An electrolysis conversion system for converting water into hydrogen and oxygen, includes a housing in which are housed electrodes. The electrodes are immersed in an electrolyte and are connected to a positive and negative sides of an energy source. The housing is a non-conductive material that has chambers to separate the hydrogen and the oxygen. The present invention further discloses a method of utilizing the electrolyzer in conjunction with the fuel system of an internal combustion engine to improve the efficiency of said internal combustion engines.
ENHANCED DEVICE FOR GENERATING HYDROGEN FOR USE IN INTERNAL COMBUSTION ENGINES

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This is a continuation-in-part of co-pending International Application PCT/US2007/009591, filed on Apr. 20, 2007, which designated the U.S., claims the benefit thereof and incorporates the same by reference. The International Application PCT/US2007/009591 is a continuation of co-pending U.S. patent application Ser. No. 11/409,917, filed Apr. 25, 2006, and claims the benefit thereof, and this continuation-in-part application incorporates the same by reference.

BACKGROUND OF THE INVENTION

[0002] This invention relates to internal combustion engines and to an apparatus for producing and separating water into hydrogen and oxygen.

[0003] The oxygen and hydrogen are provided by electrolysis, and the hydrogen is used to enhance the burn of fossil fuel in the internal combustion engine. The oxygen may be used either to supplement passenger compartment oxygen or to supplement fuel to operate an auxiliary engine or an engine specifically designed to burn hydrogen and oxygen. If not so required, the oxygen may be vented to the atmosphere.

[0004] Through the electrolysis of water the separation of hydrogen gas is achieved at an amount sufficient to enhance the burn of fuel when introduced into the combustion zone of the engine cylinders where the hydrogen gas mixes with the ambient air.

[0005] An internal combustion engine may be provided with a computer, engine controller, or electronic control module (hereinafter “Controller”) with a mass air flow sensor and at least one oxygen sensor to govern the combustion chamber for proper combustion of fuel and air and to regulate emissions.

[0006] If a constant amount of hydrogen gas is provided for use by the Controller, fuel savings and lower emissions can be achieved by leaning out the fuel and enhancing the burning of fuel in the combustion chambers.

[0007] The burning of fossil fuels in an internal combustion engine has one inherent problem: it produces emissions, specifically hydrocarbons, oxides of nitrogen, carbon monoxide, and carbon dioxide. These emissions are released into the atmosphere, having adverse effects thereon.

[0008] The device described herein, which generates hydrogen and oxygen, produces hydrogen to enhance the burn of the fossil fuels. When hydrogen produced by the device is introduced in the correct amounts to the combustion chamber of an internal combustion engine, the result is a more complete burn of the fossil fuels, reducing the harmful emissions released into the atmosphere. In addition, the amount of harmful emissions released into the atmosphere is reduced because the Controller will lean out the fuel to air mixture through information it receives from an oxygen sensor. Then, in turn, the amount of fossil fuels consumed is less, thereby further reducing the amount of emissions released into the atmosphere.

SUMMARY OF THE INVENTION

[0009] According to the present invention, there is provided a device for generating hydrogen for use with an internal combustion engine, comprising means for providing a positive electric current to power the device, means for providing a negative electric current to ground the device, means for housing in a chamber a positive electrode (anode), a negative electrode (cathode), and an electrolyte fluid to enable electrolysis within said means for housing, means for separating the positive electrode (anode) from the negative electrode (cathode), said separating means extending down into the electrolyte fluid to a point spaced from the chamber bottom and being perforated within said electrolyte fluid so that the electrolyte fluid can flow freely between the electrodes but impervious to the passage of gases above the level of said electrolyte fluid, means for separately venting the generated hydrogen from other gas or gases produced by the electrolysis, and means for replenishing the electrolyte fluid.

