

J. JANICKI.
HYDROCARBON POWER GENERATOR.
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1,052,588.

Patented Feb. 11, 1913.

Fig. 1.

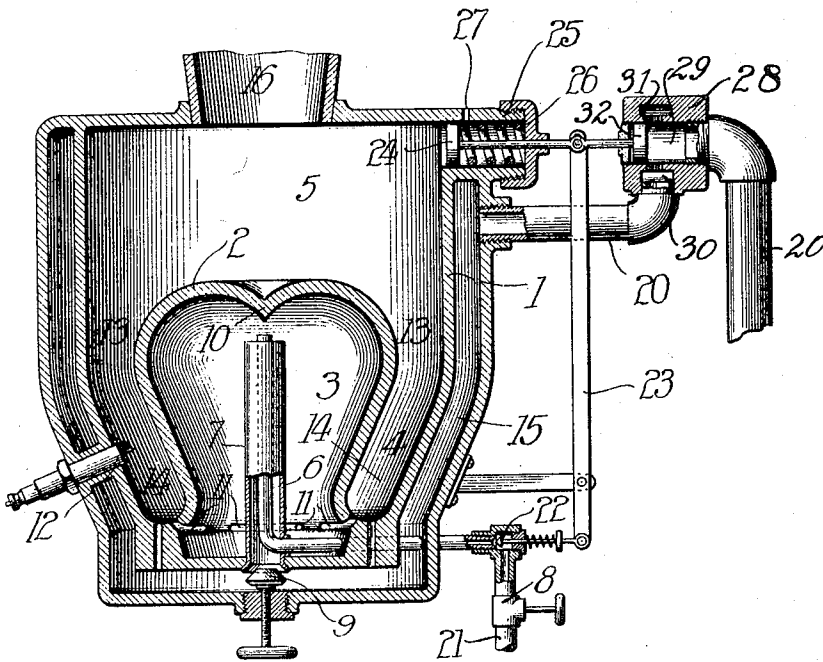
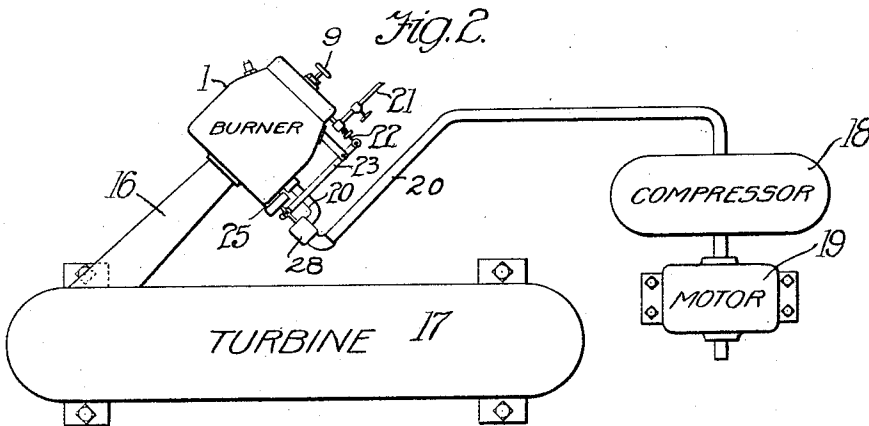


Fig. 2.



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UNITED STATES PATENT OFFICE.

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HYDROCARBON POWER-GENERATOR.

1,052,588.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, JOHN JANICKI, a citizen of the United States of America, and a resident of Chicago, county of Cook, State of Illinois, have invented certain new and useful Improvements in Hydrocarbon Power-Generators, of which the following is a specification.

The main objects of this invention are to provide improved means for generating power from the combustion of hydrocarbon fuel and particularly adapted for utilizing the power due to expansion of the fuel during combustion, in such manner that the products of combustion may be used for operating a motor at comparatively low temperature; to provide in apparatus of this kind improved means for vaporizing liquid or powdered fuel; to provide improved means for preventing "back firing" in the vaporizing chamber; to provide improved regulating means for such apparatus; and to provide improved means for burning hydrocarbon fuel.

A specific embodiment of this invention is illustrated in the accompanying drawing, in which—

Figure 1 is a sectional view indicating the arrangement of the parts of the generating apparatus. Fig. 2 is a diagrammatic view, showing the general arrangement of a complete system including the fuel combustion apparatus, motor and compressor, and illustrating a suitable arrangement of such parts.

