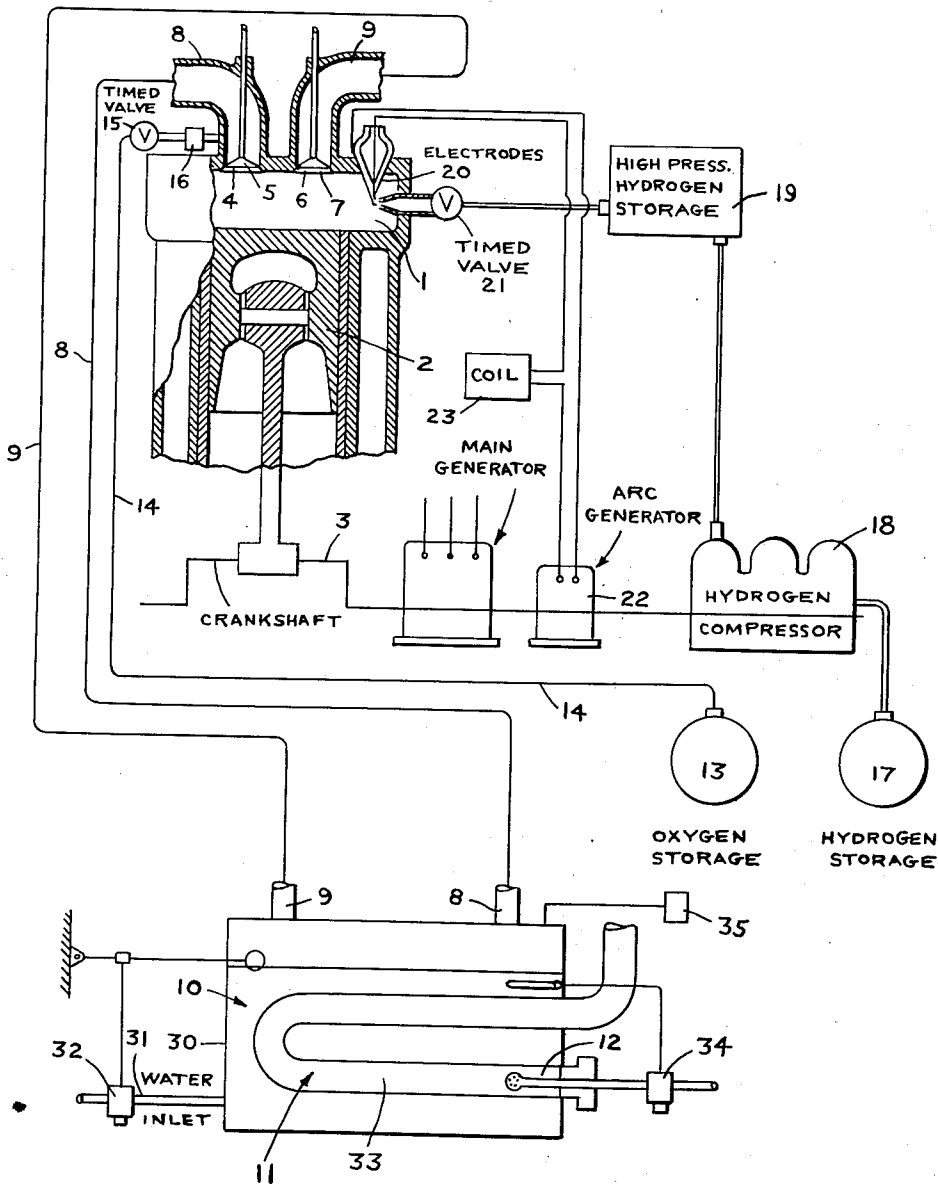


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R. M. KELSEAUX ET AL
PRIME MOVER AND A FUEL-POWER FUNCTION
OF OPERATION THEREOF
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RAYMOND M. KELSEAUX
JAMES A. LUPFER
INVENTOR.

BY

Robert Meyer
att'y

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PRIME MOVER AND A FUEL-POWER FUNCTION OF OPERATION THEREOF

Raymond M. Kelseaux, 2606 E. 7th St., and James A. Lupfer, 4117 Birmingham Ave., both of Tulsa, Okla.