[0010] According to a further aspect of the present invention, there is provided a device for generating hydrogen for use with an internal combustion engine, comprising a positive electrode (anode) powered by electric current, a negative electrode (cathode) connected to an electrical ground of the internal combustion engine, a housing forming a chamber containing the positive electrode (anode), the negative electrode (cathode), and an electrolyte fluid that enables electrolysis within said chamber, a chamber divider extending downwardly into said chamber to separate the positive electrode (anode) from the negative electrode (cathode), said divider terminating short of the bottom of the chamber and being perforated below the level of electrolyte fluid to allow the free flow of electrolyte fluid between said electrodes but being impervious to gaseous flow above the level of said electrolyte fluid, a radiator/reservoir for containing electrolyte fluid, a hot electrolyte fluid cooling line connecting the radiator/reservoir with the chamber of the housing, facilitating the flow of electrolyte fluid from the chamber of the housing to the radiator/reservoir, and a cool electrolyte fluid return line connecting the radiator/reservoir with the chamber of the housing, facilitating the flow of electrolyte fluid from the radiator/reservoir to the chamber of the housing, vents for separately venting hydrogen and other gas or gases produced by the electrolysis, and a filler cap facilitating the replenishment of electrolyte fluid.

According to a still further aspect of the present invention, there is provided a device for generating hydrogen for use with an internal combustion engine, comprising a positive electrode (anode) powered by electric current, a negative electrode (cathode) connected to an electrical ground of the internal combustion engine, a housing forming a chamber containing the positive electrode (anode), the negative electrode (cathode), and an electrolyte fluid that enables electrolysis within said chamber, a chamber divider extending downwardly into said chamber to separate the positive electrode (anode) from the negative electrode (cathode), said divider terminating short of the bottom of the chamber and being perforated below the level of electrolyte fluid to allow the free flow of electrolyte fluid between said electrodes but being impervious to gaseous flow above the level of said electrolyte fluid, an auxiliary reservoir being connected with
the housing so as to facilitate and allow the flow of electrolyte fluid from said auxiliary reservoir means to the positive electrode (anode) portion of said housing, a hot electrolyte fluid cooling line connecting the auxiliary reservoir with the chamber of the housing, facilitating the flow of electrolyte fluid from the chamber of the housing to the auxiliary reservoir, and a cool electrolyte fluid return line connecting the auxiliary reservoir with the chamber of the housing, facilitating the flow of electrolyte fluid from the auxiliary reservoir to the chamber of the housing vents for separately venting hydrogen and other gas or gases produced by the electrolysis, and a filler cap facilitating the replenishment of electrolyte fluid.

[0011] According to a still further aspect of the invention, there is provided a device for generating hydrogen for use with an internal combustion engine, said device including a positive electrode (anode), powered by electric current, a negative electrode (cathode) connectable to an electrical ground of the internal combustion engine, a housing forming a chamber containing the positive electrode (anode), the negative electrode (cathode), and an electrolyte fluid that enables electrolysis within said chamber, a chamber divider separating the positive electrode (anode) from the negative electrode (cathode), vents for separately venting hydrogen and other gas or gases produced by the electrolysis, and a filler cap facilitating the replenishment of electrolyte fluid, wherein said positive electrode (anode), negative electrode (cathode), and chamber divider are three concentric cylinders, the innermost and outermost concentric cylinders being the electrodes and the intermediate concentric cylinder being the chamber divider, and wherein the bottom of the intermediate concentric cylinder is spaced from the bottom of the housing forming the chamber and a portion of the intermediate cylinder between the bottom and the level of the electrolyte fluid is perforated to allow the free flow of electrolyte fluid between said electrodes.

[0012] The hydrogen gas may be isolated in single or multiple devices for use in an internal combustion engine, and hydrogen and oxygen produced may be separated without the expense and maintenance requirement of filters and without the expense, weight, and energy requirements of magnets.

[0013] Individual units of the invention may be “stacked” together in order to boost the amount of hydrogen and oxygen gases produced as required, for example, with use in larger internal combustion engines.

[0014] Different electrolytes may be used to manipulate the output of hydrogen and oxygen gases in order to enhance safety and minimize any environmental impact.

[0015] Also, the operating temperature of the electrolyte fluid may be maintained by using engine coolant heat.

[0016] Additionally, a temperature control valve can regulate the amount of engine coolant heat used to regulate the temperature of the electrolyte fluid.

[0017] A sensor may be used to indicate a low level of electrolyte fluid and an indicator in the passenger compartment will alert a motor vehicle driver that the electrolyte fluid must be replenished.

