

A Practical Guide to 'Free Energy' Devices

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Please note that this is a re-worded excerpt from this patent. It describes in considerable detail, one of Stan's methods for splitting water into hydrogen and oxygen gasses and the subsequent methods for using those gasses.

United States Patent 5,149,407 22nd September 1992 Inventor: Stanley Meyer



PROCESS AND APPARATUS FOR THE PRODUCTION OF FUEL GAS AND THE ENHANCED RELEASE OF THERMAL ENERGY FROM SUCH GAS

ABSTRACT:

Water molecules are broken down into hydrogen and oxygen gas atoms in a capacitive cell by a polarisation and resonance process dependent on the dielectric properties of water and water molecules. The gas atoms are then ionised or otherwise energised and thermally combusted to release a degree of energy greater than that of combustion of the gas in air.

OBJECTS OF THE INVENTION:

A first object of the invention is to provide a fuel cell and a process in which molecules of water are broken down into hydrogen and oxygen gasses, and a fuel gas mixture comprised of hydrogen, oxygen and other gasses formerly dissolved in the water, is produced. A further object of the invention is to realise significant energy-yield from a fuel gas derived from water molecules. Molecules of water are broken down into hydrogen and oxygen gasses. Electrically charged hydrogen and oxygen ions of opposite electrical polarity are activated by electromagnetic wave energy and exposed to a high temperature thermal zone. Significant amounts of thermal energy with explosive force beyond the gas burning stage are released.

An explosive thermal energy under a controlled state is produced. The process and apparatus provide a heat energy source useful for power generation, aircraft rocket engines or space stations.

BRIEF DESCRIPTION OF THE DRAWINGS:

Figs.1A through **1F** are illustrations depicting the theoretical bases for phenomena encountered during operation of the fuel gas production stage of the invention.

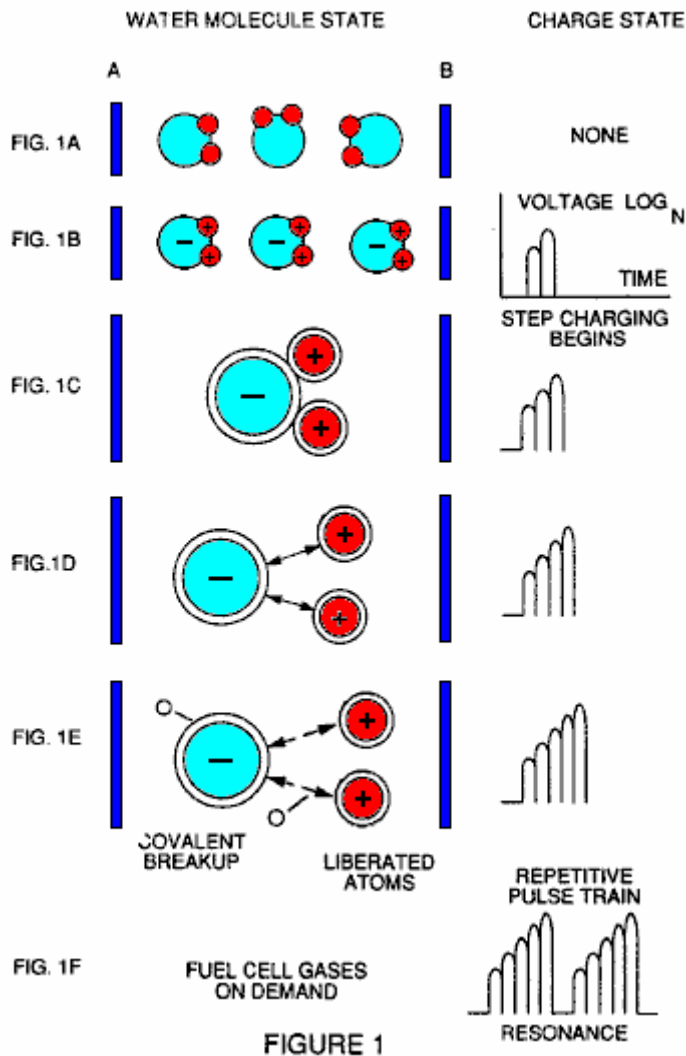


Fig.2 illustrates a circuit which is useful in the fuel gas generation process.

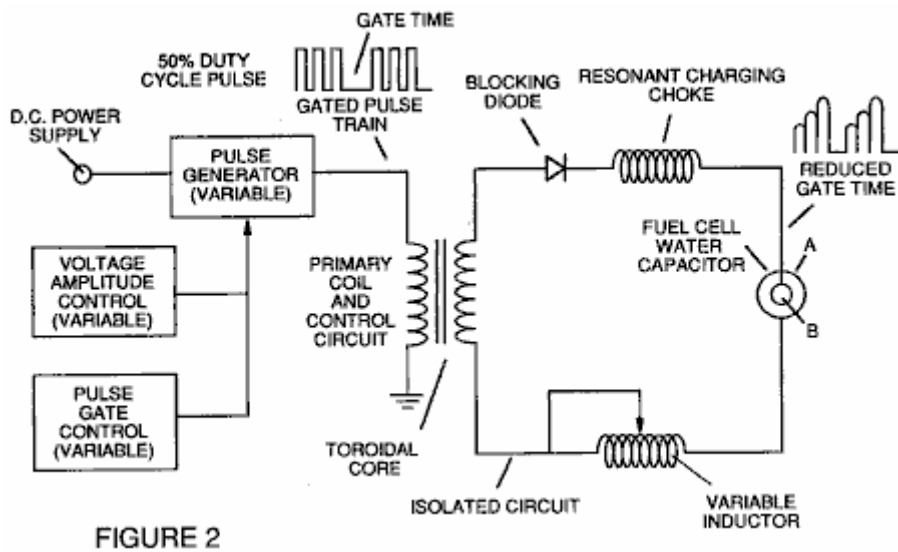


Fig.3 shows a perspective of a "water capacitor" element used in the fuel cell circuit.

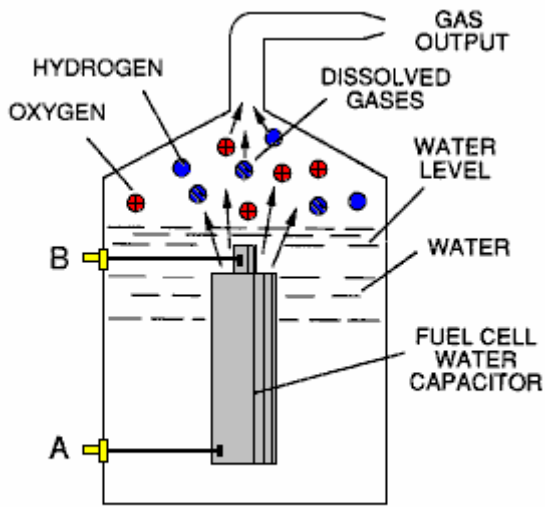


FIGURE 3

Fig.4 illustrates a staged arrangement of apparatus useful in the process, beginning with a water inlet and culminating in the production of thermal explosive energy.