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This invention relates to prime movers of the type utilizing an internal reaction or combustion of fuel as the motivating energy, and to the process or power-function of utilizing the chemical components of molecular water as a source of fuel to provide the internal reaction or combustion within the prime mover.

An object of the present invention is to provide a process of generating and utilizing fuel in internal reaction or combustion prime movers, which is readily applicable for use in all types of internal combustion or reaction prime movers (such as diesel or Otto cycle prime movers, jet prime movers, rotary piston prime movers, centrifugal impeller type prime movers, etc., and which results in a considerable reduction in fuel costs over existing fuel-power cycles).

The present invention is based upon the recognition and mechanical control of the following:

(1) Molecular (ordinary) water in the liquid and vapor states is a relatively poor conductor of heat. Water is chemically stable over a wide temperature range. Upon the application of heat, molecular (ordinary) water will progressively expand through the liquid and vapor states from about 4° C. to about 2550° C. where it decomposes into water vapor plus free oxygen and hydrogen.

(2) Hydrogen is normally rated as a fuel constituent of low fuel value, namely 320 British thermal units per cubic foot. However, when molecular or ordinary hydrogen is passed through an electric arc between suitable electrodes (such as tungsten poles) a considerable amount is transformed into free ortho-hydrogen and free para-hydrogen. When a stream of this atomic hydrogen gas strikes an arresting surface, an exceedingly large evolution of heat takes place through recombination to ordinary hydrogen. This heat is sufficient to melt tungsten (melting point 3370° C.).

This fuel power cycle function is adaptable to the various types of prime movers utilizing the expensive force or energy created upon or by a motivating gas or vapor by heat, of an explosion or otherwise, in what is commonly called a reaction or combustion chamber in the prime mover.

In the drawing and in the following description; the fuel-power cycle is shown and described in connection with a modified Otto or diesel type of prime mover, but it is to be understood that the invention is not limited to such prime movers, but is applicable to all types and kinds of prime movers.

The drawing shows a diagrammatic view of a prime mover or power plant utilizing a modified Otto or diesel type prime mover and embodying the present invention.

In the drawings the prime mover is shown as embodying a combustion or reaction chamber 1 in which a piston 2 reciprocates and drives a crank shaft 3 from which the power generated is taken off for work. The combustion or reaction chamber 1 has an inlet port 4 controlled by an inlet or intake valve 5 and an exhaust port 6 controlled by an exhaust valve 7. The valves 5 and 7 are operated by

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the usual type of timing operating mechanism (not shown), and it is to be understood that the prime mover is constructed in the usual manner in all respects except those specifically described herein.

The inlet port 4 opens into a conduit 8 which delivers water vapor to the combustion or reaction chamber 1 and the exhaust products (water vapor) from the combustion or reaction chamber 1 are delivered by the conduit 9 into a steam reservoir unit 10 which maintains and controls the water vapor at a suitable operating pressure.

Water vapor is returned from the reservoir unit 10 to the combustion or reaction chamber through the inlet conduit 8.

The steam reservoir unit 10 includes the water and steam containing shell 30, into which water (from any suitable source not shown) is fed through a water inlet pipe 31 under control of a float operated valve 32 of any approved construction. Water in the shell 30 is converted into steam by the steam generating system 11 including the tubes 33 which are submerged in water in the shell 30 and to which heat is supplied by a suitable burner 12 (utilizing a hydrocarbon fuel). Operation of the burner is controlled by a suitable thermostatically operated fuel supply valve 34 of any approved construction thus providing temperature control for the generation of steam in the reservoir unit 10, while the water level is properly maintained by the valve 32 to permit supply of fresh water to the system whenever the returned exhaust products fall below a predetermined level. Predetermined pressure is maintained within the steam generating unit 10 by any suitable automatic pressure maintaining means, indicated at 35, which may be purchased upon the open market. The water level and temperature control means 32 and 34 are also well known and may be purchased upon the open market.