[0018] A radiator/reservoir may be provided to keep electrolyte fluid in the electrolyte chamber at a constant level and temperature. A thermostat, heating element, and recirculating pump may all be used to regulate the electrolyte fluid temperature and to ensure that electrolyte fluid is circulated between the radiator/reservoir and the chamber for production of hydrogen and oxygen gases.

[0019] The device is powered by electrical connection with the electrical circuitry of the internal combustion engine. It may be connected with the ignition or it may have a separate, toggle-type switch for activation. The device has a positive (anode) and negative (cathode) electrode. The positive (anode) electrode is connected with a positive current connection of the ignition electrical circuit. The negative (cathode) is connected with an electrical ground, e.g., the frame of the motor vehicle. The electrodes are immersed in a chamber containing an electrolyte fluid.

[0020] The electrolyte fluid is comprised of water and a catalyst. The chamber is divided by a perforated chamber divider that does not quite extend to the bottom of the chamber, thereby allowing the free flow of ions. The chamber divider is perforated in order to allow the free flow of ions through the electrolyte fluid to said anode and cathode. An electrical current flows through the electrolyte fluid, causing ions in the electrolyte fluid through electrolysis to release hydrogen and oxygen from the electrolyte fluid. The released hydrogen and oxygen are isolated from each other so that they may be separately captured. The oxygen and hydrogen are used as described above.

[0021] The device operating temperature must be maintained at the optimum in order to ensure that it operates within the correct parameters. In addition, water in the electrolyte fluid is depleted during electrolysis, although the amount of depletion is directly affected by the operating temperature. In order to maintain the optimum temperature and the optimum amount of electrolyte fluid, one embodiment of the device uses a radiator/reservoir. The radiator/reservoir is connected with the chamber in such a fashion as to allow the flow of electrolyte fluid from the chamber to the radiator/reservoir.

[0022] The radiator/reservoir may be supplemented or replaced by an auxiliary reservoir. The auxiliary reservoir may, for example, be comprised of a chamber without an anode or cathode and without a perforated divider. This auxiliary reservoir chamber is connected with the chamber of the anode, allowing the flow of electrolyte fluid from the auxiliary reservoir chamber to the anode chamber of the device.

[0023] The radiator/reservoir may contain a heating element to help regulate the electrolyte fluid temperature, or the heating element may be placed on one or both of lines that allow the flow of electrolyte fluid from or to the radiator/reservoir. The device may use a thermostat to help regulate the temperature of the electrolyte fluid in the chamber. It also may employ a sensor to determine the level of electrolyte fluid. This sensor may be located on or in the radiator/reservoir, on or in the chamber, or on or in the auxiliary reservoir.

[0024] The device may employ a recirculating pump that enables the circulation of electrolyte fluid from the chamber to the radiator/reservoir and the auxiliary reservoir, if applicable.

[0025] An alternative embodiment of the present invention employs one large chamber in which multiple anodes share the same side of the chamber and multiple cathodes share the other side of the chamber, separated from each other by the perforated divider.

[0026] Another alternative embodiment of the present invention employs a single enlarged anode and a single enlarged cathode, separated from each other in the chamber by the perforated divider.

[0027] Still another embodiment of the present invention uses three concentric cylinders, the innermost being the anode, the intermediate being a perforated divider, and the
The capacity of the device to produce hydrogen and oxygen can be increased by increasing the size of the chamber and the anode and cathode contained therein and by manipulating the pH content of the electrolyte fluid. Another way of increasing the capacity of the device to produce hydrogen and oxygen is to “stack” the units, that is, any embodiment of the device may be “stacked” to increase the amount of hydrogen and oxygen produced. This is accomplished by connecting additional chambers together so that the anode chambers of the additional chambers share electrolyte fluid, and the cathode chambers of the additional chambers share electrolyte fluid. Separation of the produced hydrogen and oxygen gases is maintained.

DESCRIPTION OF THE DRAWINGS

Specific embodiments of the invention will now be described with reference to the accompanying drawings in which:

FIG. 1 is a section through one embodiment of the invention.
FIG. 2 is a part sectional side elevation of a second embodiment of the invention.
FIG. 3 is a sectional side view of a modification of part of the embodiment shown in FIG. 2.
FIG. 4 is a top plan view of a further modification of part of the embodiment shown in FIG. 2; and
FIGS. 5A through 5E schematically show alternative configurations of a device of the invention.