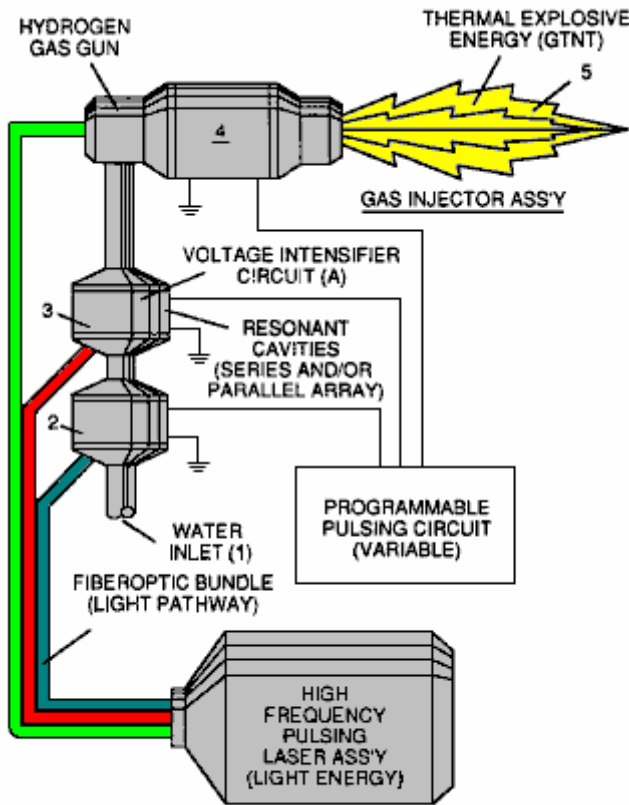


FIGURE 4

Fig.5A shows a cross-section of a circular gas resonant cavity used in the final stage assembly of Fig.4

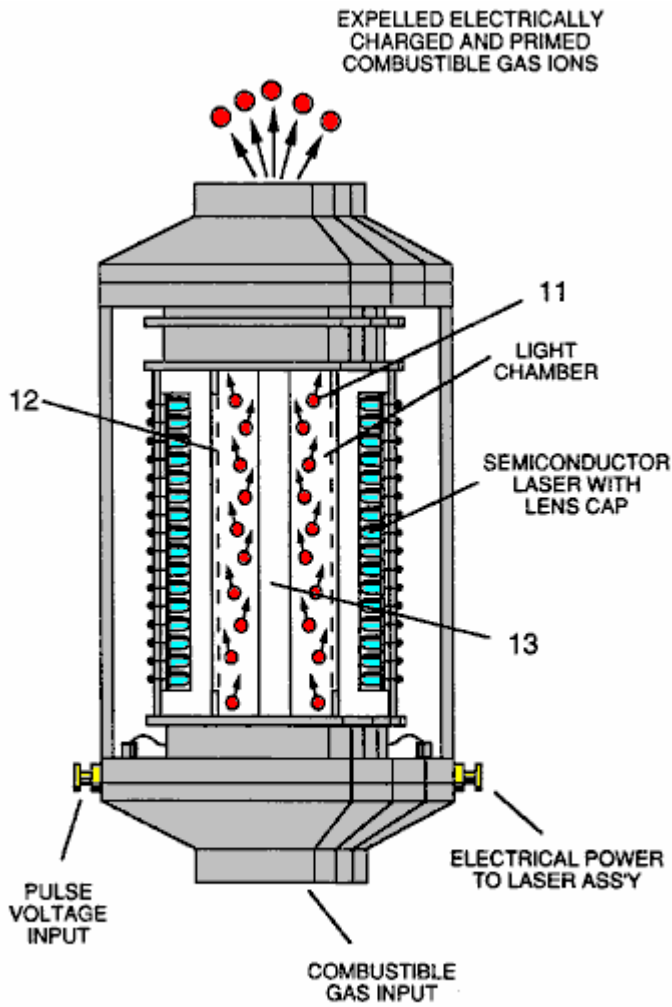


FIGURE 5A

Fig.5B shows an alternative final stage injection system useful in the apparatus of Fig.4

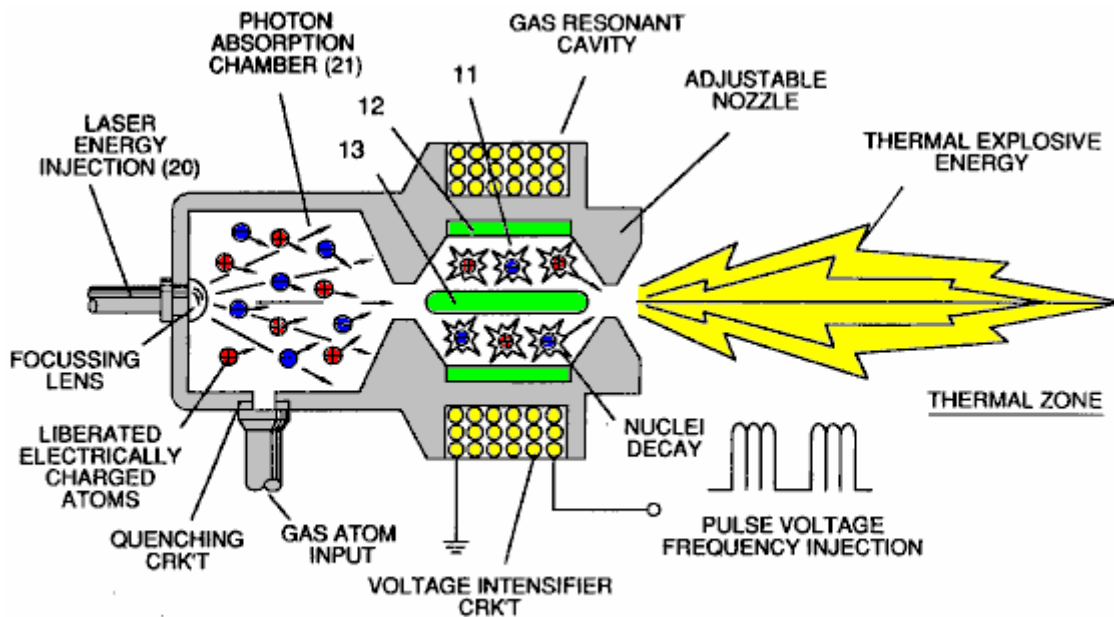


FIGURE 5B

Fig.5C shows an optical thermal lens assembly for use with either final stage of Fig.5A or Fig.5B.

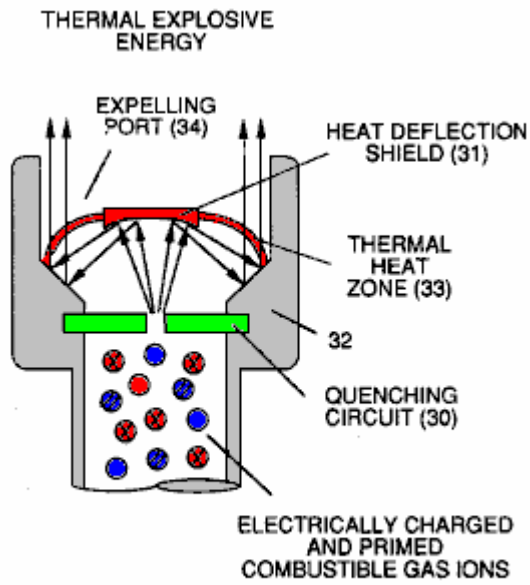


FIGURE 5C

Figs.6A, 6B, 6C and 6D are illustrations depicting various theoretical bases for atomic phenomena expected to occur during operation of this invention.