Oxygen from any suitable source is supplied to a storage tank 13. Oxygen from storage tank 13 is delivered to the intake conduit 8 slightly in advance of the intake valve 5 through a suitable conduit or line 14, a timed valve 15, and an orifice 16, so that upon the intake stroke of the piston, a mixture of oxygen and water vapor will be drawn into the combustion or reaction chamber 1.

The mixture of oxygen and water vapor drawn into the combustion or reaction chamber 1 upon the intake stroke of the engine piston 2 will be compressed in the combustion or reaction chamber upon the upward compression stroke of the piston 2.

Hydrogen from any suitable supply source is delivered to a storage tank 17. Hydrogen from storage tank 17 is compressed by a compressor 18, to a pressure above the compression pressure of the oxygen and water vapor mixture in the combustion or reaction chamber 1 and this compressed hydrogen is delivered to a high pressure storage tank 19.

An electric arc producing means 20, of any approved construction including suitable electrodes (such as tungsten poles) is located within the combustion or reaction chamber 1 and hydrogen from the high pressure hydrogen storage tank 19 is forced through the electric arc produced by said means 20 which effects a partial transformation of the molecular hydrogen into free ortho and para hydrogen, that is atomic hydrogen gas.

The quantity of hydrogen injected into the combustion or reaction chamber through the electric arc, and the timing of such injection (i.e. so that it will enter the combustion or reaction chamber at the completion of the compression of the oxygen and water vapor mixture) is controlled by a valve 21.

A suitable electric current generator 22 is operated by the crank shaft 3 for generating electric current for the arcing means, 20 and a suitable coil 23 is placed in the circuit between the generator 22 and the arcing means 20.

Upon completion of the compression stroke of the piston 2 of the prime mover at which time the mixture of water vapor and oxygen therein is compressed, the hydrogen gas is injected through the electric arc 20 within the combustion or reaction chamber forming the free ortho and para-hydrogen, which is atomic hydrogen gas. The recombination of the free ortho-hydrogen and free para-hydrogen takes place resulting in an exceedingly large evolution of heat within the combustion or reaction chamber 1. The reactions are so rapid and the heat evolved through the recombination of this atomic hydrogen gas, that is of free ortho-hydrogen and para-hydrogen and the subsequent oxidation of the hydrogen are so great that it would be very difficult to control the energy evolved to produce useful work except for the physical constants stated in paragraph two hereof; namely the poor heat conductivity of water and that upon application of heat molecular water will progressively expand through the liquid and vapor states from above 4° C. to about 2550° C. The water vapor in the combustion or reaction chamber 1 serves as a protective media to prevent excessive heating of the exposed metal parts. The water vapor, being a poor conductor of heat, absorbs the intense heat of the reaction, and progressively and evenly expands. This rapid, but cushioned expansion exerts controlled pressure upon the piston 2 to perform the work function.

The products of combustion are essentially water (when properly adjusted, lubricating oil is not burned).

The exhaust products of combustion are conveyed through the conduit 9 to the steam reservoir where part of the water vapor is condensed to the liquid state.

The initial starting of the power unit is accomplished by applying heat from any available source to the steam reservoir unit 10 until sufficient water vapor is generated to permit the purging of air from the combustion or reaction chamber 1 and all connecting conduits 8 and 9.

Initial rotation of the power unit is accomplished by an electric motor, auxiliary internal combustion engine or steam from an outside source acting on the piston or the blades or impeller of the prime mover as is usual in the starting of such prime movers.

Hydrogen and oxygen from a suitable outside source is used for the initial starting of the power unit and this source of hydrogen and oxygen is used for the continuing operation of the power unit.

It will be understood that the invention is not to be limited to the specific construction or arrangement of parts shown, but that they may be modified within the invention defined by the claims.

What we claim is:

1. A fuel-power function to operate prime movers having a combustion or reaction chamber consisting of the act of feeding a metered quantity of oxygen with water vapor into the combustion or reaction chamber of a prime mover, compressing the water vapor and oxygen in the combustion or reaction chamber, passing a regulated quantity of hydrogen through an electric arc to produce free ortho-hydrogen and para-hydrogen, passing the ortho-hydrogen and para-hydrogen into the combustion or reaction chamber wherein recombination of the ortho-hydrogen and para-hydrogen takes place resulting in the production of high heat, said heat resulting in expansion of the water vapor and oxygen mixture which provides a power stroke of the prime mover.