DESCRIPTION OF PREFERRED EMBODIMENTS

Turning now to the drawings, in the embodiment shown in FIG. 1, a housing 1 defines a chamber 9 to contain electrolyte fluid 2 introduced through an opening closeable by a fill cap 5. Electrodes in the form of an anode 3 and a cathode 6 are carried by the housing and extend downwardly into the chamber for partial immersion in the electrolyte fluid.

The positive electrode or anode 3 provides a way for the positive current to contact with the electrolyte fluid and the negative electrode 6 provides a place for the negative current to come in contact with the fluid.

The electrical connectors to the anode and cathode will be described in greater detail and the electrolytes generated by the electrodes in the electrolyte fluid produce oxygen and hydrogen which gases respectively exit through vents 4 and 7. Within the chamber, the oxygen and hydrogen are kept separate by a chamber divider 8.

The electrolyte fluid 2 is produced by mixing a catalyst with distilled water, which increases the electrical conductivity of the distilled water. The catalyst may be a number of different elements: for example, sodium citrate, sodium hydroxide, potassium hydroxide, or other sodium mixtures or compounds suffice. As the distilled water is used from the electrolyte fluid, it must be replenished. The electrolyte fluid as well may be replaced as required.

The anode or positive electrode 3 which provides a way for the positive current to come in contact with the electrolyte fluid, is powered by the alternator through, for example, an ignition source of the motor vehicle. Additional power may be provided by generating electricity through braking of the motor vehicle, by solar cells, or other means.

The cathode or negative electrode 6 which provides a place for the negative current to come in contact with the electrolyte fluid, is connected to an electrical ground on the motor vehicle, for example, the motor vehicle frame.

Four factors affecting electrolysis are the temperature and pH of the electrolyte fluid, the electrical voltage provided, and the surface area of the anode and cathode. Increasing the surface area of the anode and cathode, increasing the electrical current provided, stabilizing the temperature, and increasing the pH of the electrolyte fluid increase, in turn, the rate of electrolysis.

The divider 8 extends downwardly into the electrolyte fluid and provides a barrier impervious to gas passage above the surface of the electrolyte fluid. A portion of the divider 8 below the surface of the electrolyte fluid is perforated and thus separates the produced hydrogen gas from the produced oxygen gas while allowing free flowing of ions through the chamber divider.

The perforated chamber divider 8 does not extend to the bottom of the chamber 9 in order to allow free flow of ions to and from the anode and cathode. The perforations of the chamber divider do not start until about one-third of the way down from the top (vented end) of the chamber divider to ensure the separation of gases produced by the anode and the cathode.

In order to increase the capacity of the system, FIG. 2 shows an embodiment in which a radiator/reservoir 13 houses electrolyte fluid at a temperature for the production of hydrogen and oxygen gases at constant output. The size of the radiator/reservoir varies with the amount of electrolyte fluid that must be cooled. In addition, the radiator/reservoir has a heating element 15 to heat the electrolyte fluid and a recirculating pump 16 to keep the electrolyte fluid flowing from the radiator/reservoir to the chamber. The heating element does not necessarily have to be in the radiator and may, alternatively, for example, be located in the cool electrolyte fluid return line 17.

A window 10 allows the operator visually to check the electrolyte level. Preferably, the perforations start at a level just below the bottom of the window, and extend to the bottom of the chamber divider.

The electrolyte fluid in the radiator/reservoir may be replenished through a filler cap 18 or indirectly through the fill cap 5.

Instead of providing a separate radiator/reservoir 13, any one of the extant vehicle radiators may be used for heat exchange purposes. For example, the engine coolant radiator, the power transmission fluid radiator (if independent from the engine coolant radiator), or the engine oil coolant radiator may be used to cool the electrolyte fluid.