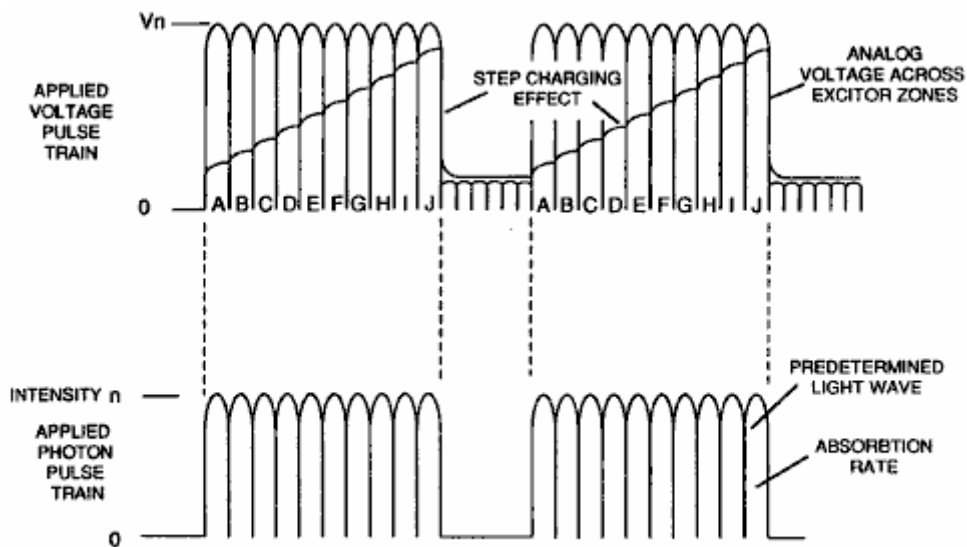


FIGURE 6A

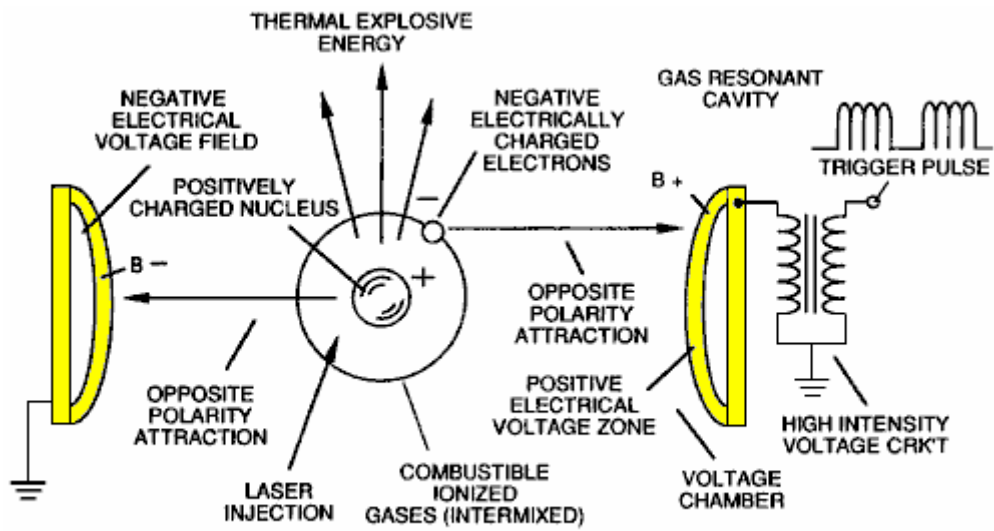


FIGURE 6B

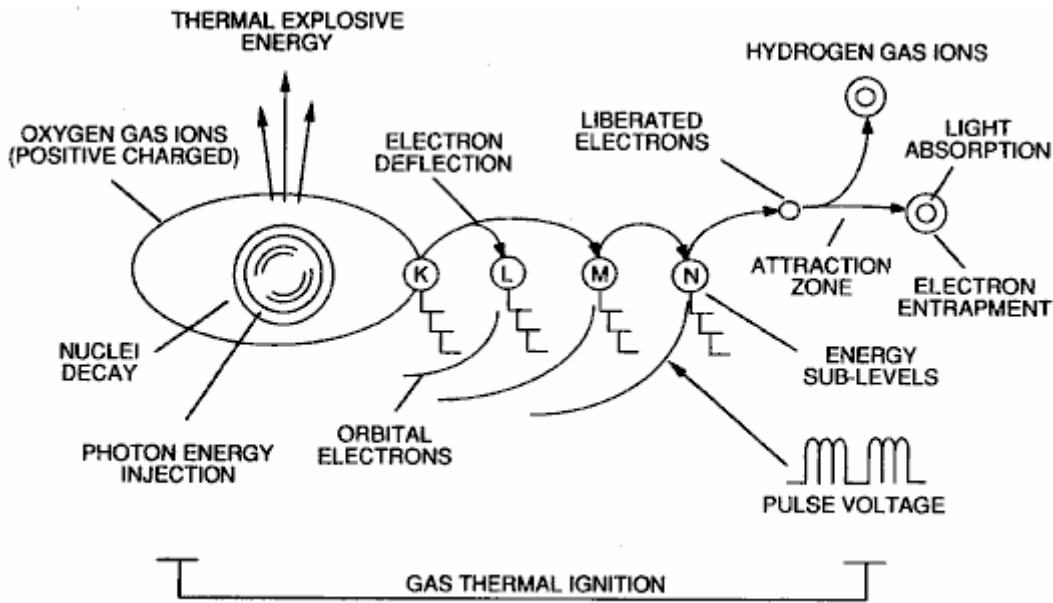


FIGURE 6C

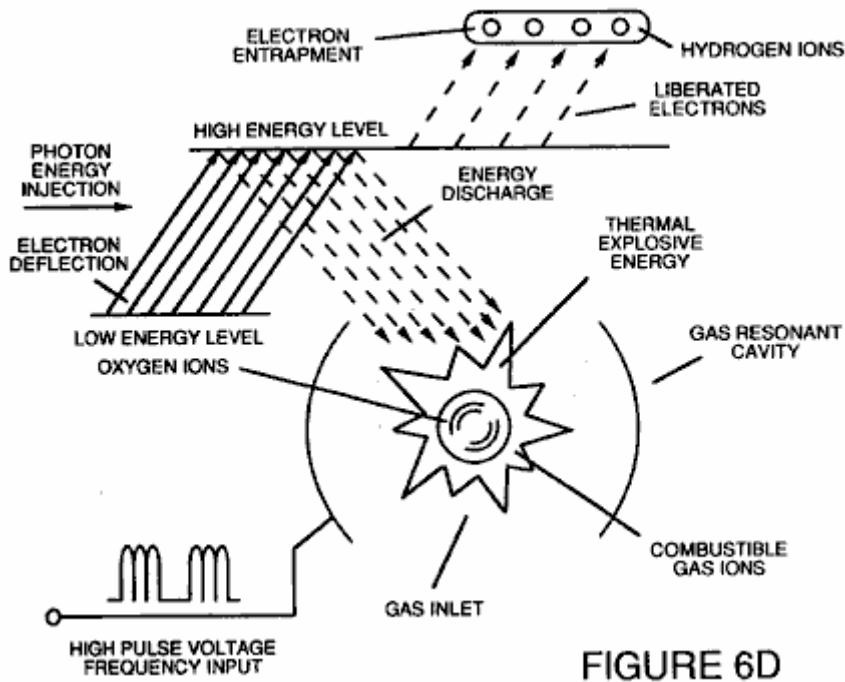


FIGURE 6D

Fig.7 is an electrical schematic of the voltage source for the gas resonant cavity.

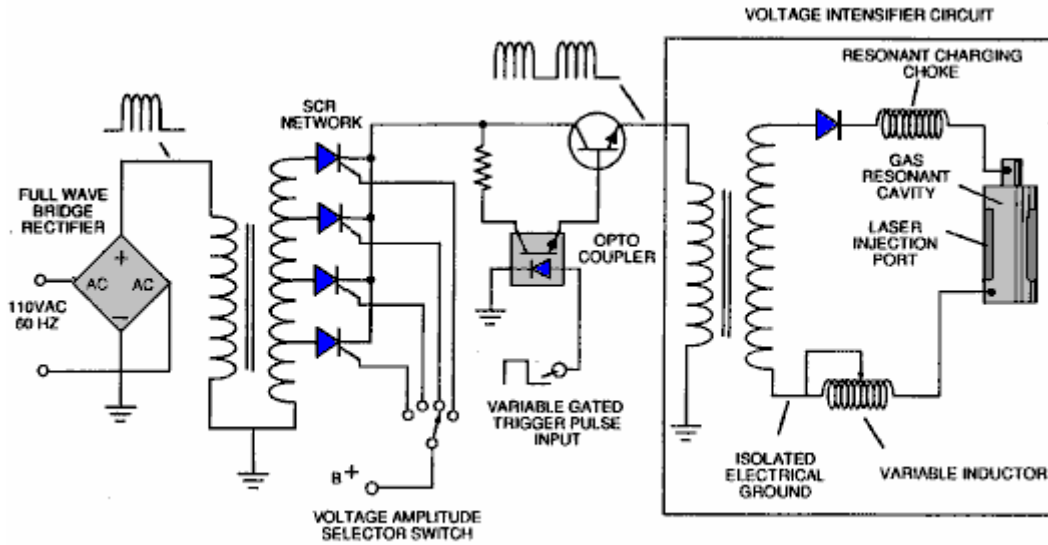


FIGURE 7

Figs.8A and 8B respectively, show (A) an electron extractor grid used in the injector assemblies of Fig.5A and Fig.5B, and (B) the electronic control circuit for the extractor grid.

