



HOW TO TURN WATER INTO HYDROGEN FUEL!

By

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Water Car - How to Turn Water into Hydrogen Fuel!

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Warning! Legal Disclaimer Warning!

Making combustible gas from water and then using it as fuel is an inherently dangerous activity. Even as the use of fossil fuels has occasioned injuries and death to millions of people, the increasing use of water as fuel will no doubt also bring with it unfortunate accidents accompanied by casualties. Since making water fuel is at this point a do-ityourself endeavor, safety standards also are to be selfimposed. This book is not a manual to guide you step by step in the creation of a safe water fuel system. If you choose to experiment with water fuel, using any of the information included in this book/DVD/CD, you do so completely at your own risk and responsibility.

The author and publishers of this book and any accompanying CDs/DVDs assume no responsibility for any untoward consequences resulting from the implementation of any of the ideas presented in these materials. No guarantee is made as to their fitness for safely making a water fuel device or using the resulting fuel. The author and publishers have simply gathered historical information that can serve as an impetus for others to do more research on this important topic.

Use good judgment in your work, be careful, and think ahead. Of course, injury or death can result to you and/or others from unwanted, unexpected explosions, but also from electrocution, EMF radiation, heat or chemical burns, inhaling toxic fumes, fire, etc. This book is all about sharing the history, not acquainting you with the acceptable, necessary, and required safety standards and equipment. You must find that information elsewhere, and then apply it.

Table of Contents

Legal Disclaimer/Warning 1 2 Table of contents 3 Dedication 4 Author's note Early pioneers of water fuel research, to 1799 5 9 All we really needed to know 1800-1900 High tech of the twentieth century 1901-2000 43 Something new under the sun: 2001-2006 121 133 Conclusion 135 Index 137 Appendix



Laurent Lavoisier demonstrerar brännförsok.

"We are men of science. We should be curious and bold."

– Dr. Henry Jeckyl

Dr. Jeckyl and Mr. Hyde R L Stevenson 1886

Dedication

To the few who love me and whom I love - to those who feel rather than to those who think - to the dreamers and those who put faith in dreams as in the only realities – I offer this Book of Truths, not in its character of Truth-Teller, but for the Beauty that abounds in its Truth; constituting it true. To these I present the composition as an Art Product alone – let us say as a Romance, or, if I be not urging too lofty a claim, as a Poem.

What I here propound is true – therefore, it cannot die – or if by any means it can be now trodden down so that it die, it will "rise again to the life everlasting."

Nevertheless, it is as a poem only that I wish this work to be judged after I am dead.

Eureka Edgar Allan Poe 1848

This book is dedicated to the memory of the pioneers of water fuel technology, to the men and women whose contribution to the advancement of knowledge, be it science fact or science fiction, led to our current ability to use water as fuel. And to the only One who can, and the only One who will, make it happen. Author's Note...

In 1979, as I was talking to a neighbor about our collision course with nature, he called me a hypocrite for talking about it while owning a car. Ever since then, I wanted to find a way to avoid polluting the earth, but it escaped me. I had a feeling that there were answers that have been with us all along, and that we just weren't aware of them. If I did catch wind of some technology, like water fuel, I concluded that, if it was true, I couldn't hope to implement it anyway.

Many people say, "If some good alternative really existed, we would be using it." That would be true, if it weren't for the trillions of dollars made by those who sell energy. The worst thing for you to find out, from their standpoint, is that you have options that make their products unnecessary. What's more, our beleaguered planet would be better off without them! Their products are the #1 reason we are changing the weather and contaminating our air, land, and water. If it wasn't for people making money on energy, we could all be making our own for free, and without creating *any* pollution!

This book was written to help you learn about just one such option: making hydrogen fuel from water, where and when you need it. We opened the world's first museum dedicated to telling the story. Not to replicate it, for that has already been done enough. Not replication, but publication, is what this suppressed energy technology needs. This book represents my own small effort to tell the world about water fuel. I hope it is of benefit to all.



THE EARLY PIONEERS OF WATER FUEL RESEARCH, TO 1799.

No matter where we live, we are surrounded by water. There is so much of it covering this planet, we should stop and think about why it is here. For many reasons, obviously. But what about as a source of fuel? Water fuel? Yes! It is the most intelligent source of fuel for human use. If you break H20 down into its component gases and burn it, it becomes water again, only cleaner than it was before! And unlike when you burn anything else, the earth and its atmosphere have been not been adversely affected, because no oxygen has been taken from the atmosphere for the combustion, and either no or very little pollution has resulted from the process. The water is soon ready to be used again! It's a "no-brainer," if there ever was one!

There are fascinating new technologies that are now becoming public knowledge, as well as many old technologies that have long been in the public domain, that have to do with efficiently turning water into a clean-burning combustible fuel, when and where one needs it. It shouldn't come as a surprise to us that water, made up of 67% hydrogen and 33% oxygen, could be decomposed and used as a fuel. Nor should it come as a surprise that the people who have sold you fuel, and those who tax fuel sales, do not want you collecting yours in a rain barrel. They have done a masterful job of seeing to it that this option is one that you will not learn the truth about. Thus, no institution of "higher learning" has been bold enough to promote it.

But let's begin at the beginning. The first instance of humans producing hydrogen from water and using it for some purpose probably happened too long ago to be remembered, but almost 500 years ago a Swiss-German physician named Paracelsus noted that a flammable gas was formed when iron reacted with sulfuric acid in water. The chemistry behind this reaction was not understood until much later. Now it is known as a "single-replacement reaction," because an active metal replaces the hydrogen in the acid, releasing the hydrogen, and illustrated thus:

 $A + BC \rightarrow AC + B$

Alchemists like Paracelsus looked for ways to make gold, but what they should have been looking for is an ingot which, when dropped in water, causes a copious release of hydrogen gas. The U.S. military recently requested such ingots to produce hydrogen gas in the field for fuel cell use. In fact, cerium is a metal that does this by itself when immersed in plain water! It has been reported that some Swiss postal vehicles at one time ran on the gas generated from a cerium brick in water. Recent developments along this line will be discussed later.

But we can't move on just yet, because Paracelsus was a man whose life story is both strange and typical. He suffered from the same persecution that later water fuel inventors would, albeit at times due to his arrogance. He was both a doctor and a university professor, and he challenged the scientific establishment with his advanced thinking about

6

medicine. He cared more about learning and healing than being counted among the "learned" healers. He set an example for the rest of us, that we should not take learning sitting down, and that it should be done with a view to comforting the afflicted, even if at the same time it afflicts the comfortable, and possibly even costs us our job. His example should inspire us to accomplish important scientific achievements today, regardless of how academia views them. His courageous work still benefits people today.



A few other Europeans are known to have made hydrogen from water by adding acids and metals, but Henry Cavendish, a meticulous British scientist, went further because he had what many of us wish we had: enough money to do nothing but experiments. He took advantage of his fortunate financial circumstances for the

advancement of scientific learning, and he made excellent notes of his discoveries. For men, women are a distraction. Henry was so enthralled with science that he refused to be distracted. He wouldn't even look!

In 1766, after repeated experiments, he isolated and described hydrogen gas (then called "inflammable air"), identifying it as a distinct element. He applied a spark to the gas, it yielded water, and at length he concluded that water is made of two parts hydrogen and one part oxygen. Now you know who was the first human on record to reach this conclusion about the nature of water. Travel by hydrogenfilled balloons followed soon after, in 1783. A very admirable partnership was that of Antoine Laurent and Marie Anne Lavoisier. They are deservedly called "the



founders of modern chemistry." They were a French husband and wife scientific team that did the most important experiment of the 18th century, and, interestingly, it had to do with identifying the makeup of water. By proving the composition of H₂0, Lavoisier

disproved the erroneous teaching surrounding phlogiston, which was thought to be a component of combustion. Belief in phlogiston was a mistaken notion held by the scientific community for more than half a century, and it ceased to exist when Lavoisier named the gas formerly known as "inflammable air" hydrogen, from the French hydro (water) + gene (maker). Inversely, you could say "made from water."

The couple did a tremendous amount of good by their numerous experiments touching on diverse subjects. If they were alive today, you can be sure that they would be at the forefront of pointing to a viable alternative to polluting, expensive, disappearing fossil fuels. For instance, in 1774, they focused sunlight through a series of high powered lenses to produce enough heat to melt platinum, over 3000 degrees. An 18th century artist's rendering of their device is shown on page 2 of this book. Do you see Lavoisier wearing sunglasses?

Heat has since been used to perform thermolysis of water. Yes, water can be broken down in its component gases simply by applying heat, and a solar collector can provide the heat necessary to do it, by using a catalyst to lower the temperature at which the reaction occurs. The sun is the most abundant source of energy available on this planet, and water is the most abundant resource. Additionally, solar collectors can produce steam that can move turbines. These are methods that could be supplying all of our energy needs *now*!

Unfortunately, despite his work in behalf of the common man, Lavoisier lost his head to the guillotine in the French revolution, due to his association with the ruling class. It was said at his trial that 'scientists aren't needed by the revolution.' One of his friends said 'it took only a second to remove that head, and a hundred years won't produce another one like it.'

Such a scientist was he that reportedly, even after his death, he managed to do one more experiment. The story goes that he asked a friend to count how many times he blinked his eyes after losing his head, to determine how long the brain continues to function after being disconnected from the body.

10,000 Lire note depicting Volta and his battery



Alessandro Volta was an awesome Italian inventor much to be admired and emulated. He traveled widely, sharing his discoveries with the European scientific community. In 1800 he created the first battery, known as the "voltaic pile," which made all other electrochemistry technology possible. It is depicted in the 10,000 lire note above, although you may not recognize it, for it is but a pile of alternating pieces of dissimilar metals, spaced with pieces of saltwater-soaked paper. He also made the first spark-igniter device, and was the first scientist known to collect methane swamp gas for experimentation.

In 1776 he made an electric spark-fired methane gas pistol that could shoot a cork! It was later described and demonstrated before Europe's scientific community. He even proposed a form of telegraph using the pistol. Were he alive today, he would most certainly come up with something to help us in our present environmental, economic, and energy "crisis." One of his present day countrymen named Ruggero Santilli has done so, as we will see later.

Within weeks of Volta's invention of the battery, a British



chemist and popular science magazine publisher named William Nicholson, with surgeon Anthony Carlisle, made one of their own, and were the first to perform the electrolysis of water, producing hydrogen and oxygen by passing the battery's electric current through the water. And according to academia, those whom we look to tell us

what's do-able, we might as well stop right here. "Electrolysis uses up more energy than what you get out." And they say there is no improvement to be made on the electrolysis that these two gents did in 1805. "Any claim to produce more gas with less current is nonsense, and you may as well deposit this book in the trashcan. Better yet, burn it!" Nevertheless, we will note that, since 1800, humans have been able to produce a clean burning, renewable fuel from water by adding an electrolyte and introducing a DC electric current into it. But what exactly is going on in the water during the electrolysis process?

Two bonds must be overcome to break down water. Two hydrogen atoms cling to the oppositely charged oxygen atom in a "Mickey Mouse head" configuration, forming a molecule of water in a "covalent bond." But the resulting molecules have a "plus" and a "minus" side to them, so they also cling together like a pile of magnets in a "hydrogen bond." This explains why a drop of water is "sticky." The electrolytic decomposition reaction is expressed thus:

2H₂O --> 2H₂ + O₂

That is, two water molecules break apart to form two "diatomic" hydrogen molecules and one "diatomic" oxygen molecule. This is because a lone hydrogen atom looks for a mate, and so does a lone oxygen atom, to share electrons with. That's why you don't just get H and 0, but H₂ and 0₂.

Electrolysis works by passing a direct current (DC) through two electrodes inserted into an electrolyte solution, which is water with a chemical added to make it more conductive. Remember Volta used saltwater-soaked paper? But too much salt produces chlorine gas. Today, most people use either potassium hydroxide, also known as caustic potash (KOH), or sodium hydroxide, also known as lye (NAOH). These will instantly damage eye tissue. There are other chemicals that are as effective without being so dangerous. Put simply, the positively charged hydrogen atoms are attracted to the negative electrode (cathode) and they bubble to the surface. The negatively charged oxygen atoms are attracted to the positive electrode (anode) and they bubble to the surface.

This is the most basic way of decomposing water using electricity, but it is by no means the best way to do it. It normally takes more watts of electricity to perform such "brute force" electrolysis than the energy value of the combustible gas that comes out. This is because electrolysis is supplying electrons, the electrons needed, atom per atom, to overcome the bonds that tie the water molecules together. Conventional wisdom says that electrolysis cannot be improved upon due to the physics of the process.

However, even bumpkins have found that engines can be made to run on the output of an electrolyzer when the system is designed right, with a larger alternator supplying the electricity needed to decompose the water. More efficient methods of decomposing water with various and sundry waveforms, which do not resemble DC electrolysis*, would take many years to discover, but this didn't stop inventors from trying their hand at using brute force DC electrolysis to make their own fuel from water. Bravo!

We must remember that, whereas batteries now existed, onboard battery charging was still 100 years away from being developed, so the efficiency of DC electrolysis was not measured against the output of a car's generator. If you could build a battery and make your own fuel from water, that was enough of an accomplishment for the time being!

*For simplicity, we will refer to a chamber into which some type of radiant waveform is introduced as an *electrolyzer* or *chamber*. There are actually about a dozen different ways of decomposing of water.



The world's first internal combustion engine vehicle ran on water fuel in 1805! Swiss inventor Isaac de Rivaz obtained his patent in 1807.

Francois Isaac de Rivaz was a Swiss engineer and magistrate and one of many amateur inventors fired with enthusiasm by 18th century technology's progress. His lifelong dream was to build a self-propelled wagon. In 1786 he began building a steam vehicle and later built a steamboat. Of greater interest to us is what he did in 1805. That's when he applied for a patent on the world's first internal combustion engine car. The engine resembled a cannon, and not by accident. Earlier internal combustion engines were fired by grains of gunpowder.

In his 1805 version of the car, the hydrogen from water was his fuel, carried in a cylindrical tank, and he used Volta's electric spark device to ignite the gas, which was manually introduced into the vertical 5" diameter copper cylinder. After combustion pushed it up, the fall of the 150 pound piston caused the car to lurch over 15 feet. The cycle could be repeated at five second intervals, allowing a maximum speed of about 3 MPH. De Rivaz later went on to set the world's first land speed record in 1813 with another version of the car; it used coal gas as fuel.

Coal gas, and the many variations of it, was first made in the

1700's by passing steam (water) over hot coal. Mostly hydrogen, some methane, and other gases would issue forth. So in a sense you could say that it, too, was water fuel. Sometimes they "scrubbed" the other gases from it and produced pure hydrogen. Hydrogen also issues forth from steam sprayed onto red-hot iron fillings. This is because the iron reacts with the oxygen in the steam, freeing the hydrogen. The availability of hydrogen gas in Europe in the early part of the 19th century is attested to by the next invention.



In 1820, 28-year old William Cecil, a British clergyman, designed and demonstrated a vacuum-powered hydrogen internal combustion engine. His paper, presented to Cambridge University and entitled "On the Application of Hydrogen Gas to Produce Moving Power in Machinery,"

described an engine in which hydrogen and oxygen were ignited, causing a vacuum that generated a moving force from the air that rushed in to fill the void. Peter Long, a Cambridge University professor who recently oversaw the project to make a computerized model of the Cecil engine, stated: "There is a great deal to be gained by reviewing the innovative ideas from our past. We might not find the perfect solution, but we may encounter something that will spark the imagination."

A portion of Cecil's 25-page presentation to the Cambridge Philosophical Society, reproduced on the following page, XIV. On the Application of Hydrogen Gas to produce a moving Power in Machinery; with a Description of an Engine which is moved by the Pressure of the Atmosphere upon a Vacuum caused by Explosions of Hydrogen Gas and Atmospheric Air.

By THE REV. W. CECIL, M.A.

FELLOW OF MAGDALEN COLLEGE, AND OF THE CAMBRIDGE PHILOSOPHICAL SOCIETY.

[Read Nov. 27, 1820.]

THERE is scarcely any uniform operation in the Arts which might not be performed with advantage by machinery, if convenient and economical methods could be found for setting such machinery in motion. The extensive application of machinery, therefore, depends much upon the number and various capabilities of the engines which can be employed to produce moving force. Even the most perfect engines at present employed for this purpose, are not capable of being applied universally; but each has a province peculiar to itself, beyond which the use of it cannot be extended with profit or convenience.

An engine upon this principle is found in practice to work with considerable power, and with perfect regularity. The advantages of it are; that it may be kept, without expense, for any length of time in readiness for immediate action: that the engine, together with the means of working it, may easily be transferred from one place to another: that it may be worked in many places where a steam engine is inadmissible, from the smoke and other nuisances connected with it. a gas engine may be used in any place where a gas light may be burnt: in places which are already supplied with hydrogen for the purpose of illumination, the convenience of such an engine is sufficiently obvious: it may be added, that it requires no attention so long as it is freely supplied with hydrogen. argues for the acceptance of a hydrogen engine, based on implosion, over the steam engine, pointing out the advantage of no polluting exhaust. It shows that hydrogen was quite available for indoor lighting in England in 1820.

Many agree with Cecil and have recommended implosion as the preferred method of moving a piston in an engine, allowing the 14.7 PSI atmospheric pressure to do the work as the implosion has created a vacuum in the cylinder. The horsepower an engine running on implosion greatly exceeds that of the same engine run on gasoline or diesel.

To accomplish this in an internal combustion engine requires a change in the distributor timing, so that the sparkplug fires near the beginning of the compression stroke, just after the intake valve has closed. This allows the piston to be "sucked up" by the implosion, or vacuum, created in the cylinder by the oxyhydrogen recombining to form water vapor. The ratio of oxyhydrogen to water is 1800:1. When a spark is passed through a stoichiometric mix (perfectly balanced 67%-33%), it causes 1800 volumes of oxyhydrogen to become one volume of water. Caution: Do not conclude that it will not explode!

Michael Faraday was a brilliant British scientist and devout



Christian minister who, as a youth, was a lab assistant to Sir Humphry Davy, thus exposing him to one of the greatest scientists of all time. He made great progress in his own studies, which included chemistry, electricity, and magnetism. In 1824 he made the first rubber balloon, not as a plaything for children, but to hold the oxyhydrogen gas

emanating from his numerous electrolysis experiments. By 1834, Faraday had determined that the input energy

of brute force direct current in an electrolyzer was proportional to the resulting output volume of hydrogen and oxygen gases, as described in "Faraday's Law." Faraday's Law is used, along with the second law of thermodynamics, to make the case that no improvement can be made in the efficiency of any process to decompose water, even if the process under consideration is not at all similar to the brute force electrolysis that Faraday studied. No discoveries, and accompanying evidence to the contrary, have been allowed to contradict this staunch belief!

To claim that numerous recently discovered methods of super-efficient water decomposition, that are *not* bruteforce electrolysis, are impossible because Faraday did not discover them, is like saying that space travel is not possible because the Wright Brothers did not discover it!

For example, Faraday's law does not take into account factors that can affect the decomposition of water that are not related to the watts of electricity introduced into the chamber. Photolysis, radiolysis, and sonoluminescence are a few of the proven ways to decompose water that are not electrolysis. Strangely, people parrot "laws of inefficiency" without even knowing which process is being discussed!

This insistence on inefficiency reminds me of a humorous scene that appeared in a TV show about 'crooks who goofed.' In this case from England, a robber demanded that a bank teller hand over her money, but instead she pushed a button that caused a steel curtain to instantly fall to the counter. Realizing that his caper was now over, he tried to escape. In a panic, he threw himself repeatedly against the heavy glass door, imagining that it had been locked by the teller's action. He was like a wild animal that had been caged, yet, try as he might, he could not open the door. Just then a little old lady appeared outside the bank, oblivious to what was going on inside. Although obviously frail, she easily pushed open the same door that he had been struggling to force open from the other direction. Before she appeared on the scene and strolled in, he was certain that the door could not be opened, period. His "law" was wrong!

Additionally, the later discovery of monatomic hydrogen and oxygen, as well as the isotopes of hydrogen and oxygen, make the application of old "laws" to water as fuel a blatantly incomplete picture. For instance, the output energy of monatomic oxyhydrogen (H + H + 0) is up to four times that of diatomic oxygen and hydrogen ($H_2 + 0_2$), because its activation energy is lower. Yet the input energy needed to create it has been proven to be far less than what Faraday calculated, and that energy is clearly not related mathematically to the enormous output energy.

The activation energy is the energy that must be overcome in order for a chemical reaction to occur. For example, in order to release the energy of diatomic hydrogen in a car's engine, it first must be broken down into monatomic hydrogen by a preliminary explosion, which uses energy, and then it can really "explode" by implosion, creating water again. It can be simply illustrated by a wood fire: It takes a lot more energy to light a log (diatomic) than it does to light a piece of kindling (monatomic). Faraday is not to blame. A close look at his beliefs reveals that he himself would never approve the use of his name to limit the possibilities of what could be done by means other than those employed in his research. His attitude toward what is scientifically possible is revealed by this quotation attributed to him: "Nothing is too wonderful to be true."

In 1836, Edmund Davy, cousin of famous British chemist Sir



Humphry Davy (pictured), accidentally discovered a new compound from which a combustible gas can be made immediately and economically by simply adding water. By heating potassium carbonate with carbon at high temperatures, he produced a residue of potassium carbide, which when reacted

with water released the new gas. A similar reaction takes place between calcium carbide and water. It was then forgotten until Marcellin Berthelot rediscovered it in 1860, for which he coined the name "acetylene."

The on-demand production of acetylene gas from water has been used for many purposes over the years, including running automobile engines. A Mother Earth News article from 1980 (that is viewable online) describes one man's progress in developing an economical acetylene system for his vehicle, making his fuel from water on-demand. I'm not suggesting that this a great system, but that it can be done!

Despite their recent popularity, fuel cells have been around for more than 160 years, since 1838, thanks to inventor



William Robert Grove, an English lawyer turned scientist. Fuel cells can produce electricity as long as hydrogen and oxygen are supplied, combining hydrogen and oxygen electrochemically without burning, thereby avoiding the inefficiencies and pollution of current internal combustiondriven systems.

Grove discovered that from two platinum electrodes with one end immersed in a container of sulfuric acid and the other ends separately sealed in containers of oxygen and hydrogen, a constant current would flow between the electrodes. Thus, the basic operation in a fuel cell is the opposite of electrolysis. As the cell is supplied with hydrogen and oxygen, electrical power can be obtained. Water is produced and the chemical energy of the reaction is converted to electricity and heat. A super-efficient "electrolyzer" is capable of gas production sufficient to power such a fuel cell indefinitely, creating a perpetual "free" electrical energy supply such as the world has not been allowed to know. Would you not like to have one in your "utility" closet?



Edgar Allan Poe is generally known as a writer of horror stories. In fact, he was also a science writer, and we are indebted to him for his contributions. He inspired the next entry to pursue water fuel in life, which inspired someone else to pursue it in art, which inspired still others to do so in life. Interestingly, the introduction to his most serious scientific treatise, mentioned at the beginning of this book, asks the reader to consider it all poetry, and not science.

In 1846 he wrote "The Balloon-Hoax," the fictional account of a three-day trans-Atlantic crossing in a coal gas-filled balloon. In it, he mentions that "coal gas was employed in place of the more expensive and inconvenient hydrogen." He refers to hydrogen's "great tendency to escape." This helps to explain why hydrogen from water was not generally chosen over coal gas in the 19th century. Coal gas was more "easily procured and managed."

History has taken some strange turns, and one of them is that Edgar Allan Poe was instrumental to our present day ability to use water as fuel. He had a direct influence on the work of hydrogen balloon-builder Thaddeus Lowe and French writer Jules Verne, whose work we will consider later.





Jean Joseph Etienne Lenoir a great Belgian inventor living in France, was the world's first commercially successful internal combustion engine builder. In 1860, a year after oil was discovered in Titusville, Pennsylvania, he manufactured a car that produced its own combustible hydrogen fuel by onboard electrolysis. A battery connected to a pressure cooker-like chamber that fed gas to the engine is shown in drawings. It does not appear that there was an extensive production of this type of electrolyzer.

Unfortunately, coal gas won out as the fuel of choice in his engines, for reasons made clear by Edgar Allan Poe: cost and convenience. Lenoir made other important improvements to the internal combustion engine, and even developed the spark plug we still use today. He, too, has been overlooked for his contributions, and mention of his water-powered car is difficult to find in history books.



When Thaddeus Lowe was 9, his mother died, and his father sent him to a neighbor farmer to be an indentured servant. Lowe ran away after a year of abuse. He later wrote: "The blood of Revolutionary ancestors was in my veins, and I had an intuitive belief that freedom was my rightful heritage." While working odd jobs, he read the above-mentioned Edgar Allan Poe story about an airship crossing the Atlantic. He began experimenting, as some of us "backyard tinkerers" have, with hydrogen gas-filled soap bubbles.

He worked at different jobs; at one point he worked for a snake oil salesman. But he continued experimenting with flight and, in 1857, built his first balloon. He became an aeronaut, and took paying passengers aloft, charging \$1 for a tethered flight and \$5 for an un-tethered one. Soon he was manufacturing the balloons. This led to him becoming America's one-man air corps. Who else but a former assistant-snake oil salesman could have arranged that?

In April 1861 – just a week after the Civil War began – he set a world record for free floating travel in a hydrogenpowered balloon: a nine hour, 900-mile trip from Ohio to South Carolina, reaching an altitude of 18,000 feet. The Confederates captured him as a spy, which he was, but he managed to talk his way out. Snake oil salesmanship?

He came up with a compact and portable system of tanks and copper plumbing, which mixed water, iron filings and sulfuric acid to make hydrogen. During the war hydrogen from water was created on the battlefield for various purposes, including lighting and use in these telegraphequipped reconnaissance balloons. In 1861 he made a requisition for 60 gallons of sulfuric acid and four tons of iron for gas production. Some 3000 military flights were made.

After the war, Lowe continued with the study and promotion

of hydrogen from water, patenting a process in 1873 for generating large amounts of hydrogen gas for residential and commercial use. By passing steam over hot coal, carbon dioxide and hydrogen were produced, which were then cooled and scrubbed by passing through water vapor, resulting in pure hydrogen. As a result, gas plants producing 'carbureted water gas' were established along the east coast of the U.S., allowing for the widespread use of this gas for lighting and heating. Ammonia refrigeration systems also resulted from Lowe's manufacture of ammonia from atmospheric nitrogen and hydrogen. He was the first person in history to become wealthy from water fuel. His work with hydrogen balloons during the civil war undoubtedly contributed significantly to the fictional work of the next entry.



In 1875, French author Jules Verne wrote a fiction novel, set at the time of the U.S. civil war, in which a balloon-assisted prison escape goes awry, and the occupants are swept far away to "The Mysterious Island." The characters get settled into their new island home, demonstrating their resourceful ingenuity

as they carve out a very comfortable existence.

It has been suggested that Verne's purpose in writing The Mysterious Island was to reassure the post-industrial revolution world that they could indeed survive without their technological conveniences. As Isaac Asimov wrote, "The point of the story is that human beings using their hands and brains can supply all their wants if only nature is kind." As we increasingly depend on corporations to supply all our wants, this message seems to be even more appropriate. When fossil fuel becomes outrageously expensive, and the harmful effects of it ever more apparent, we are supplied an ideal opportunity to put such resourcefulness to work. But let's get back to the story line of The Mysterious Island.

The characters have a serious discussion of what will happen when the world's supply of coal, the principle fuel at that time, runs out. One of them states confidently that "water will be the coal of the future." He goes on to state that water, decomposed into its primitive elements, will supply a source of light and heat the intensity of which coal cannot equal. When another states that he would like to see it happen, the answer given is: "You were born too soon."

Verne was not, as some have suggested, prophesying about something totally unknown to him and other Europeans of that era. He was, rather, talking about the expansion of a technology that was already in evidence, but not generally recognized by a public that wasn't watching closely.

For example, Verne was from France, where Lenoir drove his water car in 1860. Even now it is hard to find mention of his use of on-board electrolysis to power his engine, because he switched to the use of coal gas and apparently never went back. But Verne, paying close attention to this detail, could then write of water's potential as a source of fuel. As for his prediction that it wouldn't be introduced within the lifetimes of people then alive, he was certainly right. Sadly, over 130 years later, the situation has not changed! Were we, also, "born too soon" to see it happen in our lifetimes?

Hydrogen-filled dirigibles were gaining in popularity in Europe at this time, and they had to occasionally vent buoyancy gas. In 1872, a U.S. Patent was granted to Paul Haenlein to use that otherwise wasted gas in the dirigible's engines. This idea caught on during WWI, and during the 1920's it was found that it extended the range of a dirigible by 20%. Unfortunately, the Hindenburg fire brought about an end to the successful use of these earth-friendly vehicles.



An enigmatic physicist and inventor of the late 19th century was acoustic researcher John Worrell Keely, of Philadelphia, USA. It is reported that in 1872 he demonstrated the dissociation of water using sound vibrations to a group of Philadelphia businessmen who then decided to back him financially, in hopes that a marketable motor could be propelled by the unusual energy he had

discovered. He was written up in local newspapers and national magazines, and was funded by wealthy philanthropists. He is said to have inspired Verne, Nicola Tesla, Thomas Edison, and others.

Keely was targeted by Scientific American while alive, and after his death in 1898, the magazine claimed to find evidence of fraud hidden in the floor and walls of his lab in the form of a large air tank and compressed air lines. Also after his death, a supporter of his work said that it would take 100 years before someone would come along and be able to understand what he had done. Who was right?

Be that as it may, it seems quite certain that the man made important discoveries relating to matter and energy, and that some of his claims have been vindicated in recent years. For instance, his claim to have found the resonant frequency of water, and to have achieved dissociation with the use of three tuning forks, has apparently been replicated electronically. He was the first to produce sonoluminescence, or the production and collapse of gas bubbles in water with the use of sound waves, with the resulting over unity discharge of blue light and intense heat. The experiment done in the 1996 movie Chain Reaction is based on this. It seems that what we can now accomplish with electricity, Keely did with what he knew best: sound waves. Keely's work has a cult following, and a good place to get information about him, as well as other free energy information, is at a website named after him: keelynet.com.

Many patents issued in the remaining years of the 19th century reveal that a number of inventors did their best to make Jules Verne's prediction come true. Their work is worthy of imitation. Most were like Cavendish in doing thorough experimenting. They were from an era that worked more patiently, and the fact that recent patents for "new" high-tech water fuel devices are strikingly similar to these inventions of over 100 years ago is more than coincidental. As the Cambridge professor said, we need to look backward in time to see what's there, and implement what ideas are useful, because answers can be found there.

Although it is not human nature to share the limelight with someone long dead, a few inventors have been honest enough to admit that they are not the innovators, but simply the modifiers, of their technologies. Others have attempted to patent ideas that have long been in the public domain. However, some may not know that what they are doing was already done long ago. The beauty of this is that a device or process patented over 15 or 20 years ago is now in the public domain and can be utilized by anyone, but you should check the date to be sure, because it can vary.

Whereas the U.S. Patent and Trade Office won't even look at a patent application for anything that claims to be a "perpetual motion machine," the system has approved and preserved numerous water fuel-related patents for our good today. Stop and analyze that for a moment. The patent office has gone on record as officially recognizing such patents as legitimate inventions! Here are a few of them from the late 19th century. We have only listed a few of them so as to give you an idea of what was happening in the late 1800's. Also, we have not included them in their entirety for reasons of limited space.

If you want to see the full text or an image of a particular patent, you may do so for free by visiting sites such as freepatentsonline.com (my favorite, as it's the easiest to use, although not a government site), or the USPTO or the European Patent Office, and typing in the patent number or other information. Most sites only let you print or save one page at a time; you pay a few dollars to download an entire patent at sites such as the USPTO. References are often given to related patents. Much good information is waiting to be found.

Some search engines do not make it easy to find many old patents; it seems you have to already know about them to find them. Going to a large library and looking at the old annual Patent Gazettes is the best way I know to actually see what patents were applied for or awarded in a given year. Another good way is to follow the prior art references listed usually on the first page or in the body of a patent. Do this and before long you'll have dozens to look at.

Although patent examiners are well-educated and trained to recognize valid claims, the patent office does not profess to verify all of a patent's claims, and so we should not believe that something works just because it is patented. The character and competence of the inventor and the body of his other accomplishments are good indicators as to the validity of his claims for a particular patent. The fact that most inventors have been ripped-off by others will cause them to do things to make replication of their work, based on the patent alone, extremely difficult. However, even a patent that is not worthy of replication may offer theory or design information that is still useful.

Let's start with one that has to do with conditioning the gas that comes out of an electrolyzer, to make it more like what your appliance is used to burning. In 1884, Henry M. Paine obtained Patent # 308276, shown below, which bubbles oxyhydrogen from an electrolyzer through a liquid containing carbon, specifically turpentine, making the resulting gas easier to burn than oxyhydrogen in those applications where coal gas was used.

Remember, as Poe said, hydrogen wasn't as convenient as coal gas because of its unique properties. A fossil fueldominated world has produced equipment that burns fossil fuel. Oxyhydrogen is not a fossil fuel and so must be modified to burn "correctly" in an engine designed for gasoline, etc. For example, the flame propagation speed, that is, the speed at which a flame travels through a fuel mixture, is many times faster for oxyhydrogen than that for gasoline, propane, natural gas, etc. This patent is important because it shows that there are easy ways to adapt oxyhydrogen gas to other types of gas appliances.

UNITED STATES PATENT **OFFICE.**

HENRY M. PAINE, OF NEWARK, NEW JERSEY, ASSIGNOB TO BENNET OS-BORN AND HENRY W. MOREHOUSE, BOTH OF SAME PLACE.

PROCESS OF MANUFACTURING ILLUMINATING-GAS.

SPECIFICATION forming part of Letters Patent No. 308,276, dated November 18, 1884. Application filed January 14, 1884. (No model.)

To all whom it may concern: Be it known that I, HENRY M. PAINE, & citizen of the United States, residing at Newark, in the county of Essex and State of New Jersey, have invented certain new and useful

Improvements in the Process of Manufacturing Illuminating Gas; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable

- 10 others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawing, and to letters or figures of reference marked thereon, which form a part of this specification.
- The present invention relates to processes 15 for manufacturing illuminating-gas, as here-inafter explained and set forth. Heretofore it has always been found necessary to keep the constituent gases of water thus obtained
- separated from each other from the source of production to the point of ignition, for the two gases, hydrogen and oxygen, being pres-ent in the proper proportions for a com-plete reunion, form a highly-explosive mix-
- ture. Consequently the two gases have either been preserved in separate holders and only 25 brought together at the point of ignition or else the hydrogen product alone has been
- saved and the oxygen to support combustion has been drawn from the open air, and the 30 hydrogen gas thus obtained has been carbu-retted by itself by passing it through a liquid hydrocarbon, which imparts luminosity to the flame.
- I have discovered that the mixed gases ob-tained by the decomposition of water by elec-trolysis can be used with absolute safety if 35 they are passed through a volatile hydrocarbon; and my invention consists of the new
- 40 gas thus obtained and the process herein described of treating the mixed gases, whereby they are rendered safe for use and storage under the same conditions as prevail in the 45
- Inder the same conditions as prevail in the use of ordinary coal gas, and are also trans-formed into a highly-luminiferous gas. In the accompanying drawing, which shows in sectional elevation an apparatus adapted to carry out my invention, G is a producer for generating the mixed gases, preferably by the decomposition of water by an electric

current. A is a tank partly filled with turpentine, camphene, or other hydrocarbon fluid, as indicated by B. The two vessels are con-nected by the pipe O, the end of which ter-minates below the surface of the turpentine, 55 and has a broad mouth-piece, C', with numer ous small perforations, so that the gas rises through the turpentine in fine streams or bubbles in order that it may be brought intimately in contact with the hydrocarbon. 60 Above the surface of the turpentine there may be a diaphragm, E, of wire netting or perforated sheet metal, and above this a layer of wool or other fiber packed sufficiently tight to catch all particles of the hydrocarbon fluid that 65. may be mechanically held in suspension, but loose enough to allow a free passage to the gases

The pipe F conducts the mixed gases off directly to the burners or to a holder. 70

I am aware that hydrocarbons have been used in the manufacture of water-gas from steam, and, as before stated, hydrogen-gas alone has been carbureted; but I am not aware of any attempt having been made to 75 treat the explosive mixed gases in this manner.

Experiments have demonstrated that the amount of turpentine or other volatile hydrocarbon taken up by the gases in this process 80 is very small and that the consumption of the same does not appear to bear any fixed ratio to the volume of the mixed gases passed through it. I do not, however, attempt to explain the action of the hydrocarbon on the 85

gases. What I claim as my invention, and desire to secure by Letters Patent, is—

to secure by Letters Fatent, 18-The process herein described of manufac-turing gas, which consists in decomposing 90 water by electrolysis and conjointly passing the mixed constituent gases of water thus ob-tained through a volatile hydrocarbon, sub-stantially as and for the purpose set forth. In testimony whereof I affix my signature 95 in presence of two witnesses. HENRY M DAINE

HENRY M. PAINE: Witnesses:

BENNET OSBORN, Jr., W. E. REDDING.

(No Model.) H. M. PAINE. PROCESS OF MANUFACTURING ILLUMINATING GAS. No. 308,276. Patented Nov. 18, 1884.

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WITNESSES 6. of Belp Oscar Nauck

INVENTOR Henry M. Paine, urbadd. Attorneys.

It appears that the "tweaking" of the gases coming out of an electrolyzer is as important as producing them in the first place. Increasing the mass density of the hydrogen by slight pressurizing and regulating is necessary, and "water fog" injection has proven to be effective in slowing and cooling the burn in an engine. Passing air bubbles or recirculation some of the oxyhydrogen back through for reprocessing all seem to accomplish a higher grade of gaseous fuel. But this patent could points to a successful method of tweaking the gases to be more user-friendly. The patent says that the amount of turpentine consumed is minimal. The resulting emissions are probably negligible due to the combustion of the oxyhydrogen. The small amount of carbon fuel conveyed with the gas may serve a good purpose in an internal combustion engine.