In the construction shown in the drawings, the power generator comprises a casing 1, having in its interior a dome-shaped baffle wall 2 arranged to provide a vaporizing chamber 3 within it and an ignition space 4 communicating with an expansion space or combustion chamber 5 outside of the chamber 3. Concentric fuel and air inlet pipes, designated 6 and 7 respectively in the drawings, extend axially into the chamber 3 and are controlled by valves 8 and 9 respectively. The baffle wall 2 at the point directly opposite the inner ends of the pipes 6 and 7 is provided with a conical projection 10 located in axial alinement with said pipes, so that the fuel and air discharged from said pipes will be caused to spread and flow along the surface of the baffle wall 2 and become heated through contact therewith.

At the end of the chamber 3 which is distant from the inner ends of the pipes 6 and

7, an annular series of narrow openings 11 connect the chamber 3 with the annular space 4 outside of the wall 2, which annular space forms the ignition chamber. This chamber is provided with a spark plug 12 or other suitable means for initially igniting the mixed fuel and air in the space 4. The passage 13, which connects the ignition space 4 with the expansion space 5, is slightly contracted so as to retard the flow of gases through it and thereby encourage eddying and thorough mixing of the air and fuel in their passage through the ignition space 4. An annular series of additional air inlets 14 enter the ignition space 4 from the jacket space 15 which surrounds the casing 1. These inlets 14 are preferably located adjacent to the inlets 11 and so directed that the currents of air and gas issuing from the two sets of inlets will conflict and become thoroughly mixed.

The combustion chamber 5 is of sufficient volume to serve as a storage reservoir and allow a certain amount of expansion of the gases while the combustion which was started in the ignition space 4 is being completed. The outlet from the chamber 5 is preferably in the form of an expansion nozzle 16 of the De Laval type, whereby the pressure and temperature of the products of combustion are reduced, the energy being transformed into kinetic energy.

A motor, preferably in the form of an impulse turbine 17, is connected with the nozzle 16 so as to be driven by the products of combustion discharged therefrom.

An air compressor 18, here shown as driven by a motor 19, communicates by the pipe 20 with the jacket space 15, from which air is supplied to the air inlets of the combustion chamber. The motor 19 is shown independent of the motor 17 as it is preferred to have independent speed control.

Fuel, preferably liquid, is supplied to the pipe 6 by a pipe 21 controlled by the valve 8. An additional automatic valve 22 also controls the pipe 21. This valve, in the form shown, is controlled by a lever 23 connected at its opposite end with a piston 24 movable in a small cylinder 25 and having one face exposed to the pressure of the gases in the chamber 5. A spring 26 normally urges the piston 24 to the position in which it is shown in Fig. 1, and also normally urges the opening of the valve 22. A fit-

ting 28 is interposed in the air supply pipe 20, and has formed therein a cylinder 29 surrounded by an air jacket 30. One branch of the pipe 20 connects the cylinder 29 with the compressor 18 and the other branch of the pipe 20 connects the air jacket 30 with the burner. Communication between the cylinder 29 and the air jacket 30 is had through the ports 31 and controlled by the piston 32, which is connected to the piston 24 so that their movements are simultaneous. If the pressure in the chamber 5 should increase so as to overcome the pressure of the spring 6, the piston 24 will move outward, causing the valve 22 to close and the piston 32 to cover the ports 31, so as to reduce or cut off the fuel and air supply, and if the excess of pressure exceeds a certain amount, predetermined by the strength of the spring 26, the piston will uncover an outlet opening 27 and cause a reduction of the pressure in the chamber 5. Normally, the outlet opening 27 will be covered, and the movement of the piston 24 will be slight, so as to automatically control the admission of fuel and air to correspond with the consumption of power by the motor.

Accurate adjustment of the relative fuel and air admission may be had by manipulating the valves 8 and 9. The valve 9 should be so set that the mixture in the chamber 3 will be insufficient to support complete combustion, thus preventing back firing into the space 3, whereas, the additional supply of air at the inlets 14 will permit complete combustion to take place in the ignition chamber 4. This combustion, together with the continued combustion in the chamber 5, heats the baffle wall 2 to redness, and this is sufficient to maintain the combustion after it is once started without requiring the continuous operation of the ignition device 12. The inflowing fuel, striking the hot baffle wall 2, becomes vaporized and thoroughly mixes with the air from the pipe 7 during its passage along the wall 2.

It will be seen that the arrangement of the fuel inlets and ignition chambers is such that it is equally suitable for use in connection with liquid, gaseous, or powdered solid fuel, the only change required for different fuels being such as can be readily made by those skilled in the art.

Although but one specific embodiment of this invention is herein shown and described, it will be understood that numerous details of the construction shown may be altered or omitted without departing from the spirit of this invention, as defined by the following claims.