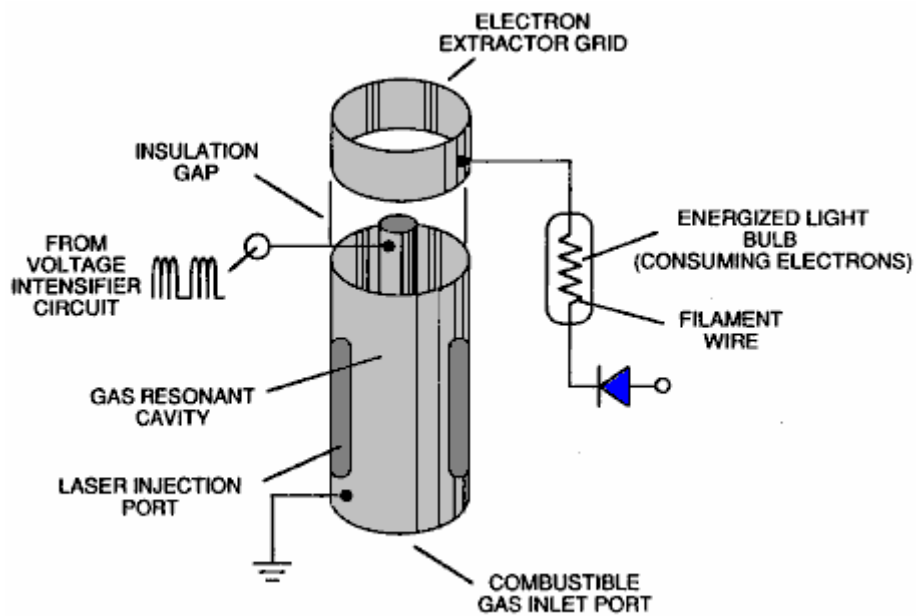


FIGURE 8A

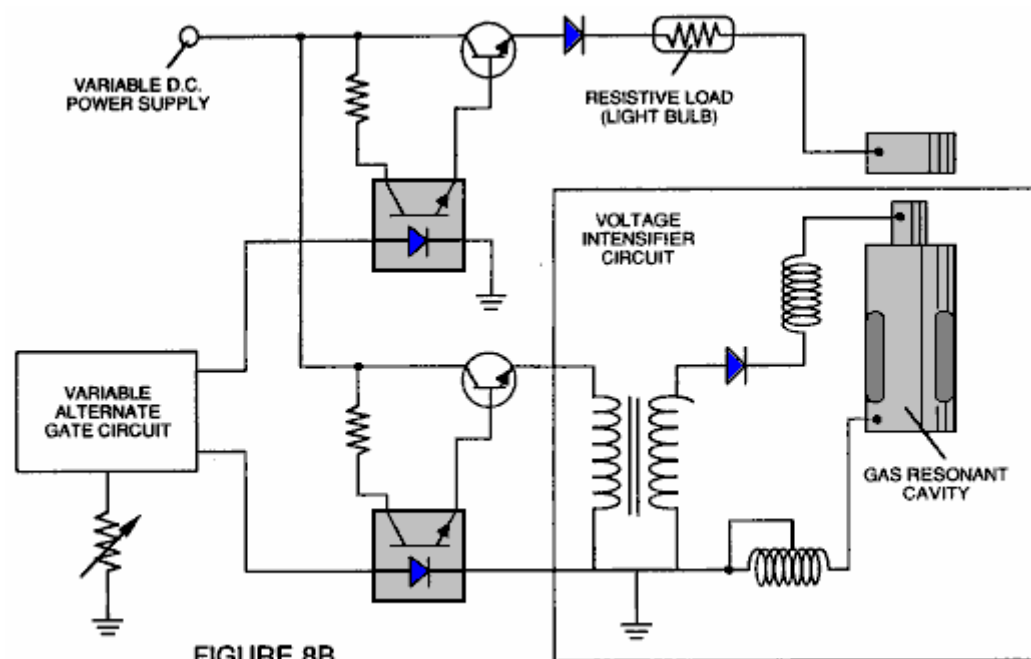


FIGURE 8B

Fig.9 shows an alternative electrical circuit useful in providing a pulsating waveform to the apparatus.

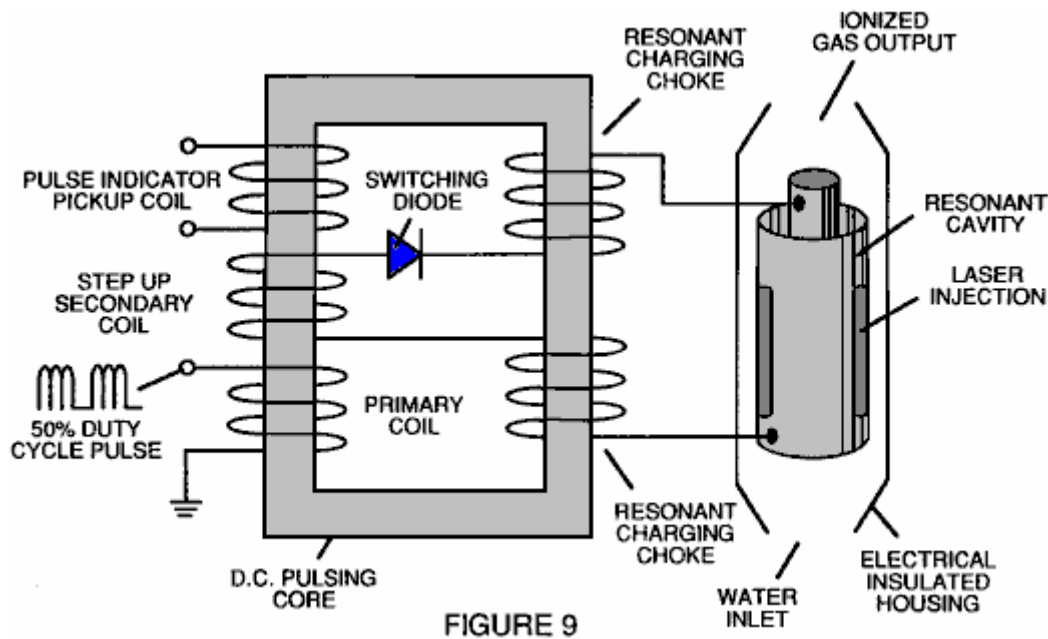


TABLE 1: PROCESS STEPS LEADING TO IGNITION

Relative State of Water Molecule and/or Hydrogen/Oxygen/Other Atoms	Stage
Random (ambient state) alignment of polar fields, polarisation of molecules. Molecular elongation. Atom liberation by breakdown of covalent bond	1st Stage: Water to Gas
Release of gasses, Liquid to gas ionisation, Electrical charging effect, Particle Impact	2nd Stage: Gas Ionisation
Electromagnetic Wave, Laser or photon injection, Electron extraction, Atomic destabilisation	3rd Stage: Priming
Thermal Ignition	Final Stage: Ignition

DESCRIPTION OF THE PREFERRED EMBODIMENT:

A fuel gas is produced by a hydrogen fracturing process which follows the sequence of steps shown in Table 1. Beginning with water molecules, the molecule is subjected to successively increasing electrical wave energy and thermal forces. In the succession of forces, randomly orientated water molecules are aligned with respect to molecular polar orientation and themselves polarised and “elongated” by the application of an electric potential, to the extent that the co-valent bonding of the water molecules is so weakened that the atoms disassociate and the molecule breaks down into hydrogen and oxygen elemental components. Next, the released atomic gasses are ionised and electrically charged in a vessel while being subjected to a further energy source which promotes inter-particle impact in the gas at an increased overall energy level. Finally, the atomic particles in the excited gas, having achieved successively higher energy levels, are subjected to a laser or electromagnetic wave energy source which produces atomic destabilisation and the final release of thermal explosive energy.