British inventors William and Thomas Hawkins were granted U.S. Patent # 490,437 on January 24, 1893, in which they describe how to make a hydrogen generator that would fit in your utility closet. It mixes sulfuric and/or hydrochloric acid with an alloy made from iron fillings stirred into molten zinc. They recommend using the resulting gas to fill balloons or power engines; you could heat your house with it, or drive cross-country without filling up with anything but water!

In 1897, U.S. inventor Luther Wattles patented a series of cells (Patent # 583,104) capable of producing enough hydrogen to power a vehicle, and at the same time, electricity to do additional work. This patent is significant because it is cited in Francisco Pacheco's 1972 patent for a hydrogen internal combustion engine. It is worthy of our recognition. In 1897 Wattles also patented an engine (Patent # 577,567) to burn the fuel he created. In his engine patent, he writes: "My invention is also peculiarly well adapted for the use of hydrogen gas."

He mentions on page 5 of the following patent a funny-sounding list of the types of vehicles, existing in 1897, that would run on the output of his cells. Here are a few pages of his U.S. Patent # 583,104.



2 Sheets-Sheet 2. (No Model.) L. H. WATTLES. SYSTEM OF GENERATING AND USING HYDROGEN GAS AND ELECTRICITY. Patented May 25, 1897. No. 583,104.



Fig. 9.

WITNESSES: Janus A. Me Bain B. p. Davis

INVENTOR Lo wither, A. Wattles. By Thos: S. Laynor: ATTORNEY.
UNITED STATES PATENT OFFICE.

LUTHER II. WATTLES, OF PROVIDENCE, RHODE ISLAND, ASSIGNOR, BY DIRECT AND MESNE ASSIGNMENTS, OF THREE-FOURTHS TO WILLIAM B. SHERMAN, OF SAME PLACE, AND BYRON C. DAVIS, OF BROOKLYN, NEW YORK.

SYSTEM OF GENERATING AND USING HYDROGEN GAS AND ELECTRICITY.

SPECIFICATION forming part of Letters Patent No. 583,104, dated May 25, 1897. Application filed December 7, 1895. Serial No. 571,336. (No model.)

To all whom it may concern: Be it known that I, LUTHER H. WATTLES, a citizen of the United States, and a resident of Providence, in the county of Providence

- 5 and State of Rhode Island, have invented certain new and useful Improvements in Sys-tems of Generating and Using Hydrogen Gas and Electricity, of which the following is a specification.
- This invention relates to improvements in 10 systems of generating and using hydrogen gas and electricity; and it consists in providing a generator or a number of generators in which
- generator or a number of generators in which hydrogen gas and electricity are both gener-15 ated simultaneously, combining therein gas-collecting apparatus having ducts for con-ducting the gas to the apparatus or mechan-ism intended for its storage or use, with conductors for the electricity generated therein 20 to deliver it to the apparatus intended for its
- use, and in combining the gas-using appara-tus and the electrical apparatus with a common means of receiving the energy developed by the conversion of the gas and electricity
- 25 into mechanical power, so that the two forms of energy developed in the generator thus become collected, converted, and delivered at the same time to the same mechanism for its ntilization or work.
- The object of my invention is to provide a 30 generator of hydrogen gas and electricity and to combine with the same such a combination of apparatus and mechanism capable of converting them into the form of useful work as 35 will secure by said means the maximum avail-
- ability and use of the forces developed in the generator.

generator. The character and purposes of my inven-tion will be more fully explained and under-to stood by reference to what follows herein and as will be pointed out in the claims, and also by reference to the accompanying draw-ing in which ings, in which— Figure 1 represents a front view of the gen-

erator. Fig. 2 represents a tront view of the generator. Fig. 3 is a top or plan view of the generator. Fig. 4 is a top view of the zinc or other element employed for the generation of the gas and electric current. Fig. 45

5 is a side elevation of Fig. 4. Fig. 6 is a 50 bottom view of Fig. 4. Fig. 7 is a front ele-vation of the holder and terminal for the zinc or other electrode. Fig. 8 is a side elevation of Fig. 7. Fig. 9 represents a dia-gram of a battery of generators having gas 55 and electrical conductors combined therewith, a gas-engine connected with the gasconductors, and an electric motor connected with the electric conductors and the engine and the motor both applying their power to 6c the same work-shaft. This figure also shows how the gas may be conveyed or forced into a suitable holder adapted for its storage, if desired, and it also shows how the gas can be connected with a carbureter if it is desired 65 to enrich it by the addition therewith of carbon or hydrocarbon gas for illuminating pur-poses or in transit to the engine. It also shows how the electric current can be utilized for electric lighting or heating purposes. The 70 figure further shows how the electric spark which is required for igniting the gas in the engine is obtained by the induction-coil necessary for the purpose and the electrical connections of the same with the generator and 75 the engine.

In the drawings, A represents a cup or cell, made of copper, to which a cover A' is fitted, by means of an internal screw-thread A³, to the corresponding external screw-thread Λ^3 so upon the neck Λ^4 of the cup Λ . A packing Λ^6 is fitted around the neck of the cup, so as to make a tight joint between the cup and the cover when the latter is screwed on in position thereon. 85

The cover A' has two apertures A⁶ A⁶, through which the holder B projects and upon which the electrode C is mounted when in position within the cup A. The electrode in position within the cup A. The electrode or zinc C has a central opening C', through 90 which the threaded extremity B' of the holder B passes, and by means of the nut B^2 the zinc C and the holder B are thereby securely connected together. The lower portion of the aperture C' is enlarged and squared, as 95 seen at C³, to fit a correspondingly-shaped portion B^3 of the holder B to prevent the zinc C from turning upon the holder B through accident or otherwise. The cover A' is provided with sleeves $A^{7} A^{7}$, having insulationbushings $A^{8} A^{8}$, by means of which the holder B and the cover A' may be insulated from

5 each other. Each of the neeks $B^4 B^4$ of the holder B is provided with a spring retainingeatch B^5 , which is fitted in a groove B^3 therein and by means of which the holder will be held in an elevated position, as indicated by the detail line in $E^{in} P = P = P = P = P$

2

- to the dotted lines in Fig. 2, by resting upon the bushings $\Lambda^s \Lambda^s$ whenever it is desired to lift the zinc out of the solution in the cup and hold it in that position. The sleeves Λ^r Λ^r in the cover Λ' retain the holder B with
- 15 the zinc C in a central position in the cup in case the latter should be tilted or the like. The holder B is provided with an insulating-covering B⁸ to prevent short-circuiting in the cup or with it.
- 20 Within the cup A an inverted gas-collector D, of copper or other metal, is arranged and secured to the cover A'. The collector D is of larger dimensions than the zinc C in that portion of it within which the zinc is a secure and secure
- 25 suspended, so that no contact is made between the two parts of the device, but is narrowed in its dimensions in its upper portion D' and is provided with an aperture D², which also extends through the cover Δ' and through
- a gas-conductor Aⁿ, having nipples A¹⁰ A¹⁰, to which conducting tubes or pipes for conveying the gas generated within the collector may be connected. The cover A', which, together with the entire shell of the cup A,
- 35 forms one of the electrodes of the generator or battery, is provided with a binding-post A¹¹, having a nut A¹², to which the wire conductor for the current generated may be connected. The holder B has upon its upper 40 extremities a corresponding pair of binding-
- posts B⁶ B⁶ and nuts B⁷ B⁷ for the other conductor to be connected with. The cover Λ' is also provided with an opening Λ^{13} , to which a stopper Λ^{13} is fitted for the purpose of fill-45 ing the cup with the solution required, re-
- newing or decanting it, or the like.

The solution required to generate the gas consists of water and sulfuric acid or any other acid that will liberate hydrogen gas and 50 generate electric currents by its chemical action upon zine, iron, or other substance capable of such effects. The strength of the solution is determined by the rapidity with

which the gas and electricity are to be pro-55 duced and may be varied from, say, one part (in bulk) to twenty parts of water up to one part acid to four parts water or oven stronger than this when quick action is necessary. The production of hydrogen gas and electric-

60 ity by the chemical action of dilute sulfurie acid upon zine being well known and understood its further description is deemed unnecessary. My generator being thus described I will now explain the manner of its

65 use in combination with the other mechanism required to carry out the purposes of my invention.

Referring to Fig. 9, $\Lambda \Lambda$ A represent a series or battery of generators made as already described. The cups and zincs are connected 70 alternately in series like any battery of galvanic cells connected up to produce a maximum voltage; but the generators may be also connected in multiple are if quantity rather than voltage is required; or modifica- 75 tions of both of these methods of connecting up the poles of a number of cells may be employed, if preferred. The terminal elements A" C" of the battery are connected with the conducting-wires EF, respectively, which so connect in turn with the terminals G G' of an electric motor G2 and to which the current generated as described is conducted and in which it is converted into mechanical power by the motor in the woll-known manner of 85 electric motors. The circuit-conductors E F, leading to the motor G2, have the usual fuse II, switch I, and resistance-box J, by means of which the current to the motor can be controlled. Each one of the gas-conductors A^{9} , Λ^{9} , leading from the gas-collectors D D of the generators Λ Λ , is connected by means of its respective nipples $\Lambda^{10} \Lambda^{10}$ and couplings K K, which are made of any suitable insulating substance not subject to destructive effects 95 of the gas, so as to make one continuous con-duit for the gas evolved by the whole series of cnps that may be in active operation pro-ducing the gas at the time. The gas is con-ducted by the main duct L to the gas-engine 100 M, one end L' of the duct being connected with the conductor A¹⁵ at the end of the series of cells A Λ A and the other end L² with the gas-engine M for this purpose. A branch duct I, leads to a pump N and gas-holder O. An- 105 other branch pipe L^4 leads to a retort or car-bureter P. The pipe L^5 has a connection L^6 with the gas-holder O and another, L7, with the carburster P, another, L⁸, with the gas-burner Q, and, finally, ono, L⁹, which connects 110 it again with the main duct L. Valves or cocks R R R are fitted in the gas-ducts around in the different positions necessary for the proper control of the flow and manipulation of the gas as required. IIS

The gas-engine M receives its supply of gas through the pipe L¹⁰, the flow of which is regulated by the valve R'. M⁶ represents a bevelod gear mechanism which actuates the valve mechanism (not shown) of the engine M. 120 The conductors E F are provided with

The conductors It I^c are provided with switches S S', having terminal connections with the conductors E' F', in which the induction-coil T is in circuit. The conductors T' T² have terminals T⁵ T⁴ at the engine M 125 and connections with the coil T, by which a circuit between it and the engine M is established whenever the electrodes T⁵ T⁶ within the cylinder are in contact. The piston M', to which the electrode T⁶ is attached, carries 130 the latter away from the electrode T⁵ with every outward stroke of its operation, thereby breaking contact with the electrode T⁵ and producing an electric spark within the gas

583,104

contained in the cylinder and igniting it at a right time, so as to cause the proper explosive

583.104

- right time, so as to cause the proper explosive effect necessary in operating gas-engines. The power of the engine M is applied, through its connecting-rod M², to the crank-shaft M³ in the usual manner. The power of the motor G² may be applied to the crank-shaft 5 M^s of the engine M through the belt U and wheel M⁴ of the engine M, in which case the ro engine crank-shaft becomes the common re-
- ceiver of power produced by the motor and the engine.

A work-shaft V may be provided having a

- A work-shaft V may be provided having a pulley V', over which the belt W runs and is driven by a pulley M⁵ on the engine-shaft M³. The shaft V has also a pulley V³, to which the belt U from the motor G² may be directly con-15 nected, as shown by the dotted lines, if pre-ferred. By this arrangement the shaft V be-20 comes the receiver of power produced by the
- engine and the motor and from which it could be transmitted otherwise for application or use. Switches S² S³ in the conductors E F have
- Switches $S^* S^*$ in the conductors E F have terminal connections with the circuit-wires X X', in which the electric lamp X² is placed and by means of which the electric current from the generators may be caused to pro-duce light. Switches S⁴S⁵ are also placed in expection with the conductors F F and the 25 connection with the conductors E F and hav-
- ing terminal connections with the loop T in which the resistance or heating coil Y2 is placed in circuit, so that the electric current may be utilized for heating purposes, if de-35 sired.
- The operation of my invention will now be described: The generators are prepared for use by charging each one of them with a so-Intion of acid of the requisite strength and
- 40 filling each one to the level indicated by the dotted line a b in Fig. 2, in which case all of the zinc C except its shank or neck becomes immersed therein and subject to the dissolving and chemical effects of the solution. The circuit between the zinc C and the cup A is
- closed, as indicated by the circuit established through the conductors E F and mechanism through the conductors E if and mechanism connected therewith in Fig. 9. The cap or cover A' being adjusted upon the cup and 50 the stopper A¹⁴ being in place each generator becomes ready for effective use.

The gas connections between each of the generators and the external gas receiving and converting apparatus being in proper connec-tion and condition, the gas becomes evolved

- 55 in each generator and passes through the col-lectors through the ducts and through the engine, where it is used, as produced, in producing mechanical effect, as already de-60 seribed, or it may be delivered into the holder
- O and stored there until required for use; or it may be passed through the carbureter P and enriched, as already described, by the addition of carbon or hydrocarbon gases and afterward used in the engine or for illuminat-
- 65 ing or other purposes, as desired. The electric current, which becomes gen-scribed as in combination.

erated simultaneously with the evolution of the gas and the disintegration of the zinc, is power, which may be applied to the crankshaft of the engine or the independent work-shaft, as already explained. It can thus be seen that the two forms of energy simultaneously generated in the generators are at the 75 same time transmitted to the corresponding mechanisms for converting them into mechanical energy, and in this way the maximum efficiency for useful work is delivered to the work-shaft intended for its reception and use. So It can also be observed that the electric current from the generator also coöperates through the agency of the induction-coil with the gas in igniting the latter in the engine, and thus effects the successful operation of S5 the eugine.

The importance of this invention may be understood from the fact that for some purposes primary batteries used for generating electric currents alone are near the point, as 90 to economy, of successful competition with other methods of generating and using elec-tricity. Now by the additional useful efficiency obtained by this method of using the gas as generated simultaneously and in con- 95 junction with the electricity produced it can be seen that it makes it possible for applications of this system of producing and using power in many ways and under conditions never successful commercially heretofore. 100 Its use therefore is in the case of small units of application peculiarly well adapted as a means of propulsion for bicycles, tricycles, motocycles, or horseless vehicles and other forms of carriages, cars, and devices for 105 transportation: Its adaptability for work of this character can be more fully understood by reference to another application, dated December 7, 1895, for Letters Patent, Serial No. 571,338, which I have made and which is 110 now pending before the office for an improve-ment in motocycles. The details of the ap-plication of hydrogen gas in this way to the operation of gas-engines can also be better understood by reference to another applica- 115 tion for Letters Patent, dated December 7, 1895, which I have also made, Serial No. 571,337, and which is likewise pending before the office, for an improvement in gas-engines.

The invention is likewise applicable to the 120 propulsion of boats, stationary power instal-lations, small or large, as may be required. Large installations of generators for the production and use of hydrogen gas and electricity can likewise be made and the gas used 125 for general lighting and heating purposes as well and stored in large holders and carbu-reted as commercial illuminating-gas is now treated. The electricity can from the same plant be used for heating, lighting, and power 130 purposes, as now done, in addition to or in-dependent of the combination of the engine and motor mechanism herein shown and de-

3

In 1898, U.S. Patent # 603,058 was granted to a group of U.S. inventors, Eldridge, Clark, and Blum, for a device called an electrical retort, which is a chamber or cell. Another dated word is "gasometer," which refers to a container for holding gas.

Anyway, this old patent refers to a process similar to the one that Dr. Ruggero Santilli has more recently perfected, and which is described later. It involves the use of an underwater carbon arc to produce a hybrid gas containing hydrogen and carbon monoxide. It burns just like natural gas but produces no pollution, because during combustion the carbon monoxide is burned with the hydrogen, yielding only oxygen as a result! This type of system has been proven to be over-unity, producing from three to five times more energy out than what was put in. So this very old patent is all about excess energy and no pollution...in 1898!

To quote the inventors, "The object of our invention is to provide a portable plant for manufacturing hydrogen gas in which the elements for the plant are simple in construction, easily operated and controlled, and assembled together in a manner to secure tight joints at all points to prevent the leakage and escape of the gas."

I love that description. But the real beauty of this invention is that although it requires carbon, it does not have to come from carbon rods, as the patent suggests. Any liquid containing carbon can be used, producing energy even while eliminating harmful waste! Then you can use tungsten rods instead of carbon rods, using raw sewage, waste oil, antifreeze, etc., as the carbon source.

I recently witnessed a simple demonstration of "cold fusion" that consisted of a variation of this 1898 patent. Instead of using carbon rods, a stainless steel rod and a thoriated tungsten rod were partially immersed (but not touching) in a glass of water containing a spoonful of baking powder. 300 volts AC was applied, and sparks flew! I was told that the resulting heat was over unity, and that an engine runs much more efficiently with the vapor inducted into it.



UNITED STATES PATENT OFFICE.

HILLIARY ELDRIDGE, DANIEL JOHNSON CLARK, AND SYLVAIN BLUM, OF GALVESTON, TEXAS.

ELECTRICAL RETORT.

SPECIFICATION forming part of Letters Patent No. 603,058, dated April 26, 1898. Application filed June 28, 1897. Serial No. 642,701. (No model.)

To all whom it may concern:

Be it known that we, HILLIARY ELDRIDGE, DANIEL JOHNSON CLARK, and SYLVAIN BLUM, citizens of the United States, residing at Gal.

- citizens of the United States, residing at Gal-veston, in the county of Galveston and State of Texas, have invented a new and useful Elec-trical Retort, of which the following is a specification.
- Our invention relates to electrical retorts 10 for manufacturing hydrogen gas from water to be utilized as a fuel for heating purposes. We construct the apparatus with electric ap-pliances and with means for feeding water
- thereto, so as to produce an electric arc with-to in a closed vessel containing a suitable quan-tity of water. The heat evolved by the electric arc and the electrolytic action of the electric current on the water operate to decom-
- tric current on the water operate to decom-pose the water into its component elements, zo hydrogen and oxygen. The gas thus pro-duced is conducted to a suitable gasometer containing a water-bath. The oxygen, freed by the decomposition of the water in the retort, unites or combines with the vapor-
- 25 ized carbon evolved by the consumption of the anodes and cathodes of the refort and the anodes and cathodes of the retort and produces carbonic-acid gas, the major portion of which is "washed out" or absorbed by the water within the gasometer, to which the 3° gas from the retort is conveyed. The object of our invention is to provide a portable plant for manufacturing hydrogram
- The object of our invention is to provide a portable plant for manufacturing hydrogen gas in which the elements of the plant are simple in construction, easily operated and 35 controlled, and assembled together in a manner to secure tight joints at all points to pre-
- vent the leakage and escape of the gas. To the accomplishment of these ends our
- invention consists in the novel combination 40 of devices and in the construction and arrangement of parts, which will be hereinafter fully described and claimed.

To enable others to understand our inven-tion, we have illustrated a preferred embodi-45 ment thereof in the accompanying drawings, forming a part of this specification, and in which-

Figure 1 is a sectional elevation through a portable gas plant constructed in accordance with our invention. Fig. 2 is an enlarged sectional view through the retort; and Fig. 3 is a sectional view, on an enlarged scale, through the feed mechanism for the anode of the retort.

Like numerals of reference denote corre-sponding parts in all the figures of the draw-

ings, referring to which— The numeral 1 designates the retort in its entirety, which is constructed in a novel manner to itself constitute the cathode of the 60 electric appliances, and this retort is also constructed to receive the movable anode of constructed to receive the movable anode of the electric appliances in a manner to pre-vent the leakage of the gas evolved by the decomposition of the water within the retort. 65 The body of the retort consists of a cast-iron vessel or shell 2, preferably cylindrical in form. The bottom 3 of the retort is closed

by a head, which is shaped to constitute an interior seat 4, and this cylindrical retort- 70 shell has an annular flange 5 at its lower end shell has an annular flange 5 at its lower end and a similar flange 6 at its upper open end. The annular flange 5 at the base of the re-tort furnishes a means for receiving the bolts 7, which operate to fasten the retort to a tile 75 foundation 8. On the foundation is placed the tile or tiles 9, upon which rests the base of the retort-shell 2, and through the base-flange 5 of the retort, the tile 9, and the foun-dation 8 page the holts 7, which serve to hold 80 dation 8 pass the bolts 7, which serve to hold 80 the retort solidly in place.

The interior of the retort-shell 2 is lined with a carbon lining 10 or other material re-fractory to heat. This carbon lining is of cylindrical form, and it rests snugly upon the 85 interior seat 4 within the shell of the retort. Interior seat 4 within the shell of the retort. The carbon lining 10 is pierced at one side, near its lower end, with an induction-port 11 for the water, and it is likewise provided with an eduction-port 12, the latter being situated 90 at a point diametrically opposite to the water-induction port 11 and near the upper end of the retort the retort.

the retort. The cathode or negative electrode 13 is in the form of a flat disk of carbon, which is 95 fitted within the seat 4 of the retort, upon the bottom thereof. The cathode is shown as fitting snugly within the carbon lining 10 of the retort, and the parts 10 13 are thus fitted snugly together to be held from dis- roo placement within the retort. The angle or positive electrode 14 passes

The anode or positive electrode 14 passes

through an insulated stuffing-box on the cover of the retort, and this stuffing - box is constructed in a novel manner to insulate the anode from the retort and to produce a tight joint to obviate leakage of the gas which may

be generated in the retort. The anode consists of a rod or pencil of car-

- bon, and it is connected at its upper part to a carrier or holder 25, which is controlled by a suitable feed mechanism to adjust the anode
- 10 suitable feed mechanism to adjust the anode within the retort as may be required. The supporting and adjusting devices for the anode will be presently described in detail. The upper open end of the retort-shell 2 is
 15 designed to be closed by a cast-metal cover or head 16, which is fastened tightly upon the retort-shell by the through-bolts 17. To secure a tight joint between the retort-shell and its closure, we provide an asbestos pack-to ing 18 between the flange 6 and the head 16, said packing heing clamped between said
- said packing being clamped between said flange and the cover or head 16 when the bolts are tightened. The cover or head 16 of the retort carries a stuffing box, through which the anode 14 enters the retort. This 25 stuffing-box consists of a nipple 19 and the gland 20. The nipple 19 is formed integrally
- within the closure 16, and it extends upwardly therefrom at the center thereof. The nipple is screw-threaded interiorly to receive and
- hold the insulating-bushing 21, which is screwed into the nipple, and said nipple is also screw-threaded externally to adapt it to receive the gland 20. This gland is a casting having upper and lower at a failement di 35
- having upper and lower parts of different di-ameters joined together by an integral shoul-der, and the lower part of the gland 20 is threaded internally to enable said gland to be screwed upon the externally-threaded nip-40
- ple of the stuffing-box. The upper smaller end of the gland 20 is screw-threaded internally to receive the threaded block of insu-lating material 22, which constitutes the up-per bushing for the movable anode 14, said upper bushing 22 being held or fastened se-curely in the upper part of the gloud 20 by
- 45 upper busing 22 being held or fastened se-curely in the upper part of the gland 20 by reason of the screw-threaded connection of the bushing with the gland. It will be ob-served that we have provided two insulating-bushings 21 22 for the anode, one of which bushings is fastened within the nipple and the other bushing is fastened within the gland of the stuffing-hor
- 50 of the stuffing-box.
- The insulating-bushings 21 22 within the stuffing-box are made either of asbestos, mica, or a substance known as "phonolite" to form an electric insulator, which is also refractory 55
- The insulating-bushings 21 22 are spaced 60 apart vertically within the stuffing-box, and the gland 20 is arranged to be screwed on the nipple 10, so as to provide a space or cham-ber above the nipple and within the gland, which space or chamber is designated by the numeral 23. Within this chamber, in the cland of the stuffing here is plead or making
- 65 gland of the stuffing-box, is placed a packing 24, of asbestos or other appropriate material,

and this packing encompasses the anode 14, whereby the stuffing-box provides a tight joint against the leakage of gas from the re- 70 tort, and it also serves to sustain the bushings that operate to electrically insulate the anode from the metallic vessel or shell of the retort. Thestuffing-box packing 24 may con-sist of asbestos, as described, or we may use 75 asbestos wool or asbestos rope or asbestos fiber mixed with a little fire-clay, which admixture makes the stuffing-box packing re-fractory to heat. The bushings 21 22 are pierced with vertical apertures, and said 80 bushings are held within the members of the stuffing-box to bring the vertical apertures in the respective bushings in alinement with each other, whereby the anode 14 may readily pass through and have the desired vertical 85 play within the bushings 21 22.

play within the busnings 21 22. The upper extremity of the carbon anode 14 is fitted in a socket 24, provided in the lower side of the carrier or holder 25, said anode being made fast to the carrier by the 90 employment of a clamping-screw 26. This employment of a clamping-screw 26. This carrier 25 has a rack-formed guide-rod 27, atcarner 25 mas a rack-formed guide-rod 27, at-tached thereto or made an integral part there-of, and this guide-rod passes vertically through a suitable aperture in a boxing or 95 casing 28. Said boxing or casing is supported by the cross-arm 29 of a supporting-frame 30, which is erected upon the closure or head of the return. Within the mide her or resider the retort. Within the guide box or casing 28 is arranged an adjusting gear or pinion 31, 100 which is carried by a shaft 32, that is journaled in said box or casing 28. This gearpinion 31 meshes with the rack formed on one pinion 31 mesnes with the rack formed on one edge of the guide-rod 27 of the carbon-carrier 25, and the shaft 32 of said gear-pinion has 105 an insulated hand-wheel 33, by which the shaft and pinion may be rotated to adjust the carrier 25 and the anode 14 vertically, as may be required. The carrier or holder 25 is provided with a transverse hole or socket 34, in 110 which is fitted the end of one of the electric conductors 35, and this conductor is made fast to the carrier or holder 25 by a bindingscrew 36, which works in a threaded aperture

screw 36, which works in a threaded aperture in the carrier 25 and impinges upon the con- 115 ductor 35, as shown more clearly by Fig. 3. The upright standards or legs 30' of the sup-porting-frame 30 terminate at their lower ends in the feet 30", which rest upon the cover or closure 16 of the retort. The frame 30 is 120 clamped to, but insulated from, said closure of the retort in the following manner: Be-tween the feet 30" of the standards and the metallic closure 16 are interposed layers or strips of insulating material 38, and upon the 125 upper sides of the feet 30" are placed other layers or strips of insulating material 39. The clamps 40 40 are arranged to embrace the feet of the supporting-frame 30 and the flange 6 of the retort, and said clamps are provided 1:0 with binding-screws 41, which operate against the flange 6 of the retort to draw the clamps tightly upon the feet 30" of the standards. It will thus be seen that the supporting-frame

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In summary, the aforementioned patents are not the only ones worthy of note from the 19th century, but they are enough to establish the fact that the technology necessary to efficiently power internal combustion engines with hydrogen from water was advanced enough to have replaced fossil fuels even at that time. I am not going to vouch for all of the patents shown in this book; some may be scams. But even if only one of them is what it claims to be, an efficient water fuel device, it means that human society could have been free of oil dependence even before it became oil dependent. Then, as now, it was not a matter of if it could be done technologically, but rather, politically and economically. Sadly, the web that long ago was allowed to be woven by a few powerful people is now set in stone.

Coal was the backbone of the economy back then. Besides producing coal gas, it was used to power factories and steamers and to heat homes and businesses. You would find it hard to believe how many thousands of tons of coal were used per year in just one city! That is why Jules Verne included in his book a discussion of what mankind will do when it runs out. People viewed it then as many now view petroleum: vital to their security. And any alternative to it was subject to the same opposition that would later come from the purveyors of petroleum.

When Nicola Tesla discovered how to harvest free electricity from the atmosphere, his backer, J. P. Morgan, reportedly asked: "Where do we put the meter?" That kind of thinking on behalf of the rich and powerful kept the advancement of 19th century free energy devices on the back burner, a fossil fuel-fired burner that could enhance their wealth still more.



CHAPTER THREE: THE HIGH TECHNOLOGY OF THE 20TH CENTURY 1901-2000

The period from 1901 to 2000 was marked by a greater number of internal combustion engines and personal vehicles powered by them. Car engines had just one or two cylinders, and even the later four cylinders were of low horsepower, so the vehicles were slow and the fuel demand was not very great. Most cars of that era never went over 20 MPH. Then again, the narrow roads of that time weren't paved and smooth, so power and speed didn't matter. Producing enough water fuel to run those engines was not difficult, and several determined inventors did it.

Inventors kept up the work of finding new and better ways to turn water into fuel, as well as coming up with new uses for the fuel, while others worked on improving the automobile. Thanks to U.S. inventor Charles Kettering, the 1912 Cadillac was the first car that came with a generator to charge the battery. This made possible the on-board, on-demand production of oxyhydrogen with no need to regularly replace a discharged battery. A good invention that could have prevented the word "smog" from entering the English language soon followed. And it has recently resurfaced. In 1916 Charles H. Frazer applied for a patent for a "hydrooxygen generator," receiving Patent # 1,262,034 in 1918. Mr. Frazer actually made what we today call a "hydrogen booster." Luther Wattles had suggested, in his 1897 patent, that his gas aided the combustion of other fuels. Mr. Frazer makes four interesting statements among his patent claims. The first is that his invention increases the efficiency of internal combustion engines, the second is that it achieves the complete combustion of volatile hydrocarbons, the third is that an internal combustion engine is cleaner when utilizing oxyhydrogen gas to boost a fossil fuel, and the fourth is that a lower, and thus less expensive, grade of fuel can be used with equal performance. We might add that, in line with his first claim, less fuel is used as well.

What I find interesting is the apparent suppression or ignoring of even this technology, which is a great way to make fossil fuel less offensive. That is, if you're going to use it at all, why not do so more intelligently? But then the question arises: Why was it suppressed, if it did not directly threaten fossil fuel? After all, it was being promoted as a booster only, not a replacement for gasoline or other fossil fuels.

This patent being thrust aside may be the first verifiable indication of what was to follow: a secret but obvious effort to keep the fuel economy of vehicles at a level that the people who sell fuel are comfortable with. Another reason to suppress a hydrogen booster was that it too closely resembled a full-blown oxyhydrogen fuel system, which had already been proposed for decades. This very fact proves to me that on-demand hydrogen fuel from water was a reality in the early 20th century, because an excellent technology that only resembled it was viewed as too dangerously similar to utilize. Not dangerous due to safety concerns, but economic concerns. The safety of the public was sacrificed for the economic benefit of a few already very wealthy people, all of whom are now dead. Can we also say it was due to the potential loss of government tax revenue? The U.S. government didn't begin collecting fuel taxes until 1932, and individual states began doing so in the 1920's, so fuel tax revenue was not an issue. It was all about personal gain for a very small group of powerful, elite people. People who already had more than enough money.

This type of booster will increase gas mileage from 20% to 40% or more. And they are easy to install and maintain. They do not have a negative effect on an engine, and the exhaust coming out the tailpipe is much cleaner, even as the pollution coming out of a coal-fired power plant is greatly reduced by introducing oxyhydrogen into it, to continue the burn of the hydrocarbons.

It just doesn't make sense for a world that is choking on its own exhaust to not have used at least this technology a long time ago. Instead, the government mandated "smog devices" that don't perform as well and actually use up more fuel! It doesn't take a rocket scientist to see that there's a real disconnect between what has been possible technologically, for the good of this planet and future generations, and what we have been allowed to do. Is there anyone who can do something about this absurd situation? Yes, and I believe He will do so. Frazer's patent follows.



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UNITED STATES PATENT OFFICE.

CHARLES H. FRAZER, OF COLUMBUS, OHIO.

HYDRO-OXYGEN GENERATOR.

Patented Apr. 9, 1918.

1,262,034.

Specification of Letters Patent. Application filed June 30, 1916. Serial No. 106,887.

To all whom it may concern:

- Be it known that I, CHARLES H. FRAZER, a citizen of the United States, residing at Columbus, in the county of Franklin and 5 State of Ohio, have invented certain new
- and useful Improvements in Hydro-Oxygen Generators, of which the following is a specification. This invention relates to hydro-oxygen
- 10 generators for use with internal combustion engines. The attachment is designed particularly to increase the efficiency of inter-nal combustion engines, in that an additional quantity of oxygen is supplied where-15 by complete combustion of the volatile hy-
- drocarbons is insured. By the use of my attachment, the heavy carbon deposited upon the cylinder and its coöperating parts is also eliminated in that the carbon is com-20 pletely burned by the use of the additional

- pletely burned by the use of the additional supply of oxygen. The main object of my invention resides in the provision of a tank wherein a pair of electrodes are provided for decomposing water into its constituent parts, together with conduits leading from the tank to the intake manifold, whereby the generated gases are permitted to enter the engine erlinder. cylinder.
- Still a further object of the present in-80 vention resides in a controlling or throttling structure whereby the generated gases, as well as the hydrocarbon fuel may be simul-taneously throttled.
- The preferred embodiment of my inven-tion is shown in the accompanying sheet of 85 drawings, in which similar characters of reference designate corresponding parts, and in which:
- Figure 1 is a view in side elevation of an 40 internal combustion engine showing my generator mounted in position, Fig. 2 is a vertical section on an enlarged
 - scale of the generator shown in Fig. 1,
- Fig. 8 is a transverse section taken on line -3 of Fig. 2, and, Fig. 4 is a section through one of the con-3-
- trolling valves used in regulating the supply of gas to the intake manifold. In Fig. 1, the intarnal combustion engine
- 50 is represented by the reference numeral 1 and is shown as being provided with a T-shaped intake manifold 2, which latter is in communication with a carburster 8. The
- 55 generator itself comprises a circular tank 4 whose upper portion is divided by means of bureter 8. In order to provide this arrange-

a transverse wall 5 to form compartments 6 and 7. The upper and lower ends of the generator tank are closed and located in the lower wall 8 thereof are a pair of electrodes, 60 the anode being designated by the reference numeral 9 and the cathode by the reference numeral 10. Both these electrodes are located centrally with respect to their respective chambers 6 and 7. These electrodes are 65 mounted in the customary manner by being insulated from each other, as is shown and they are further adjustable up and down by means of the adjusting nuts shown at 11. The lower portion of the tank 4 is in com- 70 munication with a source of water supply (not shown) by means of the supply pipe 12, flow through which is governed by means of the valve 13. The water level is normally maintained constant by operating the valve 75 18 through the medium of a float 14. This float is pivotally attached as shown at 15 to a lever 16 which lever is also pivotally attached intermediate its ends as shown at 17 to the tank 4. The outside end of the lever 80 pivotally connects to a link 18 which latter forms a direct connection with the valve arm shown at 19. Thus, when the water level in the tank 4 rises, the valve will be closed through the elevation of one and of 85 the lever 16. When the current is turned on, the water which, of course, contains a cer-tain per cent of impurities to render it either acid or alkaline to serve as an elec-trolyte, will be decomposed into its con-90 stituents hydrogen and oxygen. These gen-erated gases will bubble to the surface of the water within the generator and collect in the compartments 6 and 7, hydrogen being generated at the cathode and oxygen at 95 the anode. These gases may then be con-ducted to the intake through the medium of pipes or conduits 20 and 21 leading out of the top of the compartments 6 and 7 rea valve shown in cross section in Fig. 4 and a valve shown in cross section in Fig. 4 and comprising a body portion 22 having alim-ing passages 28. A plug 24 operates within the body portion and is bored transversely as shown at 25, whereby when the passages 105 28 and 25 are all in alimement, free flow of the gases from the tanks 6 and 7 is permit-ted. The flow of these gases may also be throttled by partially closing the valves and the operation of these is preferably made 110 simultaneous with the throttle 26 of the car-burstare 8. In order to provide this arrange-

1,262,034

ment, each valve plug is provided with an operating arm 27 to each of which is pivotally connected a reach rod 28. A reach rod 29 is also connected to the arm of the

5 throttle valve 26 and these are in turn pivotally connected with a common operating rod, 30 leading to any convenient point of operation, such as the dash of a motor vehicle, or preferably to the ordinary throttle
10 control mechanism.

It will thus be apparent that when the curernt is thrown on, hydrogen and oxygen will be generated by decomposing the water within the tank 4. These gases rise and are

15 collected in the chambers 7 and 6 from where they are permitted to enter the intake manifold by passage through the pipes 21 and 20. The flow through these pipes is regulated by the valve structure shown and the
20 regulation of these valves is effected simultaneously with the engine throttle valve. By the addition of the separate gases, I am thus enabled to enrich any hydro-carbon fuel which the carbureter may handle. In

25 this manner, a very low grade fuel may be used and by properly setting the valves 22, the proper supply of gases may be added to render the fuel thoroughly combustible. What I claim, is:

30 1. The combination with the intake of an internal combustion engine and its carbureter, of a generator tank, positive and negative electrodes within said tank, a water supply pipe leading to said tank, means for

85 maintaining a constant level in said tank, and a pair of outlet conduits leading from said tank to said intake between the engine and carbureter.

2. The combination with the intake of an 40 internal combustion engine and its carbureter, of a generator tank, a dividing wall dividing the upper portion of said tank into a pair of compartments, positive and negative electrodes in the lower portion of said tank, a water supply pipe leading into the 48lower portion of said tank, means for maintaining a constant level in said tank, and an outlet conduit leading from each compartment into said intake between the engine and carbureter.

3. The combination with the intake of an internal combustion engine and its carbureter, of a generator tank, a dividing wall dividing the upper portion of said tank into a pair of compartments, positive and negative electrodes in the lower portion of said tank, a water supply pipe leading into the lower portion of said tank, means for maintaining a constant level in said tank, an outlet conduit leading from each compartment 64 into said intake between the engine and carbureter, a controlling valve in each of said conduits, a throttle valve for said intake, and means for simultaneously controlling all of said valves.

4. The combination with the intake of an internal combustion engine and its carbureter, of means for generating hydrogen and oxygen, and means for leading said gases to said intake between the engine and car-

5. The combination with the intake of an internal combustion engine and its carbureter, means for electrically decomposing water into hydrogen and oxygen, means for leading said gases to said intake between the engine and carbureter, and means for regulating the amount of flow of said gases to said intake.

