump to maintain the pressure for forcing the liquid

hydrocarbon into the heater during ordinary operation, and thus maintains a continuous feed from the reservoir, while the exhaust from the engine is sufficient to generate the desired heat for the heater, and the combustion of this exhaust at the burner consumes the odorous gases which would otherwise be discharged in the air. By this means a hydrocarbon engine can be utilized for driving automobiles without necessitating the use of an explosion engine, and without the usual disagreeable odors incident to hydrocarbon engines. The heated hydrocarbon gas constitutes a continuous supply of high pressure fluid for propelling the engine, and the utilization of this gas at the exhaust as fuel for the heater, effects a material saving in the percentage of fuel in proportion to the resulting power obtained.

For automobiles and similar devices, this invention provides a power generating and driving mechanism which is exceedingly compact, simple, and light, and which avoids the noise, odors, and excess of heat, incident to previous engines for driving this type of machine.

Referring to the drawing, I will now describe in detail one adaptation of my invention as applied to a self-propelled vehicle engine.

The engine is of the type that uses a fluid working expansively, as with steam in a steam engine, the expansive fluid in this instance being generated from oil or other combustible liquid fuel.

The mode of operation is as follows:—The engine is started by first pumping up an air pressure on the fuel tanks O and O' by operating the handle H of the air pump P, forcing air in at the bottom of the oil tank O'. The air in rising through the oil becomes saturated with an oil vapor, so that it will burn readily when it is liberated through the valve G into the burner B and there ignited. The generator pipes or coil C are thus heated; the valve S is then opened and oil is fed into the hot coil C sufficient to furnish a supply of oil gas to maintain a pilot fire for keeping the coil C hot when the engine is not in operation. The gas generated for this purpose passes from the coil C to the burner B direct through the by-pass A, which is always open when the engine is not in opera-

tion. The engine can now be started by operating the throttle lever T, admitting oil in larger quantity to the coil C, and at the same time partially closing the by-pass A. Pressure will immediately be created in the coil C, and the engine pistons will be operated by the expansive oil vapor or gas thus generated. This oil gas after passing through the engine and giving up its expansive energy, is exhausted through the pipes D into the burner B, where it serves as the fuel supply for the generation of more expansive fluid which operates the engine. As soon as the engine is in motion and the fuel supply is established through the exhaust pipes D, the valve G and by-pass A are closed, so that the whole fuel supply is derived from the exhaust of the engine.

In order that this system shall develop high efficiency and not be wasteful of oil or fuel, the area of the heating surface and length of the generator coil C are so proportioned that with proper regulation of the oil feed at the throttle T, the gas that passes to the engine will be so expanded and rarefied by heating that the latent heat of vaporization, plus the specific heat of expansion or rarefaction, together with the usual waste or loss at the smoke stack, shall practically equal the heat of combustion of the amount of oil gas so vaporized, expanded, and rarefied or heated. The vapor or gas is preferably superheated, that is to say, heated above the point of vaporization. This is possible because the heat is applied to the vapor separately from the liquid.

When it is desired to stop the engine temporarily, it is only necessary to close the throttle T, which simultaneously opens the by-pass A, thus supplying the burner B with gas generated from the oil admitted continuously through the valve S for maintaining

the small pilot fire for keeping the coil C hot so that the engine can be started again immediately when so desired.

It will be seen that my invention provides improvements which can be variously and advantageously availed of in whole or in part, and it will be understood that the invention is not limited to the particular details of construction, arrangement, combination or operation, of features or parts hereinbefore set forth as constituting its preferred form, since it can be availed of in whole or in part according to such modifications, as circumstances, or the judgment of those skilled in the art, may dictate, without departing from the spirit of the invention.

What I claim is:—

1. A reservoir for hydrocarbon liquid, a heater vaporizing and heating said liquid, a burner therefor, an engine, means feeding said liquid to said heater, means compressing said liquid, means communicating between said heater and said burner, means controlling the feed from said reservoir to said heater, independent means controlling said feed, means for feeding from said heater to said burner independently of said engine, and means for feeding from said reservoir to said burner independently of said heater.

2. A reservoir for hydrocarbon liquid, an engine, a pump operated by said engine and applying pressure to the liquid in said reservoir, and a hand means for operating said pump for feeding said reservoir adapted to be adjusted and set for regulating said pump.

In witness whereof, I have hereunto signed my name in the presence of two subscribing witnesses.

MILAN W. HALL.

Witnesses:

FRED WHITE,
GEORGE WILLIAMS.