Instead of, or in addition to, the viewing window 10, a sensor 14 monitors the electrolyte fluid level in the radiator/reservoir and alerts by indicator in the passenger compartment or elsewhere when said level is low. In a different embodiment, the sensor may be housed on or in the housing 1, in addition to or in lieu of being located on or in the radiator/reservoir 13 or in addition to or in lieu of the window 10.

In an alternative embodiment (not shown), the radiator/reservoir is sealed and therefore will lack a filler cap 18.
In operation, the temperature of the electrolyte fluid is maintained between about 135° to about 155°, preferably at about 145°.

A thermostat 111 controls a gate valve which opens at a pre-determined temperature, for example 145°, thereby allowing electrolyte fluid to flow through the hot electrolyte fluid cooling line 12 from the chamber 9 to the radiator/reservoir. In a different embodiment, there is no thermostat or re-circulating pump and electrolyte fluid flows freely between the chamber and the radiator/reservoir.

The cool electrolyte fluid return line 17 allows the flow of the cooled electrolyte fluid through the recirculating pump 16 from the radiator reservoir 13 into the chamber 9. The recirculating pump 16 may be located at the radiator/reservoir, the housing, or somewhere on the cool electrolyte fluid return line 17.

Controlled temperature of the electrolyte fluid is required for the efficient production of hydrogen. In a cold or freezing environment, the heating element 15 heats the electrolyte fluid entering the chamber 9. During this process the thermostat controlled gate valve is closed. When electrolyte fluid reaches optimum temperature the thermostat opens the gate valve and the electrolyte fluid flows through the hot electrolyte fluid cooling line 12 into the radiator/reservoir 13, cooling the electrolyte fluid and thereby allowing temperature regulation.

The electrolyte fluid may be heated to desired operating temperature by a heat exchanger working in conjunction with the hot electrolyte fluid cooling line or the cool electrolyte fluid return line. A temperature control valve or thermostat may be used to govern the electrolyte fluid temperature by regulating the gate valve to the heat exchanger.

In the preferred embodiment, electrolyte fluid extracted from the chamber and flowing to the radiator/reservoir is extracted from the anode or positive electrode side of housing 1. This minimizes the amount of hydrogen extracted from the chamber. Extracting the electrolyte fluid from the cathode or negative electrode side of housing 1 will draw amounts of oxygen with the flow of the hot electrolyte fluid, thereby adversely affecting the ability of the Controller to lean out the fuel mixture.

The amount of nickel present in the stainless steel of the cathode is a factor determining the amount of hydrogen produced. The amount of nickel present in the stainless steel of the anode and cathode affects resistance to corrosion.

In greater detail one form of electrodes in a device of the invention. The anode 103 and cathode 107 are similarly constructed, and depend from a top surface of the housing 101. Each electrode comprises a circular or spiral tubular member 133, 136, securely held in position by fasteners 134, 135 attached to the housing top. As will be explained, in particular with reference to the embodiment of FIG. 4, the larger the exposed area of the electrode, the greater the efficiency of the device. With this in mind, the tubular members 133, 136 are advantageously corrugated along their length and by having crests and valleys (corrugations) along the length of the tubular members, rather than a plain external surface, the area of the active surface is increased.

Oxygen and hydrogen generated by electrolysis respectively exit the housing through oxygen outlet 104 and hydrogen outlet 107. Also, line 112 leads from the housing to a radiator/reservoir (not shown) and a return line 117 from the radiator/reservoir enters the housing 101.

A thermostat 111 senses the temperature of the electrolyte fluid and, for example, by means of a gate valve, controls flow of the electrolyte fluid from the chamber within the housing to the line 112.

Replenishment of electrolyte fluid can be effected through an opening closeable by a fill cup 105.

A divider 109 extends down into the housing 101 between the electrodes (anode and cathode) and, as explained in the foregoing paragraphs with reference to FIGS. 1 and 2, the divider provides a barrier which is impervious to gaseous flow above the level of the electrolyte fluid within the chamber, is perforated at locations below the level of the fluid but is spaced from the bottom of the housing.

FIG. 3 also shows hookups 140,141 for coupling to adjacent units whereby such units can be “stacked” and coupled anode to anode; cathode to cathode to provide a composite “powerpack” for increasing the amount of hydrogen and oxygen generated.