Engineering design parameters based on known theoretical principles of atomic physics, determine the incremental levels of electrical and wave energy input required to produce resonance in each stage of the system. Instead of a dampening effect, a resonant energisation of the molecule, atom or ion provides a compounding energy interaction resulting in the final energy release.

In brief, in the first stage, a gas mixture including hydrogen, oxygen and other gasses formerly dissolved in the water, is obtained from water. In general, the method used in the first stage consists of:

- (A) Providing a capacitor, in which the water is included as a dielectric liquid between capacitor plates, in a resonant charging choke circuit, which includes an inductor in series with the capacitor.

- (B) Subjecting the capacitor to a pulsating, unipolar electric voltage field in which the polarity does not pass beyond an arbitrary ground, whereby the water molecules within the capacitor are subjected to a charge of the same polarity, and the water molecules are distended by the electrical polar forces.
- (C) Further subjecting the water in the capacitor to the pulsating electric field to achieve a pulse frequency which induces a resonance within the water molecule.
- (D) Continuing the application of the pulsing frequency to the capacitor cell after resonance occurs so that the energy level within the molecule is increased in cascading incremental steps in proportion to the number of pulses.
- (E) Maintaining the charge of the capacitor during the application of the pulsating field, whereby the co-valent electrical bonding of the hydrogen and oxygen atoms within the water molecules is destabilised to such a degree that the force of the electrical field within the molecule exceeds the bonding force of the molecule, causing the molecule to break apart into the elemental gasses of hydrogen and oxygen.
- (F) Collecting the hydrogen and oxygen gasses, along with any other gasses formerly dissolved in the water, and discharging the collected gasses as a fuel gas mixture.

The water molecules are subjected to increasing electrical forces. In an ambient state, randomly orientated water molecules are aligned with respect to a molecular polar orientation. Next, they themselves are polarised and “elongated” by the application of an electrical potential to the extent that co-valent bonding of the water molecules is so weakened that the atoms disassociate and the molecule breaks down into hydrogen and oxygen elemental components. In this process, the point of optimum gas release is reached when the circuit is at resonant frequency. Water in the cell is subjected to a pulsating, polar electric field produced by the electrical circuit, whereby the water molecules are distended by the electrical force on the plates of the capacitor. The polar pulsating frequency applied is such that the pulsating electric field induces a resonance in the molecules. A cascade effect occurs, and the overall energy of specific water molecules is increased in cascading incremental steps. The hydrogen and oxygen are released when the resonant energy exceeds the co-valent bonding force of the water molecules.

A preferred construction material for the capacitor plates is stainless steel T-304 which does not react chemically with water, hydrogen or oxygen. An electrically conductive material which is inert in the fluid environment, is a desirable material of construction for the electric field plates of the “water capacitor” employed in the circuit.

Once triggered, the gas output is controllable by the attenuation of operational parameters. Thus, once the frequency of resonance is identified, by varying the applied pulse voltage to the water fuel cell assembly, gas output is varied. By varying the pulse shape, pulse amplitude or pulse train sequence, the gas output can be varied. Attenuation of the voltage field’s mark/space ratio of OFF/ON periods also affects the rate of gas production.

The overall apparatus thus includes an electrical circuit in which a water capacitor is an element. The water capacitor has a known dielectric property. The fuel gasses are obtained from the water by the disassociation of the water molecules. The water molecules are split into component atomic elements by a voltage stimulation process called the ‘electrical Polarisation process’ which also releases dissolved gasses trapped in the water.

From the outline of physical phenomena associated with the first stage of the process described in Table 1, the theoretical basis of the invention considers the respective states of molecules, gasses and ions derived from liquid water. Before voltage stimulation, water molecules are randomly dispersed throughout water in a container. When a unipolar voltage pulse train such as that shown in **Figs.1A** through **1F** is applied to positive and negative capacitor plates, and increasing voltage potential is induced in the molecules in a linear, step-like charging effect. The electrical field of the particles within a volume of water including the electrical field plates, increases from a low energy state to a high energy state in a step manner following each pulse train as illustrated figuratively in **Figs.1A** through **1F**. The increasing voltage potential is always positive in direct relationship to negative ground potential during each pulse. The voltage polarity on the plates which create the voltage fields remains constant although the voltage charge increases. Positive and negative voltage “zones” are thus formed simultaneously in the electrical field of the capacitor plates.

In the first stage of the process described in Table 1, because the water molecule naturally exhibits opposite electrical fields in a relatively polar configuration (the two hydrogen atoms have a positive

charge while the oxygen atom has a negative charge), the voltage pulse causes the water molecules which were initially orientated in random directions, to spin and align themselves with the electrical field applied to the cell. The positively charged hydrogen atoms are attracted to the negative field while the negatively charged oxygen atoms, of the same water molecule, are attracted to the positive voltage field. Even a slight potential difference between the plates of a containment chamber capacitor will initiate the alignment of each water molecule within the cell.

When the voltage applied to the plates causes the water molecules to align themselves, then the pulsing causes the voltage field intensity to be increased in accordance with **Fig.1B**. As further molecular alignment occurs, molecular movement is hindered. Because the positively charged hydrogen atoms of the aligned molecules are attracted in a direction opposite to the negatively charged oxygen atoms, a polar charge alignment or distribution occurs within the molecules between the voltage zones as shown in **Fig.1B**, and as the energy level of the atoms, subjected to resonant pulsing, increases, the stationary water molecules become elongated as shown in **Figs.1C** and **1D**. Electrically charged nuclei and electrons are attracted towards opposite electrically charged voltage zones - disrupting the mass and charge equilibrium of the water molecule.

As the water molecule is further exposed to an increasing potential difference resulting from the step charging of the capacitor, the electrical force of attraction of the atoms within the molecule to the capacitor plates of the chamber also increases in strength. As a result, the co-valent bonding between the atoms of the molecule is weakened and ultimately, terminated. The negatively charged electron is attracted toward the positively charged hydrogen atoms, while at the same time, the negatively charged oxygen atoms repel electrons.

In a more specific explanation of the "sub-atomic action which occurs in the water cell, it is known that natural water is a liquid which has a dielectric constant of 78.54 at 20 degrees Centigrade and 1 atmosphere of pressure [Handbook of Chemistry and Physics, Section E-50].

When a volume of water is isolated and electrically conductive plates that are chemically inert in water and which are separated by a distance, are immersed in the water, a capacitor is formed, having a capacitance determined by the surface area of the plates, the distance of their separation and the dielectric constant of the water.

When water molecules are exposed to voltage at a restricted current, water takes on an electrical charge. By the laws of electrical attraction, molecules align according to positive and negative polarity fields of the molecule and the alignment field. The plates of a capacitor constitute such an alignment field when a voltage is applied across them.

When a charge is applied to a capacitor, the electrical charge of the capacitor equals the applied voltage charge. In a water capacitor, the dielectric property of water resists the flow of current in the circuit, and the water molecule itself, because it has polarity fields formed by the relationship of hydrogen and oxygen in the co-valent bond, and an intrinsic dielectric property, becomes part of the electrical circuit, analogous to a "microcapacitor" within the capacitor defined by the plates.

In the Example of a fuel cell circuit of **Fig.2**, a water capacitor is included. The step-up coil is formed on a conventional torroidal core formed of a compressed ferromagnetic powdered material that will not itself become permanently magnetised, such as the trademarked "Ferramic 06# 'Permag'" powder as described in *Siemens Ferrites Catalogue*, CG-2000-002-121, (Cleveland, Ohio) No. F626-1205. The core is 1.50 inch in diameter and 0.25 inch in thickness. A primary coil of 200 turns of 24 AWG gauge copper wire is provided and a coil of 600 turns of 36 AWG gauge wire comprises the secondary winding. Other primary/secondary coil winding ratios may be conveniently determined.

An alternate coil arrangement using a conventional M27 iron transformer core is shown in **Fig.9**. The coil wrap is always in one direction only.

In the circuit of **Fig.2**, the diode is a 1N1198 diode which acts as a blocking diode and an electric switch which allows current flow in one direction only. Thus, the capacitor is never subjected to a pulse of reverse polarity.