2. A fuel-power function as claimed in claim 1, which includes compressing the hydrogen to a pressure above the pressure of the compressed water vapor and oxygen prior to injecting the hydrogen through the electric arc.

3. A fuel-power function as claimed in claim 1, which includes exhausting the resultant products of combustion from the combustion or reaction chamber, passing the exhausted products of combustion through a steam reservoir unit, and returning the water vapor to the combustion or reaction chamber.

4. A fuel-power function as claimed in claim 3, which includes compressing the hydrogen to a pressure above the pressure of the compressed water vapor and oxygen prior to injecting the hydrogen through the electric arc.

5. A fuel-power function to operate prime movers including a combustion or reaction chamber, which includes feeding a quantity of water vapor and oxygen into the combustion or reaction chamber, and heating and progressively expanding the water vapor by injecting hydrogen through an electric arc in the combustion or reaction chamber to produce free para-hydrogen and ortho-hydrogen in the mixture in the combustion chamber.

6. A fuel-power function to operate prime movers including a combustion or reaction chamber, which includes feeding a quantity of water vapor and oxygen into the combustion or reaction chamber, and heating and progressively expanding the water vapor by passing a predetermined quantity of hydrogen through an electric arc in the combustion or reaction chamber to produce atomic hydrogen gas in the combustion or reaction chamber.

7. A fuel-power function to operate a prime mover having a combustion or reaction chamber which includes passing hydrogen gas through an electric arc between suitable electrodes to form free-ortho-hydrogen and para-hydrogen that is atomic hydrogen gas in the combustion or reaction chamber of the prime mover.

8. A fuel-power function as claimed in claim 6, in which a predetermined quantity of oxygen and water vapor is fed into the combustion or reaction chamber prior to the injection of hydrogen through an electric arc to produce free-ortho-hydrogen and para-hydrogen that is atomic hydrogen in the combustion or reaction chamber.

9. In a power plant the combination of an internal combustion or reaction type prime mover, said prime mover including a combustion or reaction chamber and inlet and exhaust ports therefor, means for feeding water vapor into the combustion chamber, means for delivering a predetermined quantity of oxygen into the combustion or reaction chamber, an electric arc producing means, means for feeding a predetermined quantity of hydrogen through an arc produced by said electric arc producing means to produce a gas in the combustion or reaction chamber formed of free para-hydrogen and ortho-hydrogen that is atomic hydrogen gas.

10. A power plant as claimed in claim 9, including a compressor for compressing the hydrogen to a predetermined pressure prior to its delivery to said electric arc producing means.

11. A power plant as claimed in claim 10, including means for regulating the quantity of hydrogen delivered to the combustion or reaction chamber through said electric arc and the timing of such delivery.

12. A power plant as claimed in claim 11, including means for regulating the quantity of oxygen delivered to said combustion or reaction chamber, and a means for timing the delivery of oxygen to the combustion or reaction chamber.

13. The method of operating prime movers of the internal combustion type which includes feeding a metered quantity of oxygen and water vapor into the combustion or reaction chamber of the prime mover, compressing the mixture of oxygen and water vapor in the combustion or reaction chamber, passing hydrogen through an electric arc located in the combustion or reaction chamber to produce free-ortho-hydrogen and free para-hydrogen that is atomic hydrogen gas in the compressed mixture of oxygen and water vapor in the combustion or reaction chamber.

14. A power plant as claimed in claim 9, including a steam reservoir unit, means for delivering products of combustion from said combustion or reaction chamber to said steam reservoir unit, and means for delivering

water vapor from said steam reservoir unit to said combustion or reaction chamber.

15. A power plant as claimed in claim 14, wherein said steam reservoir unit includes means for delivering and controlling delivery of water to the unit and means 5 for heating water in the unit to produce steam.

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