It has already been explained how the efficiency of the device of the invention will be increased if the anode and cathode present enlarged exposed working surfaces. FIG. 4 of the drawings shows an embodiment in which composite electrodes (anode 403 and cathode 406) extend lengthwise in a housing 401. Each electrode comprises a plurality of plates 403, 406, stacked side by side and securely held together by elongated metal sheets 434, 435. The sheets can be welded, clamped or otherwise secured to the stacked plates to present two elongated electrodes (anode 403 and cathode 406) having rectangular upper, lower, and side surfaces and thereby presenting an enlarged exposed area for contact by the electrolyte fluid.

Oxygen outlet 404, hydrogen outlet 407, and fill cap 405 correspond to the components 104, 107, and 105 of the embodiment described with reference to FIG. 3. Similarly, thermostat 411, line 412, and return line 417 correspond to the components 111, 112, and 117 of the embodiment of FIG. 3; and hookups 440 and 441 serve to couple to adjacent units whereby the units can be stacked for increasing the amount of hydrogen and oxygen generated.

FIGS. 5A through 5E schematically show alternative configurations for the device housing.

In FIG. 5A, three separate housings 201, 201', 201" are coupled or “stacked” together with each housing having an anode and a cathode separated by a divider 209, 209', and 209". This essentially is a schematic showing of three of the devices of the embodiment in FIG. 1 coupled or stacked together.

FIG. 5B shows a single elongated housing 301 having three separate pairs of anodes and cathodes coupled in series (anode to anode to anode; and cathode to cathode to cathode) separated by a divider 309 as described.

The embodiment shown in FIG. 5C is similar to that shown in FIG. 5B but includes an enlarged single elongated anode and an enlarged single elongated cathode separated by a divider 409 within a housing 401. This essentially is the embodiment shown in FIG. 4 of the drawings.

FIG. 5D shows the embodiment of FIG. 2 of the drawings in which a housing 501 accommodates an anode and a cathode separated by a divider 509 within the housing 501 coupled to a radiator/reservoir 513 in the manner described with reference to FIG. 2 of the drawings.

Finally, FIG. 5E shows a device made up of three concentric cylinders. The innermost cylinder constitutes an anode 603 and the outermost cylinder constitutes a cathode
The concentric cylinder between the anode and the cathode provides a divider which is perforated at locations below the level of an electrolyte fluid and which terminates short of the bottom of the housing in which the device of FIG. is accommodated.

[0071] The internal combustion engine may run off hydrogen only. In other words, the on-board production of hydrogen by this invention may be the sole source of fuel, in lieu of fossil fuels. In this instance, a sufficient amount of hydrogen produced by the invention must be stored in a pressurized container for starting the motor vehicle and production of hydrogen. The internal combustion engine must be engineered for burning only hydrogen.

What is claimed is:

1. A device for generating hydrogen for use with an internal combustion engine, comprising means for providing a positive electric current to power the device, means for providing a negative electric current to ground the device, means for housing in a chamber a positive electrode (anode), a negative electrode (cathode), and an electrolyte fluid to enable electrolysis within said means for housing, means for separating the positive electrode (anode) from the negative electrode (cathode), said means comprising extending down into the electrolyte fluid to a point spaced from the chamber bottom and being perforated within said electrolyte fluid so that the electrolyte fluid can flow freely between the electrodes but impervious to the passage of gases above the level of said electrolyte fluid, means for separately venting the generated hydrogen from other gas or gases produced by the electrolysis, and means for replenishing the electrolyte fluid.

2. A device for generating hydrogen for use with an internal combustion engine in accordance with claim 1, comprising additional means for sensing the level of electrolyte fluid in said means for housing.

3. A device for generating hydrogen for use with an internal combustion engine in accordance with claim 1, wherein said means for separating comprises a chamber divider.

4. A device for generating hydrogen for use with an internal combustion engine in accordance with claim 3, wherein said means for separately venting comprises separate vents emanating from each side of the chamber formed by the chamber divider.

5. A device for generating hydrogen for use with an internal combustion engine in accordance with claim 1, wherein said means for generating hydrogen comprises a fill cap.