In testimony whereof I affix my signature sin presence of two witnesses.

CHARLES H. FRAZER.

Witnesses: C. C. SHEPHERD,

A. L. PHELPS.

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It was also during the early part of the 20th century that a few inventors began claiming to have discovered an additive, typically made from coal, which made water usable as a fuel in an internal combustion engine. One example from 1917 is the story of John Andrews, whose lengthy story is viewable online at such internet sites as rexresearch. His story is probably the basis for a 1960 One Step Beyond television show. The episode, which is viewable for free on line at liketelevision.com, is entitled "Where are they?" Another is Guido Franch, who claimed to have learned his formula from a German rocket fuel expert around 1940. We will not go into detail here, because, while there is some news media documentation, and even a court's confirmation of his claims, there are no patents, and I don't know which of the claims, if any, are in fact true.

A couple of other television shows, such as the 1964 comedy series "The Munsters," have been produced about such an invention, usually in a humorous context. There was also a Universal feature length comedy film made in 1949 entitled "Free for All." In these two comedy productions, oil companies seek to prevent the invention's distribution. In one case, \$50,000 is offered to *not* market it.

Even if some hucksters have made false claims about such inventions to bilk investors, there is no reason to believe that this type of chemical cannot be produced, nor that it has not been done. As shown by Jean-Louis Naudin's research, a water droplet can be exploded without adding anything but the right spark, so it is not too hard to believe that it can also be done to water vapor in an engine's cylinder under pressure after adding some chemical preparation to it. It is without question do-able. It is only a question of how many people have actually done it and what they used to do it.

Later, adding as much as 80% water to fossil fuel was actually proven to work. Rudolph Gunnerman's U.S. Patent #5,156,114 (see Appendix), Paul Pantone's Geet systems, and others, have shown that fossil fuels can be diluted with water and perform as well as before, and with less pollution. In 2005, New Zealander Steve Ryan proclaimed that his company, Biosfuel, had turned water into fuel by "entraining the hydrogen in water." A 2005 NZ "60 Minutes" program, viewable online, features the technology. A patent is pending.

It goes without saying that the unnecessary use of chemicals by humans, and done on a large scale, as in the case of a fuel for transportation, constitutes a gross waste of Earth's resources, and probably a source of pollution that future generations will have to pay for. Common sense should tell us to not pursue a technology that requires us to add a chemical to every tank of water fuel we use, if we can avoid it. Of course, Big Business thrives on turning you into an "addict" who needs to keep buying their product for the rest of your life. And they will probably charge as much for their "new" concoction to add to water as you are now paying for gasoline.

In 1922, an inventive U.S. scientist named Samuel Ruben was granted patent # 1,431,047. Years later he become co- founder of Duracell International. The patent, shown below, recommends the use of high frequencies superimposed upon the direct current of brute force electrolysis, causing ionization of the liberated gases and a reaction between them, also setting the ions in the liquid into vibration, causing collisions with the atoms of the gas, and further ionization. Knowledge of hydrogen isotopes was limited at the time, and the existence of deuterium had not even been considered.

It is possible that Ruben would have reached a different conclusion about the output gases of his invention had he known what others later discovered. This patent helps us to see how to build a simple combination electrolysis - radiolysis chamber and why. He recommends reintroducing some of the hydrogen gas into the electrolyzer under pressure, through the tube in the middle of the chamber, as an integral part of the system.

Ruben wasn't into building a water car, so he had nothing to hide, as have others. But patents like his contain nuggets of scientific truth that are there for the inventors of water fuel devices to benefit from.



1,431,047

UNITED STATES PATENT **OFFICE.**

SAMUEL RUBEN, OF NEW YORK, N. Y.

METHOD OF AND AFPARATUS FOR PROMOTING CHEMICAL REACTIONS BETWEEN GASES.

Application filed April 16, 1920. Serial No. 374,420.

have invented certain new and useful Im-provements in Methods of and Apparatus for Promoting Chemical Reactions Between Gases, of which the following is a speci-10 fication.

This invention relates to a method of and apparatus for promoting chemical reactions between gases, or between a gas and vapor. In carrying out the invention, I provide a

- 15 suitable vessel containing a conductive liquid, and means for liberating a gas within the liquid, either by electrolysis or by
- in the liquid, either by electrolysis or by chemical reaction, in the immediate pres-ence of another gas or vapor which is intro-20 duced into or generated within the liquid, and a high frequency electric current, of high current density, is simultaneously passed through the liquid. This latter cur-rent causes ionization of the active atoms 25 of the liberated grees and thereby promotes
- 25 of the liberated gases and thereby promotes a reaction between the gases. The ioniza-tion of the active gas particles is brought about, directly, by the action of the high frequency current upon the atoms, and also,
- indirectly, by the action of said current in setting the ions in the liquid into vibration, 80 in accordance with the frequency of the current, these ions, by collisions with the active atoms of the gas, causing further ionization 35 of the latter.
 - Where electrolysis is relied upon for the generation of the active gases, a direct cur-rent is passed through the liquid between electrodes submerged therein, for the pur-pose of decomposing the liquid, and a high
- 40 frequency current, for causing ionization of the gas, is superposed upon the direct cur-rent by connecting the same electrodes to a
- source of high frequency current. A porous partition separates the gases evolved at the electrodes, and a gas or vapor with which the active gases liberated at the negative electrode may combine, is introduced into the liquid by mechanical means or evolved 50
- therein by chemical means adjacent said electrode. Where the active gas is evolved within the liquid by chemical reaction instead of by electrolysis, of course the elec-trodes are connected only to the high fre-55 quency current source.

To all whom it may concern: Be it known that I, SAMUEL RUBEN, a shown an apparatus suitable for carrying citizen of the United States, residing at 70 out the invention by electrolytic means, the East 93rd Street, New York city, in the electrical circuits being shown diagram-5 county of New York and State of New York, matically. how invented certain new and useful Im-60

Referring to the drawing, A indicates a suitable vessel, which may be of iron, hav-ing an internal lining 1, to protect the metal against the oxidizing effect of the gases, the vessel being adapted to hold an electrolyte 65 2, which may be water made slightly conductive by the addition of a suitable acid or salt. Upon a threaded spindle 3, projecting upward from the bottom of the vessel A, is arranged an electrode E, which is 70 adjustable upon and removable from the spindle. Above this electrode is arranged another electrode E', the latter being sup-ported at the lower end of a tube 4, which extends through the top of the casing and 75 is connected by an insulating joint or coupling 5 with a pipe 6, through which gases or vapors may be delivered to the tube 4 and thence to the electrode E'. This electrode, as shown in the drawing, is in the 80 form of a bell having a perforated lower wall e, opposed to the electrode E. Gases or vapors entering the liquid through tube 4 will flow in close contact with the lower wall and thence around the lower edges of 85 the bell before passing apward through the liquid to the space above. The vessel A is provided with a top a, composed of an an-nular part 7, which may be of metal and suitably secured by screws 8 to the vessel, 90 and a central part 9, which is composed of some suitable insulating material, such as baked lava. Between the parts 7 and 9 is secured a sleeve 10, which extends downwardly within the container and supports 95 a porous cup 11, which extends into the liquid and forms a partition between the electrodes E and E'. This partition divides the interior of the vessel A into two compartments, a' and a^2 , and prevents the in- 100 partments, a and a, and prevents the in-termingling of the gases evolved at the two electrodes. A pipe 12 connects the com-partment a' with a suitable exhaust pump. not shown, and when the apparatus is in not shown, and when the apparatus is in operation the exhaust pump causes gas or 105 vapor, as the case may be, to flow into the compartment a^{\prime} , through the pipe 6 and past the electrode E' and thence outward through the pipe 12. The compartment a^{2} of the vessel A is provided with a pipe 13, through 110

which gases evolved at the electrode E may escape, and with a fitting 14, by means of which liquid may be admitted to or withdrawn from the vessel, and also with a suit-5 able gage 15, by which the height of the liquid in the vessel may be ascertained. A wire 16 connects the metal shell of the

vessel A with one terminal of a direct current generator B, and the other terminal of

- 10 said generator is connected by conductor 17 with the tube 4, as shown. Since the electrode E is connected to the shell of the vessel or container and the electrode E' is connected to the tube 4, it will be evident that the current from the direct current genera-
- 15 tor will flow through the liquid from one electrode to the other and that, assuming the electrode E' to be the negative electrode, hydrogen gas will be liberated at said elec-20 trode, and the gas introduced through the pipe 6 will be brought into intimate contact
- with the hydrogen gas at the surface of the electrode. These gases while in the liquid electrode. These gases while in the liquid are acted upon by a high frequency cur-25 rent which should also be of high amperage.
- In the drawing, I have shown a means for producing a high frequency current of high current density, consisting of a suitable al-ternating current source C, one terminal of
- which is connected by conductor 18 to con-ductor 17 and thence to the tube 4 and electrode E', and the other terminal of the alternating current source being connected by conductor 19, through a spark gap device 85 20, to conductor 16 which leads to the elec-
- trode E through the wall of the vessel A;
- trode E through the wall of the vessel A; A condenser 21 is connected to the conduc-tors 18 and 19 and discharges a heavy oscil-lating current through the liquid each time 40 the circuit is established through the spark gap device. In order to prevent this high frequency current from discharging through the direct current generator suitable induc-tive resistances 22 are placed in circuit with 45 the latter generator. The vessel A is also grounded as shown by the ground wire 23
- grounded as shown by the ground wire 23, which is connected through conductors 19 and 16 to the vessel.
- As a practical illustration of the operation of the apparatus, assuming that the high frequency and direct currents are ap-plied to the liquid, nascent hydrogen will
- be liberated at the negative electrode E', by the decomposing action of the direct cur-55 rent, and if carbon monoxide (CO) be caused to flow through the chamber c' it will be brought into intimate contact with the hydrogen at the lower surface of the electrode, and a reaction will take place un-
- der the influence of the high frequency cur-60 rent, resulting in the formation of formaldehyde, which passes off through the pipe 12. By reversing the polarity of the direct current oxygen will be evolved at the sur-65 face of the electrode E'. Various reactions

are possible, according to the gas or vapor introduced, and the direction of flow of the direct current. Where, for instance, more efficient hydrogenation or oxidation of a gas is desired, the gas will be introduced 70 through the electrode E' and the polarity of the direct current will be changed, ac-cording to whether oxygen or hydrogen is to be evolved at the electrode E.

What I claim is:

1. The method of promoting a reaction between gaseous fluids which comprises causing the fluids to be brought into contact with one another in a conductive liquid and passing a high frequency current 80 through the liquid. 2. The method of promoting a reaction

between gaseous fluids which comprises caus-ing the fluids to be brought into contact with one another in a conductive liquid and 85

with one another in a conductive inquite and so passing a high frequency current of high current density through the liquid. 8. The method of promoting a reaction between gaseous fluids which comprises in-troducing a gaseous fluid into a conductive 90 liquid, enging the liberation of another liquid, causing the liberation of another gaseous fluid in said liquid, and passing a high frequency current through the liquid.

4. The method of promoting a reaction between gaseous fluids which comprises in-95 troducing a gaseous fluid into a conductive liquid, causing the liberation of another gaseous fluid in said liquid by electrolysis, . 180

and passing a high frequency current through the liquid. 5. The method of promoting a reaction be-tween gaseous fluids which comprises in-troducing a reaction fluids which comprises introducing a gaseous fluid into a conductive liquid in proximity to an electrode, caus-ing another gaseous fluid to be liberated at 105 the surface of said electrode by electrolysis, and passing a high frequency through said electrode and liquid. current

6. In an apparatus for the purpose described, a vessel containing a conductive 110 liquid, electrodes in said liquid, direct and high frequency electric current sources connected to said electrodes, a porous partition between said electrodes, and means for drawing gaseous fluid through said conductive 115 liquid in contact with one of said electrodes. 7. In an apparatus for the purpose de-

scribed, a vessel containing a conductive liquid, a porous partition dividing said vessel into two compartments, electrodes in 120 sei into two compartments, enservoues in 120 said compartments, one of said electrodes having an opening therethrough, a pipe con-nected to said latter electrode, means for drawing gaseous fluids through the com-partment containing said latter electrode by 125 way of said pipe, and direct and high fre-quency electric current sources connected to said electrodes.

In testimony whereof I affix my signature. SAMUEL RUBEN.

His drawing also reveals an effective way of keeping the gases separate, using a porous membrane. I like his simple design, and his easy to follow, straightforward lesson in "rocket science." He may not have revealed everything needed to build a water car, but he contributed greatly to our understanding of the physics behind one kind of super-efficient electrolyzer.

His patent shows that high frequencies produce results that have nothing to do with high wattage, thus defying the conventional wisdom which says that dramatically improved efficiency is impossible and certainly not affected by such efforts. There is a huge gulf between what some textbook says is possible and what actually happens in an electrolyzer that has been designed, built, and tested by someone like Ruben. We may not have the means to identify just what's going on inside or what's coming out of the chamber, but we can conclude that milliamps of DC current can produce high voltage, high frequency radiation that changes the nature of what is being done in a chamber from electrolysis to radiolysis.

Also in 1922, F. Scott Fitzgerald wrote The Diamond as Big as the Ritz, the science-fiction story about a man who discovers a mountain that is a huge diamond. He greedily hides it from the world, enslaving, imprisoning, and killing others, to maintain his personal empire. Was it a veiled commentary about money, power, and "sustainability"? That is precisely why editors refused to run it in their publications.



Not long after the release of the above mentioned patent, and probably with full knowledge of it, a father and son team from Dallas, Texas, Charles H. Garrett and his father, Henry "Dad" Garrett, began working on a bolton electrolytic carburetor that would turn water into fuel on-demand, under the hood, and on-the-fly. Although it is Charles' name that appears on the patents, more is known about the senior Garrett, who was a competent inventor, and who generally gets credit for the invention. We will, therefore, focus on him.

There are "learned" people who have, without knowing him or his work, called him a 'con man who duped people into thinking he had made a water-powered car, since everyone knows it is impossible to do.' Yet, a description of this man, made on the editorial page of The Dallas Morning News at the time of his death in 1952, said that "he was a modest, kind, and deeply spiritual soul withal, a worthy, if less well-known son of his famous father, the Episcopal missionary bishop of Dallas, the Rt. Rev. Alexander C. Garrett." The eulogy praised his "foresight, skill, and practical genius," which were responsible for many inventions that have benefited mankind. Does that sound like a "con man"?

It seems appropriate to include a biography about his life, so that his work as water car inventor can be judged in the light of his other accomplishments, and his personality.

Henry Garrett was born in Canada in 1861, to a father who was an Episcopalian missionary to native Americans. When he was 15 years old, the family moved to Dallas, Texas, and there he lived until his death in 1952. His early interest in electricity and inventing is revealed in an article that appeared in the Dallas Daily Times on January 28, 1891. It tells of reports of strange lights and sounds coming from an old mill, and two policemen climbing to the third floor to investigate. What did they find? "Two young men who, when questioned, told the officers that they were working on an invention which would, when completed, throw some light on science. The young men are Henry Garrett, son of Bishop Garrett, and Henry Sutton, son of Doctor Sutton."

The next mention of Dad Garrett appears in a Dallas Morning News article from January 28, 1911, covering a Dallas city council meeting, in which "Electrician Garrett" files a report about the damaging effects of electrolysis on the city's water pipes, along with a recommended solution. He obviously knows his stuff, and his impressive technical assessment of what the problem is caused by, and what should be done about it, is respected by all.

In 1912, two fires broke out at almost the same time on opposite sides of Dallas, and all the city's firemen, having responded to the first call, had no way of knowing that a second call had also come in. This caused Dad Garrett to devote years to the invention of the emergency dispatch radio, which he gave to the city without cost. He did this by setting up Dallas' first municipal radio station, WRR, which broadcast emergency calls in between music and other programming. He was its founder, engineer, and announcer. He was also the first to put a radio in a car. People laughed at his strange inventions, so unusual were they. Imagine how people reacted the first time a car came down the road playing music.

Later, traffic accidents, caused by emergency vehicles responding to their calls, motivated him to invent Dallas' first automatic traffic signal in 1923, capable of switching for emergency vehicle right-of-way. He was not allowed to receive fair compensation for this invention, a court deciding that the rights to anything so useful to society cannot be held by a private individual for personal gain.

He at one time ran an electronics business, a car dealership, a radio station, all the while working for the Dallas fire department until retirement. He both played and built his own organ, giving free concerts to the downtown crowds. But he is best remembered for one invention in particular, the one that has caused him to be featured in this book.

My admiration for Henry Dad Garrett grows with every new revelation about him that I have been able to uncover. He was obviously a gifted inventor who was respected as an upstanding citizen and public servant. He, like most inventors, was abused by the system, but he was apparently never embittered. He ended up donating a great deal of his time and assets to help his fellowman. It hurts me to read negative propaganda about him based on greed.

The following newspaper article, from the Dallas Morning News dated September 8, 1935, describes the invention as being the creation of Charles H. Garrett. The inventor said that he had been working on the device for eight years, assisted by his father, Henry Garrett. For a pair of inventors like the Garretts, eight years spent working on a project is significant. A second, more recent article, remembers the first announcement of the invention. Some articles about the inventor prior to his water car invention are followed by the full patent. Then, reflections about the man published by The Dallas Morning News after his death.

Dallasite Patents Invention Which He Claims Substitutes Water for Gasoline as Fuel

C. H. Garrett, Dallas inventor, gave ; the demonstration, at varying speeds a private demonstration Saturday of a recently patented contrivance which he said substituted water for gasoline as fuel for internal combustion engines.

He said it broke up the water by electrolysis into its component gases. oxygen and hydrogen, using the highly explosive hydrogen for fuel in the motor cylinder.

The working model operated a fourcylinder engine for several minutes in and with several starts and stops. Garrett said he had operated the engine continuously for more than forty-eight hours.

The inventor said the idea itself was not new. He explained that difficulty had been encountered beretofore in attempts to store the dangerously inflammable hydrogen. He claimed to have avoided that trouble by making and exploding the gas in the same process without a storage chamber to which the flames from the motor cylinders might reach.

Water, he explained, is broken down into its component gases by passage of an electric current through it from electrodes immersed in the water, Hydrogen collects at the negative pole and oxygen at the positive. The hydrogen. Garrett said. is mixed with air and introduced directly into the cylinders.

The inventor said he had been working on the device for eight years. assisted by his father. Henry Garrett, traffic signal engineer for the city of Dallas, inventor of the traffic signal system now in use here and holder of several patents on such contrivances

Garrett said attachment of the electrolytic carburetor and installation of a generator of about double normal capacity to furnish power for the breaking down of the water were the only changes needed to convert a gasoline-burning automobile into a water burner. He said the electrolysis chamber would have to vary in size with the size of the motor used, one of about a quart capacity being big enough for the ordinary automobile.

He claimed instantaneous starting in any weather, elimination of fire hazards, cooler motor operation and fulfilling of all motor requirements in power and speed.

Dallas Inventors **I**I ちら Built Car Using P ars Water as Fuel

KAREN KLINEFELTER

Back in 1986, when the fair ground were taking alone for Alired was governor and Da-las was worrying alone raising water rates, two Dallas invaa-tors preduced a mariy pola-tion free car. But in these days before scolagy and pollution became bouched words, the wonder of the investion was not its effect on the sevironment. The big news was the car's fuel — writer. And that, indeed, would be big news was the car's fuel — writer. And that, indeed, would a big news was the car's fuel — writer. And that, indeed, would be big news was the car's fuel — writer. And that, indeed, would a big news was the car's fuel — writer and fast, indeed, would a big news was the car's fuel — writer and fast, indeed, would a big news was the car's fuel — writer and fast, indeed, would a big news was the car's fuel a set that shared gas for water as fuel for internal con-

THE CONTRAPTION was the brainchild of C. R. Garrett and his father. Heavy M. (Ded) Gerrett, both sow

E. P. Aldredge, who was reading The Dallis News as avidy in 1955 as he doet to day, recently jogged The News' memory of the water wonder with his letter to the editor, printed on the editorial page

According to a Page 1 article in the Sept. 3, 1903, lause of The News, the water concept for "several milautes," accord-ing to the article. And months later, after the two investors went back to the drawing beard, it worked long enough for them to put the car through its paces for Paths

PATHE NEWS, incidentally, showed films throughout the Garland Road, and the driver filling the fuel ank with water from White Road, and the driver from White Road, and the from the driver, that the Gar-rets came up with a new, arriing invention. Dad Garrett had been doing that for a long time. He's known as the father of the automatic traffic signal light system, creator of WTR (then the first municipally worked nadio station is build a radio h his car and inventor

I of the system of sending and car's dalue, became ted up reveiving emergency signals to with the way patents were to moving vehicles.
AFTER THE BURST or two treased. According to the related away, its car that near matic traffic signal system and of publicity. The Carrett had a patent on the interpret signal system and that contraption. But no men the court said that such has the found in the Dellas Public evaluation the court said that such has the found in the Dellas Public evaluation to all. APTER THE BURST or two of publicity, the car that ran on water just faded away, like old publics. The Gerretts had a patent on their contraption. But no mea-tion of later development could be found in the Dellas Public Library or in The News file.

7 5 × t telative of the inventors d The News that Ded Gar-t, about the time of the

DAD GARBETT, according to the relative, approved y clied to forget the car that be and his sea and worked on for eight years. The relative has no idea as to what happened to the car.

According to a Sept. 6, 100, News' story, the Garneds' in-broken into its component gas-es, caypen and hydrogen, by electrolysis. The highly explosive hydro-gen was used as fuel in the motor cylindar. The article, quoting C. H. Garnet, said that writer was broken down by passage of an electrode immersed in the wa-ter. Hydrogen collects at the negative pole and oxygen at the positive, the nacy said. The hydrogen. Garnet was quoted as asying, then mixed with air and was introduced di-rectly into the cylinders.

AT THE THE, the younger Gerrett said attachment of the electrolytic carbureter and in-about double normal capacity to furnish power for the break-ing down of the water were the only changer meeded to convert a gateline-burning au-tornobile into a water burner. He was quoted as saying the electrolytic chamber would have to vary in size with the size of the motor uses, one of about a quart capacity being big enough for the ordinary au-tornobile.

Garrett claimad instanta-neous starting in any weather, elimination of fire hazards, cooler motor operation and lei-filling of all motor require-ments in power and speed. The Garretts' relative, who still lives in Dallas, said that the weter cur was a strange

HE SAID the inventors used Austin engine mounted on a

chassis "that they picked up from somewhere." The traditional gas pecial, he

sid, was replaced with a save die valve that increased or ca-creased the amount of laydro-gen associd to move the car at varying speeds. Adverge process that preceded debut of the car as a velatile time.

Aldredge said he had offices on the seventh facer of the old Allen building and the inven-tors, who ran National Electric Signal Co., had offices on the Signal Co., had offices on the 10th floor.

"They worked in that lab and meanly blow the roof off," he said.

THE WATERAPUELED CAR may seemd strange to most falls, but not to Dr. Carlos Con, assistant professor of thermal and fluid sciences at Southern Methodist University "This is a perfectly viable concept," Dr. Com said when questioned about the Garretts invention, "Theoretically, there's no reason why it wouldn't work. It didn't receive the emphasis at the time that the gasoline arging did. "It's probably just a quirt of history that the development of history that the development of the estimabile occurred

HE ADDED, however, that hydrogen is very dangerous and the system naturally would have to be properly developed for safety. But Dr. Coen sees the inven-tion as a nearly pollution-free

Depending upon combusion temperatures, he said, such a car could form oxides of nitro-gen because of the silregen in the air. But its emissions would be very low in particu-late matter and there would be absolutely us hydrocurbon and carbon monoralist emissions. "It would offer substantial advantages over the present

he said simply.

1912 Fires Led to Car Radio Invention, Gave Dallas First

nomber neurity as horge Links Building. No. 1 Neurithe, Dad G. young destriction with fire alarm statuon. By the state of the state of the state state who has alarm arquired with one of the state state of the state of the state of the state state of the state of the state of the state state of the state of the state of the state state of the state of the state of the state interact on a sich, he can sky R with Pare Ini-ited to wark. How the state of the state to device the state of the state budy as the state of the state of the state of the state the state of the state of the state of the state of the state the state of the state

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HOLD A CONFERENCE

NEW POLICE AND FIRE COMMISSION ERS GET TOGETHER FOR THE FIRST TIME.

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INVENTOR TTORNEY



STATES PATENT TED

2,006,676

ELECTROLYTIC CARBURETOR Charles H. Garrett, Dallas, Tex.

Application July 1, 1932, Serial No. 620,364 Benewed November 30, 1934

5 Claims. (Cl. 294-5)

This invention relates to carburetors and it has particular reference to an electrolytic carburetor by means of which water may be broken up into its hydrogen and oxygen constituents and the 5 gases so formed suitably mixed with air. The principal object of the invention is to pro-

vide in a device of the character described, a mechanism by means of which water may be readily decomposed into its constituents, and the constituents intimately mixed with each other and with air.

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Another object of the invention is to provide means whereby the electrolyte level in the carburetor may be maintained at a more or less constant level regardless of fluctuations in fluid

15 pressure at the fluid inlet of the carburetor. Another object of the invention is to provide means whereby the relative amount of air mixed with the hydrogen and oxygen may be regulated as desired. 20

Still another object of the invention is the provision of means to prevent loss of hydrogen and oxygen gases during periods in which these gases are not being drawn from the carburetor. Still another object of the invention is the

.25 provision of means whereby the hydrogen and oxygen resulting from electrolysis may be formed in separate compariments, and a further object of the invention is the provision of means to peri-

odically reverse the direction of current flow and 20 thereby alternate the evolution of the gases in the separate compartments, to be later intermingled.

With the foregoing objects as paramount, the invention has particular reference to its salient 35 features of construction and arrangement of parts, taken in connection with the accompany-

40 form of carburetor.

Figure 2 is a modified form.

Figure 3 is a diagrammatic view of a pole changer, showing its actuating mechanism, and Figure 4 is a wiring diagram for the modified form of carburetor shown in Figure 2. 45

Continuing more in detail with the drawings, reference is primarily directed to Figure 1 in which the reference numeral (designates the carburetor housing, which is preferably con-structed of bakelite or other suitable insulating

50 material. The housing i is so designed as to di-vide the carburetor into a float chamber 2 and gas generating chamber 4, connected by a fluid - 1 D88 age 3.

Water under pressure is forced into the car-55

buretor through an opening 5 which communicates with the float chamber 2 through the medium of the sediment chamber 6 and the needle valve orifice 7, which is closed by a needle valve 8 when the device is not in operation. A float 9 surrounds the needle valve 8 and is free to move vertically relative thereto. Depending from the cover .10 to the float chamber 2 are two ears 11, located at spaced intervals on opposite sides of the needle valve \$. The members 12 are pivoted 10 to the ears 11, as shown. The weighted outer ends of the members 12 rest on top of the float 9, and their inner ends are received in an annular groove in the collar 13 which is rigidly attached to the needle valve 8.

Within the gas generating chamber 4, a series of spaced, depending plates 14 are suspended from horizontal member 15 to which a wire 16 has electrical contact through the medium of the bolt 17, which extends inwardly through the housing 20

1 and is threaded into the horizontal member 18. A second series of plates 18 is located inter-mediate the plates 14 and attached to the horizontal member 19, and has electrical contact with

the wire 28 through the bolt 21. A gas passageway 22, in which a butterfly valve 23 is located, communicates with the gas generating chamber 4 through an orifice 24. An air inlet chamber 25 has communication with the gas passageway 22 above the orifice 24. A downwardly opening check valve 26 is in control of the openings 27, and is held inoperatively closed by means of light spring 28.

25

An adjustable auxiliary air valve 29 is provided in the wall of the gas passageway 22, which air 34 valve is closed by the butterfly valve 23 when the butterily valve is closed, but communicates with the outside air when the butterily valve is open.

The operation of the device is as follows: The chambers 2 and 4 are first filled to the level a with a solution of weak subhuric acid or other electrolyte not changed by the passage of

other electrolyte not changed by the passage of current therethrough, and the opening 5 is con-nected to a tank of water, not shown. The wire 16 is next connected to the positive pole of a storage battery or other source of di-rect current and the wire 26 to the negative pole. Since the solution within the carburetor is a con-ductor of electrolyte matching form there. 45 ductor of electricity, current will flow there-through and hydrogen will be given off from the 50 negative or cathode plates 18 and oxygen from

the positive or anode plates 14. The butterfly valve 23 is opened and the gas passageway 22 brought into communication with a partial vacuum. Atmospheric pressure acting on the top of the check valve 26 causes it to be forced downwardly as shown in dotted lines. The hydrogen and oxygen liberated from the water at the plates 18 and 14 are drawn upwardly through the orifice 24 covered by the check valve 33 where they are subsequently mixed with air entering through the openings 27 and through the

auxiliary air valve 29. When it is desired to reduce the flow of hydro-10 gen and oxygen from the plates 18 and 14, the current flowing through the device is reduced, and when the current is interrupted the flow ceases. When the butterfly valve 23 is moved to

closed position, the check valve 28 is automatically closed by the spring 28. Any excess gas given off during these operations is stored in the 15 space above the fluid where it is ready for subsequent use.

Water is converted into its gaseous, constituents by the device herein described, but the dilute sulphuric acid or other suitable electrolyte. 20 in the carburctor remains unchanged, since it is

not destroyed by electrolysis, and the parts in contact therewith are made of bakelite and lead or other material not attacked by the electrolyte. 25 The structure shown in Figure 2 is substantial-

ly the same as that shown in Figure 1 with the exception that the modified structure embraces a larger gas generating chamber which is divided

by means of an insulating plate \$1 and is further 30 provided with a depending baffle plate 32 which separates the gas generating chamber 33 from the float chamber \$4 in which the float \$5 operates in the same manner as in Figure 1. More-

35 over, the structure shown in Figure 2 provides a series of spaced depending plates 34 which are electrically connected to the wire 37, and a second series of similar plates 38 which are electri-

cally connected to the wire 39 and are spaced apart from the plates 38 by the insulating plate 40 31. Gases generated on the surfaces of the plates ss and ss pass upward through the orifice sta into the gas passageway 40 where they are mixed with air as explained in the description of Fig-45. ure 1.

A pipe 51 bent as shown in Figure 2 passes downwardly through the housing of the carbu-

abwinwarduy unrough the indusing of the casts retor and has a series of spaced apertures a in its horizontal portion beneath the plates 36 and 38. An upwardly opening check valve 53 is in control of the air inlet 54. When a partial 50 vacuum exists in the chamber 33, air is drawn in through the opening 54 and subsequently p upwardly through the apertures a. This air tends

55 to remove any bubbles of gas collecting on the plates 36 and 38 and also tends to cool the electrolyte. The check valve 53 automatically closes when a gas pressure exists within the carburetor and thereby prevents the electrolyte from being 60

forced out of the opening 54.

In order to provide for alternate evolution of the gases from the plates 35 and 35, a pole changer 41 shown in Figure 3 is provided, which is actuated periodically by the motor 42 which

drives the worm 43 and the gear 44 and causes oscillations of the member 45 which is connected by a spring 46 to the arm 47, thereby causing the pole changer to snap from one position to the other.

In operation, the carburetor shown in Figure 2 is connected as shown in the wiring diagram of Figure 4. A storage battery 48 or other suitable source of direct current is connected to a variable rhecstat 49, switch 50, pole changer 41 10 and to the carburetor as shown. Thus the rate of evolution of the gases can be controlled by the setting of the rheostat 49 and the desired alternate evolution of the gases in the compartments of the carburctor is accomplished by means of 15 the periodically operated pole changer 41.

Manifestly, the construction shown is capable of considerable modification and such modification as is considered within the scope and meaning of the appended claims is also considered 20 within the spirit and intent of the invention. What is claimed is:

1. An electrolytic carburetor including an anode and a cathode, float means to control the level of the electrolyte within said carburctor, 25 means to mix the gases resulting from electrolysis with air, and a check valve independent of said float means to control ingress of air to said carburetor.

2. An electrolytic carburetor including anode 30 and cathode plates, a float actuated valve in con-trol of the electrolyte level within said carburetor, means to mix the gases resulting from electrolysis with air, a check valve in control of said means, a second check valve independent of said means, a second uncer valve independent of said float actuated valve to prevent loss of gases from said carburctor. 3. An electrolytic carburctor for producing mixtures of hydrogen, oxygen and air, including

a series of spaced and electrically connected anode plates partially immersed in the electrolyte 40 within said carburetor, a series of electrically connected cathode plates spaced between said anode plates, a float operated valve in control of the electrolyte level within said carburetor, an air inlet to said carburetor and a check valve 45 in control of said air inlet.

4. An electrolytic carburetor for generating hydrogen and oxygen gases from water and for mixing the said gases with air, including an anode and a cathode partially immersed in an electrolyte within said carburstor, float actuated means to replace the water consumed whereby to maintain a constant fluid level within said device, means for mixing the said gases with air, and a check valve in control of said latter means.

5. An electrolytic carburetor including an anode and a cathode, float actuated means to control the level of the electrolyte within said carburetor, means to mix the gases resulting from electrolysis with air, a check valve in control of said latter means and means to periodically reverse the direction of current through said carbu-

retor.

CHARLES H. GARRETT.

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FILMING TABLE TO EARTHQUAKES SEE PAGE 42

"Gasless" Touring in a Diesel Auto by C. L. Cummins

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BIG \$1.750.00 CASH PRIZE CONTEST

Water Succeeds Gasoline As New Invention Is Perfected



This water powered motor is the invention of G. H. Garrett, who is shown here with his right hand upon the electrolytic carburetor which obtains explosive hydrogen from water. WATER powered automobiles are predicted for the not too distant future as the result of an invention of G. H. Garrett of Dallas, Texas, which substitutes water for gasoline.

Garrett uses an electrolytic carburetor which breaks up water by electrolysis into its component gases, hydrogen and oxygen, and then forces the explosive hydrogen into the combustion chambers for fuel.

For operating the automobile motor on which the tests have been conducted, Garrett has added an over-size generator to supply the extra electricity needed by the carburetor. Beyond that, the motor has needed no changes, though it has been in operation continuously for several days.

Garrett has protected his device with patents.

To Henry (Dad) Garrett By Larry Grove

Our town isn't much on statues; there's only a handful to memorialize the men and women of another day who had a part in the building of it. We're more inclined to name a street or a park for someone we would honor, or forget them altogether. But, silent tributes blink all over the city -- all over the world -- to remind us of Henry (Dad) Garrett. Garrett, in 1923, gave Dallas its first automatic traffic signal lights, and a claim to being the first in the nation to control traffic with lights. He pioneered the police and fire signal system here, first in the nation, and installed the first radio in an automobile (1920) with a pair of antennas that would put present-day chrome antennas to shame. His genius for invention is one of the colorful pages of Dallas' past. Garrett's father was the revered and storied Episcopal churchman, Alexander C. Garrett, whose story we hope to tell in some future column. During his father's work among Indians in Canada, Henry Garrett was born, in 1861. He was 15 when his father came to Dallas to set up the Episcopal diocese that was the labor of his life, until his death, a beloved bishop, and blind, at age 92. Henry Garrett set up an electrical supply business here, but he was always at the organ for Sunday services. Once, he built an organ for himself; concerts he gave at his business firm downtown drew visitors from far and near.

When services were held in old St. Matthew's Cathedral for his father, Henry Garrett asked others to remain outside the church for awhile. Alone, with his father's casket, Garrett went to the organ and played some hymns. He seldom played afterward.

He came to be known simply as "Dad" Garrett, another city employe, and one of its most faithful. In his college days in Tennessee, Garrett had rigged up a campus telegraphic network. And, with the coming of automobile traffic, he put his inventive nature to work on traffic control. Firemen racing to fires needed signals that could be operated at a central station to warn other motorists to yield right of way. Garrett improvised a sign-flashing network with a switch and a sewing machine motor. He became signal officer for the Dallas fire department, a career that held his interest until his death in 1952, at age 90.

When Dad Garrett had founded the city's first police radio station (KVP), he saw the need for car radios. Garrett told of it later: "Everyone said it could never work. I rigged up a spark transmitter at the old fire station (near the present City Hall), threw a mess of wiring and radio parts into my

sedan, and drove up to White Rock Lake. At the old pump station, I mounted a home-made receiver in the front seat of the car. An aerial was tied to the top of the station smokestack. I took another length of wire to ground the receiver in the lake water. ..." He received signals from the downtown transmitter. But, he could hardly drive around with the aerial on a smokestack and the ground wire in the lake. Signals continued to come in after the ground wire was removed, but silence came when he unhooked the aerial wire. He hit on the idea for two "fishing pole" aerials mounted on the car fenders and coiled about them.

Until recent years, many old-timers were around, who remembered Dad Garrett and his car radio system. By 1921, the City of Dallas was broadcasting a general alarm from a 50-watt police radio for a bandit who had held up the Dallas post office.

Even when reports came, that the message had been heard in points as distant as northern New Mexico, some of Dad Garrett's ideas were the subject of general laughter.

But, general approval was not long in coming. By 1931, the City of Dallas ordered 20 radioequipped cars, first of what has become a fleet tied into a communication network.

Traffic lights have become so ordinary, that the early start in Dallas is scarcely remembered. It has been said that Dad Garrett could have made millions. But, he gave his ideas, royalty free, to the City of Dallas.

- February 3, 1965, The Dallas Morning News, Sec. 4, p. 3, col. 6-8.

Dad Garrett Dies; Electronics Expert

Henry (Dad) Garrett, pioneer in electronics and father of traffic safety in Dallas, died early Wednesday in his sleep at the home of his daughter, Mrs. Curtis Johnson, near Mesquite. He was 90.

Garrett was the son of the late Alexander C. Garrett, the Episcopal bishop, who left a comfortable parish in Ireland to pioneer in North America. Garrett retired in 1940, after thirty-three years as superintendent of the Dallas fire and police signal division.

Garrett, in 1923, used his inventive genius to create and install an automatic system of traffic lights, first in America, and copied all over the country. In the intervening years, Garrett confounded friends by using fully, a third of his salary from the city, to improve the equipment. He got basic patents on features of the system used throughout the world. From the City of Dallas, he expected, and got, nothing extra for this work. Garrett worked out a plan by which part of the traffic lights would keep in regular operation, while others cleared paths for racing fire engines. Garrett built WRR, the city's radio station, first municipally owned radio station in the world. He also built KVP, the police department broadcasting station.