The primary coil of the torroid is subject to a 50% duty-cycle pulse. The torroidal pulsing coil provides a voltage step-up from the pulse generator in excess of five times, although the relative amount of step-up

is determined by pre-selected criteria for a particular application. As the stepped-up pulse enters the first inductor (formed of 100 turns of 24 gauge wire, 1 inch in diameter), an electromagnetic field is formed around the inductor. Voltage is switched off when the pulse ends, and the field collapses and produces another pulse of the same polarity; i.e. another positive pulse is formed where the 50% duty-cycle was terminated. Thus, a double pulse frequency is produced; however, in a pulse train of unipolar pulses, there is a brief time when pulses are not present.

By being so subjected to electrical pulses in the circuit of **Fig.2**, the water between the capacitor plates takes on an electrical charge which is increased by a step-charging phenomenon occurring in the water capacitor.. Voltage continually increases (to about 1000 volts and more) and the water molecules start to elongate.

The pulse train is then switched off; the voltage across the water capacitor drops to the amount of charge that the water molecules have taken on, i.e. voltage is maintained across the charged capacitor. The pulse train is then applied again.

Because a voltage potential applied to a capacitor can perform work, the higher the voltage potential, the more work is performed by a given capacitor. In an optimum capacitor which is wholly non-conductive, zero current flow will occur across the capacitor. Thus, in view of an idealised capacitor circuit, the object of the water capacitor circuit is to prevent electron flow through the circuit, i.e. such as occurs by electron flow or leakage through a resistive element that produces heat. Electrical leakage in water will occur, however, because of some residual conductivity and impurities, or ions that may otherwise be present in the water. thus, the water capacitor is preferably chemically inert. An electrolyte is not added to the water.

In the isolated water bath, the water molecule takes on charge, and the charge increases. The object of the process is to switch off the co-valent bonding of the water molecule and interrupt the sub-atomic force that binds the hydrogen and oxygen atoms together to form a molecule, thus causing the hydrogen and oxygen to separate.

Because an electron will only occupy a certain electron shell, the voltage applied to the capacitor affects the electrical forces inherent in the co-valent bond. As a result of the charge applied by the plates, the applied force becomes greater than the force of the co-valent bonds between the atoms of the water molecule, and the water molecule becomes elongated. When this happens, the time share ratio of the electrons between the atoms and the electron shells, is modified.

In the process, electrons are extracted from the water bath; electrons are not consumed nor are electrons introduced into the water bath by the circuit, as electrons would be during conventional electrolysis. Nevertheless, a leakage current through the water may occur. Those hydrogen atoms missing electrons become neutralised and atoms are liberated from the water. The charged atoms and electrons are attracted to opposite polarity voltage zones created between the capacitor plates. The electrons formerly shared by atoms in the water co-valent bond are re-allocated so that neutral elemental gasses are liberated.

In the process, the electrical resonance may be reached at all levels of voltage potential. The overall circuit is characterised as a "resonant charging choke" circuit which is an inductor in series with a capacitor [*SAMS Modern Dictionary of Electronics*, 1984 p.859]. Such a resonant charging choke is on each side of the capacitor. In the circuit, the diode acts as a switch which allows the magnetic field produced in the inductor to collapse, thereby doubling the pulse frequency and preventing the capacitor from discharging. In this manner, a continuous voltage is produced across the capacitor plates in the water bath and the capacitor does not discharge. The water molecules are thus subjected to a continuously charged field until the breakdown of the co-valent bond occurs.

As noted initially, the capacitance depends on the dielectric properties of the water and the size and separation of the conductive elements forming the water capacitor.

Example 1:

In an example of the circuit of **Fig.2** (in which other circuit element specifications are provided above), two concentric cylinders 4 inches long, formed the water capacitor of the fuel cell in the volume of water. The outside cylinder was 0.75 in outside diameter; the inner cylinder was 0.5 inch in outside diameter.

Spacing between the inside cylinder and the outside cylinder was 0.0625 inch (1.59 mm). Resonance in the circuit was achieved at a 26 volt pulse applied to the primary coil of the torroid at 10khz and a gas mixture of hydrogen, oxygen and dissolved gasses was given off. The additional gasses included nitrogen and argon from air dissolved in the water.

In achieving resonance in any circuit, as the pulse frequency is adjusted, the current flow is minimised and the voltage on the capacitor plates is maximised. Calculation of the resonant frequency of an overall circuit is determined by known means; different cavities have a different resonant frequency. The gas production rate is varied by the period of time between trains of pulses, pulse amplitude, capacitor plate size and plate separation.

The wiper arm on the second inductor tunes the circuit and allows for contaminants in the water so that the charge is always applied to the capacitor. The voltage applied, determines the rate of breakdown of the molecule into its atomic components. As water in the cell is consumed, it is replaced by any appropriate means or control system.

Thus, in the first stage, which is of itself independently useful, a fuel gas mixture is produced having, in general, the components of elemental hydrogen and oxygen and some additional atmospheric gasses. The fuel gas is itself combustible in a conventional manner.

After the first stage, the gas atoms become elongated during electron removal as the atoms are ionised. Laser or light wave energy of a predetermined frequency is injected into a containment vessel in a gas ionisation process. The light energy absorbed by voltage-stimulated gas nuclei, causes destabilisation of gas ions still further. The absorbed laser energy causes the gas nuclei to increase in energy state, which in turn, causes electron deflection to a higher orbital shell.

The electrically charged and laser-primed combustible gas ions from a gas resonant cavity, may be directed into a an optical thermal lens assembly for triggering. Before entry into the optimal thermal lens, electrons are stripped from the ions and the atom is destabilised. The destabilised gas ions which are electrically and mass unbalanced atoms having highly energised nuclei, are pressurised during spark ignition. The unbalanced, destabilised atomic components interact thermally; the energised and unstable hydrogen gas nuclei collide with highly energised and unstable oxygen gas nuclei, causing and producing thermal explosive energy beyond the gas burning stage. The ambient air gas components in the initial mixture aid the thermal explosive process under a controlled state.

In the process, the point of optimum energy yield is reached when the electron-deficient oxygen atoms (having less than a normal number of electrons) lock on to an capture a hydrogen atom electron, prior to, or during, thermal combustion of the hydrogen/oxygen mixture. Atomic decay results in the release of energy.

After the first stage, the gas mixture is subjected to a pulsating, polar electric field which causes the orbits of the electrons of the gas atoms to become distended. The pulsating electrical field is applied at a frequency which resonates with the electrons of the gas atoms. This results in the energy levels of the electrons increasing in cascading incremental steps.

Next, the gas atoms are ionised and subjected to electromagnetic wave energy of the correct frequency to induce further electron resonance in the ion, whereby the energy level of the electron is successively increased. Electrons are extracted from the resonating ions while they are in this increased energy state, and this destabilises the nuclear electron configuration of the ions. This gas mixture of destabilised ions is thermally ignited.

In the apparatus shown in **Fig.4**, water is introduced at inlet **1** into a first stage water fracturing module **2**, such as the water fuel cell described above, in which water molecules are broken down into hydrogen, oxygen and released gasses which were trapped in the water. These gasses may be introduced to a successive stage **3** or other number of like resonant cavities, which are arranged in either a series or parallel combined array. The successive energisation of the gas atoms, provides a cascading effect, successively increasing the voltage stimulation level of the released gasses as they pass sequentially through cavities **2**, **3**, etc. In a final stage, and injector system **4**, of a configuration of the type shown in **Fig.5A** or **Fig.5B**, receives energised atomic and gas particles where the particles are subjected to further energy input, electrical excitation and thermal stimulation, which produces thermal explosive

energy **5**, which may be directed through a lens assembly of the type shown in **Fig.5C** to provide a controlled thermal energy output.