I claim:—

1. A power generator, comprising a combustion chamber, means providing a closed baffle wall in said chamber adapted to be

heated by the combustion of fuel in said chamber, a fuel inlet nozzle arranged to direct the incoming, unconsumed fuel against said closed baffle wall, and a fluid actuated motor arranged to be driven by the products of combustion from said combustion chamber.

2. A power generator, comprising a combustion chamber having an ignition space at one end and an expansion space at its other end, and a hollow vaporizing chamber extending into said combustion chamber in position to have its walls heated by the products of combustion and having a contracted opening communicating with said ignition space, and means for discharging air and fuel into said vaporizing chamber.

3. A power generator, comprising a combustion chamber having an ignition space at one end and an expansion space at its other end, and a hollow vaporizing chamber extending into said combustion chamber in position to have its walls heated by the products of combustion and having a contracted opening communicating with said ignition space, and means for discharging air and fuel into said vaporizing chamber, said means being arranged to direct the inflowing fuel and air against the walls of said ignition chamber at a point distant from said contracted opening, and the adjacent part of the wall of said ignition chamber being provided with a projection adapted to distribute the inflowing current of air and fuel and cause it to spread over the surface of said wall in its passage toward said contracted opening.

4. A power generator, comprising a combustion chamber having an ignition space at one end and an expansion space at its other end, and a hollow vaporizing chamber extending into said combustion chamber in position to have its walls heated by the products of combustion and having a contracted opening communicating with said ignition space, and means for discharging air and fuel into said vaporizing chamber, said combustion chamber having an additional air inlet communicating therewith, an air jacket surrounding said combustion chamber and communicating with said last named air inlet opening and having an air inlet distant therefrom, whereby the air supplied to said combustion chamber will be caused to traverse said jacket before entering said combustion chamber.

5. A power generator, comprising a combustion chamber, means providing a baffle wall in said chamber adapted to be heated by the combustion of fuel in said chamber, a fuel inlet nozzle arranged to direct the incoming, unconsumed fuel against said baffle wall, a fluid actuated motor arranged to be driven by the products of combustion from said combustion chamber, and means

directly controlled by the pressure in said combustion chamber for regulating the admission of fuel thereto.

6. A power generator, comprising a combustion chamber having an ignition space at one end and an expansion space at its other end, and a hollow vaporizing chamber extending into said combustion chamber in position to have its walls heated by the products of combustion and having a contracted opening communicating with said ignition space, means for discharging air and fuel into said vaporizing chamber, and a fuel inlet valve controlling the admission of fuel to said vaporizing chamber and normally urged to an open position, and mechanism actuated by variations in the pressure in said combustion chamber and connected with said fuel inlet valve so as to tend to close the same through an increase in pressure in said combustion chamber.

7. A power generator, comprising a combustion chamber having an ignition space at one end and an expansion space at its other end, a hollow vaporizing chamber extending into said combustion chamber in position to have its walls heated by the products of combustion and having a contracted opening communicating with said ignition space, means for discharging air and fuel into said vaporizing chamber, a fuel inlet valve controlling the admission of fuel to said vaporizing chamber and normally urged to an open position, and mechanism actuated by variations in the pressure in said combustion chamber and adapted to control the admission of air to said combustion chamber.

8. A power generator, comprising a combustion chamber having an ignition space at one end and an expansion space at its other end, a hollow vaporizing chamber extending into said combustion chamber in position to have its walls heated by the products of combustion and having a con-

tracted opening communicating with said ignition space, means for discharging air and fuel into said vaporizing chamber, a fuel inlet valve controlling the admission of fuel to said vaporizing chamber and normally urged to an open position, and mechanism actuated by variations in the pressure in said combustion chamber and adapted to control the admission of fuel and air to said combustion chamber.

9. A power generator, comprising a combustion chamber having an ignition space at one end and an expansion space at its other end, a hollow vaporizing chamber extending into said combustion chamber in position to have its walls heated by the products of combustion and having a closed forward end and a contracted opening communicating with said ignition space, means for discharging air and fuel into said vaporizing chamber, and an air compressor driven by said motor and communicating with the air inlet.

10. A power generator, comprising a combustion chamber, means providing a baffle wall in said chamber adapted to be heated by the combustion of fuel in said chamber, said baffle wall having a deflecting portion, a fuel inlet nozzle in axial alinement with said deflecting portion arranged to direct the incoming, unconsumed fuel against said baffle wall, a fluid actuated motor arranged to be driven by the products of combustion from said combustion chamber, and an expansion nozzle interposed between said combustion chamber and said motor and adapted through expansion to reduce the temperature of the products of combustion in their passage to said motor.

Signed at Chicago this 6th day of April 1911.

JOHN JANICKI.

Witnesses:

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