Garrett, also, was believed to be the first man in the world to build a radio into his car, and, as an early reporter said, roll along like a circus bandwagon, with the people staring and wondering where the music was coming from.

Garrett, of medium size, was a man of many interests. He could play and build an organ. And, he had. Everyone was his friend. He was happiest when working with electricity, radio, or playing a piano or organ. Then, his blue eyes beamed.

Until recent years, Garrett liked to visit with E. L. Archer, his successor, and electricians at the police and fire signal division headquarters at 2121 Main. He was modestly proud that the system had increased to 229 traffic signal lights and 678 fire alarm boxes over the city.

Archer, and others, of the police and fire signal division headquarters, visited Garrett last at the Mesquite home, just before last Christmas. Like his clergyman father, Garrett spent his last days in blindness.

Garrett's father died in February, 1924. At that time, Garrett shut everyone out of St. Matthew's Episcopal Cathedral and played a number of hymns on the organ, while his father's body was inside the casket. He rarely played the organ afterward.

Funeral services will be held at 10 a.m. Thursday in Sparkman-Brand Chapel, 2115 Ross. The Rev. Bertram L. Smith, rector of Christ Episcopal Church, will officiate. Burial will be in Oakland Cemetery, where Bishop Garrett is buried. Pallbearers will be members of the fire and police signal division. Garrett is survived by his daughter, Mrs. Johnson, and two sons, C. H. Garrett and F. A. Garrett, both of Dallas. Silent Tributes Blinking-January 17, 1952, The Dallas Morning News, pt. 1, p. 9. C.H. Garrett's patent is the most simple, straightforward way to power an internal combustion engine with water. It should have changed history. While it is true that the automobile engines in use at the time of the Garrett's patent were different from what we use now, in design, construction, and materials, and the fuel requirements were lower, the principles are there for us to imitate. There are several noteworthy nuances to the design. Among them are: periodically reversing the polarity of the anode and cathode plates, and sucking intake air through the electrolyzer plate area.

You can ask for nothing better than to produce a cleanburning combustible fuel from a safe, non-combustible liquid at the point of use, with the shortest possible path from the electrolyzer to the engine. The danger of an unwanted explosion is virtually eliminated, and the only pollution that is produced is from the burning of atmospheric nitrogen, which would be reduced to negligible levels. This is because an amount of unintended water vapor injection, discussed later, would likely result from such a compact system.

There is no good explanation for why the Garrett's invention did not gain immediate acceptance, other than greedy suppression. It was not utilized by any automobile manufacturer in the ensuing years, nor was it offered as a retrofit device, not even during the fuel shortages of the WWII years. Of course, gas was cheap in the 1930's, and since the device never went into mass production, a conversion would have been costly, so the savings may not have been justifiable to someone who didn't drive much and who was just 'getting by' economically. It would be like someone offering you a water car conversion kit right now for \$75,000: would you be able to justify it economically? Could you even afford to buy it? But why was it shelved? An answer may be found in considering another type of invention that, coincidentally, was issued Patent # 2,026,798 at almost the same time as Garrett's Patent # 2,006,676. That's when Charles Pogue, of Winnipeg, Canada, patented a vapor carburetor, that is, a gasoline carburetor that turned the fuel into a vapor with heat, extending the miles per gallon in an engine of that time to over 200 MPG! It, too, disappeared and was not used even during the lean war years, except for rumors that it was secretly utilized by the U.S. military in the Sahara desert tank battle with Rommel, wherein the limited supply of gasoline made it imperative to achieve higher fuel efficiency to overtake the enemy.

The story goes that, after the war, the carburetors were removed and never seen again. A descendant of the carburetor manufacturer who actually built Pogue's carburetors for him has recently confirmed that Pogue was both threatened and at the same time offered a lifetime monetary re-imbursement for not continuing to produce his carburetors. He would not speak publicly about his high MPG carburetors from then on.

I believe it is safe to conclude that something similar happened to the Garrett's invention. There may have been a payoff, or even extortion. Probably an excuse was given about it being a threat to national security, in view of the trouble brewing in Europe. Perhaps a scare tactic was used, predicting another economic collapse, worse than the Depression, if the bottom fell out of the petroleum market. Maybe it was a few local oilmen who convinced them to just drop the thing for the good of everyone concerned.
Whatever it was, it worked, and the oil companies and automakers have apparently since then worked together, with government approval, to produce products that are supposedly superior, but are definitely not as friendly to the earth or the consumer, partially burning their fossil fuel, and not lending themselves to easy water fuel conversion.

When Dad Garrett died in 1952, his obituary didn't even mention his water car invention! Neither did another article recapping his life. A copy of it follows.

Meanwhile, in Germany, combustion expert Rudolph Erren, in cooperation with an international array of collaborators, had already converted over 1,000 vehicles of all types, and even a submarine, to run on bottled hydrogen. And engineer Hermann Honnef designed huge wind-power generators which could produce up to 100 megawatts of power, stored as hydrogen by electrolysis. Although they never were manufactured, they could have eliminated a huge amount of needless pollution and depletion of earth's resources.

On October 8,1935, U.S. Patent # 2,016,442 was granted to Alfred Kilgus, of Stuttgart, Germany. In it, the inventor recommends the use of magnetic forces to aid in electrolysis, noting that the yield in gases is materially increased, up to 50%, and the energy consumed, decreased. He states that he obtained a development of hydrogen and oxygen greatly in excess of the quantities which would be obtained if the magnetic field was omitted. He specifically says that "iron electrodes become magnetic under the influence of the magnetic field." He used a 30% solution of caustic potash, that is, potassium hydroxide, or KOH, for his electrolyte. His U.S. Patent # 2,016,442 follows.

UNITED STATES PATENT OFFICE

2,016,442

PRODUCTION OF GASES BY DECOMPOSI-TION OF AQUEOUS ELECTROLYTES

Alfred Kilgns, Stuttgart-Oberturkhelm, Germany

Application May 11, 1932, Serial No. 610,591 In Germany May 13, 1931

2 Claims. (OL 204-1)

My invention relates to decomposing methods, more particularly to such methods wherein aqueous electrolytes are decomposed. It is an object of my invention to facilitate such methods with a particular view to the energy consumed therein.

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As is known to those skilled in the art aqueous electrolytes may be decomposed with the aid of electric currents, whereby hydrogen and oxygen,

10 or other gases, depending on the nature of the substances dissolved in the water, are developed. My invention is based on the discovery that such decompositions may be either brought about or fourmable information by memory in and on the second or the superscript of the second secon

or favorably influenced by magnetic fields and/or 15 magnetic forces.

If for instance a permanent magnet or an electromagnetic body is brought into contact with acidulated water, a distinct development of gases occurs, which mainly consist of hydrogen 20 which is by no means due to marely chemical phenomena, i. e. to a dissolution of the iron of the area of the iron of

the magnet, since the development of gases also occurs in such cases in which a magnet or electromagnet has been previously passivated with 25 the aid of concentrated nitric acid to such an

extent that it does not react with dilute acids, This decomposition with the aid of magnetic forces may be used either alone or, preferably,

together with electrical or chemical influences. 30 If for instance an aqueous electrolyte underlying electrolytic decomposition is simultaneously subjected to the action of a magnetic field, the yield in gaseous decomposition products is materially increased. When subjecting acidulated water 35 to electrolysis, I have ascertained a development of gases, which is increased for about 50 per cent when simultaneously subjecting the electrolyte to the influence of a magnetic field.

In carrying out my invention I may produce a 40 magnetic field between the electrodes of an electrolytic cell, where the decomposition is brought about, but I may also use electrodes, which are magnets themselves, viz. permanent magnets and/or electromagnets. 45 Another modification of my invention consists

45 Another modification of my invention consists in alternatingly arranging magnetic and nonmagnetic electrodes in the same cell, and even bloolar electrodes, which are not metallically connected with the source of electricity, may be 50 magnets and/or electromagnets.

A particularly intense action of the magnetic field is obtained, if the aqueous electrolyte to be decomposed is brought into direct contact with magnets; preferably with their poles. Similarly, 55 I may use iron electrodes which become magnetic under the influence of the magnetic field. The other details which should be observed when carrying out my invention do not differ from those usual in the corresponding chemical or electrolytical decomposition methods. When decomposing for instance water I may collect the gases developed on the two electrodes either separately or together. By using closed pressureresisting decomposing vessels I may collect and withdraw the gases under pressure.

In any case the use of an electromagnetic field ¹⁰ reduces the energy consumed in the decomposition reaction, and the yield is increased accordingly.

In the drawing affixed to this specification and 15 forming part thereof I have diagrammatically shown electrolytic cells for the decomposition of water.

In Fig. 1 the tank a contains an anode b and a cathode c, which are connected with the positive 20 and negative poles, respectively, of a source of 20 electricity (not shown). Both electrodes consist of a magnetizable metal, preferably of iron. This cell is subjected to the influence of an artificial magnetic field, which is produced by 25 means well known to those skilled in the art, for instance by strong electromagnetic coils. The direction of the magnetic field is indicated in the direction of the magnetic field is indicated in the strengthere in the magnetic field is indicated in the strengthere is indicated in the strengthere in the strengthere is indicated in the strengthere in the strengthere is indicated in the strengthere is in

Fig. 2 is a diagrammatical plan view of a similar cell, but the direction of the magnetic field is not in parallel to the surfaces of the electrodes, but runs from the anode to the cathode. In operating these cells I fill them with a 30

In operating these cells I nit them with a 30 per cent solution of caustic potash, and on applying to the electrodes a sufficient voltage, I obtain a development of hydrogen and oxygen greatly in excess of the quantities which would be obtained by the same amount of electrical energy if the magnetic field were omitted.

The direction of the magnetic field according to Fig. 1, i. e. in parallel to the electrode surfaces, reduces the voltage wanted for a given decomposition effect, while the direction of the magnetic field according to Fig. 2 results in an 45 increased gas yield.

Example 1

An electrolytic cell as shown in Fig. 1 was filled with a 30 per cent solution of caustic potash, and so a direct voltage of 7.55 volts was applied to the electrodes, resulting in a current intensity of 10 amperes; the temperature of the electrolyte was kept at 18° C., the pressure being 740 mms, mercury. The magnetic field was as strong as gg

feasible between the poles of an electromagnet arranged outside of the tank a. There were ob-tained 27.720 litres of gas per hour. On repeating this experiment under the same conditions, but on omitting the magnetic field, a voltage of 10.6 volts proved to be necessary to obtain a current intensity of 10 amperes, and the yield was reduced to about 24.9060 litres per hour. hour.

Exemple 3

A cell corresponding to that shown in Fig. 2 was operated under similar conditions as desoribed with reference to Example 1, the volt-age being 2.9 volts, the current intensity 5.0 amperes, the temperature 16° C. and the pressure 16

amperes, the verngerature 10° C. and the pressure 781 mms, mercury (absolute). On using a strong magnetic field there were obtained 15.5 coms, gas (reduced to 0° C, and 760 mms, mercury) per ampere and minute, 1: a. materially more than corresponds to the theoretical amount of 10.44 20 coms.

On repeating this experiment under omission of the magnetic field, a voltage of 2.95 volts re-sulted in a gas yield, which exactly corresponds 25

to 10.44 coms. (reduced as above) per ampare and minute.

Various changes may be made in the details disclosed in the foregoing specification without departing from the invention or sacrificing the s advantages thereof.

In the claims affired to this specification no selection of any particular modification of the invention is intended to the axclusion of other modifications thereof and the right to subse-10 quantly make claim to any modification not covered by these claims is expressly reserved.

I claim:-

1. The method of producing gases by elsc-trolytic decomposition of an aqueous electrolyte 15 comprising subjecting the electrolyte to the elec-trolytic action of an electric current between

anagest abstrodes. 2. The instand of producing gases by electro-lytic decomposition of an aqueous electrolyte 20 comprising causing an electric current to pass through the electrolyte between magnetized iron electrodes.

ALFRED KILGUS. ۰.

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<u>q. Z</u>.



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In the early 1940's, the U.S. Vice President Henry Wallace went on a "Goodwill Tour" of South America. One of his stops was Bolivia, and there he was introduced to an inventor named Francisco Pacheco, who was producing fuel from water and no air pollution. He was so impressed with Pacheco's water fuel device that he invited him to emigrate to the U.S. and make his invention available to the WWII gasoline-starved American

market. And less fumes from cars and trucks would be okay, too.

Francisco followed his suggestion and settled in New Jersey. But his lawyer advised him to wait on securing a patent, saying that people were not in desperate need of it at the time, and concern about pollution was not that great. So Pacheco went to work to support his family and waited almost 30 years before starting to publicize his invention, securing Patent # 3,648,668 on March 14, 1972. You will notice that he references Luther Wattles 1897 patent!

He did numerous public demonstrations of his device, powering small engines, boats, cars, even an entire home. He was given awards for his invention. And this was before he drastically improved it in his February 18, 1992 U.S. Patent # 5,089,107. Following are pages from his 1972 patent, followed by his 1992 patent, along with pictures of a 1977 demonstration.

On a West Milford, New Jersey newspaper (called AIM) webpage, http://www.mycommunity.com/town/West_Milford_Twp, you can read a June 9, 2006 article written about him by Ann Genader. The title of the article is "Local man's fuel cell energy source was ignored."

As you can see from paragraphs 8 and 9 of the 1972 patent, Francisco's first invention produced on-demand hydrogen from the interaction of salt water, magnesium, carbon, and electricity. By stepping on the gas pedal, current flowed and the process began. His 1992 improved patent required no electricity input at all.

United States Patent

[54] GAS-OPERATED INTERNAL **COMBUSTION ENGINE**

- [72] Inventor: Francisco Pacheco, Hewlitt, N.J.
- [73] Assignces: Michael Ebert, New York; Eugene J. Kalil, New York, N.Y., part interest to each
- [22] Filed: July 8, 1970

Pacheco

- [21] Appl. No.: 53,112
- [52] U.S. CL..123/3, 123/1 A, 123/1, 123/119 E, 136/100 M ..F02b 43/00, H01m 17/02 ..123/119 E, 1, 3; 290/1 A; 136/100 M, 140 R, 100 R
- [51] Int. CL.
- [58] Field of Search ..
- [56] **References** Cited

UNITED STATES PATENTS

[45] Mar. 14, 1972

2,925,455	2/1960	Eidensohn et al	
3,218,195	11/1965	Corren	136/100 M
3,247,024	4/1966	Tamminen	
390.675	10/1888	Humphreys	

Primary Examiner-Wendell E. Burns Attorney-Michael Ebert

[57] ABSTRACT

A gas-operated internal combustion engine for driving a vehi-cle, the vehicle carrying a hydrogen gas generator including a magnesium electrode immersed in a salt-water electrolyte. The rate of gas evolution in the generator is controlled as a function of demand, the gas being intermixed with air and supplied to the cylinders of the engine.

6 Claims, 1 Drawing Figure



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BACKGROUND OF THE INVENTION

This invention relates generally to gas-operated internalcombustion engines, and more particularly to a combined engine and gas-generator assembly wherein the engine is operated by hydrogen gas produced in a generator borne by a vehicle driven by the engine.

In a gasoline-operated internal-combustion engine, the thermal energy which is released when the liquid fuel is burned, is converted into mechanical energy. The engine includes a carburetor wherein gasoline is mixed with air to form a combustible mixture which is compressed in a cylinder and ignited by an electric spark. Gases created in the cylinder by the combustion of the mixture expand and thrust the cylinder piston downwards. The piston imparts a rotary motion to the crankshaft of the engine. The spent gases are removed from the cylinder and replaced by a fresh gas-and-air mixture so that a fresh cycle can begin.

In order to avoid pollution of the atmosphere resulting from the combustion products of gasoline, it is known to operate an internal-combustion engine with propane or other inflammable gases rather than with a liquid fuel. In this instance, the internal-combustion engine is unchanged, except that the carburetor is adjusted to accommodate the use of gas rather than liquid fuel.

The disadvantage of existing gas-operated engines is that the fuel gas is stored in pressurized tanks having a limited capacity. Since gases such as propane have a relatively limited 30 energy content, frequent replacement of the tanks is necessary. Moreover, a tank of highly flammable gas represents a serious hazard, and in the event of an accident an explosion may occur.

OUTLINE OF THE DRAWING

For a better understanding of the invention as well as other objects and further features thereof, reference is made to the following detailed description to be read in conjunction with 40 the accompanying drawing, whose single FKGURE shows an assembly in accordance with the invention.

SUMMARY OF THE INVENTION

In view of the foregoing, it is the primary object of this invention to provide a combined engine and gas-generator assembly wherein hydrogen produced in the generator is utilized as the fuel for the engine.

As the tue for the engine. More particularly, it is an object of the invention to provide an assembly of the above type in which the amount of 50 hydrogen produced is controlled as a function of engine demand, to prevent the excess build-up of gas and to obviate gas hazards.

Also an object of the invention is to provide an assembly in which hydrogen is generated by the interaction of magnesium 55 and a saline solution.

Briefly stated, these objects are attained in a combined engine and gas-generator assembly wherein hydrogen is generated in a tank wherein magnesium and carbon electrodes are immersed in a sea-water bath, the rate of hydrogen generation being controlled by a variable-resistance path connecting the electrodes. The hydrogen evolved in the tank is supplied through an adjustable valve into a carburetor where it is intermixed with air, the mixture being fed into the cylinders of an internal-combustion engine.

DESCRIPTION OF THE INVENTION

According to one embodiment of the invention, a pair of electrodes is suspended in a tank containing highly saturated 70 sea water. Preferably, the electrodes are suspended in sea water concentrated to such extent as to produce supersaturation so that undissolved salt collects at the bottom of the bath. One electrode is composed of magnesium while the remain-

ing electrode preferably is composed of carbon. The tank is 75 clency assumed) is determined as follows:

;

sealed except for a conduit provided for the escape of gas from the container. Means are provided for interconnecting the exposed ends of the electrode through a suitable variable electrical load. In the event that the gas produced is to be utilized as the fuel in the engine of an automotive vehicle, the load may comprise electrical devices such as electric lamps, etc., used in the operation of the vehicle. In any event, the load preferably is in the form of a variable potentioneter under the control of the operator and means are provided for open-circuiting the electrodes.

With the electrodes open-circuited, there is a chemical reaction between the magnesium electrode and the liquid contents of the tank acting very slowly to produce hydrogen gas which is led out through the conduit. Upon closing the circuit between the two electrodes, electric current is caused to flow therebetween dependent upon the magnitude of the load and gas is generated at a higher rate than with the electrodes opencircuited. The rate of production of the hydrogen varies in 20 proportion to the current flow which is inversely proportional to the resistance of the variable potentiometer and may be controlled by the operator.

The reaction is accompanied by the decomposition of the magnesium electrode and the formation of magnesium 25 hydroxide which is deposited in the bottom of the tank and the reaction continues until the magnesium electrode is entirely decomposed, whereupon the magnesium hydroxide is removed and a new magnesium electrode is arranged in the tank and the liquid contents thereof are replenished. The magnesium hydroxide may be processed to recover its magnesium content for further use as desired. Polarization of the carbon electrode by the gas formed in the reaction is prevented by agitation of the carbon electrode through any suitable means for that purpose.

In another embodiment of the invention, powdered magnesium is introduced into a tank containing water highly saturated with sea-water salts. Reaction between the magnesium and the saturated water results in the production of gas at an uncontrolled rate and such gas preferably is stored in an expansible chamber from which it is later withdrawn as desired. However, the reaction may be controlled by means of an automatic magnesium powder or pellet dispenser which discharges magnesium into the tank as a function of hydrogen demand. In this modification, as well as in the other, the reaction yields magnesium hydroxide which as before may be processed to obtain magnesium. After the reaction is completed, the ingredients of the tank are replenished for a further production of the gas. The production of the gas according to this embodiment may be facilitated by the addition of powdered carbon or powdered zinc.

The gas produced according to either of the procedures above described, when mixed with air in the proper proportions, is highly explosive, and when this gas is mixed with air in the proper proportions through a simple valve or jet arrangement and brought to proper compression in a combustion chamber of an engine, it may be ignited by standard ignition

60 In order to appreciate the advantages of the invention, a thermodynamic analysis will now be presented, comparing the hydrogen energy system to the conventional fossil-fuel system utilizing gasoline as the energy source. According to page 1,446 of the 28th edition (1944) of the Handbook of Chemis-65 try and Physics, a mol weight of hydrogen (two grams) provides 104,100 B.t.u.'s (net), or a total of about 23,608,000

B.t.u.'s/ib. According to the same publication (page 1,446), gasoline provides 20,750 B.t.u.'s/ib. Assuming that an automobile travels a distance of 200 miles and requires 13 gallons of gas (80 pounds), the total thermal output of the gasoline will be 1,660,000 B.t.u.'s. Assuming magnesium is now employed to create the source of energy, the amount of magnesium equivalent to 1,660,000 B.t.u.'s (100-percent conversion efficiency asymmed) is determined as follows:

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One mol of magnesium (24.3 grams) will react with 2 mols of water to form 1 mol of hydrogen (2 grams). The amount of hydrogen equivalent to 1,660,000 B.t.u.'s is 31.7 grams, which corresponds to about 386 grams of magnesium, or 0.85 pound. Thus, on a thermodynamic basis, a car travelling 200 miles requires 80 pounds (13 gallons) of gasoline (1,660,000 B.t.u.'s), which corresponds to about 0.85 pound of magnesium. The energy cost for gasoline at approximately \$0.40 per gallon comes to about \$5.20, while the cost for magnesium, at approximately \$0.40 per pound, comes to approximately \$0.34. Assuming the magnesium-hydrogen system to be only 10 percent efficient, the energy cost would be in the neighbor hood of \$3.40, which is still less than the cost of conventional fuel, the magnesium-hydrogen system having the added advantage of avoiding air pollution. The actual efficiency of the 15 magnesium-hydrogen system is, of course, much higher than 10 percent, hence the realistic costs of operating a vehicle is much cheaper than with gasoline.

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An arrangement for practicing the invention, as shown in the Figure, includes a tank 10 borne in a vehicle 11, such as an 20 automobile or truck, which is driven by an internal-combustion engine of standard design, represented by block 12. Tank 10 is preferably formed of non-corrosive metal, and is provided with an insulating liner, the tank including a gas-25 discharge outlet 13.

The tank is filled with sea-water or a salt solution 14 which is highly saturated to a point at which the water is incapable of dissolving more salt. Supported within tank 10 is a magnesium electrode 15 which is insulated from the metal tank. A second electrode 16, preferably composed of carbon and also insu- 30 lated from the tank, is supported therein, the second electrode being mounted for agitation through a flexible seal in the wall of the tank by an external vibrator which is energized from the storage battery of the vehicle or from energy derived by galvanic action from the tank electrodes. The purpose of the 35 vibrator is to agitate the carbon electrode to dislodge gas collecting thereon, thereby to prevent polarization of the electrode.

Connected between the electrodes is a potentiometer 18 in series with a switch 19. When switch 19 is open and the elec- 40 trodes unloaded, gas is generated very slowly and is discharged through outlet 13 leading to a valve 20. Assuming that the valve is closed, hydrogen will collect in a reserve tank 21. The purpose of reserve tank 21 is to collect a small supply of hydrogen gas for starting purposes, before an adequate gas 45 build-up occurs when closing the switch prior to driving the vehicle

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When switch 19 is closed, gas is electrolytically generated at a rate which depends on the load resistance introduced by potentiometer 18. In practice, potentiometer 18 is adjusted to 50 a level sufficient to supply no more hydrogen than is necessary to operate the engine, thereby avoiding an excessive build-up of gas that might lead to a hazardous condition. The adjustment of the potentiometer may be manual, or it may be automatically controlled in response to a pressure sensor 24 disposed in the tank to regulate the amount of gas generated as a function of demand, as reflected by the pressure within the tank.

Hydrogen from outlet 13 is fed through valve 20 into a carburetor 22, where it is intermixed with air in an appropriate 60 ratio, such as 1-to-7, the explosive mixture then being fed into the cylinders of engine 12. The vehicle accelerator 23 is operatively linked to valve 20 to vary the amount of hydrogen fed into the carburetor, thereby to control vehicle speed.

While there have been shown and described preferred em- 65

bodiments of a gas-operated internal-combustion engine in accordance with the invention, it will be appreciated that many changes and modifications may be made therein without, however, departing from the essential spirit of the invention.

- For example, though the system has been described in conjunction with an internal-combustion engine, it is usable for fueling any type of burner or engine capable of consuming hydrogen in place of the existing fuel. Also, in place of carbon electrodes, the tank itself may be fabricated of carbon or provided with an inner liner of carbon.
- Another way of controlling the amount of gas generated is by adjusting the degree of immersion of the magnesium electrode in the electrolyte, thereby varying the effective electrode surface. Also, in lieu of a single magnesium electrode, one may provide a bank of magnesium plates, thereby greatly
- augmenting the area of activity and the rate of gas production. The magnesium electrodes are preferably in alloy form, the alloy being such as to inhibit polarization of the electrode. For this purpose, an alloy consisting essentially of 93 percent mag-
- nesium and 7 percent zinc, by weight, has been found suitable. It is also possible to alloy magnesium with iron to minimize polarization effects.
- In practice, reserve tank 21 may be combined with a compressor to provide an adequate supply of fuel to improve acceleration of the engine. In lieu of sale water, one may use other ionizable compounds to provide a magnesium-corrodable aqueous electrolyte. It is intended therefore in the annexed claims to encompass all such changes and modifications. I claim:
- 1. A gas-operated internal-combustion engine adapted to drive a vehicle and having a carburetor, comprising:
- A. a gas generator mounted on said vehicle, said generator including a tank having a salt-water electrolyte and a magnesium electrode suspended in said electrolyte to cause hydrogen to evolve in the tank.
- B. adjustable means coupled to said generator to vary the rate at which hydrogen is evolved in said tank,
- C. means to feed hydrogen from said tank into said carbure-tor to intermix with air to produce a combustible mixture, D. means to supply said mixture to the cylinders of said en-
- gine,
- E. means to sense the amount of hydrogen consumed by the engine to produce a control signal as a function thereof, and
- F. means responsive to said control signal to operate said adjustable means whereby the amount of hydrogen evolved is not substantially in excess of that required by the engine.

2. An engine as set forth in claim 1, wherein said tank also has a carbon electrode immersed in the water, and said means to vary the rate at which hydrogen is evolved comprises a variable resistance connected between the magnesium and carbon electrodes.

3. An engine as set forth in claim 1, further including a reserve gas tank coupled to the outlet of the gas generator to accumulate a supply of hydrogen for starting purposes.

4. An engine as set forth in claim 1, further including a valve interposed between the generator and carburetor, and m operatively coupling the valve to the accelerator pedal of the vehicle.

- 5. An engine as set forth in claim 1, wherein said salt solution is highly saturated.
- 6. An engine as set forth in claim 1, wherein said salt solution is sea water.

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United States Patent [19]

Pacheco

[54] BI-POLAR AUTO ELECTROLYTIC HYDROGEN GENERATOR

[76] Inventor: Francisco Pacheco, 60 Princeton Rd., P.O. Box 169, Hewitt, N.J. 07421

[21] Appl. No.: 555,037

- Jul. 18, 1990 [22] Filed:
- [51] Int. Cl.5
- [52] U.S. Cl.
- [58] Field of Search 238-239

[56] **References** Cited

U.S. PATENT DOCUMENTS

3,256,504	6/1966	Fidelman	
3,892,653	7/1975	Pacheco .	204/248 X

204/248 X 3,942,511 3/1976 Black et al. . 4,325,798 4/1982 Mack

5,089,107

Feb. 18, 1992

Primary Examiner-Donald R. Valentine

ABSTRACT . [57]

[11] Patent Number:

[45] Date of Patent:

An autoelectrolytic hydrogen generator system constituted by one or a plurality of similar cells wherein a galvanic arrangement of magnesium and aluminum plates of sacrificial elements as anode; stainless steel as cathode and sea water as electrolyte, by its very nature is made to develop a voltage when connected in short circuit causing a current to flow within the system and hydrogen production of hydrogen in situ and on demand by the electrolytic action at one pole, the cathode, and additional hydrogen by the electrochemical reac-tion at the other pole, the anode. Surplus electric energy of the system applied to a optional electrolyzer will also be made to produce additional hydrogen at its two sacrificial aluminum electrodes.

7 Claims, 2 Drawing Sheets



A California inventor named Samuel Freedman was awarded Patent # 2,927,856 on March 8, 1960, for "Multi-Purpose Alloys of Controlled Homogeneity," and his company was known as Chemalloy Electronics Corp. Among the claims made for this alloy of several metals and acids is 'the conversion of moisture into hydrogen gas.' The product came to be called Chemalloy.

There are more recent patents that are apparently similar. An invention from 1982 that chemically produces hydrogen from an alloy was assigned U.S. Patent # 4,324,777, granted to Texan Eugene Anderson. His, like that of so many other inventors, is an interesting story, and it is difficult to discern the real truth behind it.

A year before the 1973 OPEC oil embargo caused large numbers of people to begin searching for alternative fuels, Roy McAlister filed for a patent for his injector sparkplug, capable of introducing hydrogen directly into the combustion chamber of an engine, allowing for an inexpensive conversion. He was granted U.S. Patent # 3,830,204 on August 30, 1974. He has continued researching ways to convert existing systems to clean-burning fuels.

He went on to form the American Hydrogen Association, and has been instrumental in sharing information on the need to stop burning fossil fuels while emphasizing the ease with which the changeover to alternatives, such as solar hydrogen, can be implemented. His 1996 book, The Philosopher Mechanic, emphasizes the folly of the post-Industrial Revolution world's "fossil energy good life...which has been placed ahead of the sustainability of civilization." He states that Earth's true wealth is the environment, and our current lifestyle of pollution and depletion had better stop now, because our "scandalous, embarrassing, and pathetic" fossil fuel abuse is fast catching up with us. Happily, he predicts that in the future, "you will use an electrolyzer to produce hydrogen from water. Your car will be filled with hydrogen in a few minutes at your home station."



Philippine engineer Daniel Dingel states that he began developing his water-powered car technology in the late 1960's, and that he has converted over 100 vehicles since then. He admits that, like any invention, there is continuous room for improvement, and so he has

continued working on the system over the years, perfecting it. His simple device is encased in a steel box about the size of a large car battery, and apparently contains an array of plates that generate the gas to run his 1600cc Toyota Corolla. He uses seawater for his electrolyte solution, and has claimed to be making deuterium gas in his chamber.

Deuterium, or heavy hydrogen, is a hydrogen isotope, that is, the same element with an extra neutron. The gas is twice as dense as hydrogen, and can also exist as a liquid, deuterium oxide, or heavy water. It is not radioactive.

In a video interview that is viewable online, he says that his goal is to do good for the environment and the people of his country. But the unstable political situation, as well as the feared loss of fuel tax revenue, resulted in the Philippine governments, from Ferdinand Marcos to the present, not being able to help. He was also made aware of the sad fact that the Philippines, being a debtor nation, is not to compete with World Bank and IMF-controlled commodities.

Dingel has a French patent for at least one of his many inventions, but there is none for his water car device. He has not been willing to reveal exactly what goes on in his electrolysis chamber, and so his device has remained a "black box" for those who are interested in replicating it, for the good of the environment, and the people. However, rumor has it that an agreement has been reached with an Asian nation to mass-produce his device. Time alone will tell whether this materializes or not.

Another Filipino was in the news recently for having developed a system that may be similar to Dingel's. Meanwhile, Daniel Dingel has passed 70 years of age, and has expressed hope that his invention will result in some good being done for the pitiable poor of his country, rather than for the wealthy. He, like other water fuel inventors, talks about reducing pollution on Earth with the use of his invention. How many people can say that? I admire him greatly.

In the meantime, there are tidbits of information that are able to be gathered by watching the documentary video of him and his Toyota Corolla. He comments on several aspects of his system that are worthy of noting by those building a water car of their own. My suggestion is to take notes as you watch the video a few times, and you can put together a list of pointers that you have gleaned.

The 1970's saw a plethora of new water fuel inventions, not only because the OPEC oil embargo of 1973 caused the price of gasoline to skyrocket, but also because of the increasing awareness of air pollution. For instance, it was in 1972 that the Perris (California) Smogless Automobile Association recommended by demonstration a hydrogenpowered car. This doesn't mean that everyone who was recommending hydrogen as a fuel believed in the concept of on-board production of it from water, but they still helped to develop the technologies associated with using the fuel in current applications, including necessary safety measures.



For example, American inventor Roger Billings converted a Model A Ford to run on bottled hydrogen when he was just 16 years old, inspired by German hydrogen fuel pioneer Rudolph Erren. He started the Billing's Energy Corporation in 1973. He recommended using solar, wind, and hydroelectric-generated hydrogen from water. His

was the first modern home entirely powered by hydrogen. But he found that the timing was not right for the implementation of hydrogen energy in the 1970's. He now states that the problems caused by fossil fuels were not as obvious, and an efficient and affordable method of producing hydrogen was not yet available. The energy firm, which was taken over by stockholders and shut down in the mid-1980's, has been recently revived by Billings.

Following is his October 5, 1976 Patent # 3,983,882, showing how to recycle water car exhaust vapor and use it as an anti-pollution water-injection system. Knowing that anything we do en masse causes repercussions in the natural world around us, such dehumidifying of the water car's exhaust is probably an important step to avoid climate change.

United States Patent [19] Billings

[54] METHOD AND APPARATUS FOR HYDROGEN FUELED INTERNAL **COMBUSTION ENGINES**

- [75] Inventor: Roger Evan Billings, Provo, Utah
- [73] Assignee: Billings Energy Research Corporation, Provo, Utah
- [22] Filed: Mar. 3, 1975
- [21] Appl. No.: 554,533

Related U.S. Application Data

- [63] Continuation of Ser. No. 385,439, Aug. 3, 1973.
- [52] U.S. Cl....
- **123/1 A;** 123/25 A; 123/DIG. 12
- [51] Int. CL2 [58] Field of Search 123/DIG. 12, 1 A, 25 A

[56] **References** Cited

UNITED	STATES	PATENTS

1,268,648	6/1918	Van Meter
3,608,529	9/1971	Smith et al. 123/DIG 12 X
3,616,779	11/1971	Newkirk
3,646,924	3/1972	Newkirk et al 123/DIG 12 V
3,672,341	6/1972	Smith et al. 123/DIG 12 X
3,682,142	8/1972	Newkirk 123/1 A
3,696,795	10/1972	Smith et al
3,710,770	1/1973	Newkirk et al

[11] 3,983,882 Oct. 5, 1976 [45]

OTHER PUBLICATIONS

"The UCLA Hydrogen Car" by A. F. Bush and W. D. Van Vorst, Paper Presented at Cryogenic Conference Aug. 8-10, 1973, from Advances in Cryogenic Engineering.

Primary Examiner-Charles J. Myhre Assistant Examiner-Tony M. Argenbright Attorney, Agent, or Firm-Criddle, Thorpe & Western

ABSTRACT

· [57]

The hydrogen engine hereof introduces water as vapor with inlet hydrogen and air, as a mixture proportioned for practical internal combustion and efficient power output. Water vapor is a substantial component of the exhaust of hydrogen fueled engines. In one embodiment of the invention, water vapor is condensed from the exhaust, and thereupon arranged to provide the input water as a continuing self-supporting process. The resultant emissions are very low in oxides of nitro-gen, and readily meet the EPA Standards on pollut-ants as presently set for 1976. Further, and importantly, engine backfire is eliminated in the operation. Also, engine output power and efficiency are im-proved with the invention principles.

32 Claims, 6 Drawing Figures



U.S. Patent Oct. 5, 1976



METHOD AND APPARATUS FOR HYDROGEN FUELED INTERNAL COMBUSTION ENGINES

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BACKGROUND OF THE INVENTION

This is a continuation of application Ser. No. 385,439, filed Aug. 3, 1973.

Water introduction has been proposed for gasoline internal combustion engine (ICE) systems to moderate peak cycle temperature, and thereby reduce formation 10 of oxides of nitrogen (NOx). However, the water vapor increased the emission of carbon monoxide (CO) and hydrocarbons (HC") in the exhaust. The resultant pollutants of such gasoline fueled engine thus were poor.

One approach to hydrogen ICE systems utilizes the recirculation of exhaust products back as a substantial portion of the input charge, as taken directly from the exhaust. Nevertheless no significant reduction in NOx formation occurs until excess oxygen in the cylinders is almost completely displaced by exhaust gases but this 20 reduces output power and efficiency.

SUMMARY OF THE INVENTION

The hydrogen fueled ICE system hereof utilizes direct water induction to provide improved operation. 25 Conventional ICE engine structures and tooling are used. Although water from any source could be used, in accordance with one embodiment of the invention, water vapor formed during the hydrogen/air combustion process, together with that introduced through the 30 input, are withdrawn and condensed for reintroduction into the system. A reservoir maintains a water level ample for the induction operation. Sufficient water is produced to maintain predetermined vapor input. No compromise as to HC or CO generation is required as 35 in gasoline and liquified gas systems, as neither is generated in hydrogen combustion.

The formation of NO, is significantly reduced over prior hydrogen ICE systems by maintaining an optimum range of the mass ratio of input water to hydro- 40 gen, as will be set forth. Backfiring to the intake manifold is eliminated as a problem in the hydrogen fueled system hereof. The input water vapor quenches the hydrogen combustion process, thereby slowing down firing.

Water from the maintained reservoir is pumped to an injector nozzle or carburetor, and in turn admixed with the input hydrogen to the cylinders. A static water storage tank is unneeded but could by employed if 50 desired. Thermostatically controlled drains automatically empty water-using components to prevent their freezing-up when the engine is out of use. Antifreeze is not required. Sufficient water becomes available promptly upon engine startup. Water replenishment or 55 storage are thus obviated. The terms "water vapor" and "vapor" are used to mean: (a) the vapor of water; (b) water mist; (c) water spray; (d) water droplets; (e) or any equivalent or combination thereof.

THE DRAWINGS

FIG. 1 is a diagrammatic representation of an exemplary form of the hydrogen fueled engine system in accordance with the present invention.