A single cell, or battery of cells such as shown in **Fig.3**, provides a fuel gas source for the stages following the first stage. The fuel gas is activated by electromagnetic waves, and electrically charged gas ions of hydrogen and oxygen (of opposite polarity) are expelled from the cascaded cells **2, 3**, etc. shown in **Fig.4**. The circuit of **Fig.9** may be utilised as a source of ionising energy for the gasses. The effect of cascading, successively increases the voltage stimulation level of the released gasses, which are then directed to the final injector assembly **4**. In the injector assembly, gas ions are stimulated to an even greater energy level. The gasses are continually exposed to a pulsating laser or other electromagnetic wave energy source together with a high-intensity oscillating voltage field which occurs within the cell between electrodes or conductive plates of opposite electrical polarity. A preferred construction material for the plates is a stainless steel T-304 which is non-chemically reactive with water, hydrogen or oxygen. An electrically conductive material inserted in the fluid environment, is a desirable material of construction for the electrical field producing plates, through which field, the stream of activated gas particles passes.

Gas ions of opposite electrical charges reach and maintain a critical energy level state. The gas ions have opposite electrical charges and are subjected to oscillating voltage fields of opposite polarity. They are also subjected to a pulsating electromagnetic wave energy source. Immediately after reaching critical energy, the excited gas ions are exposed to a high temperature thermal zone in the injection cell **4**, which causes the excited gas ions to undergo gas combustion. The gas ignition triggers atomic decay and releases thermal energy **5**, with explosive force.

Once triggered, the explosive thermal energy output is controllable by the attenuation of operational parameters. With reference to **Fig.6A**, for example, once the frequency of resonance is identified, by varying applied pulse voltage to the initial water fuel cell assemblies **2, 3**, the ultimate explosive energy output is likewise varied. By varying the pulse shape and/or amplitude, or pulse train sequence of the electromagnetic wave energy source, final output is varied. Attenuation of the voltage field frequency in the form of OFF and ON pulses, likewise affects the output of the staged apparatus. Each control mechanism can be used separately, grouped in sections, or systematically arranged in a sequential manner.

A complete system in accordance with the present application thus includes:

1. A water fuel cell for providing a first fuel gas mixture consisting of at least a portion of hydrogen and oxygen gas.
2. An electrical circuit of the type shown in **Fig.7** providing a pulsating, polar electric field to the gas mixture as illustrated in **Fig.6A**, whereby electron orbits of the gas atoms are distorted by being subjected to electrical polar forces, changing from the state shown conceptually in **Fig.6B** to that of **Fig.6C**, at a frequency such that the pulsating electric field induces a resonance with respect to electrons of the gas atoms. The energy level of the resonant electrons is thereby increased in cascading incremental steps.
3. A further electric field to ionise the gas atoms and
4. An electromagnetic wave energy source for subjecting the ionised gas atoms to wave energy of a predetermined frequency to induce further electron resonance in the ions, whereby the energy level of the electron is successively increased, as shown in **Fig.6D**.
5. An electron sink, which may be in the form of the grid element shown in **Fig.8A**, extracts further electrons from the resonating ions while such ions are in an increased energy state and destabilises the nuclear electron configuration of the ions. The "extraction" of electrons by the sink is co-ordinated with the pulsating electrical field of the resonant cavity produced by the circuit of **Fig.7**, by means of
6. An interconnected synchronisation circuit, such as shown in **Fig.8B**.
7. A nozzle, **10** in **Fig.5B**, or thermal lens assembly, **Fig.5C**, provides the means to direct the destabilised ions, and in which they are finally thermally ignited.

As previously noted, to reach and trigger the ultimate atomic decay of the fuel cell gasses at the final stage, sequential steps are taken. First, water molecules are slit into hydrogen and oxygen gasses by a voltage stimulation process. In the injector assembly, a laser produced coherent light wave is absorbed by the gasses. At this point, as shown in **Fig.6B**, the individual atoms are subjected to an electric field to begin an ionisation process. The laser energy is absorbed and causes gas atoms to lose electrons and form positively charged gas ions. The energised, positively charged hydrogen atoms now accept electrons liberated from the heavier gasses and attract other negatively charged gas ions as conceptually

illustrated in **Fig.6C**. Positively and negatively charged gas ions are re-exposed to further pulsating energy sources to maintain random distribution of ionised gas particles.

The gas ions within the wave energy chamber are subjected to an oscillating high-intensity voltage field in a chamber **11** in **Fig.5A** and **Fig.5B** formed within electrodes **12** and **13** in **Fig.5A** and **Fig.5B** of opposite electrical polarity, to produce a resonant cavity. The gas ions reach a critical energy state at the point of resonance.

At this point, within the chamber, additional electrons are attracted to the positive electrode; while positively charged ions or atomic nuclei are attracted to the negative electrode. The positive and negative attraction forces are co-ordinated and act on the gas ions simultaneously; the attraction forces are non-reversible. The gas ions experience atomic component deflection approaching the point of electron separation. At this point electrons are extracted from the chamber by a grid system such as shown in **Fig.5A**. The extracted electrons are consumed and prevented from re-entering the chamber by a circuit such as shown in **Fig.8B**. The elongated gas ions are subjected to a thermal heat zone to cause gas ignition, releasing thermal energy with explosive force. During ionic gas combustion, highly energised and stimulated atoms and atom nuclei collide and explode during thermal excitation. The hydrogen fracturing process occurring, sustains and maintains a thermal zone, at a temperature in excess of normal oxygen/hydrogen combustion temperature, that is, in excess of 2,500 degrees Fahrenheit. To cause and maintain the atomic elongation depicted in **Fig.6C** before gas ignition, a voltage intensifier circuit such as shown in **Fig.7** is utilised as a current-restricting voltage source to provide the excitation voltage applied to the resonant cavity. At the same time, the interconnected electron extractor circuit shown in **Fig.8B**, prevents the reintroduction of electrons back into the system. depending on calculated design parameters, a predetermined voltage and frequency range may be designed for any particular application or physical configuration of the apparatus.

In the operation of the assembly, the pulse train source for the gas resonant cavity shown at **2** and **3** in **Fig.4** may be derived from a circuit such as shown in Figs. **2**, **7** or **9**, and such cavity circuits may be in sequence to provide a cascading energy input. It is necessary in the final electron extraction, that the frequency with which electrons are removed from the system be sequenced and synchronised with the pulsing of the gas resonant cavity. In the circuit of **Fig.8B**, the co-ordination of synchronisation of the circuit with the circuit of **Fig.7** may be achieved by interconnecting point "A" of the gate circuit of **Fig.8B** to point "A" of the pulsing circuit of **Fig.7**.

The circuit shown in **Fig.9** enhances the voltage potential across the resonant charging choke coils during pulsing operations and restricts current flow by allowing an external electromagnetic pulsing field **F**, derived from the primary coil **A** being energised to traverse the coil windings **D** and **E** being energised by the incoming pulse train **Ha xxx Hn**, through switching diode **G**. The external pulse field **F**, and the incoming pulse train **Ha xxx Hn**, are sequentially the same, allowing resonant action to occur, restricting current flow while allowing voltage intensity to increase to stimulated the electrical polarisation process, the gas ionisation process and the electron extraction process. The voltage intensifier circuit of **Fig.9** prevents electrons from entering into those processes.

Together, the hydrogen injector assembly **4**, and the resonant cavity **2** and **3**, form a gas injector fuel cell which is compact, low in weight and whose design can be varied. For example, the hydrogen injector system is suited for cars and jet engines. Industrial applications require larger systems. For rocket engine applications, the hydrogen gas injector system is positioned at the top of each resonant cavity arranged in a parallel cluster array. If resonant cavities are sequentially combined in a parallel/series array, the hydrogen injection assembly is positioned after the exits of the resonant cavities have been combined.

From the outline of the physical phenomena associated with the process described in **Table 1**, the theoretical basis of the invention considers the respective states of molecules, gasses and ions derived from liquid water. Before voltage stimulation, water molecules are randomly dispersed throughout water within a container. When a unipolar voltage pulse train such as shown in **Fig.6A (53a xxx 53n)** is applied, an increasing voltage potential is induced in the molecules, gasses and/or ions in a linear, step-like charging effect. The electrical field of the particles within a chamber including the electrical field plates increases from a low-energy state (**A**) to a high-energy state (**J**) in a step manner, following each pulse train as illustrated in **Fig.6A**. The increasing voltage potential is always positive in direct relationship to negative ground potential during each pulse. The voltage polarity on the plates which

create the voltage fields, remains constant. Positive and negative voltage “zones” are thus formed simultaneously.