6. A device for generating hydrogen for use with an internal combustion engine in accordance with claim 1, wherein said means for replenishing comprises a fill cap.

7. A device for generating hydrogen for use with an internal combustion engine in accordance with claim 1, wherein a plurality of positive electrodes (anodes) and a plurality of negative electrodes (cathodes) are accommodated in the housing, and wherein the housing contains means separates the positive electrodes (anodes) from the negative electrodes (cathodes).

8. A device for generating hydrogen for use with an internal combustion engine in accordance with claim 1, wherein said means for housing accommodates an enlarged positive electrode (anode) and an enlarged negative electrode (cathode).

9. A device for generating hydrogen for use with an internal combustion engine in accordance with claim 1, further comprising a radiator/reservoir for storing electrolyte fluid, said radiator/reservoir being connected with said means for housing to allow a flow of electrolyte fluid between said radiator/reservoir and said means for housing.

10. A device for generating hydrogen for use with an internal combustion engine in accordance with claim 9, wherein said radiator/reservoir is connected with said means for housing.

11. A device for generating hydrogen for use with an internal combustion engine in accordance with claim 9, wherein a pump is operable to facilitate the flow of electrolyte fluid between said radiator/reservoir and said means for housing.

12. A device for generating hydrogen for use with an internal combustion engine in accordance with claim 9, wherein a heater is operable to heat the electrolyte fluid in said radiator/reservoir.

13. A device for generating hydrogen for use with an internal combustion engine in accordance with claim 9, wherein a sensor is operable to determine the amount of electrolyte fluid in said radiator/reservoir.

14. A device for generating hydrogen for use with an internal combustion engine in accordance with claim 9, wherein a plurality of chambers are formed by multiple housings, chambers wherein each chamber contains one of a plurality of positive electrodes (anodes), and one of a plurality of negative electrodes (cathodes), and an electrolyte fluid that enables electrolysis within each chamber, and wherein each chamber has a divider, separating the positive electrode (anode) from the negative electrode (cathode) but allowing the free flow of electrolyte fluid between said electrodes, vents for separately venting hydrogen and other gas or gases produced by the electrolysis, and a filler cap facilitating the replenishment of electrolyte fluid.

15. A device for generating hydrogen for use with an internal combustion engine, in accordance with claim 9, wherein said auxiliary reservoir being connected with the housing means so as to facilitate and allow the flow of electrolyte fluid from said auxiliary reservoir to the positive electrode (anode) portion of said housing means.

16. A device for generating hydrogen for use with an internal combustion engine in accordance with claim 1, further comprising an auxiliary reservoir for storing electrolyte fluid, said auxiliary reservoir being connected with the housing means so as to facilitate and allow the flow of electrolyte fluid from said auxiliary reservoir to the positive electrode (anode) portion of said housing means.

17. A device for generating hydrogen for use with an internal combustion engine in accordance with claim 9, having the housing accommodates an enlarged positive electrode (anode) and an enlarged negative electrode (cathode).

18. A device for generating hydrogen for use with an internal combustion engine in accordance with claim 9, further comprising an auxiliary reservoir for storing electrolyte fluid, said auxiliary reservoir being connected with the housing means so as to facilitate and allow the flow of electrolyte fluid from said auxiliary reservoir to the positive electrode (anode) portion of said housing means.

19. A device for generating hydrogen for use with an internal combustion engine, comprising a positive electrode (anode) powered by electric current, a negative electrode (cathode) connected to an electrical ground of the internal
combustion engine, a housing forming a chamber containing the positive electrode (anode), the negative electrode (cathode), and an electrolyte fluid that enables electrolysis within said chamber, a chamber divider extending downwardly into said chamber to separate the positive electrode (anode) from the negative electrode (cathode), said divider terminating short of the bottom of the chamber and being perforated below the level of electrolyte fluid to allow the free flow of electrolyte fluid between said electrodes but being impervious to gaseous flow above the level of said electrolyte fluid, a radiator/reservoir for containing electrolyte fluid, a hot electrolyte fluid cooling line connecting the radiator/reservoir with the chamber of the housing, facilitating the flow of electrolyte fluid from the chamber of the housing to the radiator/reservoir, and a cool electrolyte fluid return line connecting the radiator/reservoir with the chamber of the housing, facilitating the flow of electrolyte fluid from the radiator/reservoir to the chamber of the housing, vents for separately venting hydrogen and other gas or gases produced by the electrolysis, and a filler cap facilitating the replenishment of electrolyte fluid.