FIG. 2 is a schematic showing, in cross-section, of a 65 carburetor for converting water to inlet vapor and mixing it in predetermined mass ratio to the hydrogen as used.

2 FIGS. 3, 4 and 5 show modified forms of the invention system.

FIG. 6 is a set of curves that illustrate performance of the engine system upon variation of the ratio of water 5 induction.

DESCRIPTION OF THE INVENTION

The engine system 10 of FIG. 1 utilizes two carburetors 15 and 20 in series flow relation. Carburetor 15 is for the hydrogen (H₂) input via supply line 16. Line 16 is supplied with gaseous H2 at relatively low pressure; can be reduced from a tank at high pressure. Air input duct 17 leads into the carburetor 15. The air is mixed in preset proportion with the hydrogen, in conventional manner.

A commercially available carburetor for unit 15 is an air/gas valve diaphragm-operated type, as made by Impco. The H₂/air mixture from carburetor 15 is directed into water carburetor 20 via duct 18. Carburetor 20 may be a usual gasoline type, serving as the water (H2O) metering device. FIG. 2 is a schematic showing of carburetor 20 hereof, and is described later on. The carburetors 15 and 20 are readily adapted for the hydrogen and for the water flow respectively, by making their jet nozzles of suitable size, or adjusting their metering as indicated.

Condensed water is directed into carburetor 20 via supply line 21 by pump 22. The predetermined mass ratio of water vapor to hydrogen is substantially maintained by the settings in carburetor 20. The overall air proportion with respect to both the H2 and H2O is also maintained by the carburetors 15,20 over the engine power operating range, as will now be understood by those skilled in the art. The pivoted throttle valve therein is controlled by lever 23 and wire 24. The mixture of air, H2 and H2O-vapor in the quantity or volume as determined by the throttle setting, is conducted into the intake manifold 26 of engine 25 through inlet 28. It is to be understood that the physical positions of carburetors 15 and 20 may be reversed in system 10, with the same results.

The initial engine exhaust is introduced directly to condenser 30 by tubing 32 from the exhaust manifold 27. The condenser 30 serves as a precooler, and acts to the hydrogen combustion rate, and thus potential back- 45 muffle sounds from the engine. The interior surface of the walls 31 of condenser 30 are proportioned to condense out and convert contained water vapor into sufficient water for the peak demands of the engine/vehicle. The water enters the reservoir 35 thereof, and is retained for the induction to the engine. A feed line 36 extends from an opening in the lower region of reservoir 35 to the input of the water pump 22. The pump 22 creates a forward pressure on water line 36 and into water supply line 21 to carburetor 20. Pump 22 may be electrically driven, or be a mechanical one. The pump input can back drain via line 36.

For a 50 brake horsepower (BHP) vehicle, such as a small Volkswagen, up to 12 gallons of inducted water may be used per hour of operation. A 12 volt, one 60 ampere motor for the pump 22 would be satisfactory therefor. Cars with larger engines would require proportionally higher water flow rates at rated power, and correspondingly larger pumps. The condenser 30 system is designed to condense out water at a sufficient rate to serve under all steady-state drive conditions. The reservoir 35 is included to store enough water to at least handle rapid transient drive demands, such as passing another car at high speed. About one-half a Here's why Billing's patent is important: First, we shouldn't be nonchalant about the moisture our water-powered cars emit into the biosphere. If we can reduce it, we should. Otherwise, it could contribute to a new type of global warming or, at least, an increased humidity scenario. Could it be that even a zero pollution car engine is contributing to global warming just from the heat it exudes?

Second, water-injection, that is, inducting a very fine mist of water vapor in with the fuel, by cooling the burn of the hydrogen, can reduce the nitrogen pollution that is the result of burning air in an internal combustion engine. Air is made up of over 78% nitrogen, and it turns into a form of smog, or oxides of nitrogen, when exploded in the cylinder of an engine. Adding micron-sized particles of water to the intake air can reduce this pollution to negligible levels.

Third, water injection helps to slow down the hydrogen combustion rate, thus reducing backfiring. Remember, the flame speed of hydrogen is much faster than that of gasoline, and oxyhydrogen is faster still. To get the gas to mimic gasoline, introducing water vapor seems to be the most natural way, and not very difficult to accomplish.

Used extensively before and during WWII in gasoline engines, water injection has not been credited for what fuel savings it can bring to even a gasoline engine. We know what makes a hydrogen fuel system efficient, powerful, and environmentally responsible: water injection. It increases power, reduces the amount of fuel needed, slows the burn and lowers the temperature. It seems quite interesting to me that water is the best answer to the unique challenges to be overcome when using water as fuel.



Archie Blue, from Christchurch, New Zealand, was both a professional athlete in his younger years, and an avid inventor. He was an elderly man in the early 1970's when, while attempting to come up with a portable hydrogen heater that produced its own fuel from water, he realized that he might as well go on and convert a car to run on the gas. And that is exactly what he did! His van ran

on the output of his electrolyzer. There is abundant proof that his approach, like that of those before him, produced something that the textbooks of academia cannot explain and that they therefore deny as being a hoax. It is a worthy system to replicate.

His U.S. Patent # 4124463, shown below, specifies compressed air being forced up through his electrolyzer, and one of his patent references is that of Samuel Ruben, who had stipulated the recirculating of some of the hydrogen gas back through the electrolyzer for further treatment. For that matter, the textbooks say that one way to make deuterium, which is double-dense hydrogen, is by continuous electrolysis. Since most water fuel inventors have no way of knowing what gas they have produced, is it possible that Archie Blue, and others, have made deuterium without knowing it, and that this explains the power of their electrolyzer output?

Peter Lowrie is a New Zealander in his mid-forties who was inspired to to replicate Mr. Blue's invention. He actually met Archie when he was a teenager. Recently he announced the development of an industrial generator fueled by three interconnected electrolyzers that are driven by a three-phase marine alternator. He directs the pressurized gas output of one electrolyzer into the bottom of the next one, so that the gas passes through the electrolysis process repeatedly. The output runs a 1600cc four-cylinder engine.

United States Patent [19]

4,124,463 [11] Nov. 7, 1978 [45]

[54] ELECTROLYTIC CELL

Blue

- [75] Inventor: Archie H. Blue, Christchurch, New Zealand
- [73] Assignces: Ross Derisley Wood; Roland Edgar; Alec Henry Taylor, all of St. Martin's Guernsey, Channel Islands; Margaret Elizabeth Pyke, Essex, England England
- [21] Appl. No.: 755,608
- [22] Filed: Dec. 29, 1976
- [51] Int, CL² C25B 1/02; C25B 9/00;
- [52] U.S. Cl.
- 1/02; C25B 9/00; C25B 9/02

 2:25B 9/02

 2:25B 9/02

 2:04/129; 204/265; 204/277; 204/288

 2:04/277; 204/288

 2:04/266, 269, 270, 277, 278, 275, 288, 289
 [58] Field of Search

References Cited

[56]

U.S. PATENT DOCUMENTS

1,219,333	3/1917	Kynaston
1,376,207	4/1921	Jacobs
1,431,047	10/1922	Ruben
1,544,052	6/1925	Avery
1.862.663	6/1932	Cartis
2.000.815	5/1935	Beri
3.192.138	6/1965	Eak et al. 204/246 X
3.433.729	3/1969	Proskurvakov et al
3 518 036	6/1070	Steats at al 204/129 X

Primary Examiner-Arthur C. Prescott Attorney, Agent, or Firm-Haseltine, Lake & Waters

[57] ABSTRACT

In the electrolytic production of hydrogen and oxygen, air is pumped through the cell while the electrolysis is in progress so as to obtain a mixture of air with the electro-lytically produced hydrogen and oxygen.

5 Claims, 3 Drawing Figures





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ELECTROLYTIC CELL

BACKGROUND AND BRIEF DESCRIPTION OF 5 THE INVENTION

This invention relates to the production of gases which can be utilized primarily but not necessarily as a fuel.

To electrically decompose water it is necessary to 10 pass direct current between a pair of electrodes which are immersed in a suitable electrolyte. It is normal in such electrolysis to place some form of gas barrier between the two electrodes in order to prevent the gases evolved during the electrolysis from forming an explo- 15 sive mixture. However provided suitable precautions are taken it has been found that the gases can be allowed to mix and can be fed into a storage tank for subsequent use. Because the gases when mixed form an explosive mixture, it is possible for the mixture to be utilized for 20 instance as a fuel for an internal combustion engine. In such circumstances it is desirable that the gases should also be mixed with a certain proportion of air in order to control the explosive force which results when the 25 gases are ignited.

One of the difficulties encountered with electrolysis is that bubbles of gas are liable to remain on the electrodes during the electrolysis thus effectively limiting the area of electrode which is in contact with the electrolyte and preventing optimum current flow between 30 the electrodes. Because in accordance with the present invention it is desirable that the gases evolved during the electrolysis be mixed with air, then it is possible for air to be passed through the cell while the electrolysis is in progress. The passage of air through the cell can be 35 directed past the electrodes so as to entrain in the passage of air any bubbles of gas remaining on the electrodes.

Accordingly the invention comprises an electrolytic cell including a gas tight casing, a plurality of electrodes 40 adapted to be supported on a central post within the cell in a spaced apart relationship and to be electrically insulated from each other, each alternative electrode being adapted to be connected to a positive direct current source or a negative direct current source respectively and wherein the central post is in the form of a tube, one end of which is extended out of the cell and is adapted to be connected to a source of air under pres sure, with the other end of the central post termin ating in an air outlet below the said electrodes, the said cell 50 including a gas outlet to exhaust air forced into the cell through the central post and to exhaust the electrolytically produced gases mixed with the said air.

DETAILED DESCRIPTION OF THE INVENTION

Various forms of the invention will now be described with the aid of the accompanying drawings wherein: FIG. 1 is a diagrammatic elevational view partly in

section of one form of the invention,

FIG. 2 is a diagrammatic elevational view partly in section of a modified form of the invention,

FIG. 3 is a section along the line III—III of FIG. 2. The cell as shown in FIG. 1 comprises a gas-tight casing 11 which is formed from a non-corrodible mate- 65 rial such as a plastics material as is known in the art. A plurality of cathodes 11 and a plurality of anodes 12 are supported within the cell by means of an electrically 2

insulating central post 13, with the cathodes and anodes being spaced apart by means of insulating spacers 14. The anodes 12 are all connected in parallel to a positive terminal post 15 while the cathodes are all connected in parallel to the negative terminal post 16, these connections being indicated in dotted lines in the drawings. The cathodes and the anodes are preferably in the form of disc like plates of a suitable metal which is consistent with the composition of the electrolyte utilized so as to ensure a satisfactory life to the cell. The plates may be shaped to conform with the shape of the walls of the cell which may be circular in cross section as indicated or any other desired shape.

The central post 13 is preferably in the form of a tube which extends out of the cell as at 13*a*. The lower end 18 of the tube is open so that air can be pumped into the cell through the central post 13 and enter the cell via the lower end 18 where it will pass up through the electrolyte. This will keep the electrolyte constantly in motion and thereby assist in the rapid removal from the electrodes of any gases that might be adhering thereto.

In the modification shown in FIG. 2 and 3, the electrodes are each provided with holes 17 and in such a case the central post 13 is preferably formed with at least one air hole 19 adjacent the lower end 18 thereof. A deflector plate 20 is also supported by the central post 13, this plate being dish shaped so as to deflect air issuing out of the air hole 19 up through the holes 17 in the electrodes. Such action further assists in dislodging any bubbles of gas clinging to the electrodes.

The cell also includes a gas outlet 21 so that the air which enters the cell together with the gases produced by the electrolysis can be exhausted out of the cell into a suitable storage tank (not shown in the drawings). If desired such storage tank can be arranged to accept the gases under pressure and for this purpose the air pumped into the cell will be pumped in under the required pressure. A gas drier (not shown in the drawings) can also be interposed between the gas outlet 21 and the storage tank.

Although the electrolysis will naturally produce considerable heat, nevertheless it can be found advantageous to install a heater in the cell, preferably in the bottom of the cell, to assist and facilitate the warming up of the electrolyte so that the cell reaches its most efficient operating conditions as quickly as possible.

Preferably also, current limiting means as is known in the art are employed so that the intensity of the electrolytic action can be controlled.

Means may also be provided for the automatic replenishment of water within the cell as the level of the electrolytic drops during use.

While it is recognized that the mixing of hydrogen and oxygen will create a dangerous explosive mixture, 55 nevertheless by carrying out the invention as hereinbefore described the risk of explosion is minimized. The gases produced can be utilized for instance as a fuel to power an internal combustion engine and for this purpose it is desirable, as beforementioned, to mix with the 60 gases evolved during the electrolysis a proportion of air so that when the mixture is ignited within the cylinder or cylinders of the engine, the explosive force so created can be of the desired amount.

While in the foregoing description reference is made to the utilization of the mixed gases as a fuel, it will of course be understood that the gases can be separated for individual use by techniques as known in the art. What is claimed is:

1. A process for producing by electrolysis of an aqueous liquid a combustible mixture of hydrogen and oxygen, comprising: electrolyzing the aqueous liquid into hydrogen and oxygen in an electrolytic cell having a 5 gas-tight casing, a substantially central tubular post mounted in the casing and having an air inlet at its upper end, and a plurality of electrodes supported on the post and axially spaced therealong, alternate electrodes 10 spaced therealong, alternate electrodes being connected being connected to a first electrical terminal and to a second electrical terminal respectively connected to a respective poles of a current source and being mutually insulated, the post having an air outlet below the elec-15 of air from the air inlet into the cell and over the electrodes out of which flows air from the air inlet into the cell and over the electrodes; and a source of air under pressure connected to the said air inlet forcing a flow of air through the aqueous liquid contained in the cell in 20 cell in operation thereof; the cell having in its upper operation thereof; the cell having in its upper region a common outlet exhausting the combustible mixture comprising air forced through the cell and hydrogen produced by electrolysis of said liquid in said cell.

2. The process according to claim 1 wherein the 25 electrodes are discs each having a plurality of holes therethrough.

3. The process according to claim 1 further including a dish-shaped air deflector plate supported on the said post below the said air outlet.

4. Apparatus for producing by electrolysis of an aqueous liquid a combustible mixture of hydrogen and oxygen, comprising: an electrolytic cell having a gas-tight casing, a substantially central tubular post mounted in the casing and having an air inlet at its upper end, and a plurality of electrodes supported on the post and axially to a first electrical terminal and to a second electrical terminal respectively for connection to respective poles of a current source and being mutually insulated, the post having an air outlet below the electrodes for flow trodes; a dish-shaped air deflector supported on said post below said air outlet; and a source of air under pressure connected to the said air inlet for forcing a flow of air through the aqueous liquid contained in the region a common outlet for exhausting the combustible mixture comprising air forced through the cell and hydrogen and oxygen produced by electrolysis of said liquid in said cell.

5. The apparatus according to claim 4 wherein the electrodes are discs each having a plurality of holes therethrough.

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Another inventor whose water fuel work dates from the 1970's was Bulgarian emigrant to Australia Yull Brown. He had suffered years of unjust persecution in Eastern Europe, and when he got settled in his new home of Australia, he set to working on something that had intrigued him all his life: Jules Verne's prediction of water being used as fuel. He pursued his research with great effort and skill, finally marketing what are known as "Brown's Gas" welders. He went on to show many awesome uses for the

unusual oxyhydrogen gas, including the claimed neutralizing of nuclear waste. He also ran vehicles on the fuel, recommending an implosion cycle as the best way to power an ICE.

Although I have great admiration for Yul's work, I object to the use of the term "Brown's gas." He didn't "discover" the gas, and he wasn't the first to make a welder using the oxyhydrogen gas. U.S. Physicist William Rhodes, in 1961, first developed a small oxyhydrogen torch, marketed the following year as a Hene's Water Welder. Yul Brown even cited Rhodes' work when filing his patent. But that's not the point. I don't think any person deserves this distinction. "Electrolytic gas" or "e-gas" is one way to say it, "hydroxy" is another. Call it what you want, but to me, "Brown's Gas" is a misnomer. The two patents that deal with these welding units, for the record, are Rhodes' 1966 U.S. Patent # 3,262,872 and Brown's 1977 U.S. Patent # 4,014,777.

What is more impressive is Rhodes' 1966 Multicell Oxyhydrogen Generator Patent # 3,310,483. It is but a plastic box with slots in the sides and bottom to accommodate 6" X 6" steel plates connected in series. A copy of Patent # 3,310,483, dated March 21, 1967, follows. This is the same design later used by others, including George Wiseman, Bob Boyce and, most recently, Denny Klein. It seems that you can't beat it as the most basic cell design for effecting a reaction in an electrolyte solution, even if the reaction you want is not just electrolysis. It is fairly cheap to build and compact enough to fit where a car battery goes. In fact, it looks like and is a battery.



United States Patent Office

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3,310,483 MULTICELL OXYHYDROGEN GENERATOR William A. Rhodes, 4421 N. 13th Place, Phioenix, Artz. 85014 Filed Nov. 22, 1963, Ser. No. 325,689 1 Claim. (Cl. 204—268)

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This invention relates to a multicell oxyhydrogen generator and more particularly to a multicell oxyhydrogen generator employing a plurality of spaced plates operat-ing electrically in series with each other and an electrolyte therebetween

Heretofore, multicell oxyhydrogen generators having a plurality of spaced plates operating electrically in series with each other and with an electrolyte have been con-. 15 structed in a manner to insulate all of the plates from each other to seal the edges of the plates to a housing to prevent electrical short-circuiting around the edges of the plates and through the electrolyte.

Such generator construction has created many mechan-ical complexities and scaling problems and has, additionally, further complicated the problem of maintaining a constant level of the electrolyte in all of the series operated cells. Additionally, the problem of adding makeup fluid to all of the cells and equalizing the addition and/or 25 resultant concentration of the electrolyte has been difficult to solve

Accordingly, it is an object of the present invention to provide a very simple multicell oxyhydrogen generator wherein a plurality of electrode plates are operated elec-trically in series in a tank of dielectric material having slots holding the edges of the plates; said slots being sufficiently deep to prevent short-circuiting of electrical current around the edges of the plates, thus, solving the usual sealing problem.

Another object of the invention is to provide a very simple multicell oxyhydrogen generator wherein a plurality of electrolizing plates are operable in series with each other and with an electrolyte, thereby obviating the .40 necessity of utilizing a step-down transformer to obtain the desired electrolizing voltage. Another object of the invention is to provide a multi-

cell oxyhydrogen generator wherein a novel dielectric con-tainer holds electrodes in such a manner as to obviate the necessity of utilizing electrical insulation between the elec- 45 trolizing plates and to provide a substantially continuous conductive body of plates and electrolyte in series from one electrode at one end of the generator to an electrode at the opposite end of the generator.

Another object is to provide a very novel multicell oxyhydrogen generator employing a plurality of spaced electrolizing plates operable in an electrolyte and in electrical series with each other, and the electrolyte whereby one surface of each plate produces hydrogen gas and the opposite surface of the plate produces oxygen gas.

Another object of the invention is to provide a novel multicell oxyhydrogen generator wherein a plurality of electrolizing plates are disposed in spaced series with relation with each other and an electrolyte and wherein novel means is provided for periodic makeup of feed water to be added to all of the cells at an even and equal capacity.

Another object of the invention is to provide a novel multicell oxyhydrogen generator having a plurality of spaced electrolizing plates separating respective cells therebetween and wherein the upper edges of the plates may be overrun by the electrolyte simply by tilting the generator until the electrolyte overruns the upper edges of the plates so that equalization of the volume of fluid been the plates and in the cells may be accomplished. Another object of the invention is to provide a multi-

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cell oxyhydrogen generator having novel oxygen and hydrogen production and mixing directly from opposite sides of each of the electrolizing plates in the generator and for carrying the combined gases into a common duct properly mixed for combustion.

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Another object of the invention is to provide a multicell oxyhydrogen generator having a plurality of spaced plates and adjacent cells, each plate acting as an electrode for each side of each cell, each electrode being the electrolysis means for both hydrogen and oxygen gases in both adjacent chambers of liquid in contact thereto.

Another object of the invention is to provide a novel multicell oxyhydrogen generator having a tank composed of electrical insulation material wherein edges of electrolizing plates are contained in grooves in the side walls and the bottom of the tank and wherein each groove in the electrolyte tank in which electrode plate rests is sufficiently deep in relation to the electrode plate thickness that the electrical current flowing through the cross section of each. chamber or cell finds a shorter and preferred path by passing through the metal of the plate instead of passing through the electrolyte around the edge of the plate.

Another object of the invention is to provide a multicell oxyhydrogen generator wherein a tank is composed of insulation material and provided with grooves in the side walls and the bottom thereof; said grooves being spaced from each other, such that plates at their vertical and lower edges are loosely contained in the grooves in the tank, thereby providing a very simple multicell oxy-

gen and hydrogen generating apparatus. Further objects and advantages of the invention may be apparent from the following specification, appended claim and accompanying drawings, in which: FIG. 1 is a perspective view of a multicell oxyhydrogen

generator in accordance with the present invention:

FIG. 2 is a fragmentary sectional view of one end of

the generator taken from the line 2-2 of FIG. 1; FIG. 3 is a cross sectional view of the generator taken from the line 3-3 of FIG. 1 and showing by broken lines the tilting of the generator tank whereby electrolyte reaches a level above upper edges of the plates to thereby equalize the total volume of electrolyte in all of the series arranged cells; and

FIG. 4 is an enlarged fragmentary cross sectional view of a pair of spaced electrolizing plates of the invention having their edges contained in slots in the side structure of the insulating tank of the invention and wherein electrolysis takes place upon opposite sides of the plate to produce oxygen on one side and hydrogen on the other and wherein the edges of the plates are projected a sufficient distance inwardly of the said slots to prevent shortcircuiting of the electrical current around the edges of the electrolizing plates.

As shown in FIG. 1 of the drawings, the multicell oxyhydrogen generator of the present invention comprises generally rectangular tank 10 composed of end walls 12 and 14, a top 16, a bottom 18 and side walls 20 and 22.

The end walls 12 and 14 and the bottom and side walls 18, 20 and 22 are all integral or fused together and are 60 made of electrical insulation material, such as Lucite or the like. The top 16 is connected to the sides and ends by bolts 24 which extend downwardly through openings in the top 16 and into blocks 26 connected respectively to the sides and ends of the tank.

Referring to FIG. 2 of the drawings, it will be seen that a bolt 24 extends downwardly through an opening 28 in the top 16 and that the bolt 24 is screwthreaded in a metal bushing 30 in one of the blocks 26 which is fused or otherwise secured to the end wall 14.

In some instances, the material of the side walls, end



In 1979, Dr. Ruggero Santilli was invited by then U.S. President Jimmy Carter's Department of Energy to come up with a clean-burning alternative to fossil fuel. He found that the basic problem is that carbon is too tightly bound to be able to be burned completely. It has been unavoidably a polluting fuel source from start to finish! The following Tampa Tribune article does a very good job explaining what he has been up to lately.

Local Scientist Has Alternative Fuel

February 11, 2006 Section: MONEYSENSE Page: 1 By STEVEN ISBITTS sisbitts@tampatrib.com

TARPON SPRINGS - As a Harvard University scientist and mathematician in the late 1970s, Ruggero Santilli was awarded five grants by the U.S. Department of Energy to research the development of a clean-burning fuel.

The goal wasn't to create a fossil fuel derivative or an additive to improve vehicle emissions or gas mileage, but to find a new source of energy - from scratch.

The task meant years of developing math and science to support a new energy with atomic bonds that could be fully combustible and, subsequently, emit near-zero emissions.

The fruits of Santilli's 20-plus years of labor, and that of his team of scientists, sit in a Tarpon Springs warehouse. That's where Santilli, 71, a former Nobel Prize nominee for chemistry, stores machines that can transform any liquid, including water and used motor oil, into a natural gas equivalent called MagneGas.

"This was the vision of the Carter administration," said Santilli, who settled in Palm Harbor in 1990. "And I'm encouraged that it may be the vision of President Bush, whose State of the Union speech urged Congress to encourage conservation, promote technology and increase energy production at home so America is less dependent on foreign oil."

Santilli's company, U.S. Magnefuels Inc., has five U.S. patents on the technology.

walls and bottom, may be Lucite or other equivalent insulating material forming a float type container

The cover 16 is provided with a recessed gasket 32 which bears on the upper edges of the side and end walls, as shown in FIG. 2 of the drawings, to provide a gas seal 5 at the upper end of the tank.

The side walls 20 and 22 are provided with spaced slots 34 and 36, as shown on the enlarged scale in FIG. 4 of the drawings. The bottom 18 is provided with similar slots 38, these slots as shown in FIG. 2 of the drawings, 10 are spaced from each other and electrolizing plates 40 are provided with edges 42, 44 and 46 disposed respectively in the slots 34, 36 and 38 of the sides 20 and 22 and the bottom 18.

The slots 34, 36 and 38 are all of substantially similar 15 depth and correspond structurely to the description which will be hereinafter made in connection with FIG. 4 of the drawings.

As an example, the plates may be eighteen thousandths of an inch thick and the slots may be 32 thousandths of 20 an inch wide. These dimensions may be varied in proportion to the size of the apparatus required and are only given by way of an example.

The plates 40 may be any suitable material known in the art for the purpose of electrolizing a conventional 25 electrolyte to produce hydrogen and oxygen, as will be hereinafter described.

Referring to FIG. 4 of the drawings, it will be seen that the slots 36 contain the edges 44 of the plates 49 and that these edges project a sufficient distance into the slots 36 so that electrolysis indicated generally by broken lines A limited to a median angle on substantially 45 degrees will not pass the edges 44, but will complete the electrical circuit through the plate 40 without a tendency of shortcircuiting around the edges 44 In this manner the plates 40 and the electrolyte therebetween are forced to operate as a continuous conductor with the plates in series thereby obviating the necessity of using a step down transformer. As for example, when 120 volts alternating current is used in connection with a conventional half-wave or a full-wave rectifier, direct current of the order of 120 volts or more, when operating in series through 60 or more of the plates 40 is reduced to substantially two volts at each plate which is a desired electrolyzing voltage. The plates operate in series by reason of an electrical connection provided by a conductor 56 having a clamp terminal 48 coupled to one of the plates 40 adjacent the end plate 14 while another conductor 50 is coupled to a similar plate 40 ad-jacent to the end plate 12. Thus, the circuit is completed through the plates 40 in series with each other and with the electrolyte therebetween.

A particularly novel feature of the present invention is the construction of the tank holding the electrolyte and particularly the construction of this tank of insulating material and providing it with the plate edge holding slots wherein the plates are loosely supported and wherein the dots are sufficiently deep to prevent short-circuiting of the electrical energy around the edges of the plates. Thus, each electrolizing plate 40 is caused to operate in series with the other plates and to produce oxygen on one sur-

face and hydrogen on the opposite surface. In the top 16, a conduit 52 is provided to communicate with the interior of the tank below the cover 16 and above

the upper edges 54 of the plates 40. The electrolyte is disposed in the tank below the upper edges 54 of the plates and the level of the electrolyte in the tank may be varied to vary the effective area of the plates which correspondingly relates to power consumption and the amount of gas yield of the generator.

When it is desired to add makeup water, it may be poured through the conduit 52 and the tank may be tilted

as indicated by broken lines B in FIG. 3 of the drawings, so that the electrolyte level is disposed at C above upper edges 54 of the titled plates 40. Thus, the electrolyte volume between each adjacent plate and in each cell is equalized.

The generator of the present invention when operated produces hydrogen and oxygen gas from opposite sides of each of the plates 40 and these gases rise and mix intimately at the upper edges 54 of the plates and may be carried outwardly through the conduit 52 or any other suitable conduit to a use location, such as a torch or other combustion means.

It will be obvious to those skilled in the art that various modifications of the present invention may be resorted to in a manner limited only by a just interpretation of the following claim.

T claim:

In a multicell oxygen and hydrogen generator the combination of: a tank adapted to contain electrolyte and of electrical insulating material; said tank having side and bottom walls provided with parallel, spaced slots; a plu-rality of parallel electrolizing plates disposed in said slots and loosely contained therein forming compartments therebetween the edges of said plates extending into said slot portions a sufficient distance whereby electrolysis acting at approximately 45 degrees to the edges of said slots intersect said plates inwardly of the edges thereof, thereby electrolizing through said plates and preventing short-circuiting through the electrolyte around the edges of said plates; an electrode adjacent each of the opposite end walls of said tank adapted to communicate with electrolyte adjacent said plates and adapted to conduct direct current to act in series with said plates and electrolyte in the compartments therebetween; a cover sealed to the upper portion of said tank and having an outlet for a mixture of hydrogen and oxygen gases; upper edges of said plates spaced substantially below said cover forming a gas collecting chamber above said plates whereby tilting of said tank may cause electrolyte therein to pass above upper edges of said plates and equalize the volume of fluid in said compariments throughout said tank, com-60 munication between said compartments being limited to said gas collecting chamber.

References Cited by the Examiner INTER STATES DATE

	• •	ONTED	BIATES PATENIS	•
•	1.397.735	11/1921	Holland	204 260
	1,415,466	5/1922	Pechkranz	204-209
2	1,579,138	3/1926	Petz	204-256
		FORE	IGN PATENTS	
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13,723 1893 Great Britain

JOHN H. MACK, Primary Examiner.

D. R. JORDAN, Assistant Examiner.

In simple terms, the MagneGas producer forces liquid through an area that reproduces the temperature of the sun's chromosphere, 10,000 degrees. The liquid then becomes a sterilized, carbonized gas, which moves through a simple purification process. The result is a natural gas equivalent with a natural odor.

The gas has U.S. Environmental Protection Agency approval for motor vehicle use.

Santilli said his research found a way of putting atoms together that is not molecular. He calls it a "magnecule." The prefix magne denotes the magnetic nature of the bond.

All magnetic effects disappear at a varying high temperatures, Santilli said, so this new magnetic atomic bond allows total combustion without emitting carcinogenic or toxic substances. "The theoretical and mathematical development lasted more than 20 years," Santilli said. "It was a struggle. Production began in 1998, and we only recently reached the point where the company is sustained by sales."

There is no consumer application for the MagneGas producer. Santilli hopes to create a prototype of an inexpensive home model that could power a house, treat the occupants' waste and fill their gas tanks.

For now, the roughly million-dollar machines - contraptions that look like something out of Batman's bat cave - are available only in industrial sizes. Two are in use in Santilli's native Italy, said Michael Walerstein, the company's Pennsylvania-based sales director; others will be operational soon at a Swedish airport and a company in Cyprus.

The machine headed to Cyprus was tested by Santilli's seven-person staff in Tarpon Springs on Thursday. It will be shipped Feb. 23. The machine can produce about 100 kilowatts of energy.

Walerstein said his goal is to sell a similar machine to a municipality in the United States to be used to power vehicles and treat wastewater.

"I want the American people to know this technology exists," Santilli said. "I believe that until the American people are made aware of the capability to develop alternative fuels, nothing will happen to lead us to energy independence."

Reporter Steven Isbitts can be reached at (727) 451-2336.

As we considered earlier, Santilli's technology goes back to the late 1800's. It's too bad we haven't been using it all along. At least we have a technology that can clean up some of the mess that the petrochemical world has created, and produce clean-burning fuel at the same time. In fact, he states that he is "fossil fuel's best friend" because his gas can clean up even the emissions from a coal fired power plant, and using fossil fuel as a feedstock for his device is much more cost effective than just burning it outright. He has not offered consumer units, and only time will tell if such become available.

There were others pursuing water fuel during the 1970's whose names are not mentioned much, such as Frenchman Hector Pierre Vaes (See appendix) and American Sam Leslie Leach. Then there's Australian Steven Horvath, who obtained U.S. Patent # 3,980,053 on September 14, 1976. In this exhaustive and concise patent, the inventor lays bare the essentials for a safe water fuel system using pulsed high voltage in a unique, compact electrolyzer. He makes many excellent points, but his August 15, 1978 Patent # 4,107,008 goes further and uses a word that is foreign to most people: radiolysis. In most systems, it is the key to efficient gas production, as well as a follow-up treatment of the gas.

Radiation is anything that radiates, be it heat, light, sound, xrays, radio waves, etc. Electromagnetic radiation, or EMF, is produced easily by all of us every time we start our cars. The car's ignition coil takes very little current and turns it into many thousands of volts for spark ignition of the fuel, and this produces EMF radiation. It can be used for radiolysis!

United States Patent [19]

Horvath

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[54] ELECTROLYSIS METHOD FOR PRODUCING HYDROGEN AND OXYGEN

[75] Inventor: Stephen Horvath, St. Ives, Australia

- Beeston Company Limited, Hong [73] Assignee: Kong, Hong Kong
- [21] Appl. No.: 753,610
- [22] Filed: Dec. 22, 1976

Related U.S. Application Data

- Continuation-in-part of Ser. No. 586,080, Jun. 16, 1975, abandoned, and Ser. No. 632,579, Nov. 17, 1975, said Ser. No. 586,080, is a continuation-in-part of Ser. No. 527,083, Nov. 25, 1974, Pat. No. 3,954,592, said Ser. No. 632,579, is a continuation-in-part of Ser. No. 527,085, Nov. 25, 1974, Pat. No. 3,980,053, said Ser. No. 527,083, and Ser. No. 527,085, each is a continuation-in-part of Ser. No. 485,498, Jul. 3, 1974, abandoned. [63]
- [51] [52]

4,107,008 [11] Aug. 15, 1978 [45]

[58] Field of Search 204/129

References Cited [56]

U.S. PATENT DOCUMENTS

2,016,442 10/1935 Kilgus . 3,207,684 9/1965 Dotts ... 3,719,583 3/1973 Ustick . . 204/129 204/180 R 204/180 R

Primary Examiner-R. L. Andrews

Attorney, Agent, or Firm-Biebel, French & Nauman

ABSTRACT [57]

A novel electrolytic cell produces a mixture of highly ionized hydrogen and oxygen gases by a method combining electrolysis and radiolysis of an aqueous electro-lyte. The electrolyte, which may be a 25% of potassium ·hydroxide, is introduced into the cell and is simultaneously subjected to an electrolysing current and intense irradiation by electromagnetic radiation of frequency less than 10^{-10} meters.

14 Claims, 26 Drawing Figures



ELECTROLYSIS METHOD FOR PRODUCING HYDROGEN AND OXYGEN

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CROSS REFERENCE TO RELATED **APPLICATIONS**

This application is a continuation-in-part of application Ser. No. 586,080, filed June 16, 1975, (now abandoned) which is a continuation-in-part of Ser. No. 527,083 filed Nov. 25, 1974 (now U.S. Pat. No. 10 3,954,592), which is a continuation-in-part of Ser. No. 485,498, filed July 3, 1974 and now abandoned. This application is also a continuation-in-part of application Ser. No. 632,579, filed Nov. 17, 1975, which is a continuation-in-part of Ser. No. 527,085, filed Nov. 25, 1974 15 (now U.S. Pat. No. 3,980,053), which is a continuationin-part of said Ser. No. 485,498.

BACKGROUND OF THE INVENTION

This invention relates to the general field of electroly-²⁰ sis and has particular, but not exclusive, application to the electrolysis of water to form hydrogen and oxygen.

In an electrolysis process a potential difference is applied between an anode and a cathode in contact with an electrolytic conductor to produce an electric current ²⁵ through the electrolytic conductor.

Many molten salts and hydroxides are electrolytic conductors but usually the conductor is a solution of a substance which dissociates in the solution to form ions. 30 The term "electrolyte" will be used herein to refer to a substance which dissociates into ions, at least to some extent, when dissolved in a suitable solvent. The resulting solution will be referred to as an "electrolyte solution. 35

In a simple electrolysis porcess the mass of substance liberated at an anode or cathode is, in accordance with Faraday's laws of electrolysis, strictly proportional to the quantity of electricity passed between the anode and cathode. The rate of decomposition of the electrolyte is 40 thus limited and it is generally uneconomical for example, to generate hydrogen and oxygen from water commercially by an electrolysis proces

it is known that compounds, including electrolytes such as water, can be decomposed into their constituent 45 elements by irradiation with short wave electromagnetic radiation. Such radiation induced dissociation or decomposition may be termed "radiolysis". For example, a paper by Dr. Akibumi Danno entitled "Producing Hydrogen with Nuclear Energy" published in the 50 "Chemical Economy and Engineering Review" of June, 1974 describes in some detail the radiolysis of water and a number of hydrocarbons with an explanation of the elementary reactions involved in such radiolysis. Briefly, it is found that irradiation with short wave 55 x-rays or gamma rays, i.e. electromagnetic radiation of wave length less than 10-10 meters, results in direct decomposition of the compounds concerned. For example, if water is irradiated with gamma radiation the water will be dissociated into hydrogen and oxygen. 60 Danno proposes the use of a nuclear reactor as a source of radiation on a massive scale but concludes that water radiolysis is not a very efficient method of producing hydrogen and he proposes instead a process involving a radiolysis of carbon dioxide to produce carbon monox- 65 ide and oxygen and a subsequent conversion of the carbon monoxide to hydrogen gas by the conventional water/gas conversion process.

SUMMARY OF THE INVENTION

The present invention provides for an electrolysis process in which radiolysis is also present. It is found 5 that with the combination of electrolysis and radiolysis the yield of decomposition products can be greater than that achieved by either a simple electrolysis process or simple radiolysis. The yield rate can be very much improved in the combined electrolysis and radiolysis process by providing a magnetic field in the electrolytic conductor which provides preferred paths for the high speed photons of the short wave electromagnetic radiation and also for the ions in the electrolytic conductor thereby increasing the possibility for collision between the electrons and the ions with a subsequent improved radiolysis yield.