In the first stage of the process described in **Table 1**, because the water molecule naturally exhibits opposite electric fields in a relatively polar configuration (the two hydrogen atoms are positively electrically charged relative to the negatively electrically charged oxygen atom), the voltage pulse causes initially randomly orientated water molecules in the liquid state to spin and orientate themselves with reference to the voltage fields applied.

When the potential difference applied causes the oriented water molecules to align themselves between the conductive plates, pulsing causes the voltage field intensity to be increased in accordance with **Fig.6A**. As further molecular alignment occurs, molecular movement is hindered. Because the positively charged hydrogen atoms are attracted in the opposite direction to the negatively charged oxygen atoms, a polar charge alignment or distribution occurs as shown in **Fig.6B**. As the energy level of the atoms subjected to resonant pulsing increases, the stationary water molecules become elongated as shown in **Fig.6C**. Electrically charged nuclei and electrons are attracted towards opposite voltage zones, disrupting the mass equilibrium of the water molecule.

In the first stage, as the water molecule is further exposed to a potential difference, the electrical force of attraction of the atoms to the chamber electrodes also increases in intensity. As a result, the co-valent bonding between the atoms is weakened and ultimately, terminated. The negatively charged electron is attracted towards the positively charged hydrogen atoms, while at the same time, the negatively charged oxygen atoms repel electrons.

Once the applied resonant energy caused by pulsation of the electrical field in the cavities reaches a threshold level, the disassociated water molecules, now in the form of liberated hydrogen, oxygen and ambient air gasses, begin to ionise and lose or gain electrons during the final stage in the injector assembly. Atom destabilisation occurs and the electrical and mass equilibrium of the atoms is disrupted. Again, the positive field produced within the chamber or cavity that encompasses the gas stream, attracts negatively charged ions while the positively charged ions are attracted to the negative field. Atom stabilisation does not occur because the pulsing voltage applied is repetitive without polarity change. A potential of approximately several thousand volts, triggers the ionisation state.

As the ionised particles accumulate within the chamber, the electrical charging effect is again an incremental stepping effect that produces an accumulative increased potential, while, at the same time, resonance occurs. The components of the atom begin to “vibrate” at a resonant frequency such that an atomic instability is created. As shown in **Fig.6D**, a high energy level is achieved, which then collapses, resulting in the release of thermal explosive energy. Particle impact occurs when liberated ions in a gas are subjected to further voltage. A longitudinal cross-section of a gas resonant cavity is shown in **Fig.5A**. To promote gas ionisation, electromagnetic wave energy such as a laser or photon energy source of a predetermined wavelength and pulse intensity is directed to, and absorbed by, the ions of the gas. In the device of **Fig.5A**, semiconductor optical lasers **20a - 20p, 20xxx** surround the gas flow path. In the device of **Fig.5B**, photo energy **20** is injected into a separate absorption chamber **21**. The incremental stimulation of nuclei to a more highly energised state by electromagnetic wave energy causes electron deflection to a higher orbital state. The pulse rate as well as intensity of the electromagnetic wave source is varied to match the absorption rate of ionised particles to produce the stepped incremental increase in energy. A single laser coupled by means of fibre optic light guides is an alternative to the plurality of lasers shown in **Fig.5B**. Continued exposure of the gas ions to different forms of wave energy during voltage stimulation, maintain individual atoms in a destabilised state and prevents atomic stabilisation.

The highly energised gas ions are thermally ignited when they pass from injector **4** and enter into and pass through a nozzle **10** in **Fig.5B**, or an optical thermal lens assembly as shown in **Fig.5C**. In **Fig.5C**, the combustible gas ions are expelled through and beyond a quenching circuit **30**, and reflected by lenses **31** and **32**, back and forth through a thermal heat zone **33**, prior to atomic breakdown and then exiting through a final port **34**. A quenching circuit is a restricted orifice through which the particle stream passes, such that flashback does not occur. The deflection shield or lens **31**, superheats beyond 3000 degrees Fahrenheit and the combustible gas ions passing through the exiting ports are regulated to allow a gas pressure to form inside the thermal zone. The energy yield is controlled by varying the applied voltage or pulse-train since the thermal-lens assembly is self-adjusting to the flow rate of the ionised and primed gasses. The combustible ionic gas mixture is composed of hydrogen, oxygen and ambient air

gasses. The hydrogen gas provides the thermal explosive force, the oxygen atoms aid the gas thermal ignition, and the ambient air gasses retard the gas thermal ignition process to a controllable state.

As the combustible gas mixture is exposed to a voltage pulse train, the stepped increasing voltage potential causes the moving gas atoms to become ionised (losing or gaining electrons) and changes the electrical and mass equilibrium of the atoms. Gasses which do not undergo the gas ionisation process may accept the liberated electrons (electron entrapment) when exposed to light or photon stimulation. The electron extractor grid circuit shown in **Fig.8A** and **Fig.8B**, is applied to the assembly of **Fig.5A** or **Fig.5B**, and restricts electron replacement. The extractor grid **56**, is applied adjacent to electric field producing components **44** and **45**, within the resonant cavity. The gas ions incrementally reach a critical state which occurs after a high energy resonant state. At this point, the atoms no longer tolerate the missing electrons, the unbalanced electrical field and the energy stored in the nucleus. Immediate collapse of the system occurs and energy is released as the atoms decay into thermal explosive energy.

The repetitive application of a voltage pulse train (**A** through **J** of **Fig.6A**) incrementally achieves the critical state of the gas ions. As the gas atoms or ions (**1a xxx 1n**) shown in **Fig.6C**, become elongated during electron removal, electromagnetic wave energy of a predetermined frequency and intensity is injected. The wave energy absorbed by the stimulated gas nuclei and electrons, causes further destabilisation of the ionic gas. The absorbed energy from all sources, causes the gas nuclei to increase in energy state and induces the ejection of electrons from the nuclei.

To further stimulate the electron entrapment process beyond the atomic level (capturing the liberated electrons during the hydrogen fracturing process), the electron extractor grid (as shown in **Fig.8A**) is placed in spaced relationship to the gas resonant cavity structure shown in **Fig.5A**. The electron extractor grid is attached to an electrical circuit (such as that shown in **Fig.8B**) which allows electrons to flow to an electrical load **55**, when a positive electrical potential is placed on the opposite side of the electrical load. The electrical load may be a typical power-consuming device such as a light bulb or resistive heat-producing device. As the positive electrical potential is switched on, or pulse-applied, the negatively charged electrons liberated in the gas resonant cavity, are drawn away and enter into the resistive load where they are released as heat or light energy. The consuming electrical circuit may be connected directly to the gas resonant cavity positive electrical voltage zone. The incoming positive wave form applied to the resonant cavity voltage zone through a blocking diode, is synchronised with the pulse train applied to the gas resonant cavity by the circuit of **Fig.7** via an alternate gate circuit. As one pulse train is gated "ON", the other pulse train is switched "OFF". A blocking diode directs the electron flow to the electrical load, while resistive wire prevents voltage leakage during the pulse train "ON" time.

The electron extraction process is maintained during gas-flow change by varying the trigger pulse rate in relationship to the applied voltage. The electron extraction process also prevents spark-ignition of the combustible gasses travelling through the gas resonant cavity because electron build-up and potential sparking is prevented.

In an optical thermal lens assembly or thrust-nozzle, such as shown in **Fig.5C**, destabilised gas ions (electrically and mass unbalanced gas atoms having highly energised nuclei) can be pressurised during spark ignition. During thermal interaction, the highly energised and unstable hydrogen gas nuclei collide with the highly energised and unstable oxygen gas nuclei and produce thermal explosive energy beyond the gas-burning stage. Other ambient air gasses and ions not otherwise consumed, limit the thermal explosive process.

Variations of the process and apparatus may be evident to those skilled in the art.