20. A device for generating hydrogen for use with an internal combustion engine in accordance with claim 19, comprising a window on or in said housing to detect the level of electrolyte fluid in said chamber.

21. A device for generating hydrogen for use with an internal combustion engine in accordance with claim 19, wherein oxygen is produced by the electrolysis along with the vented hydrogen.

22. A device for generating hydrogen for use with an internal combustion engine in accordance with claim 19, further comprising a gate to increase, decrease, stop, and start the flow of electrolyte fluid from the chamber of the housing to the radiator/reservoir.

23. A device for generating hydrogen for use with an internal combustion engine in accordance with claim 19, further comprising a recirculating pump for facilitating the flow of electrolyte fluid between said radiator/reservoir and said chamber of the housing.

24. A device for generating hydrogen for use with an internal combustion engine in accordance with claim 19, further comprising a heating element for heating the electrolyte fluid in said radiator/reservoir.

25. A device for generating hydrogen for use with an internal combustion engine in accordance with claim 19, further comprising a heating element for heating the electrolyte fluid.

26. A device for generating hydrogen for use with an internal combustion engine in accordance with claim 19, further comprising a sensor to detect the amount of electrolyte fluid in said radiator/reservoir.

27. A device for generating hydrogen for use with an internal combustion engine in accordance with claim 19, further comprising an auxiliary reservoir for storing electrolyte fluid, said auxiliary reservoir being connected with the housing means so as to facilitate and allow the flow of electrolyte fluid from said auxiliary reservoir to the positive electrode (anode) portion of said housing means.

28. A device for generating hydrogen for use with an internal combustion engine, comprising a positive electrode (anode) powered by electric current, a negative electrode (cathode) connected to an electrical ground of the internal combustion engine, a housing forming a chamber containing the positive electrode (anode), the negative electrode (cathode), and an electrolyte fluid that enables electrolysis within said chamber, a chamber divider extending downwardly into said chamber to separate the positive electrode (anode) from the negative electrode (cathode), said divider terminating short of the bottom of the chamber and being perforated below the level of the electrolyte fluid to allow the free flow of electrolyte fluid between said electrodes but being impervious to gaseous flow above the level of said electrolyte fluid, an auxiliary reservoir being connected with the housing so as to facilitate and allow the flow of electrolyte fluid from said auxiliary reservoir to the positive electrode (anode) portion of said housing, a hot electrolyte fluid cooling line connecting the auxiliary reservoir with the chamber of the housing, facilitating the flow of electrolyte fluid from the chamber of the housing to the auxiliary reservoir, and a cool electrolyte fluid return line connecting the auxiliary reservoir with the chamber of the housing, facilitating the flow of electrolyte fluid from the auxiliary reservoir to the chamber of the housing vents for separately venting hydrogen and other gas or gases produced by the electrolysis, and a filler cap facilitating the replenishment of electrolyte fluid.

29. A device for generating hydrogen for use with an internal combustion engine, said device including a positive electrode (anode), powered by electric current, a negative electrode (cathode) connectable to an electrical ground of the internal combustion engine, a housing forming a chamber containing the positive electrode (anode), the negative electrode (cathode), and an electrolyte fluid that enables electrolysis within said chamber, a chamber divider separating the positive electrode (anode) from the negative electrode (cathode), vents for separately venting hydrogen and other gas or gases produced by the electrolysis, and a filler cap facilitating the replenishment of electrolyte fluid, wherein said positive electrode (anode), negative electrode (cathode), and chamber divider are three concentric cylinders, the innermost and outermost concentric cylinders being the electrodes and the intermediate concentric cylinder being the chamber divider, and wherein the bottom of the intermediate concentric cylinder is spaced from the bottom of the housing forming the chamber and a portion of the intermediate cylinder between the bottom and the level of the electrolyte fluid is perforated to allow the free flow of electrolyte fluid between said electrodes.

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