In one method according to the invention, pulses of high voltage electrical energy are applied between the anode and cathode of an electrolytic cell in such a manner as to generate the necessary short wave length radiation for radiolysis. In another method according to the invention pulses of high voltage electrical energy are discharged in one or more short wave length radiation generators separate from the anode and cathode but disposed such that the electrolytic conductor within the cell is irradiated by the short wave radiation produced thereby. The high voltage pulses of electrical energy can be generated by a quite modest direct current input supplied and the methods according to the invention will produce a greatly increased yield of decomposition products over that which could be achieved by passing the supply current through the electrolytic conductor. The invention also provides apparatus adapted to

practise the methods of the invention. As previously mentioned, the invention is particu-

larly applicable to the decomposition of water or aqueous solutions to generate hydrogen and oxygen gases and, in order that the invention may be more fully explained, apparatus designed specifically for such generation of hydrogen and oxygen will now be described in

detail with reference to the accompanying drawings. BRIEF DESCRIPTION OF THE DRAWINGS

In the drawings:

- FIG. 1 is a circuit diagram for one apparatus constructed in accordance with the invention;
- FIG. 2 is a plan view of an electrolytic cell of the apparatus;
- FIG. 3 is a cross-section on the line 3-3 in FIG. 2; FIG. 4 is a cross-section on the line 4-4 in FIG. 3; FIG. 5 is a plan view of the electrolytic cell with
- certain upper parts removed; FIG. 6 is a cross-section on the line 6—6 in FIG. 2; FIG. 7 is a cross-section on the line 7—7 in FIG. 2;
- FIG. 8 is a vertical cross-section through a modified form of electrolytic cell;
- FIG. 9 is a cross-section on the line 9-9 in FIG. 8;
- FIG. 10 is a circuit diagram for the modified apparatus of FIGS. 8 and 9;
- FIG. 11 is a circuit diagram for a further modified apparatus
- FIG. 12 is a plan view of an electrolytic cell of a further embodiment of the invention;

FIG. 13 is a rear view of the cell illustrated in FIG.

FIG. 14 is an underneath view of the cell illustrated in FIG. 12:



South African inventor Francois P. Cornish was granted European Patent # 0055134A1 on June 30, 1982 for his relatively simple water fuel device, pictured at left. It is basically an underwater arc welder that runs a car! Following is the description of his European patent:

SUMMARY OF THE INVENTION

According to the invention a method of generating hydrogen comprises the steps of exposing a fresh metal surface to water and heating the interface between the metal surface and the water at least to the lowest temperature at which the metal reacts with water to form a metal oxide and hydrogen, the metal being chosen from metals which are higher in the electromotive series than hydrogen and having stable and safe handling characteristics. Preferably the metal surface is exposed and the interface heated by pressing an electrode of the relevant metal against a second electrode under water and applying a high voltage between the electrodes while preferably moving the electrode surfaces relatively to one another.

In other words in the preferred form of the invention hydrogen is formed by creating an underwater electrical discharge between two electrodes at least one of which is made of a metal as defined above.

The electrical discharge and the relative movement between the electrode surfaces ensure that fresh metal surfaces are exposed to the water while at the same time the discharge heats the interface between the electrodes and the water to the required temperature at which the metal reacts with water to form its oxide and to liberate hydrogen. Also in the preferred form of the invention the metal is aluminum which has the advantage that it is in relatively abundant supply, relatively cheap, is formed with a protective oxide layer on its exposed surfaces and reacts with water at a relatively low temperature. Aluminum wire fed against a rotating aluminum drum has been found to give excellent results to provide hydrogen for powering small internal combustion engines. A convenient way of securing the high voltage required is to employ the conventional distributor and coil arrangement which provides the sparking for an internal combustion engine. Two coils in parallel fed from a common distributor has been found to give excellent results. Other methods of generating high voltages from the battery or the drive shaft of an internal combustion engine may also be used. The method of the invention lends itself in an excellent manner to supply hydrogen on demand. In this case hydrogen is fed to a small buffer store and as the pressure in the store exceeds a predetermined level, the electrodes are separated so that hydrogen generation is interrupted. As the pressure drops to a certain level the electrodes are again fed towards one another.

He later secured U.S. Patent # 4,702,894 on October 27, 1987, the first page of which is reproduced in the appendix. His system reportedly gets good MPG, that is, miles per gram of aluminum, but I prefer systems that don't consume metals. You agree with me, don't you?



Andrija "Henry" Karl Puharich was an inventor and MD from Chicago, USA, who decided a medical practice was not for him. He instead devoted his life to research, but not just any topic qualified for his research. It had to be something significant, like "how to turn water into fuel using sound." He at times delved into

parapsychology, but not when researching water fuel. As you may remember, John Worrel Keely demonstrated the dissociation of water with mechanically generated sound waves. Puharich accomplished it using AC resonance, or, as it has been described, audio noise. In a videotaped lecture given in Toronto in the late 1970's, he explains that this constitutes no flaw in the second law of thermodynamics. It is all in the accounting. He says that the same resonance that can cause a bridge to fall apart, as soldiers march over it in step, can be used to break apart the water molecule.

The second page of his July 19, 1983 Patent 4,394,230, shown below, shows a pair of preamplifiers and a power amplifier, with a sensor that detects resonance in his electrolyzer and feeds that information back to the amplifier controls, adjusting the output of the drivers so that resonance continues. This kind of feedback loop is necessary in those systems that work by maintaining resonance in a chamber whose parameters are constantly changing.

United States Patent [19]

Puharich

[54] METHOD AND APPARATUS FOR SPLITTING WATER MOLECULES

[76] Inventor: Henry K. Puharich, Rte. 1, Box 97, Delaplane, Va. 22025 . •

[21] Appl. No.: 272,277

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- [22] Filed: Jun. 10, 1981
- [51] Int. Cl.³ C25B 1/04; C25B 1/10;
- [52] U.S. Cl.
- 204/200; 204/129, 228, 260, 263, 204/266 [58] Field of Search ..
- [56] . **References** Cited
 - U.S. PATENT DOCUMENTS
 - 3,563,246 2/1971 Puharich 331/47

[11]		4,394,230		
[45]	•	Jul. 19, 1983		

3,726,762	4/1973	Puharich	 128/422
4,107,008	8/1978	Horvath	 204/129

Primary Examiner-R. L. Andrews

Attorney, Agent, or Firm-Mandeville and Schweitzer [57] ABSTRACT

Disclosed herein is a new and improved thermodynamic device to produce hydrogen gas and oxygen gas from ordinary water molecules or from seawater at normal temperatures and pressure. Also disclosed is a new and improved method for electrically treating water molecules to decompose them into hydrogen gas and oxygen gas at efficiency levels ranging between approximately 80-100%. The evolved hydrogen gas may be used as a fuel; and the evolved oxygen gas may be used as an oxidant.

9 Claims, 20 Drawing Figures





HALF-WAVE VECTIFICATION OF ABOVE SIGNAL

U.S. Patent Jul. 19, 1983

Sheet 1 of 11

4,394,230

Dr. Puharich reportedly put many thousands of miles on a motor home running on his water fuel device. Unfortunately, he died in 1995 at the age of 76, and the whereabouts of his vehicle is not known. A movie should be made about him.



It was as a result of the 1973 oil embargo that an Ohio, USA, inventor named Stanley Meyer anguished at the position of weakness that his country was in. Although he was never a very religious person, he got down on his knees and asked

God to help him deliver the United States from foreign oil dependence. From that point on it was a matter of faith for him to continue. The most logical idea he could find was to extract the hydrogen and oxygen from water.

Stanley and his twin brother Stephen were brought up in a family without a lot of money, so they would make their own toys out of whatever they could find. Wood slats from old lettuce boxes were turned into a go-cart that won neighborhood races because of its unique push-rod design advantage. They built and flew model airplanes. They read Popular Science and Popular Electronics. Steve rebuilt his first car engine before he was 16.

They did stints in different branches of the military, Stan in the U.S. Army and Steve in the Air Force. Interestingly, they both were discharged and showed up at their parent's home from overseas service at the same time. Afterwards, Steve went on to get his degree in electrical engineering, while Stan went to work for Bechtel, and later worked in the truck parts business. But the time came, in the early 1980's, when Stan, backed by Steve's money and experience in electronics, began his career as a full-time Water Fuel Cell inventor.

He first thought the job at hand would be "a piece of cake," and that he would accomplish his mission in a matter of weeks. Fifteen years later he would laugh at this optimistic miscalculation. The first newspaper article to appear in the Grove City News, on October 25, 1984, made the announcement that a "Local Inventor Solves Energy Problem...Operates Car on Natural Water." It appears on the next page, followed by pages of one of the forty patents secured by Meyer. Newspaper articles don't usually do justice to technological subjects, but the coverage of Meyer's work by the local paper was good enough for him to include in his company newsletter, so I feel it is appropriate to include it here.

You will notice Meyer's recognition of the fact that, as long as there are trillions of dollars to be made selling energy, a water fuel device like his will not be brought out in the open by big business or government. They stand to lose too much by a device that amounts to a one-time sale, and then no repeat business. He made it clear that his goal, as an independent inventor, was to produce a system that others could then replicate quickly and easily.

But as the years passed, he allowed his technology to morph into something better from the standpoint of
Thursday, October 25, 1984

GROVE CITY RECORD

Operates car on natural water

Local man solves energy problem!

By Shannon Hamon

By Shamon Hamons Copyright Grove City Record October, 25 1981 Through the ages, men have treamed of inventing miraculous machines for the betterment of inankind. Some have succeeded, and some have not. But one Grove City, Ohio man may have the greatest invention of them all—the 'Water Fuel Cell'.

Fuel Celly. Stan Meyer appears to have the Stan Meyer appears to have the answer for the most difficult question ever asked. What will the human race do to overcome the depletion of its heergy supplies? Hisomswer: Extract hydrogen from water to be used as fuel. fuel

fuel. Such that while to be check as The only difference between Stan Meyer and the people who have had the same response, is that Meyer has found a way to get the powerful, plentiful hydrogen out of water easily, inexpensively, and safely. Something, that before now, was impossible to do with current technology. Meyer has been working nine years to develop the Water Fuel Cell, which can convert any type of natural water

can convert any type of natural water (including salt water) into a useable

Can convert any type of natural water (including salt water) into a uscable hydrogen gus capable of supplying all industrial, commercial, and domestic luel needs. This means his fuel cell could operate your car, heat and cool your home, and keep the factories humming, just with simple water. This incredible (real is possible because he has solved four major obstacles outlined by the National Aeronautics Space Administration (NASA) that haretoiore prevented acientists from abstracting hydrogen from water efficiently. Those ob-stacles outlined by the National Aeronautics space Administration (NASA) that haretoiore prevented acientists from abstracting hydrogen from water efficiently. Those ob-stacles we efficiently. Those ob-stacles are the hydrogen from water is not a forsil fuels; and how to distribute the gas safely. Extracting hydrogen from water is not a new idea. High school students inve done tin chemistry labs all over the world. But because of the four problems listed by NASA, it was not leastible to repeat the process on a greater scale for fuel manufacturing. But Meyer has broken away from the traditional method of hydrogen gas production—the process or agas production—the process or acry out, than the amount of energy produced. However, Mayer's Water Fuel Coll Distrates an on bayer's that production.

Produced.

However, Meyer's Water Fuel Cell perates on a physical process that plarizes the water molecules and reaks them down into hydrogen and Nygen extremely easy. He is able to do this because his

He is able to do this because his invention restricts the amount of imps of electricity (which is power consumption) flowing to the fud cell, and allows voltage (or potential energy) to take over and excite and polarize the water mulecules. That in turn produces hydrogen gaswith almost no energy consumption in the process process

'It is a non-chemical device that do does not create energy." the self-styled inventor said. "The only thing the water fuel cell does is utilize a very low energy source to release a fantastic amount of energy in the

fundasic amount of energy in the form of hydrogen gus. "We have the technology to convert over a gallon of water as second into hydrogen. One gallon of water is equivalent to over 44,000 BTUs of energy. That means three to four gallons of water could heat the average home for n period of 24 hours. I also means in the right application. to also means, in the right application, that five to six gallons of water could produce all of your electrical energy for the same 24 hour period.

"You would need to convert about a "You would need to convert about a half gallon of water per hour to run your car down the road at 55 miles per hour. The release of 44,000 BTUs a second is a tremendous amount of energy. It is enough energy to propel the largest aircraft earrier or fly the lower largest aircraft earrier or fly the

largest airplane." Basically, Meyer's fuel cell is so radical and so different from every other process, that it contradicts all existing beliefs on hydrogen production. In short, it is the opposite of everything scientists say is 'possible' to do.

possible' to do. But Meyer luss denionstrated his water fuel cell to the public at fairs and at meetings and has proven how easily it can be done. Using his simple, clear, tubular fuel cell and plain tap water, he has produced a fame of over 2,500 degrees. He has also operated the engine of an automobile on hydrogen alone—his 'Water Powered Car'. This dune buggy type car has an ordinary' Volkswagen engine without modifications, except for the addition

Volkswagen engine without modifications, except for the addition of hydrogen injectors. According to the prior state of the art under the electrolysis process, this was im-possible to do because the engine would eventually seize up from the extreme temperatures (hydrogen is three times more combustable than

extreme temperatures (hydrogen is three times more combusible than gasoline). But by cleverly recirculating exhaust from the combustion back into the injectors, the hydrogen is burned to co-equal the burring of gasoline. Also, since the process is one of voltage (thysical process) and not amps, the production of the hydrogen can be increased or decreasing the voltage to the fuel cell. Because the fuel cell is a constant deman denergy source, meaning hydrogen gas is only produced as fast as it can be consumed, there is no danger resulting from the build up of stored hydrogen. If an automobile fitted with a fuel cell had an accident and the fuel tank were ruptured, all that would spill onto the roadway would be water. That certainly ex-ceeds all highway safety regulations in existence.

in existence in existence. Some other regulations surpassed by the fuel cell and the water powered car, are those of the Environmental Protection Agency. The emission from the water powered car is simply a water vapor. So in affect, every time a person installs a fuel cell on a

a water vaper. So in affect, every time a person installs a fuel cell on a car, plane, or boal, the air and the water is being cleaned. Naturally, some people will ask, 'we face water shortages now, won' this deplete our reserves further'? Since emissions from the operation of the fuel cell is water vapor, the natural process of the curth's water cycle is not being altered-except maybe helped along. Also, any type of water can be used. The sail water from oceans is an endless supply. Because energy will be so abundant with due water fuel cell, the sail water will even be easily transformed into one by desert countries of the mid-cast, but they have plenty of nel for in areas that can't afford the fresh water factories, will be aid of the resh water factories, will be out on afford the or and so for the out of the for the sol ford the oncoess. factories, will be able to afford the process with the water fuel cell. The water can then be used for drinking or irrigation. irrigation.

irrigation. When explained in these terms, the 'Water Fuel Cell' appears to be a miracle invention. But the fuel cell is not just one invention. But the fuel cell is not just one invention, it is a series of more than 30 patented inventions that all come together to create one comprehensive system. As an example, the fuel injector on the

water powered car is one of those many inventions in the series. The inventions themselves are astoanding when combined to form the fuel cell, but the history behind their existence is almost as in-credible.

their existence is almost as in-credible. Nine years ago, during the height of the end embargo by the mid-east oil manueers. Slan Meyer realized the economic base of this country was being controlled by those foreign entities. He decided it was time someone did something to make the United States energy independent. "More than half of this country'ss countries, and our dependence is growing every day." Meyer said. "I realized hack then that if all oil from the mid-east were shut off, because of war or because of embargo, life in the U.S. as we know it would cease to exist.

exist. "If we have no oil, there will be no transportation; factories will be shut down; and farmers will not be able to grow food. We have less than a 30 day food supply line in this country, and there pre-blected relief.

for tool in this country, and after people start getting hungry, they start thinking about war. "But before any of that happened, we would be in a war to make sure the oil supply would not be shut off to begin with. With all that Is going on in the mid-east, this is the right time for the water fael cell." Meyer said he was never a religious person, but when he realized the dire situation the U.S. was in, he went to his office-research laboratory and asked God to help him put a power supply in the country. After he did, he relied on faith alone to accomplish the task.

task. At that time, he was a corporate executive for a multi-million dollar a year truck part distributing company. He was also involved in research, development engineering, and product design. Basically, he was a corporate entrepreneur involved in all the steps of manufacturing. However, he depleted his financial resources trying to obtain

federal and state research development funds without the risk of

'This fuel cell could not come through...

multinational corporation.

patent buyout. But he continued his project on failh, trying to bring the fuel cell into the country without foreign controls or intervention. Soon alterward, he attended church and put two of his last three dollars into the collection plate-heeping one dollar for his creaning meal of a chocedurare cheeseburger. He said that same evening, his

checselvarger. He said that same evening, his dinner was bought by a man curious about the fuel cell. The next day another man gave Meyer \$2,000, with you strings attached. That first donation led to many more by other businessmen concerned about the economic future of the country. For mine years, the inventor said he never wortied about the source of capital for his project. "There are hundreds of men with resources that feel the same way I do and are willing to help finance a project to get an energy source into the country." Although the has some backers, he personally owns all the patents and is responsible to no one else. He said that is the only way this invention could have gotten to its current pre-production stage.

production stage.

production stage. "This fuel cell could not have come through a government or a nultinational corporation," he said. "Companies and governments have ways of suppressing these types of ultings. It had to come through a person who was determined to see the project counce to light." project come to light.

He said he was offered "large sums of money" by -various-foreign governments to sell the rights to his

an invite by set and a set of the rights to his project. He said organizations have also tried to block the completion of the project by using patent-laws to-their advantage. "But no one really fully understood what I was up to until it was too late. Because I patented what seemed to be minute inventions one after the other, it was unclear what lively were for until the whole picture came together." Meyer calls himself "a businessman rather than an in-ventor", and does seem to have a savvy of the business world's way of

Stan Meyer



Grove City Record editor Shannon Hamons takes a drink from the water host before filling up the fuel cell, Meyer's car was then operated from hydroger produced from the water in the fuel cell (photo copyright Grove City Record, produced from Oct. 25, 1984).

operating. So, in order to make sure his invention would not fall into the control of outside sources, he set down five rules for himself when the project

There is no indicate which we project began. These five rules are: no similar patents could be in existence; materials for the invention had to be readily available off the store shelf items; it had to be built in a garage, back yard or basement; it had to be a system capable of retrofitting (adapting) for all applications (car, bore factory etc): and are person home, factory, etc.); and one person had to be able to build one in one day.

If these rules were followed, no manufacturer, government, or supplier of materials would be able to slop the evolution of the invention. "When I started this thing in 1975

"When I started this thing in 19/5 and pave myself these rules, I also gave mysels a 20 billion to one shot at completing the project. And for a while, I though to myself, what the heck are you doing—this simply can't be done"

But he kept his faith, and slowly, But he kept his taith, and slowly, but surely, convinced people what he said he could do, was indeed true. But there were still these who doubted Meyer. One man, Charlie Holbrook, heard about Meyer and came to Grove City from Washington Court House, Ohio to prove Meyer to be a structure but new profiling for

heard about Meyer and Came to Grave City from Washington Court Honse, Ohio to prove Meyer to be a fraud. Holbrook is now working for Meyer as his chief assistant. "When I first heard what he was doing, I thought he was operating some kind of scam," Holbrook said. "Bat atter I saw the power and potential of this thing for myself. I just got involved to the point, where I, was telling everyone cise about 1." -... A friend of HaBrook also got he... terested in the project. "It was so unbelievables and so far fetched, I thought it was a hoax too," Stan Graumitich said. "But, I knew Charlie, and after twas exposed to it, I got an education that I could never blink what is being done by Stan is sohead of everyone else." Graudi he is retired from the dairy business and was also on the faculty of Wittenberg University in industry development. "I can sky without a doub, the eniversities have nothing that even compares with this."

development. "I can sky without a double, the universities have nothing that even compares with this." Meyer's neighbor, Walter Bausch, 78, said the too was somewhat skeptical of the happenings down the street. "This thing has been going an long time," he said. "I've really only been aware of what it was for the saw or three years, but the minute 1 saw to pertact, Linoxi twould work. I awe the flame larn, and I saw the car engine run on hydrogen. "That a retired chenist, so I have a protty good idea where Stan is coming from. He's an intelligent gay that is real down to earth. People think you have to earth. They are the flashy or something to be an inventor. All you really need is an imagination. That is why same people they lack timegination and probleme solving abilities. If I very younger, I wend invest in the project." Meyer knew he had to take the right steps to make this interiation turn to valide a patent altorney to represent him before the United States Patent of the. After Meyer did a hitle research on Meyer and the standard or proteen in the state Patent and the state state of the research on the state state of the state

fice. After Meyer did a little research on Atter forcer did a hitle research on patent attorneys, he selected Anthony D. Cennamo of Columbus to help in the project. Cennamo has been a patent attorney for more than 30 years and has been invoived in the development of some of the most

significant inventions to date. He spont 10 years working with the U.S. Navy putting some of the first vacuum tube computers to practical use. He was also involved in making the continue, macroful uses of radar practical; proceed in integration atomic energy, duplication machines for the Xerox Corp.; jet propulsion; and interplanetary communication (carth to moon, etc.).

Page Seventeen

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Patent Office. "Usually the board members sit behind a bench and give you 15 minutes to show your item," Cenammo said. "When we demon-strated the heat cell, bose goys came off the bench and came down and started iooling around with it and it took an hour and fifteen minutes-that is something they would never ordinarily do. They just couldn'thelp themselves because they were so excited—they knew Slan was on to something revolutionary." Now, Meyer is wailing for the final relearing of the "mother" patent that will allow him to finally get the fuel cell into production across the country. He expects to get the patent from the board of appeals within two months.

Norman the conduct appeals which two months. Already, he is setting up dealer-ships around the country to sell and install the fuel cell into homes and automobiles. Even before the publication of this article, peeple from all over the country were cen-tring Meyer for more information. "It is going to depend upon the American public to get the tval cell in the country." he said. "It has been peeple, not companies or govern-ments that have gotten the fuel cell his far along. If enough people want this, they will get it into the country. People are just tired of being ripped off."

technology, but certainly not better from the standpoint of easy replication by people not associated with his corporation or a government entity like NASA. Other water fuel systems devised by various inventors over the years have been easier to replicate and not subject to highly sensitive adjustments in order to keep them working. His ultimate invention, an injector sparkplug that creates the fuel, injects and then fires it, was shown publicly, but never demonstrated in use. It might as well have been a ghost.

When Meyer died in 1998 at age 57, after claiming that he had been poisoned, "sharks moved in and took everything," according to Steve. The dune buggy was stripped of its water fuel components, and even his notes, computer files, etc., were gone immediately after his death. Just who those "sharks" may have been is the subject of much speculation. As far as the cause of death, he had high blood pressure, and it is entirely possible that he died of an aneurysm, as the coroner said. There is the lingering question as to why his work stopped when he died in 1998, but it doesn't do any good to speculate here. A U.S. company paid his widow for access to the technology, with a view to replicating it, but never did.

Meyer was a sincere man who, according to his twin brother, lived in a small apartment above his garage workshop and worked 24 hours a day to develop his technology. He tried to tell the world over 20 years ago that fossil fuels were running out, atmospheric oxygen levels were dropping, and that there would be war over scarce oil. He dedicated his life to finding solutions to these problems, and he realized success in his quest: an environmentally sound technology that was proven to work. For this, he was ignored, called a fraud, and died without his small hometown even remembering him with so much as a plaque. Such has been the life of the "Stanley Meyers" of the world. But his dedication to helping mankind through ongoing research, in the face of opposition, is still worthy of imitation.

United States Patent [19]

[11] Patent Number:	4,936,961
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- [45] Date of Patent: Jun. 26, 1990
- [54] METHOD FOR THE PRODUCTION OF A FUEL GAS
- [76] Inventor: Stanley A. Meyer, 3792 Broadway, Grove City, Ohio 43123
- [21] Appl. No.: 207,730

Meyer

[22] Filed: Jun. 16, 1988

Related U.S. Application Data

- Continuation-in-part of Ser. No. 81,859, Aug. 5, 1987, Pat. No. 4,826,581. [63]
- [51] Int. CL³ C07G 13/00
- [52] [58]

[56] **References** Cited **U.S. PATENT DOCUMENTS**

1

3,740,283 1,511,450 1,696,809	4/1988 4/1985 9/1987	Laas et al

OTHER PUBLICATIONS

Julius Grant, ed., Hachh's Chemical Dictionary, 4th ed., McGraw-Hill Book Co., 1969, p. 282.

Primary Examiner-Stephen J. Kalafut Attorney, Agent, or Firm-Porter, Wright, Morris & Arthur

ABSTRACT [57]

A method for obtaining the release of a fuel gas mixture including hydrogen and oxygen from water in which the water is processed as a dielectric medium m an electrical resonant circuit.

2 Claims, 3 Drawing Sheets



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METHOD FOR THE PRODUCTION OF A FUEL GAS

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Related Application

This is a continuation-in-part of my co-pending application Ser. No. 081,859, filed 8/5/87, now U.S. Pat. No. 4.826.581.

Field of Invention

This invention relates to a method of and apparatus for obtaining the release of a fuel gas mixture including hydrogen and oxygen from water.

BACKGROUND OF THE PRIOR ART

Numerous processes have been proposed for separating a water molecule into its elemental hydrogen and exygen components. Electrolysis is one such process. Other processes are described in United States patents such as 4,344,831; 4,184,931; 4,023,545; 3,980,053; and ²⁰ Patent Cooperation Treaty application No. PCT/US80/1362, published 30 April, 1981.

OBJECTS OF THE INVENTION

It is an object of the invention to provide a fuel cell ²⁵ and a process in which molecules of water are broken down into hydrogen and oxygen gases, and a fuel gas mixture including hydrogen, oxygen and other gasses formerly dissolved within the water is produced. As used herein the term "fuel cell" refers to a single unit of ³⁰ the invention comprising a water capacitor cell, as hereinafter explained, that produces the fuel gas in accordance with the method of the invention. Brief Description of the Drawings

FIG. 1 illustrates a circuit useful in the process. FIG, 2 shows a perspective of a "water capacitor'element used in the fuel cell circuit.

FIGS. 3A through 3F are illustrations depicting the theoretical bases for phenomena encountered during operation of the invention herein.

Description of the Preferred Embodiment

In brief, the invention is a method of obtaining the se of a gas mixture including hydrogen and oxygen and other dissolved gases formerly entrapped in water, from water consisting of: (A) providing a capacitor, in which the water is included as a dielectric liquid between capacitor plates, in a resonant charging choke circuit that includes an inductance in series with the capacitor; (B) subjecting the capacitor to a pulsating, 50 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 their subjection to electrical polar forces; 55 (C) further subjecting the water in said capacitor to said pulsating electric field to achieve a pulse frequency such that the Pulsating electric field induces a reso nance within the water molecule; (D) continuing the application of the pulsing frequency to the capacitor 60 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 said capacitor during the application of the pulsing field, whereby the co-valent 65 electrical bonding of the hydrogen and oxygen atoms within said molecules is destabilized such that the force of the electrical field applied, as the force is effective

within the molecule, exceeds the bonding force of the molecule, and hydrogen and oxygen atoms are liberated from the molecule as elemental gases; and (F) collecting said hydrogen and oxygen gases, and any other gases

that were formerly dissolved within the water, and discharging the collected gases as a fuel gas mixture. The process follows the sequence of steps shown in

the following Table I in which water molecules are subjected to increasing electrical forces. In an ambient 10 state, randomly oriented water molecules are aligned with respect to a molecular polar orientation. They are next, themselves polarized and "elongated" by the application of an electric Potential to the extent that cova-

lent bonding of the water molecule is so weakened that 15 the atoms disassociate and the molecule breaks down into hydrogen and oxygen elemental components. Engineering design parameters based on known theoretical principles of electrical circuits determine the incremental levels of electrical and wave energy input required 20 to produce resonance in the system whereby the fuel gas comprised of a mixture of hydrogen, oxygen, and the other gases such as air test were formerly dissolved within the water, is produced.

	TABLE I
	PROCESS STEPS
	OF THE WATER MOLECULE AND/OR HYDROGEN/OXYGEN/OTHER ATOMS:
A.	(AMBIENT STATE) RANDOM
B.	ALIGNMENT OF POLAR FIFLDS
С.	POLARIZATION OF MOLECULE
D.	MOLECULAR ELONGATION
E.	ATOM LIBERATION BY BREAKDOWN OF
	COVALENT BOND
F.	RELEASE OF GASES

In the process, the point of optimum gas release is reached at a circuit resonance. Water in the fuel cell is subjected to a pulsating, polar electric field produced by the electrical circuit whereby the water molecules 40 are distended by reason of their subjection to electrical polar forces of the capacitor plates. The polar pulsating frequency applied is such that the pulsating electric field induces a resonance in the molecule. A cascade effect occurs and the overall energy level of specific water molecules is increased in cascading, incremental steps. The hydrogen and oxygen atomic gases, and other gas components formerly entrapped as dissolved gases in water, are released when the resonant energy exceeds the co-valent bonding force of the water molecule. A preferred construction material for the capacitor plates is a stainless steel T-304 which is non-chemically reactive with water, hydrogen, or oxygen. An electrically conductive material which is inert in the fluid environment is a desirable material of construction for the electrical 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 and/or amplitude or pulse train sequence of the initial pulsing wave source, final gas output is varied. Attenuation of the voltage field frequency in the form of OFF and ON pulses likewise affects output.

The overall apparatus thus includes an electrical circuit in which a water capacitor having a known dielec-

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The problem with Meyer's work is that he didn't remember his originally stated goal. Most people could never hope to duplicate his technology. It is too complicated and difficult to replicate "in your garage on a weekend." It is not a userfriendly technology. That is why, eight years after his death, even people who know electronics are scratching their heads wondering how to replicate it. I'm not saying that people have not successfully replicated it, but that a big corporation, the entity that he said would never produce it, would likely be the only entity that could. Could you build a plasma TV in your garage? It would be easy by comparison.

Meyer said early on that he didn't trust governments or the corporate world to do the right thing with regard to this technology, so he took steps to ensure that no intervention would stop it. Yet his work ended up like other inventions: MIA. He apparently thought "the system" would respect his "by the book" approach. Not so. His dune buggy is just as silent as any other popular water car ever made. Leave it to the corporations and the governments to sell us our fuel!

His twin brother, Steve, recently showed this to be the case by releasing a copyrighted description of a "hydroxyl filling station." It seems to promote the marketing of oxyhydrogen water fuel from gas stations that have been converted to hydrogen filling stations, making it onsite. It's reasonable to conclude that you will be required to buy your water fuel from the existing energy players, where it can be certified as approved for the environment, and taxed. It will probably cost about the same as what you now pay for gasoline, as an oil company spokesman predicted in 2005. What a twist: the same system that suppressed the introduction of water fuel for 100 years ends up being the only one approved to make it and sell it to you! And this thanks to an invention originally promoted it as a do-it-yourself product that would allow you to collect rainwater and use it as fue!!



Another effort to produce a water-powered car, that is easier for us to replicate, was taking place a few hours south, near Nashville, Tennessee, by a man named Herman Pleasant Anderson. Herman was a "country boy rocket scientist". But we need to back up just a bit to learn about his childhood friend, Donald Brisby. Donald is a down-to-earth retired Tennesseean who left the south to work in picture chromatography all over the U.S. When he

wasn't working to support his family, he was inventing or building something, like his own portable sawmill, which he used to build his family a home from lumber he milled.

Donald is a Tesla fan who has been in search of free energy for quite some time. At one point he even launched his own experimental balloon with a wire connected to it, and had sparks grounding to earth from the ionosphere! When he puzzled over what was going on up there, he knew who to ask.

In the early 1980's he had a full-sized Chevrolet pickup truck that he managed to get idling on water fuel, and after experiencing difficulty getting the system to do more than just idle, again, he asked a longtime acquaintance with a knowledge of science to help: Herman Anderson. The elder Herman had been interested in science, and ions in particular, since he was a child.

So, Donald's reason for believing that Herman could help with his water car went back to his childhood, during WWII, when he looked up to Herman as a genius inventor who was an Army Air Corps flight instructor. By the end of the war Herman could fly anything they had in the air. Later, in 1959, he learned of the inventor's newest creation, a small, lightweight, atomic ion motor, which used a small piece of a radioactive sodium 24 wafer to produce tremendous horsepower.

Donald even accompanied Herman to demonstrate the invention to government scientists. But instead of embracing the awesome technology and rewarding its inventor, an attempt was made to steal it! A Geiger counter was used to "prove" that the device emitted radiation and could not be allowed to leave the secure facility. Fortunately, a friend who was a nuclear physicist had accompanied them on the demonstration, and he demanded to hold the Geiger counter to his wristwatch. The detector went wild, exposing the pretense being used to abscond with the device: the excuse that it was unsafe. Brisby threatened to sue if they tried to stop them from leaving with it. The men held their breath until they got outside the gate with the device. Later, Brisby convinced the Nashville Tennessean newspaper to do an article on the invention, which follows.

And this wasn't the first time that Herman had come up with an advanced invention that someone wanted for free. Several years earlier, while working for the U.S Air Force's Arnold Engineering Development Center, he had produced, in his free time, a special welding rod that was needed to put the first U.S. satellite into space. The charge was made that since he was working for them when he thought of the invention, it belonged to them! I like the answer he gave them: "Okay, if it belongs to you, then why don't you already

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Williamson Farmer Claims Invention of Atomic Motor

A Williamson county farmer-inventor said yesterday he has invented a 22-ounce atomic motor which will power anything from a rocket to a car.

Herman Anderson, 42, of the Allisona community, said he has perfected what he called an atomic magnetic ion motor which he said will run for months on a tiny amount of atomic fuel.

He said he hopes to have a testing of the motor soon at Redstone arsenal.

The motor is a small coneshaped object with flippers at the bottom. Anderson, who holds about 40 other patents on inventions, said it was about 10 years in design and experimentation.

Zoomed Upward

"When I put a pair of helicopter blades on the motor it went up about 5000 feet in the air," An-derson said. He is a native of Williamson county who spent one year at Battle Ground academy before leaving school.

"I think the possibilities of this are almost endless," he said yesterday. "It can be used to power rockets, boats, cars, planes, generators and all with very little fuel."

Anderson said the motor also can be used to cause "all sorts of electrical disturbances-and thus it may be valuable as a weapon during war."

He said he is anxious to give the government first military rights to the motor-but that he has just about lost patience with Washington officials, particularly those of the Atomic Energy commission whom he visited.

Calls AEC Tightwads

"but they wanted it for nothing. They're all a bunch of politicians. They spend millions trying to develop something like this, but came back with it.

I'm about ready to sell to some more because I haven't got and



-Photo by Brisby studio

Williamson county inventor Herman Anderson, right, dem-"They know it would work and onstrates his atomic motor to Donald Brisby a neighbor. Anderthey were very interested," he said, son claims the engine will revolutionize all modes of travel.

foreign nation. I'm fed up with patent just yet. the government." "It works. I'm sure of that. I've Anderson refused to give out tested it enough. I'll show those they wouldn't pay me. Wanted many details on his motor yester- people at Redstone," he said. me to dump it in their laps. So I day. He said it works on a rotary To prove this, he said experipower system, and that it uses ments have caused considerable "I'm patriotic and all that, but atomic fuel, "but I can't tell you electrical damage in the Allisona ity, and that he was asked

A neighbor, bon Brisby "It knocked all the television sets out - and they're all mad at him. Now, whenever a television goes on the blink, they blame him. It also messed up the telephone wires so that everybody got on the same line."

Donald Pinkerton of the Middle Tennessee Electric Membership Corporation told THE NASHVILLE TENNESSEAN yesterday he was not certain whether Anderson's motor caused the electrical trouble, "We just can't tell," he said.

Anderson also said the motor if not properly shielded, demobilizes people in the surrounding area. "It's a funny feeling -you feel numbed. This happens because it makes air a conductor of electricity and causes an electrical short in the air."

Idea 10 Years Old

Anderson, a former technician at the AEDC lab in Tullahoma who now owns 80 acres of dairy farm, said: "This motor didn's just happen overnight.

"I got the idea about 10 years ago. And then in my spare time I started trying to build it. I made about 20 different models, but none of them worked. I about gave it up - I thought I'd failed completely.

"But then a couple of years later I went to work for the Arnold engineering people and 1 ran into something there that gave me a new approach, and I knew I had the thing licked."

A year and a half ago Anderson left the Arnold job to spend full time on his inventing and farming.

He said he also is working on several other inventions, including some toys. One of these is a toy helicopter which works. Recently Anderson sold a welding rod in the government for several thousand dollars.

He described himself to a reporter as a discoverer rather than an inventor.

"Everyone's an inventor because everyone has had an idea. But I'm a discoverer. I've discovered these new machines.

"That's because I'm curious. I've got curiosity about everything here on the earth," he said, "and the beyond as well." have it? Because it only exists in my head, and you're not going to get it, unless you pay me \$10,000 and allow me the patent rights to it!" That was quite a sum of money in 1955, but they paid up! Herman bought his first farm with it.

Back to the water car project. The two men went to the Vanderbilt University Science library and began a search for information on how to make a working water car work better. They reviewed patents, such as those included in this book. But they had something else going for them. Herman had access to some of the greatest scientific minds of the 20th century. Every night, a jet would fly from Tennessee to California, only to shuttle documents between the lab where Herman worked and the Jet Propulsion Laboratory in Pasadena. He knew such greats as rocket scientist Wernher Von Braun. If he had any question about moving ions in an electrolyzer, Herman knew the people to ask.

But soon after their partnership began, it ended. Donald quit altogether when he mistakenly ignited the gas escaping from a hose, causing a flashback that exploded his chamber and imbedded plastic shrapnel in the vaulted ceiling of his living room. (Hard to believe, but he had installed no flashback arrestor, such as a bubbler, between his electrolyzer and the end of his hose) He also had concerns about the EMF radiation that he detected emanating from the high voltage pulsing device he was using. He had experienced the attempt to stop a citizen from doing anything that involved radiation before, and didn't want to get embroiled in a conflict with the government. He decided that an electric car was the way to go, avoiding hydrogen from water altogether, and stopped his research, having spent around \$2000 in his quest.

Herman, on the other hand, used a different approach in building his chamber and kept pursuing it until he had perfected the system, at least to the point of proving to himself that it worked. It was not a well-polished system, by any means, but it did work. A newspaper reporter and his photographer did a story on it in 1984, shown below.

Brentwood man invents systemets top miles

By Bill Mitchiem

Herman P. Anderson's 1969 Ford LTD pers 38 miles for Sellon — of water. That associating figure is the locart of a pa-terst application for a hydrogen fuel supply and

Water Intertion retem that Anderson he the list two years at his Brenzwood home on Hill Road.

... Of course, there are several technicalities to explain. Anderson's system requires the mixing of hydrogen gas to mix with the water. The result, he says, is in effect a "powerful steam engine."

"I could sell it now," Anderson, 67, said. I've done a patent search on the improve-

ments and there aren't any like mine on the market. The patent is pending without any infringements on anyone else."

The patent, which will take several years to process, would be limited to any improvements Anderson makes on already-patented bydrogen fuel supply systems - a point that Anderson michly concedes.

The existing patents differ from Anderson's application because they depend on refillable tanks of hydrogen connected to the carburetor or manifold by pressurized lines.

The already-patented systems also run only on hydrogen gas. Anderson says he has improved on that by injecting water vapor at the poist of combustion to create a "steam engine" effect.

"The hydrogen as fuel is nothing new." the retired Air Force fighter pilot said. "Ir's the efficiency improvements that make this engine highly patentable. I'm generating my own supply of hydrogen right here under the bood "

The eight-sylinder Ford binck can be switched from hydrogen fuel to starvlard gasoline with the flip of a switch on the dashboard. demonstrating more flexibility than the exist. ing hydrogen systems, Anderson noted.

Anderson has a long himory of working with chemical and nuclear elments, yet has never taken formal training in the fields, he (Continued on Page SA)

Cal

(Continued from Page 1A) said

said He developed a welding rod that made the union of two types of me-tals easier and the sold the rights to the servences White living in Williamson Courty's Allisons Community in 1960, we developed a magnetic for motor that bees radiosctive particles as a private disting, drawing inserver as a priver sector, drawing interest from Annois Engineering officials in

. . . .

Tullahoma

"I'm basically self-taught and montally inscreated." Anderson sold. Here is Anderson's account of the workings of his latest experiment:

Served in a back corner of bis car's engine compartment is a reservoir of louized water, loso which positive and negative electric terminais are placed.

When a charge is seen through the water, the water exclocutes - H₂O

split. The oxygen storms cling to the post. tive electrode while the hydrogen stoms, in an ionized state, are conducted through the solution to the negative plate.

There, the hydrogen atoms recombine under an electrical charge to produce H, - hydrogen gas - which is collected and directed through a LP gas carburctor into the manifold for distribution to the cylinders.

Brenowood Journal, Wednesday, July 18, 1982 Page SA

Also at the manifold, a fine mist of distilled water is injected.

The mater copiests as steam when the gas ignizes and gives the piston a good solid pash all the way down." Anderson said. "It's much more powerful than a gaudine engine." Besides the increased horsepower. which has been measured on a dymemocrater, Anderson comends that the costine runs about 20° cooler and produces casty water vapor and sittens 10

oxide - laughing 845 23 missions.

The emire alternative fuel system has been intricately coordinated with the conventional carburetor and timing system, making it possible to switch fuel sources while the engine is running. Anderson demonstrated with a toggle switch on the car's dashboard.

Anderson, who says he has been inventing since age 12, further demonstrated the engine by disconnecting the gasoline fuel lines and allowing the engine to deplete the fuel left in the carboretor. He then switched on the electricity to the hydrogen gas generator and restart-

ed the motor.

The automated system of colorful wires, fubes, and water tanks under the hood of Anderson's green and white Ford sedan can be put together .by anyone who has the right information and about \$300.

The items that Anderson did not fashion himself from tubing and valves can be purchased from automobile parts stores that carry components for propane powered engines, Anderson said.

"That's why I waited so long to tell, anyone about it," Anderson smiled "I feel like I'm protected as best as I can with my patent applications."

The reporter recently told me that, for the demonstration, the gasoline line was disconnected, since the car could run on either fuel, and the car was then started and run. He put his hand in the exhaust stream and it became wet, then he breathed from the exhaust pipe as the car was running. He became a little lightheaded, but he realized that it was not normal car exhaust that he was breathing. I told him it was probably nitrous oxide, or laughing gas, that results from burning atmospheric air with its high nitrogen content.



In 1996, Dr. Cliff Ricketts, agriculture professor at Middle Tennessee State University, interviewed Herman with a video camera rolling. The hour-long interview covers the operation of "The Green Machine," as Herman's green 1971 Ford LTD water car came to be called. The information presented on the tape helps to shed light on a simple system for turning water into fuel, enough fuel to run a 302 cubic inch V8 engine in a heavy, 'big boat' of a car.

By the way, the car was parked at MTSU for several years before it was moved to a private museum in Shelbyville, Tennessee, and later sold to the Kentucky Water Fuel Museum, where it is on display now. It has not been started for almost 20 years, and the water fuel system has been reproduced on a test bench by volunteers.

Dr. Ricketts himself has been pursuing water fuel in a different way: using the electricity from solar panels to turn water into fuel while the sun shines, compressing it into tanks, and using it to power vehicles. With this setup, each day you would drive to work on the hydrogen you created the day before. This system is quite viable, would reduce oil consumption and pollution considerably right now, and is being offered by companies like United Nuclear Scientific Supplies. By the way, Dr. Ricketts and his students set a land speed record in 1991 for a hydrogen-powered car. The basic features/specifications of Herman's system, as described by the inventor in his 1996 interview, are:

- De-ionized or (preferably) ozonated water for both the electrolyzer and the water fog injection system
- Potassium hydroxide (KOH) electrolyte adjusted to pH 12
- 14" OD X 3.5" PVC pipe (1/2" thick) with inset flanges for...
- 2 13" round soft steel nickel-plated cathode/anode plates
- 2" PVC external standpipe connected with two 1" tubes for cooling of the electrolyte by thermal cycling
- 12 volt/22 amp electrolysis, alternately applied with...
- 70,000 volt/11 milliamp 7.5 hz corona discharge radiolysis
- 8 oz. water column working pressure, to increase density of the gas and suppress bubbling of the electrolyte
- On/off solenoid actuated by lp gas pressure switch
- Lp gas regulator used with stock carburetor butterfly
- Intake vacuum-powered water fog injection (Lemert)
- Ignition timing retarded, with racing-type ignition coil
- Insulation and shielding for the HV EMF radiation

On the following page a photograph of Herman's engine compartment identifies the main components of his system. The system is fairly simple: Turn on the ignition, and then a dashboard mounted switch, which powers a gas pressure sensor switch, which in turn powers a solenoid, which in turn powers both the electrolyzer (12 volts/22amps) and the high voltage system (pulsed 70,000 volts). Although Herman does not directly confirm this, it is possible that a forced air blower, namely, that used to blow heat in the vehicle, is also turned on to act as a "supercharger." The pressure builds and the engine can be started. The pressure sensor then turns the electrolyzer off and on intermittently as the pressure builds, such as when at a stop. Upon reaching one's destination, the dash switch (first) and then the ignition is turned off.



- C. Air from blower can be added to stream of gas
- D. Honeywell adjustable LP gas pressure switch (from a furnace system)
- E. LP gas regulator (possibly could be natural gas type also)
- F. Intake air cleaner adapter (off of an old LP forklift)
- G. Gasoline on/off solenoid valve
- H. Vacuum line to dash-mounted Lemert Selectrol water injector (P-51 style)
- I. On/off solenoid, connected to dash switch through pressure switch
- J. Positive electrode (anode) connected to battery by solenoid (I)
- K. (Not shown, originally installed on passenger-side floorboard)

70,000 volt coll pack and pulsing unit, with a "flip-flop" that alternates 7.5 Hz high and low voltage pulses to unit.

L. Pressure gauge to determine correct operating pressure (8 0z.)

What then, is the secret to Herman's system? Some innovation, and a joining together of known facts:

The use of de-ionized (pure) or ozonated (extra oxygen atom) water The use of potassium hydroxide electrolyte, pH 12 The use of magnetic steel to increase production (Kilgus) The use of high voltage EMF to augment gas production and treat

the resulting gas (Ruben, Horvath, Chambers) The use of water injection to control the burn & make steam (Billings) The use of forced air/gas pressure to increase the density of the gas The use of a high voltage ignition coil and a hotter sparkplug The use of a recirculation tube to both cool the electrolyte and to

re-introduce gas bubbles back into the chamber. The spacing of the plates to produce a "neutral center" where there is no rotational movement and thus more concentrated energy.

He mentions corona discharge and cold fusion. These terms may cause someone who knows nothing about such things to back off, but they shouldn't. Cold fusion is something you can do in your garage with the same HV coil your car uses! Basically, Herman ionized the atmosphere around a 70,000 volt sparkplug arc. He caused EMF radiation to go from the high field electrode, where he made that spark, through the chamber to the low field electrode. This accomplished "zero-spin energy transfer." He was the "lon King"!

The effect of this high voltage discharge action, according to Herman, is both acceleration of the gas production and altering the nature of the gas itself into deuterium, by reversing the spin of every other one of the hydrogen ions, drawing them together. This change makes a different fuel than normal electrolytic oxyhydrogen. Herman says it becomes deuterium, twice as dense (therefore slower-burning) and twice as powerful than hydrogen.

The "Green Machine" was parked in the mid-1980's, as it was rather ugly by now, the heater core had been removed to accommodate the electrolyzer, and Nashville gets cold in the winter. Herman was also up in years, yet he went on to secure U.S. Patent # 6,119,651 for a hydrogen injector sparkplug. A Tennessee corporation, made up of several of Herman's surviving friends, is still attempting to market it. However, it is not a new invention, as others had already made similar devices, such as Roy McAlister's 1976 U.S. Patent # 3,980,061. And Herman's injector plug differs greatly from that of Stanley Meyer's in that it only *injects* and then fires the hydrogen supplied to it under pressure, whereas Meyer's plug *produces* the oxyhydrogen from water just before it injects and fires it.

Nevertheless, as with all patents, important details can be gleaned by perusing it carefully. It mentions the important of a higher-thannormal spark voltage for ignition, a platinum-type sparkplug electrode, as well as a reduced sparkplug gap of only .025. I think it is very interesting that an October 2, 2000, New York Times article speaks about his patent as one of too few for that period, entitled "PATENTS; Amid public outrage over oil prices, how much progress on alternatives to fossil fuels? Alas. . . ." It points out that the mass energy density of hydrogen is low, so its energy potential needs to be increased by pressurization.

The beauty of his sparkplug invention is the adaptation of oxyhydrogen to any engine, regardless of the fuel system that it uses. All computerized electronic fuel injection devices, seemingly engineered by the oil companies to dump fossil fuel into an engine's combustion chamber, are able to be bypassed by this single, relatively simple invention. And the vehicle can continue to run on the original fuel, if desired. The function of sparkplug continues as before, it's just that now it is also an alternative fuel injection and firing mechanism.

Inexpensive devices, such as that sold by Eagle Research, can be installed to trick the car's computer into thinking that everything is fine, and it adjusts to the new fuel mixture.



I have been told that in the 1980's a book on electric vehicles published a photo and a description of the trunk-mounted device that fueled the water-powered car of Carl Cella. But it was the November, 1996 issue of Nexus

magazine that caused Carl's story to gain notoriety. They do not claim to have actually seen or tested it. It goes like this:

In 1983, an 18 year-old California heavy-metal band leader decides to build a water car. He studies everything that's been done before, and comes up with a unique and efficient system, which he successfully installs on a five-year old Cadillac. He attempts to publicize it, to no avail. He later ends up in prison, and from there he writes his story. Now he is incommunicado, if he is still alive.

There is no image of Carl, his water fuel system, or his car, nor any testimony from anyone else who ever actually saw him or it. The picture shown online (above) is not his car, but is shown alongside his plans as if it were. There is no confirming testimony nor details of how that system works. Fear? I have spoken to a man who called Cella while he was in prison, and Carl assured him that the system, if built as described, will work. His profanity-laced plans are viewable online. My view of his story is that if Carl had help from the likes of a Southern California rocket scientist, he could have done what he claims to have done at 18, the person who helped him wanting no mention made of his name or involvement in the project. This may or may not be the way things were, but it is my guess that if Cella's device works, it works because someone already knew it worked. On January 2, 1991, Juan Carlos Aguero, of Cordoba, Argentina, secured European Patent # 0405919A1, for a "Water-Propelled Internal Combustion Engine." His patent claims that less hydrogen, and thus less electricity, is required to run an engine if dry steam is added to the intake. He, like others before him, says that it cools and controls the combustion, and that the steam expands during the combustion stroke. He also recommends passing the hydrogen through a heat exchanger before induction into the engine. His patent is worthy of your attention, and is shown in the appendix at the end of this book. :)

"Something New Under the Sun..." 2000-?

The history of water fuel has been an intermingling of science fact and science fiction. Does it really matter which one is which? You bet!

Mainstream science tells us that it's impossible to run a car on water. People all over the world know for a fact that this narrow viewpoint is false, that it is really science fiction.

There are fake, non-working water car plans on the internet, to be sure. Who is responsible for such disinformation is anyone's guess. But it was those plans that caught my attention and got me interested in the technology, and I then discovered real plans. The line between science fact and science fiction is so blurred that we might as well accept what Arthur C. Clarke said: "If a scientist tells you something is impossible, he's probably wrong. If he tells you something is possible, he's probably right." Many notable scientists and inventors have agreed that almost anything is possible, including Einstein, Max Plank, Eugene Mallove, the Wright Brothers and Henry Ford. The internet has opened doors to knowledge that was previously difficult to find. If it wasn't for the internet, I wouldn't have written this book, and you wouldn't be reading it. Yes, there are real water car plans, and others that have been called "phony," circulating on the internet. They are sold on EBay. But, at least as in my case, they are causing people to hear of water fuel for the first time. Most of them are nothing new, but repeats of other plans and patents. But this free access to information by a large number of people being on line is a new phenomenon in the history of mankind.

At least one of these circulating sets of plans is based on U.S Patent # 6,126,794, secured by Xogen Power, Inc. Xogen is a Canadian company that reportedly closed after an explosion injured a worker at their facility. The 2000 patent, which follows, was issued to Stephen Chambers, and it is similar to Meyer's system. The second page describes how to produce two varieties of gas: para hydrogen and ortho hydrogen. They, like Stan Meyer, were said to have produced a stationary unit capable of powering and heating a home. Harold Jahn of Clean Energy, Inc., approached Xogen about the possibility of marketing their system, due to its similarity to Meyer's system, but no business relationship developed. It appears that this type of device encroaches too far on very large and deeply rooted utility income streams. Industry may now be allowed to create their own power, in part to reduce the effects of expensive energy on the economy, but homeowners will likely have to continue waiting.

Hydrostar and other companies and individuals are offering, for sale or for free, plans that are a bringing together of the hard work and research by people like Dingel, Meyer, Puharich, Horvath, etc. The proliferation of these plans is only going to increase. The successful ones are going to be publicized, and the truth about water fuel is going to become known. This truth includes the following details: first, that it can be done on the fly; second that less gas is required than previously thought necessary, and lastly, that it is easier than previously thought possible. In this way, the work done by all the inventors of the past 100 years will not have been in vain.



United States Patent [19]

Chambers

[54] APPARATUS FOR PRODUCING ORTHOHYDROGEN AND/OR PARAHYDROGEN

- [75] Inventor: Stephen Barrie Chambers, Alberta, Canada
- [73] Assignee: Xogen Power Inc., Calgary, Canada
- [21] Appl. No.: 09/105,023
- [22] Filed: Jun. 26, 1998
- [51] Int. Cl.⁷ C25B 15/00; C25B 9/00; C25B 11/04

[56] References Cited

U.S. PATENT DOCUMENTS

3,311,097	3/1967	Mittelstaedt 204/278 X
3,980,053	9/1976	Horvath .
4,107,008	8/1978	Horvath .
4,184,931	1/1980	Inoue
4,316,787	2/1982	Themy
4,384,943	5/1983	Stoner et al
4,394,230	7/1983	Puharich.
4,470,894	9/1984	Dyer.
4,599,158	7/1986	Ofenloch 204/229.5
4,755,305	7/1988	Fremont et al
4,798,661	1/1989	Meyer
5,205,994	4/1993	Sawamoto ct al
5,304,289	4/1994	Hayakawa .
5,324,398	6/1994	Erickson et al
5.376.242	12/1994	Havakawa .

[11] Patent Number: 6,126,794

[45] Date of Patent: Oct. 3, 2000

FOREIGN PATENT DOCUMENTS

0971886	3/1997	Japan .
9809001	3/1998	WIPO.

Primary Examiner-Donald R. Valentine Attorney, Agent, or Firm-Stoel Rives LLP

[57] ABSTRACT

An apparatus for producing orthohydrogen and/or parahydrogen. The apparatus includes a container holding water and at least one pair of closely-spaced electrodes arranged within the container and submerged in the water. A first power supply provides a particular first pulsed signal to the electrodes. A coil may also be arranged within the container and submerged in the water if the production of parahydrogen is also required. A second power supply provides a second pulsed signal to the coil through a switch to apply energy to the water. When the second power supply is disconnected from the coil by the to switch and only the electrodes receive a pulsed signal, then orthohydrogen can be produced. When the second power supply is connected to the coil and both the electrodes and coil receive pulsed signals, then the first and second pulsed signals can be controlled to produce parahydrogen. The container is selfpressurized and the water within the container requires no chemical catalyst to efficiently produce the orthohydrogen and/or parahydrogen. Heat is not generated, and bubbles do not form on the electrodes.

37 Claims, 10 Drawing Sheets



10

APPARATUS FOR PRODUCING ORTHOHYDROGEN AND/OR PARAHYDROGEN

1

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to an apparatus for producing orthohydrogen and parahydrogen.

2. Description of Related Art

Conventional electrolysis cells are capable of producing hydrogen and oxygen from water. These conventional cells generally include two electrodes arranged within the cell which apply energy to the water to thereby produce hydrogen and oxygen. The two electrodes are conventionally 15 made of two different materials.

However, the hydrogen and oxygen generated in the conventional cells are generally produced in an inefficient manner. That is, a large amount of electrical power is required to be applied to the electrodes in order to produce ²⁰ the hydrogen and oxygen. Moreover, a chemical catalyst such as sodium hydroxide or potassium hydroxide must be added to the water to separate hydrogen or oxygen bubbles from the electrodes. Also, the produced gas must often be transported to a pressurized container for storage, because ²⁵ conventional cells produce the gases slowly. Also, conventional cells tend to heat up, creating a variety of problems, including boiling of the water. Also, conventional cells tend to form gas bubbles on the electrodes which act as electrical insulators and reduce the function of the cell. ³⁰

Accordingly, it is extremely desirable to produce a large amount of hydrogen and oxygen with only a modest amount of input power. Furthermore, it is desirable to produce the hydrogen and oxygen with "regular" tap water and without any additional chemical catalyst, and to operate the cell without the need for an additional pump to pressurize it. It would also be desirable to construct the electrodes using the same material. Also, it is desirable to produce the gases quickly, and without heat, and without bubbles on the electrodes.

Orthohydrogen and parahydrogen are two different isomers of hydrogen. Orthohydrogen is that state of hydrogen molecules in which the spins of the two nuclei are parallel. Parahydrogen is that state of hydrogen molecules in which the spins of the two nuclei are antiparallel. The different characteristics of orthohydrogen and parahydrogen lead to different physical properties. For example, orthohydrogen is highly combustible whereas parahydrogen is a slower burning form of hydrogen. Thus, orthohydrogen and parahydrogen can be used for different applications. Conventional electrolytic cells make only orthohydrogen and parahydrogen. Parahydrogen, conventionally, is difficult and expensive to make.

Accordingly, it is desirable to produce cheaply ortholytogen and/or parahydrogen using a cell and to be able to control the amount of either produced by the cell. It is also desirable to direct the produced orthohydrogen or parahydrogen to a coupled machine in order to provide a source of energy for the same.

SUMMARY OF THE INVENTION

It is therefore an object of the present invention to provide a cell having electrodes and containing water which produces a large amount of hydrogen and oxygen in a relatively 65 small amount of time, and with a modest amount of input power, and without generating heat. It is another object of the present invention for the cell to produce bubbles of hydrogen and oxygen which do not bunch around or on the electrodes.

It is also an object of the present invention for the cell to properly operate without a chemical catalyst. Thus, the cell can run merely on tap water. Moreover, the additional costs associated with the chemical catalyst can be avoided.

It is another object of the present invention for the cell to be self-pressurizing. Thus, no additional pump is needed.

It is another object of the present invention to provide a cell having electrodes made of the same material. This material can be stainless steel, for example. Thus, the construction of the cell can be simplified and corresponding costs reduced.

It is another object of the present invention to provide a cell which is capable of producing orthohydrogen, parahydrogen or a mixture thereof and can be controlled to produce any relative amount of orthohydrogen and parahydrogen desired by the user.

It is another object of the invention to couple the gaseous output of the cell to a device, such as an internal combustion engine, so that the device may be powered from the gas supplied thereto.

These and other objects, features, and characteristics of the present invention will be more apparent upon consideration of the following detailed description and appended claims with reference to the accompanying drawings, wherein like reference numerals designate corresponding parts in the various figures.

Accordingly, the present invention includes a container for holding water. At least one pair of closely-spaced electrodes are positioned within the container and submerged under the water. A first power supply provides a particular pulsed signal to the electrodes. A coil is also arranged in the container and submerged under the water. A second power supply provides a particular pulsed signal through a switch to the electrodes.

When only the electrodes receive a pulsed signal, then orthohydrogen can be produced. When both the electrodes and coil receive pulsed signals, then parahydrogen or a mixture of parahydrogen and orthohydrogen can be produced. The container is self pressurized and the water within the container requires no chemical catalysi to efficiently produce the orthohydrogen and/or parahydrogen.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a side view of a cell for producing orthohydro-50 gen including a pair of electrodes according to a first embodiment of the present invention;

FIG. 2 is a side view of a cell for producing orthohydrogen including two pairs of electrodes according to a second embodiment of the present invention;

FIG. 3 is a side view of a cell for producing orthohydrogen including a pair of cylindrical-shaped electrodes according to a third embodiment of the present invention;

FIG. 4a is a diagram illustrating a square wave pulsed signal which can be produced by the circuit of FIG. 5 and applied to the electrodes of FIGS. 1-3;

FIG. 4b is a diagram illustrating a saw tooth wave pulsed signal which can be produced by the circuit of FIG. 5 and applied to the electrodes of FIGS. 1-3;

FIG. 4c is a diagram illustrating a triangular wave pulsed signal which can be produced by the circuit of FIG. 5 and applied to the electrodes of FIGS. 1-3;



Another company that proclaimed the imminent release of a revolutionary water fuel device was Genesis World Energy, before their name changed to Genesis Scientific. They claimed that a group of more than 400 visionary scientists and engineers worked for two years to produce what they called the

"Edison Device," a self-contained, self-sustaining energy generation device. To quote their press release:

"Roughly the size of an outdoor air conditioning system, the power source can be quickly and easily installed in any home or business to provide virtually unlimited energy from any available water source. The Edison Device utilizes the existing electrical wiring and natural gas plumbing in a home or business to replace the energy provided by utility companies. The home version of the Edison Device produces approximately 30 kilowatts of combined gas and electrical energy per day. By comparison, the typical home uses between five to six kilowatts per day. The commercial model is capable of producing 100 kilowatts of energy per day. The energy generation portion of the devices has no moving parts. In fact, the only "mechanical" aspects of the equipment are small circulation pumps and micro-valves, making the Edison Device both silent and virtually maintenance-free. A minimum amount of water is used over an estimated 20+ years of service life. For the first time in the history of the world, a clean and abundant source of renewable energy is as simple as the attachment of three wires, a gas line and a water hose." The "Edison" is now MIA.

Meanwhile, others have stepped up to the plate, either to help save the planet, to get even with the greedy, to make or save money, or all three. Individuals such as Patrick Kelly, Murray Willis, Andrew Batty, Tom Kramer, and others, have freely published their own analysis of water car plans and building methods. Internet chat groups have allowed thousands of people from all over the world to get together to solve this problem of trying to make a clean-burning fuel that is also affordable. It really is an historically unprecedented cooperation that is remarkable and encouraging. New and old ideas keep popping up, and the input from others helps the analysis to move along briskly. Different ideas or inventions will take center stage for discussion, and then be set aside in favor of another. The information, or disinformation, overload can be overwhelming, but the right information is there for those who are discerning.

The "Joe Cell" is just such an invention. Proponents of this approach



to powering a vehicle claim that an unknown form of energy is leaving the water-filled chamber and powering the car, without a ducted connection to the intake manifold, and even without the sparkplug wires attached! Some claim that levitation of the vehicle takes place, and that the driver's attitude can affect the performance of the device. It sounds more

like a magic carpet ride than a water fuel device.

Since its proponents claim that the cell does not make hydrogen and oxygen from water as it's fuel, I feel that it doesn't belong in among the rest of the inventions presented in this book. To learn about it, look at websites dedicated to the concept. I want to keep an open mind, but we are pursuing oxyhydrogen from water at this time, as have the inventors mentioned previously in this volume, rather than a hidden form of energy. Even so, I will keep an eye on the Joe cell, not wanting to deny the possibility of something that, for all I know, could be true. As Arthur C. Clarke put it, people accept new technology in the following four steps. First, "It's nonsense," next, "It's not important," then: "I always said it was a good idea," and finally: "I thought of it first." I will not say the Joe Cell is nonsense, because I have not tested it, and 30 years ago I said the same thing about water fuel!

The internet is now revealing new inventions even as they hit the street, such as retired Texas chiropractor Dr. Linnard Griffin's colloidal metal catalysis reactor, which he claims has produced hydrogen on a test bench for almost 400 hours continuously, with no outside electrical input, simply by connecting the two electrodes together with a jumper wire. A video, viewable on line, shows a go-cart running on the output of the chamber.

He has founded AirGen Corporation in November of 2005, with a stated purpose of developing chemical processes related to hydrogen production. He has already sold the technology to the fertilizer industry, and claims that his invention will soon change the world's energy paradigm. He has applied for European and U.S. patents, which are viewable online.



Denny Klein is another water fuel inventor, based in Florida, USA. His Hydrogen Technology Applications has produced welding units and was recently featured in a Fox TV news broadcast, which showed a car that runs partially, or entirely, on water. His recent U.S. Patent application, shown below, is interesting reading. You will note that Ruggero Santilli has

teamed up with him in this pursuit. Interesting partnership!

It is very easy to see the similarity of his electrolyzer to that of William Rhodes, which has been recommended by Bob Boyce on internet forums for years. And a new trademarked "name" is given to electrolytic gas: "Aquygen®" (?!) Following are pages of his patent application, along with a picture of one Bob Boyce's earlier PWM3 resonance drivers, which allows just 8 plates to power a vehicle!

(19) United States

- (12) Patent Application Publication (10) Pub. No.: US 2006/0075683 A1 Klein et al. Apr. 13, 2006 (43) Pub. Date:
- (54) APPARATUS AND METHOD FOR THE CONVERSION OF WATER INTO A NEW GASEOUS AND COMBUSTIBLE FORM AND THE COMBUSTIBLE GAS FORMED THEREBY
- (76) Inventors: Dennis J. Klein, Belleair, FL (US); Ruggero Maria Santilli, Palm Harbor, FL (US)

Correspondence Address: DENNIS G. LAPOINTE LAPOINTE LAW GROUP, PL PO BOX 1294 TARPON SPRINGS, FL 34688-1294 (US)

- (21) Appl. No.: 11/274,736
- (22) Filed: Nov. 15, 2005

Related U.S. Application Data

(60) Division of application No. 10/760,336, filed on Jan. 20, 2004, which is a continuation-in-part of applica-tion No. 10/277,841, filed on Oct. 22, 2002, now Pat. No. 6,866,756, and which is a continuation-in-part of . application No. 10/065,111, filed on Sep. 18, 2002,

now Pat. No. 6,689,259. Said application No. 10/277,841 is a continuation-inpart of application No. 09/826,183, filed on Apr. 4, 2001.

Publication Classification

(51) Int. Cl. C10L 3/00

(2006.01) . 48/197 FM; 204/268 (52) U.S. Cl. ..

ABSTRACT (57)

An electrolyzer which decomposes distilled water into a new fuel composed of hydrogen, oxygen and their molecular and magnecular bonds, called HHO. The electrolyzer can be used to provide the new combustible gas as an additive to combustion engine fuels or in flame or other generating equipment such as torches and welders. The new combustible gas is comprised of clusters of hydrogen and oxygen atoms structured according to a general formula H_mO_n wherein m and n have null or positive integer values with the exception that m and n can not be 0 at the same time, and wherein said combustible gas has a varying energy content depending on its use.



PWM resonance driver by Bob Boyce, useful for producing hydroxy gas in a William Rhodes-style chamber like that shown in this recent patent application.



Patent Application Publication Apr. 13, 2006 Sheet 20 of 25 US 2006/0075683 A1

Fig.19

APPARATUS AND METHOD FOR THE CONVERSION OF WATER INTO A NEW GASEOUS AND COMBUSTIBLE FORM AND THE COMBUSTIBLE GAS FORMED THEREBY

RELATED APPLICATION

[0001] This patent application is a divisional application of U.S. patent application Ser. No. 10/760,336 filed on Jan. 20, 2004, which is a continuation-in-part application of the U.S. patent application Ser. No. 10/277,841 filed on Oct. 22, 2002, a continuation-in-part application of the U.S. patent application Ser. No. 10/065,111 filed on Sep. 18, 2002, and a continuation-in-part application of the U.S. patent application Ser. No. 09/826,183 filed on Apr. 4, 2001.

BACKGROUND OF THE INVENTION

[0002] 1. Field of the Invention

[0003] This invention is related to equipment or a system and method for the processing of water or distilled water into a gaseous and combustible form of HHO combustible gas produced from water for use in internal combustion engine systems, in other fossil fuel engine systems, in gaseous welding systems and other similar systems. The invention is also related to the form of HHO combustible gas produced from electrolyzers or gas generators connected to such systems.

[0004] The field of this patent application has been the subject of a rather vast number of patents. Among such prior art is U.S. Pat. No. 4,014,777 issued on Mar. 29, 1977 to Yull Brown under the title "Welding"; U.S. Pat. No. 4,081,656 issued on Mar. 28, 1978 to Yull Brown under the title "Arc assisted hydrogen/oxygen welding"; and other similar patents. In accordance with the above patents as well as with the subsequent rather large literature in the field, "Brown gas" is defined as a combustible gas composed of conventional hydrogen and conventional oxygen gases having the exact stochiometric ratio of 2/3 hydrogen and 1/3 oxygen. As we shall see, the combustible gas treated in this invention is dramatically different than the Brown gas.

[0005] The electrolytic equipment and methods for water separation have also been the subject of a vast number of patents, among which is U.S. Pat. No. 4,726,888 issued Feb. 23, 1988 to Michael McCambridge, entitled "Electrolysis Of Water;" U.S. Pat. No. 5,231,954 issued Aug. 3, 1995 to Gene B. Stowe entitled "Hydrogen/Oxygen Fuel Cell"; U.S. Pat. No. 5,401,371 issued Mar. 29, 1995 to Yujiro Oshima entitled "Hydrogen Generator;" and others.

[0006] The novelty of the present invention over preceding prior art is clear and distinct. The prior art deals with equipment and methods for the processing of water into conventional gaseous fuels, that is, fuels possessing the conventional molecular chemical composition or mixture of chemical compositions and is sometimes referred to as "Brown's Gas". By comparison, the present invention provides equipment or a system and related processes (methodology) to produce novel fuel composed of a chemical species beyond that of molecules, that is, HHO combustible gas, which fuel is produced from water using a particular form of electrolyzer.

DESCRIPTION OF THE INVENTION

[0007] This invention deals with the structure, properties and initial applications of a new clean burning combustible gas hereinafter called "HHO gas" produced from distilled water using a special electrolyzer described in detail in the Specifications.

[0008] It will be soon evident that, despite a number of similarities, the HHO gas is dramatically different than the Brown gas or other gases produced by pre-existing electrolyzers. In fact, the latter is a combination of conventional hydrogen and conventional oxygen gases, that is, gases possessing the conventional "molecular" structure, having the exact stochiometric ratio of 2/3 hydrogen and 1/3 oxygen. As we shall see, the HHO gas does not have such an exact stochiometric ratio but instead has basically a structure having a "magnecular" characteristic, including the presence of clusters in macroscopic percentages that cannot be explained via the usual valence bond. As a consequence, the constituents clusters of the Brown Gas and the HHO gas are dramatically different both in percentages as well as in chemical composition, as shown below.

[0009] The first remarkable feature of the special electrolyzers of this invention are their efficiencies. For example, with the use of only 4 Kwh, an electrolyzer rapidly converts water into 55 standard cubic feet (scf) of HHO gas at 35 pounds per square inch (psi). By using the average daily cost of electricity at the rate of \$0.08/Kwh, the above efficiency implies the direct cost of the HHO gas of \$0.007/scf. It then follows that the HHO gas is cost competitive with respect to existing fuels.

[0010] Under direct inspection, the HHO gas results to be odorless, colorless and lighter than air. A first basic feature in the production of the HHO gas is that there is no evaporation of water at all, and water is directly transmuted into the HHO gas. In any case, the electric energy available in the electrolyzer is basically insufficient for water evaporation.

[0011] This feature alone establishes that the special electrolyzers of this invention produce a "new form of water" which is gaseous and combustible. The main objective of this invention is the first identification on record of the produced unknown chemical composition of the HHO gas, its relationship with the special electrolyzers of this invention, and some initial applications.

[0012] The second important feature of the HHO gas is that it exhibits a "widely varying energy content" in British Thermal Units (BTU), ranging from a relatively cold flame in open air, to large releases of thermal energy depending on its use. This is a direct evidence of fundamental novelty in the chemical structure of the HHO gas.

[0013] In fact, all known fuels have a "fixed energy content" namely, a value of BTU/scf that remains the same for all uses. Also, the variable character of the energy content of the HHO gas is clear evidence that the gas has a magnecular characteristic in its structure, rather than a molecular structure, namely, that its chemical composition includes bonds beyond those of valence type.

[0014] The third important feature of the HHO gas is that it does not require any oxygen for its combustion since it contains in its interior all oxygen needed for that scope. By recalling that other fuels require atmospheric oxygen for their combustion, thus causing a serious environmental problem known as "oxygen depletion," the capability to



A similar approach has been used for years by "Bob Boyce," a self-taught broadcast engineer and electronics wizard from Florida. After attempting to make water fuel many years ago, using 18" X 18" plates, he began pursuing a "William Rhodes" type electrolyzer design, made of Plexiglas, and using a number 6" X 6" 16 gage stainless steel plates, spaced 1/8th inch apart, creating a series cell (shown above). He had a

car engine running on the fuel, and even powered competition speedboats with it. Then he began to experience break-ins, vandalism, and an attempt to "frame him" for a crime. So he gave it up, and later retired to Tennessee. In recent years he has renewed his interest in the subject, and has been freely sharing information on internet forums. such as Yahoo's hydroxy group and OUpower.com.

Bob claims that a seven cell device, that is, a small plastic box containing only eight 6" X 6" plates, and being no more than 3" wide, can produce enough gas to run a small V8 engine! How? By the use of a resonance driver he calls a PWM3, a small box the size of a bar of soap! It hits the chamber with 3 frequencies, slightly out of phase of true harmonic relation to each other, causing the electrolyte to look as if it is boiling! Because the parameters for resonance are constantly changing, a micro-controller monitors these and adjusts the output of the driver so that resonance is maintained. And the cost to build such a driver? A few dollars!

He recently confided that the May 9, 2006 U.S. Patent # 7,041,203 is what he has been doing all along. It offers an explanation of what happens in a resonant electrolysis chamber using three harmonic frequencies. Bob is surprised that a patent has been issued for what he has been offering in the public domain for some time. Part of it is reproduced in the appendix, and is worthy of close study. Along with it is a reproduction of an email communication between Bob and a group member who posed a question about resonance. I think you will find it helpful to visualize what he is doing. Thanks, Bob! Solar hydrogen, as recommended by Roy McAllister, is obviously a superior way for mankind to get a combustible fuel, if that is what we must have. The past few years have revealed major improvements to our existing ability to produce such fuel while the sun shines. There is no excuse for not utilizing these methods yesterday! Except greed.

For example, in 2004 a team of Australian scientists announced a revolutionary new way to extract clean energy using special titanium oxide ceramics that harvest sunlight and split water to produce hydrogen fuel, a device with no moving parts and emitting no greenhouse gases or pollutants. They claim that rooftop panels placed on 1.6 million homes could supply Australia's entire energy needs.

Obviously, there is no reason to be igniting a combustible fuel unless absolutely necessary. Transportation should not require the use of a combustible fuel. The Clem engine is just one of many examples of how it has been done. But that is another subject altogether. Since we are surrounded by vehicles that burn something, we should immediately convert them to burn something less harmful, renewable, and cheaper, like water fuel. This is an obvious conclusion that has been pushed aside for economic gain.

The last few years have made it clear that we have, and have had all along, energy options that make our present destructive behavior inexcusable. And now we are interested in finding an alternative to fossil fuels, not so much because of real concern for the planet and its future inhabitants, but because we don't like the cost of scarce, expensive fuel. Do we even deserve this lovely planet as our home? What would you do if you were its owner?

Conclusion

One of the last scenes of the 1996 20th Century Fox film Chain Reaction says a lot about the world's energy dilemma. A heated discussion takes place between the characters played by Keanu Reeves and Morgan Freeman Jr. over what should be done with water fuel technology. Here's how the discussion goes:

MF Jr: Clean air, free energy: noble concepts. But we live on a planet that is addicted to petroleum. Now, what happens if you dump free energy onto the world market? Stock markets around the world would plummet. Our own economy would collapse overnight. Recession, unemployment, war. The world is speeding up too fast now, Eddie.

KR: You're right. It's not working! That's why we've got to try something else! Not bury the technology, but let it out!

MF Jr: You let it out, but you let it out at a pace the world can absorb.

KR: It can absorb it now!

Thus, the excuse given (not in public, of course) for withholding free energy technology is "to save the world's economy." But there are predictions that the dollar, buttressed by international oil trading, could crash due to the petroleum market shifting from dollars to Euros. Then what excuse will they use? Although this is not a pretty economic picture to contemplate, ask yourself this: If the dollar, or even the world economy, is going to crash, would you rather be with or without free energy at that time? Since much of what we presently need our cash for is to purchase energy, wouldn't you like to be free of that burden, if your money is worthless anyway? And especially if a scenario should develop wherein the grid is out of commission and/or no oil is flowing! Wouldn't you like to be your own "utility company"? Isn't that the ultimate expression of homeland security? Suffice it to say that all it takes is a situation such as we have been subjected to these past few years to get the inventors among us going, motivated by sentiments such as those voiced by the Keanu Reeves character in *Chain Reaction*. We will uncover suppressed inventions, and we will devise yet newer and better ones. I believe this is our birthright, as we are made in the image of The Great Inventor. You can't keep the human spirit from finding a way!

I hope that you are among the more concerned and inventive of the human family, and that you will take an active interest in making this technology a reality in your community. Herman Anderson said that he was not an armchair inventor. Neither should we be passive onlookers. We must turn off the TV and get our brains in gear. It is what Michael Faraday would have you do. In an address to children, his concluding words were: "In your generation, in all your actions, make your deeds honorable and effectual in the discharge of your duty to your fellowmen."

As for the future of water fuel, it is difficult to say which one of the many ways to turn water into fuel will emerge as the preferred embodiment. What a New Zealand fuel expert recently said about the future of his compatriot's Biosfuel applies equally to all of these inventions: "Watch this space."

If only one thing about this whole subject stands out, it should be this: Without most of the world paying attention, water fuel inventors have been at the forefront, not only of warning that the present world crisis was coming, but of researching and developing a practical solution. Isn't it about time they were acknowledged for their contributions, and more especially, by implementing them worldwide?

Appendix

US007041203B2

(12) United States Patent Sullivan

- APPARATUS AND METHOD FOR (54) GENERATING AND USING MULTI-DIRECTION DC AND AC ELECTRICAL CURRENTS
- (76) Inventor: John Timothy Sullivan, 11339 Barley Field Way, Marriottsville, MD (US) 21104-1346
- Subject to any disclaimer, the term of this (*) Notice: patent is extended or adjusted under 35 U.S.C. 154(b) by 215 days.

This patent is subject to a terminal disclaimer.

- (21) Appl. No.: 10/411,307
- Filed: (22) Apr. 11, 2003
- (65) **Prior Publication Data**

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	C25B 11/02	(2006.01)
	C25B 13/02	(2006.01)
	C25B 9/04	(2006.01)
	F41B 6/00	(2006.01)
	C25B 1/04	(2006.01)
	H02J 7/00	(2006.01)
	H05H 1/48	(2006.01)

- (2006.01) (52) U.S. Cl. .. 204/229.7; 204/230.5; 204/230.8; 204/252; 204/194; 124/3; 89/8; 320/135; 320/127; 320/166
- (58) Field of Classification Search 204/229.7,

204/230.8 See application file for complete search history.

(56) **References** Cited

U.S. PATENT DOCUMENTS

1,402,986 A 1/1922 Wikle

(10) Patent No.:	US 7,041,203 B2
(45) Date of Patent:	*May 9, 2006

2,949,550	A		8/1960	Brown
3,022,430	A		2/1962	Brown
3,172,083	A		3/1965	Constantine, Jr.
3,654,119	A		4/1972	White et al.
3,716,464	A	٠	2/1973	Kovac et al 205/259
3,755,113	A	*	8/1973	Entshev et al 205/341
3,865,710	A		2/1975	Phipps 204/228
3,968,419	A		7/1976	Ekstrom 321/27 R
4,430,178	A		2/1984	Anderson et al 204/114
4,525,253	A		6/1985	Hayes et al 204/149
4,623,597	A		11/1986	Sapru et al 429/101
4,728,877	A		3/1988	Adamson 320/21
4,734,176	A		3/1988	Zemba, Jr. et al 204/149
4,846,950	A		7/1989	Yao et al 204/228
4,908,109	A		3/1990	Wright 204/149
5,037,522	A	*	8/1991	Vergason 204/298.41
5,062,940	Α		11/1991	Davies 204/228
5,436,822	A		7/1995	West, Jr

(Continued)

Primary Examiner-Harry D Wilkins, III (74) Attorney, Agent, or Firm-Bacon & Thomas, PLLC

(57) ABSTRACT

Multi-directional currents are generated in a medium by cyclically reversing the direction of a conventional current applied to at least one of at least two electrodes so that an electromotive force (EMF) pulse travels from side of the electrode to the other, changing the direction of current in the medium. The multi-directional currents may be used to accelerate electrolytic processes such as generation of hydrogen by water electrolysis, to sterilize water for drinking, to supply charging current to a battery or capacitor, including a capacitive thrust module, in a way that extends the life and/or improves the performance of the battery or capacitor, to increase the range of an electromagnetic projectile launcher, and to increase the light output of a cold cathode light tube, to name just a few of the potential applications for the multi-directional currents.

34 Claims, 22 Drawing Sheets



APPARATUS AND METHOD FOR GENERATING AND USING MULTI-DIRECTION DC AND AC ELECTRICAL CURRENTS

1

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates to multi-directional, reciprocating electrical currents. The invention also relates to an apparatus and method for generating the multi-directional currents, and to applications of the generating apparatus and method.

The multi-directional currents of the invention are generated in a current carrying medium by cyclically reversing the direction of a conventional current applied to at least one of a plurality of electrodes, so that an electromotive force (EMF) pulse travels from one side of the at least one electrode to the other, changing the direction of current flowing through the medium between two or more electrodes. 20

The multi-directional electric currents have the effect of accelerating processes that rely on interaction between a current and the medium that carries the current, and of eliminating asymmetries that can lead to scaling or premature wear in batteries and other electrolytic systems. The ²⁵ medium that carries the multi-dimensional currents may be an electrolyte, gas, gel, semiconductor, or any other medium capable of carrying current between two electrodes, and having at least two dimensions so as to enable variation in the current direction. ³⁰

By way of example and not limitation, the multi-directional electrical currents of the invention may be used to (i) increase the efficiency of hydrogen generation by electrolysis of water (while at the same time preventing scaling and purifying the water), (ii) extend the life of batteries such as nickel-metal hydride cells, and of capacitors, by symmetrically charging and discharging the batteries or capacitors, (iii) provide a power source for electromagnetic projectile weapons and similar devices, and (iv) increase the efficiency of plasma generation or light conversion in cold cathode systems.

Other potential applications of the multi-directional electric currents of the invention, and of the apparatus and method for generating the currents, include computers, communications, drug and chemical development, medical treatment of cancers, anti-gravity experiments, transportation, energy, water treatment, genetic research in humans, plants, and animals, and aeronautical propulsion systems, as well as fuel cell and PEM electrolysis systems utilizing proton exchange membranes and catalyst materials. ⁵⁰

2. Description of Related Art

A. Basic Principle of Invention

The basic principle underlying the multi-directional currents of the invention may be understood from FIGS. 55 1A-1B. FIG. 1A shows the situation when electrode currents i_{E1} and i_{E2} in electrodes E1 and E2 are initially reversed, creating EMF or voltage pulses, edges, waves, or spikes that travel from left to right in the top electrode E1 and from right to left in the bottom electrode E2. The current i_S between the 60 electrodes flows from the top electrode E1 to E2, but changes direction as the current i_S follows the respective EMF pulses or voltage spikes as they propagate from left to right through electrode E1 and from right to left through electrode E2. Eventually, as shown in FIG. 1B, the current 65 flows from top right to bottom left, at which point the currents in the respective electrodes are again reversed to 2

cause EMF or voltage pulses, waves, edges, or spikes to propagate in the opposite direction. As a result, the current i_s can be caused to reciprocate or continuously change direction in an oscillating or cyclical manner within the current-carrying medium between the electrodes. If i_{E1} and i_{E2} are DC currents, the electrodes can be kept at a constant potential so that the net current direction remains constant even though the instantaneous current direction changes continuously or periodically, enabling the direction-changing current. Alternatively, i_{E1} , and i_{E2} may be alternating currents, pulsed DC currents, or polarity-reversing DC currents. In addition, a similar but smaller variation in the direction of current will occur if the direction-reversing conventional current is applied to just one of the electrodes and the second electrode has a relatively small area.

The invention may thus be characterized as a method and apparatus of generating multi-directional currents in a medium by reversing the direction of electron flow in at least one of a pair of electrodes. If the voltages applied to the electrodes are DC voltages, then the multi-directional currents have characteristics of DC currents, and if the voltages applied to the electrodes are two or three phase AC voltages, then the multi-directional currents have characteristics of AC currents. However, unlike conventional DC and AC currents, the currents generated by the method and apparatus of the invention move or rotate. If the electrodes are onedimensional wires, then the currents rotate in two-directions. If the electrodes themselves move, or extend over two or three-dimensions, for example a plane or a curved plane, then the currents will move in three-dimensions.

B. Conventional Electric Currents

There are two types of conventional electrical currents and corresponding voltages, neither of which changes direction in the manner of the present invention. The first, direct current (DC), was already well known when Benjamin Franklin performed his famous kite experiment in 1752 to prove that lighting was a form of electricity, while the second, alternating current, came into widespread use after Nikola Tesla invented the first alternating current motor in 1888 (U.S. Pat. No. 555,190).

Both direct and alternating voltages can be applied to electrodes for the purpose of causing a current to flow through a medium between the electrodes. However, the voltages are conventionally applied across the electrodes so that the resulting inter-electrode current follows a fixed, albeit reversible, path between the electrodes, irrespective of the type of medium or geometry of the electrodes. This is clearly the case in systems having only a single terminal for each electrode, and in systems having multiple terminals but no switching circuit.

It is of course possible to periodically reverse the polarity of currents applied to the electrodes in such a system, and a number of systems have been proposed for doing so, including the systems disclosed in the patents discussed below. However, none of the previously proposed systems involves changing the direction of current in a single one, or both, of the electrodes so as to vary the direction of current flowing between the electrodes by other than 180°.

The invention in its broadest form consists of the abovedescribed multi-directional currents, and apparatus and methods for generating the currents. However, an important aspect of the invention is the numerous applications in which the unique properties of the multi-directional currents may be exploited. These applications include, but are not limited to, the following:

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C. Hydrogen Generation by Electrolysis of Water

One of the applications of the invention is electrolysis of water to generate hydrogen, or hydrogen and oxygen, for use in fuel cells and other essentially pollution-free hydrogendriven power sources. This application is of particular importance because it offers a solution to the problem of generating, storing, and transporting the hydrogen.

Hydrogen fuel cells, in particular, have the potential to provide a completely non-polluting power source of electricity, not only for vehicles but also for electricity genera- 10 tion in general, but have been limited by lack of a safe distribution system for the hydrogen, and by the costs of generating the hydrogen in the first place. While it has long been known that hydrogen may be generated by applying a direct current to water, the rate of hydrogen generation is too low to provide a practical hydrogen source for mass distribution. As a result, hydrogen for mass consumption is currently produced from fossil fuels at relatively high energy costs relative to the energy value of the hydrogen produced. However, if sufficient hydrogen could be produced by water 20 electrolysis to provide an on-board hydrogen generator for a vehicle or electric power plant, so as to generate just enough hydrogen to supply the fuel cells, then the need for a distribution system and hydrogen storage would be eliminated. 25

Power or propulsion systems that use water electrolysis in combination with hydrogen fuel cells to generate the hydrogen necessary to power the fuel cells are known as regenerative electrochemical cell or systems, an example of which is disclosed in U.S. Published Patent Application No. 2002/ 0051898. Despite their theoretical promise, however, similar systems have yet to offer a practical alternative to fossil fuels. It is believed that a regenerative system can only attain widespread acceptance if the efficiency of hydrogen production is increased. The multi-directional currents of the invention offer the potential for providing such an increase in water electrolysis efficiency.

The way that the invention increases water electrolysis efficiency is by using the applied electric current to not only pull the water molecules apart at the cathode, as in a conventional electrolysis system, but to add a shearing force that helps break apart the ionic bonds between the oxygen and hydrogen atoms. The effect is similar to separating a p of magnets by sliding them perpendicularly rather than pulling them apart. In conventional electrolysis, the water molecules tend to align with the positive and negative electrodes in the manner illustrated in FIG. 2, so that the ionic bonds are at a constant angle of 54.74° relative to the direction of current flow. This is not the optimal angle for breaking the ionic bonds and disassociating the hydrogen atoms from the oxygen atoms. In the set-up illustrated in FIG. 3, on the other hand, the molecules are subject to a continuously changing current direction, which applies both tensile and shearing forces to the molecules, substantially increasing the rate of disassociation. In addition, the electrodes can be arranged in coils to add magnetic forces that further expedite disassociation.

It will be noted that the set-up illustrated in FIG. 2 does not reverse the polarities of the electrodes, which would only slow the electrolysis process due to energy lost in flipping 6 the water molecules. The multi-directional currents are not alternating currents, but rather in this embodiment are direct currents. Systems that reverse the polarities of electrodes have previously been used in electrolysis, but the currents are uni-directional and the reversals are carried out at relatively long intervals so that the effect is that of a conventional DC current. The purpose of the reversals is to

reduce scaling by switching between anodic and cathodic reactions at the respective electrodes. This can also be accomplished with the present invention, by reversing the polarities of the electrodes in addition to reversing current directions in the individual electrodes. Examples of electrolysis apparatus (though not necessarily a hydrogen generating water electrolysis apparatus) that reverse DC potential between two electrodes are disclosed in U.S. Pat. Nos. 6,258,250, 6,174,419, and 1,402,986, and in U.S. Published Patent Application No. 2002/0074237.

Periodic reversal of the polarities of electrodes has also been used in electrolytic water purification systems. The periodically reversed currents can be used to directly destroy bacteria as in U.S. Pat. No. 3,865,710, or to expedite the release of electrolytic reaction by-products such as metal ions, as disclosed in U.S. Pat. Nos. 6,241,861; 5,062,940; 4,908,109 (entitled "Electrolytic Purification System Utilizing Rapid Reverse Current Plating Electrodes"); U.S. Pat. Nos. 4,734,176; 4,525,253; and 3,654,119.

These systems are not to be confused with the system of the invention, which changes the direction of currents but does not necessarily change their polarity. However, the effects of the direction-reversing currents, and/or rele ions, on bacteria and other micro-organisms can be utilized and even increased by the present invention, i.e., the currents of the present invention can be used not only for electrolysis of water to generate hydrogen, but also to purify the water. Unlike the currents disclosed in the water purification references, which cannot be used for hydrogen generation, the present invention combines generation of hydrogen with water purification so that, for example, a power plant that included hydrogen generation cells supplied with river water would also have the effect of cleaning the river water, serving as a source not only of electricity but also of potable water.

D. Charging of Nickel-Metal Hydride Foam Batteries

Although especially useful for water electrolysis, the present invention is not limited to a particular electrolyte, electrolytic process, or electrolytic cell configuration. In another application of the invention, the multi direction currents of the invention are applied to the electrodes of a battery containing an electrolyte. This application of the invention takes advantage of the reversing currents in the electrodes to reduce the wear and tear of friction and heat caused in conventional batteries by current moving from one post down the length of the electrode.

In the case of batteries containing nickel metal hydride, as disclosed in U.S. Pat. No. 6,413,670, additional advantages of using the method and apparatus of the invention to charge the battery an increase in the hydrogen generated during the charging process, which may be captured by utilizing the principles of the gas capture system described in copending U.S. patent application Ser. No. 10/314,987 filed on Dec. 10, 2002 by the present inventor now U.S. Pat. No. 6,890,410. Furthermore, the use of multi-directional currents may improve the ability of the foam to absorb hydrogen through the hydride substrate in a manner analogous to shaking of a screen to expedite passage of granular materials.

E. Canacitors

The apparatus and method of the invention can also be applied to capacitors and capacitive systems, which have similar fundamental problems of fast charging heat losses and discharge heat wear.

An example of capacitive systems to which the principles of the invention may be applied are the thrust generating systems disclosed in U.S. Pat. Nos. 6,317,310, 3,022,430,

United States Patent [19]

Cornish

[54] HYDROGEN SUPPLY UNIT

- [76] Inventor: Francois P. Cornish, "Uitentuis", Steynsrus Road, Somerset West, Cape Province, South Africa
- [21] Appl. No.: 4,310
- Jan. 7, 1987 [22] Filed:

Related U.S. Application Data

[63] Continuation of Ser. No. 790,361, Oct. 23, 1985, abandoned, which is a continuation of Ser. No. 332,803, Dec. 21, 1981, abandoned.

Foreign Application Priority Data [30]

- ... 80/8007 Dec. 22, 1980 [ZA] South Africa
- . B01J 19/08 [51] Int. CL4 ...
- 422/186.26; 48/61; 48/65; 123/DIG. 12; 422/186; 422/186.04 [52] U.S. CL
- [58] Field of Search 123/3, DIG. 12; 423/657

4,702,894 [11] Patent Number:

Date of Patent: Oct. 27, 1987 [45]

[56] **References** Cited

U.S. PATENT DOCUMENTS

1,249,151	12/1917	McKee 422/186.26
3,224,952	12/1965	Via Loron 422/186.26
3,540,854	11/1970	Brooke et al 423/657
3,648,668	3/1972	Pochero 123/DIG. 12
4,344,831	8/1982	Weber 123/DIG. 12

Primary Examiner—Peter Kratz Attorney, Agent, or Firm—Cushman, Darby & Cushman [57]

ABSTRACT

Hydrogen is generated by heating a metal surface under water to a temperature at which the metal reacts with water to produce hydrogen. The hydrogen can then be used, for example, as a fuel for a motor vehicle engine or another type of engine. The heating can be done electrically by providing an electrical discharge, under water, between the metal surface and another surface. Water and the metal surface are consumed.

7 Claims, 2 Drawing Figures



United States Patent [19]

Herbst, Jr.

[56]

[54] PROCESS FOR PRODUCING HYDROGEN FROM SHORT WAVELENGTH **ELECTROMAGNETIC RADIATION**

- [76] Inventor: Ralph L. Herbst, Jr., 926 Langdon Ave., Box No. 6, Horsham, Pa. 19044
- [21] Appl. No.: 311,288
- [22] Filed: Oct. 14, 1981
- [51] Int. Cl.4 .. B01J 19/08 [52] [58] U.S. CL . 204/157.52 Field of Search 204/157.1 H. 157.1 W.
 - 204/157.1 R, 129; 252/429 R, 432

References Cited

U.S. PATENT DOCUMENTS

2,534,533	12/1950	Schlesinger et al 423/288
3,210,157	10/1965	Lewis et al 23/211
4,105,517	8/1978	Ryason 204/157.1 W
4,121,984	10/1978	Gomberg et al 204/157.1 H
4,176,026	11/1979	Harriman et al 204/157.1 W
4,211,621	7/1980	Porter 204/157.1 W
4,298,439	11/1981	Gainey 204/157.1 R
4,315,998	2/1982	Neukers et al 204/157.1 R
4,325,793	4/1982	Kisch
4,338,291	7/1982	Yamada et al
4,367,131	1/1983	Gratzel et al 204/157.1 W

FOREIGN PATENT DOCUMENTS

2815705 10/1978 Fed. Rep. of Germany ... 204/157.1

[11] Patent Number: 4,637,867

Date of Patent: Jan. 20, 1987 [45]

OTHER PUBLICATIONS

Gohn et al., "Homogeneous Photoredox for Hydrogen Production by Solar Energy, " pp. 1135-1139, Jul. 23, 1979.

Morapour et al., "Hydrogen Production by Visible

Morapoir et al., "Hydrogen Froduction by Visible Light Irradiation of Aqueous Solutions of RU (BI PY_{32}^{+2} , pp. 547-549, Jul. 1978. Spinks and Woods "An Introduction to Radiation Chemistry", Second Edition (1976) pp. 1, 6-7, 17-18, 25, 258-259, 268-269, 276-278, 280, 330-335, 339-342, 360-361, 365, 387-388 and 391.

Primary Examiner-Howard S. Williams Assistant Examiner-Terryenie Chapman

Attorney, Agent, or Firm-Frishauf, Holtz, Goodman & Woodward

ABSTRACT

[57]

Processes for producing hydrogen gas from water using gamma-rays, X-rays or ultraviolet radiation as the energy source, and aqueous compositions used in said processes. Said aqueous composition comprises at least one photoexcitable reagent which absorbs light to donate an electron and produce hydrogen. The composi-tion also contains at least one reagent selected from the group consisting of chain reaction agents which are free radical formers, and spectral sensitizers, and preferably at least one reagent of each of these two types. The composition also preferably contains a dispersing agent.

26 Chaims, No Drawings



[11] Patent Number:

Date of Patent:

[45]

[57]

United States Patent [19]

Anderson

[56]

- [54] HYDROGEN POWERED VEHICLE, INTERNAL COMBUSTION ENGINE, AND SPARK PLUG FOR USE IN SAME
- [75] Inventor: Herman P. Anderson, Brentwood, Tenn.
- [73] Assignee: Herman P. Anderson Technologies, LLP, Brentwood, Tenn.
- [21] Appl. No.: 09/220,286
- [22] Filed: Dec. 23, 1998

Related U.S. Application Data

- [63] Continuation-in-part of application No. 08/905,862, Aug. 4, 1997, Pat. No. 5,852,993.
- [51] Int. Cl.⁷ F02M 57/06
- [52] U.S. Cl. 123/297; 123/635; 123/DIG. 12
- [58] Field of Search 123/3, DIG. 12,
- 123/527, 297, 636, 637, 635, 169 EL; 313/120

References Cited

U.S. PATENT DOCUMENTS

2,208,030	7/1940	Holmes 123/169 EL
3,165,099	1/1965	Vanderpoel 123/637
3,926,169	12/1975	Leshner et al 123/297
3,980,061	9/1976	McAlister 123/297
4,164,912	8/1979	Beyler 123/26
4,186,712	2/1980	Fitzner et al 123/633
4,319,552	3/1982	Sauer et al 123/297
4,343,272	8/1982	Buck 123/297
4,383,198	5/1983	Hosking 313/120
4,448,160	5/1984	Vosper 123/297
4,820,957	4/1989	Zivkovich 315/209 T
5.852.993	12/1998	Anderson

6,119,651

Sep. 19, 2000

FOREIGN PATENT DOCUMENTS

686943 8/1930 France 123/297

Primary Examiner—Noah P. Kamen Attorney, Agent, or Firm—Lucian Wayne Beavers Waddey & Patterson

ABSTRACT

The internal combustion engine fuel system described includes a structure for mixing the alternative fuel, preferably hydrogen, with oxygen in ambient air to stratify the fuel. The system includes an adapter, and the adapter includes a housing mounted between spark plug and cylinder of the internal combustion engine. A plug is placed within the housing. The plug has ridges or grooves on its outer surface that act as mixing structures. Thus, when hydrogen is introduced into the adapter housing it is mixed with ambient oxygen within the chamber as it flows over the plug. The mixing structures in the housing creates a vortexing action as the hydrogen flows over the plug and towards the cylinder of the engine. An electrode protrudes from the plug towards the cylinder. The electrode is preferably platinum and generates the necessary spark to create combustion of the hydrogen/air mixture adjacent to the cylinder to thereby power the cylinder in the engine. A platinum electrode is preferably used because it enhances a catalytic conversion of combustion by-products to more environmentally compatible products. The present invention also teaches a spark plug producing a hotter spark for a hydrogen fuel system. Also taught is a hydrogen powered vehicle with reduced emissions by producing a spark during the power stroke and the exhaust stroke. Methods for reducing exhaust pollution are also taught. Methods of reducing exhaust pollution by generating a plasma are taught as well.

13 Claims, 12 Drawing Sheets


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entitled "Spark Plug Having A Low Noise Lever" issued to Nishio et al., Sep. 23, 1980 is hereby incorporated herein by reference. U.S. Pat. No. 4,029,990 entitled "Spark Plug Construction" issued to Nagy et al., Jun. 14, 1977 is hereby incorporated herein by reference.

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SUMMARY OF THE INVENTION

It is an object of this invention to provide an improved fuel system for use with alternative fuels.

It is a further object of this invention to provide an ¹⁰ improved fuel system for use particularly with hydrogen, and particularly to enhance the mass energy density of hydrogen.

It is an object to provide a hotter sparking plug to ignite the fuel.

It is still a further object of this invention to provide an adapter for use in a fuel system for an internal combustion engine that enhances the power obtained from the alternative fuels.

It is still a further object of this invention to provide an ²⁰ improved fuel system for an internal combustion engine that does not present the environmental hazards of a standard gasoline engine by providing reduced or zero emission of environmentally harmful gases.

It is yet a further object of this invention to provide an improved fuel system for an internal combustion engine that can use an alternative fuel and can use gasoline to facilitate the transition from gasoline to alternative fuels.

It is yet a further object of this invention to provide an 30 improved fuel system for an internal combustion engine that reduces backfire problems.

It is yet a further object of this invention to provide an improved fuel system for an internal combustion engine that reduces backfire problems by cooling the electrode in the 35 spark plug with the hydrogen gas fuel.

It is an object to reduce backfire by providing hydrogen at a sufficient pressure to reduce backfire and igniting it with a hotter spark (i.e. a higher voltage).

It is still a further object of this invention to provide an ⁴⁰ adapter for use in a fuel system for an internal combustion engine that enhances the power obtained from the alternative fuels.

It is a further object to generate a plasma field in a cylinder to burn residual exhaust and reduce emissions.

It is yet a further object of this invention to provide a direct injection fuel system wherein fuel is injected directly into the cylinder.

It is an object to provide a "2-fire" direct injection system, 50 wherein the fuel is ignited during the power stroke and the exhaust stroke.

It is yet a further object of this invention to provide a way to convert the standard induction fuel system of a lawnmower to a direct injection fuel system wherein fuel is injected directly into the cylinder.

It is yet a further object of this invention to provide a way to convert the indirect injection fuel system of an automobile to a direct injection fuel system wherein fuel is injected directly into the cylinder.

The internal combustion engine fuel system of this invention includes a structure for mixing the alternative fuel, preferably hydrogen, with oxygen in ambient air to stratify the fuel. The term "alternative fuels" is known in the art and is meant to refer to fuels other than conventional gasoline. 65

The invention in one embodiment comprises an adapter, the adapter including a housing mounted between spark plug and cylinder of the internal combustion engine. A plug is placed within the housing. The plug has ridges or grooves on its outer surface that act as mixing structures. Thus, when hydrogen is introduced into the adapter housing it is mixed with ambient oxygen within the chamber as it flows over the plug. The mixing structures on the plug create a vortexing action as the hydrogen flows over the plug and towards the

cylinder of the engine. An electrode protrudes from the plug towards the cylinder. The electrode is preferably platinum and generates the necessary spark to create combustion of the hydrogen/air mixture adjacent to the cylinder to thereby power the cylinder in the engine. A platinum electrode is preferably used because it enhances a catalytic conversion of combustion by-products to more environmentally compatible products.

Thus, the combination of the compression action generated by the conventional piston and push rod within the cylinder of the engine in conjunction with the hydrogen/air mixing structure that vortexes the hydrogen/air create compressed hydrogen that is mixed with a combustion facilitator, i.e. oxygen in the ambient air to enable the system of this invention to capture the abundant energy found in hydrogen fuel.

The enhanced mixing capabilities of this invention is also adaptable for use with other alternative fuels such as natural gas, alcohol, propane and the like.

One embodiment of the present invention is for a hydrogen powered vehicle including an internal combustion engine operably connected to power the vehicle and adapted to connect to a hydrogen supply line. The internal combustion engine comprises a cylinder operably connected to the supply line; a piston operably disposed in the cylinder; and a spark plug having an electrode assembly in operable

sparking communication with the cylinder, wherein the spark plug is capable of producing a spark of at least 45 kV. Preferably the spark plug comprises a housing having a

sparking end and a hollow chamber containing the electrode assembly. The electrode assembly comprises an electrode having a connector end and a sparking end, wherein the sparking end is positioned adjacent to the housing sparking end. The electrode assembly preferably comprises a coil electrically connected to the electrode connector.

Preferably the housing comprises a fuel inlet port in fluid communication with the supply line, and an insulator surrounding the electrode assembly, wherein the insulator is positioned in the hollow chamber. Preferably the insulator comprises an outer surface defining a first fuel channel having a first respective fuel exit port, wherein the first fuel channel is in fluid communication with the fuel inlet port and the fuel exit port exits into the cylinder.

The present invention also includes a method of operating an internal combustion engine comprising supplying hydrogen fuel to the engine and creating a spark in the cylinder during the power stroke and the exhaust stroke, wherein the spark created during the power stroke is at least 45 kV. In one embodiment the spark is at least 70 kV. In certain embodiments the method comprises generating plasma dur-

ing the exhaust stroke. The exhaust fuel converts to an exhaust emission and coalesces with the plasma, thereby reducing fuel pollution.

Accordingly, it is an object in the invention to provide a spark plug producing a sufficiently hot spark to ignite hydrogen fuel, including cooled hydrogen fuel.

Another object of the present invention is to provide a device for reducing fuel exhaust emissions.

Mosher et al.

[54] ENERGY MEANS FOR INTERNAL COMBUSTION ENGINES

- [76] Inventors: Edward G. Mosher, 2462 Transit Ave., Anaheim, Calif. 92804; John T. Webster, 2436 Greenleaf Ave., Anaheim, Calif. 92801
- Jan. 24, 1975 [22] Filed:
- [21] Appl. No.: 543,667
- [52] U.S. CL
- [51] Int. Cl.² [58] Field of Search
- 123/DIG. 12, 119 E, 123/3; 204/129, 278, 293

References Cited [56]

UNITED STATES PATENTS

1.876.879	9/1932		Drabold	123/DIG. 12
2 384 463	9/1945		Gunn et al.	123/DIG. 12
2,509,498	5/1950		Heyl	123/DIG. 12
2 588 450	3/1952	•	Zadra	204/293
3.074.390	1/1963		O'Laughlin	123/DIG. 12
3 311 097	3/1967		Mittelstaedt	123/DIG. 12
3 459 953	8/1969		Hughes et al.	204/129

May 17, 1977 [45]

3,829,367 8/1974 Raviv 204/129 FOREIGN PATENTS OR APPLICATIONS

1,213,641 4/1960 France 123/DIG. 12

Primary Examiner—Wendell E. Burns Assistant Examiner—David D. Reynolds Attorney, Agent, or Firm—Limbach, Limbach & Sutton ABSTRACT [57]

A gas generating system for use with internal combus-tion engines, to afford hydrogen gas and oxygen gas to be intermixed with the fuel for the engine.

It comprises an electrolysis unit which is energized by the existing electrical system normally associated with an internal combustion engine, such unit utilizing distilled water and Sodium Hydroxide as the electrolyte. The system further includes means for conducting ambient air into the electrolysis unit for agitating or mixing the electrolyte and removing the gases that accu-mulate on the anode and cathode. The unit comprises a stainless steel tank as well as stainless steel anode and cathode members.

4 Claims, 5 Drawing Figures



United States Patent [19] ...

Valdespino

[54] INTERNAL COMBUSTION ENGINE

Joseph M. Valdespino, 5023 Golf Club Pkwy., Orlando, Fla. 32808 [76] Inventor:

[21] Appl. No.: 71,776

[22] Filed: Aug. 31, 1979

Int. CL³ **[51]** C10H 5/00 [52] U.S. CL 123/3; 123/1 A; 123/DIG. 12

[58] Field of Search ..

References Cited

[56]

U.S. PATENT DOCUMENTS

2.509.498	5/1950	Head 100 /rom
3 565 000	0, 1, 0, 0, 0	11cy1
2,202,008	· 8/1951	Drabold 123/434
3,586,291	6/1971	Malec
4,054,423	10/1977	Blenman 123/3
4,064,890	12/1977	Collins et al. 137/505 42
4.111.160	9/1978	Talenti 102/1 A
4 111 000		Added and an and a second and a second secon
4,111,222	9/1978	Hassell 137/505 42

4,112,875 9/1978 Laumann et al. 123/1 A

Primary Examiner-Charles J. Myhre

Assistant Examiner-R. A. Nelli

Attorney, Agent, or Firm-Duchworth, Hobby, Allen, Dyer & Pettis

ABSTRACT [57]

An improvement to an internal combustion engine having a fuel system for feeding a fuel-air mixture to the combustion chambers and an electrical generation system, such as an alternator. An electrolytic cell is attached adjacent to the engine to generate hydrogen and oxygen upon the application of a voltage between the cathode and anode of the electrolytic cell. The gas feed connects the electrolytic cell to the engine fuel system for feeding the hydrogen and oxygen to the engine combustion chambers. Improvements include placing the electrolytic cell under a predetermined pressure to prevent the electrolyte from boiling off, a cooling system for the electrolytic cell and safety features.

20 Claims, 4 Drawing Figures





19	Europäisches Patentamt European Patent Office Office européen des brevets	Publication number: 0405 919 A1
B	EUROPEAN PAT	ENT APPLICATION
21 22	Application number: 90306988.8 Date of filing: 26.06.90	for the second
(B) (B) (B) (B) (C) (C) (C) (C) (C) (C) (C) (C) (C) (C	Priority: 27.06.89 AR 314254 Date of publication of application: 02.01.91 Bulletin 91/01 Designated Contracting States: AT BE CH DE DK ES FR GB GR IT LI LU NL SE	 Applicant: Aguero, Juan Carlos 5055 Lopez y Planes St. 5000 Cordoba, Cordoba(AR) Inventor: Aguero, Juan Carlos 5055 Lopez y Planes St. 5000 Cordoba, Cordoba(AR)
		 Representative: Gordon, Michael Vincent et al GILL JENNINGS & EVERY 53-64 Chancery Laneane London WC2A 1HN(GB)

☑ Water propelled Internal-combustion engine system.

(b) An energy transforming system is disclosed for driving, for instance, an internal combustion engine which uses hydrogen gas as its fuel. The gas is obtained by electrolysing water on board and is then injected into the combustion chambers. The electrolysis is carried out in an electrolytic tank 15 energized with electric current generated by the engine. The hydrogen passes from a reservoir 23 via collector cylinder 29 to carburettor device 39. The hydrogen is then fed into the engine together with dry saturated steam and at least part of the hydrogen may be heated 51 prior to admission. A cooler and more controlled combustion is achieved with the steam and furthermore relatively lesser amounts of hydrogen are required. This is probably caused by the steam acting as a temperature moderator during admission and combustion of the hydrogen and additionally expanding during the expansion stroke.

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jected to electrolysis, from whence the hydrogen is injected in each cylinder of the engine on the admission stroke. The hydrogen gas is mixed with water-vapour (steam at atmospheric temperature) and surrounding air, and when this mixture is ignited within the combustion chamber, the steam (vapour) seems to act as a temperature moderator first and then assist in the expansion stroke. Preferably, the steam is dry saturated steam which, as a moderator, limits the maximum temperature of the combustion, thus helping to preserve the cylinder, valve and piston elements; and in assisting the expansion, the stearn expands fast to contribute extra pressure on the piston head, increasing the mechanical output power of the engine. In other words, the inclusion of steam in the hydrogen propellant as suggested by the present invention moderates the negative effects of hydrogen and enhances the positive effects thereof in the combustion cycle.

As a result of this discovery, the amount of hydrogen required to drive the engine is lower than was heretofore expected, hence the electrolysis need not produce more than 10 cc/sec (for example, for a 1,400 cc engine). Thus the amount of electricity required for the electrolysis, a stumbling block in earlier attempts, is lower, so much so that hydrogen production on-board is now feasible.

The invention includes an apparatus comprising a first system for generating hydrogen and a second system for conditioning and suppling the hydrogen to the admission valves on the cylinder caps. The hydrogen-generating system basically consists of an electrolysis device which receives electrolitically adapted (i.e. at least partially ionized) water or some other suitable hydrogenous substance. An electric power supply is connected to the electrodes of the electrolysis device for generating the hydrogen, and the electricity requirements and the device dimensions are designed for a maximum hydrogen output rate of about 10 cc/sec for a typical automotive application.

The second system comprises means such as a vacuum pump or the like to draw out the hydrogen from the first system, means for supplying the hydrogen gas to the admission valves, means for conditioning the moisture content of the hydrogen, carburettor means or the like for mixing the hydrogen with atmospheric air or some other combustion enabling substance, and means to control and maintain a specified gas pressure valve or range for the hydrogen supplied to the mixing means.

The apparatus was tested and worked suprisingly well. It was discovered that this seemed to be the result of the steam content in the electrolytic hydrogen gas overcoming the pitfalls encountered in the prior art systems which injected relatively dry gas into the cylinder chambers, or at the most with a relatively small proportion of humidity coming from the air itself.

In the preferred embodiment, the electrolysis system is driven with a pulsed DC power signal of between and 80 Amps at between 75 and 100 Volts. The electrolyte is distilled water salted with sodium chloride with a concentration of about 30 grammes salt per litre of water to 150 grammes of

10 salt in 10 litres of water. Other concentrations are possible depending on the kind of engine, fuel and electricity consumption etc. The maximum rate of hydrogen production required for a typical domestic car-engine has been estimated at 10 cc/sec.

15 This hydrogen is drawn out by a pump generating a pressure head of around 2 kg/cm² to feed the generated steam-containing hydrogen to a receptable provided with means for removing the undesired excess of moisture from the gas. The gas is thus mixed with the desired content of steam

when it enters the carburettor or mixing means.

In the event the generated hydrogen does not have enough steam content, dry saturated steam may be added to the hydrogen is process to the engine, conveniently before entering the carburettor and mixing with intake air. Part of the gas may be shunted via a serpentine mounted in heat-exchange relationship with the exhaust manifold, to heat some of the gas before injecting it into the base of the carburettor; this heated injection operating like supercharging. The main hydrogen stream, unheated, is directly piped in at the venturi system of the carburettor, where it mixes with air

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Brief Description of the Drawings:

drawn in by the admission stroke vacuum.

Figure 1 is a schematical layout of the first and second systems and shows the electrolysis device for obtaining hydrogen, and the circuit means for injecting the steam-laden hydrogen into the combustion chambers of a motor-car engine, according to an embodiment of this invention.

Figure 2 is an elevational view of the electrolysis device of figure 1.

Detailed Account of an Embodiment

Figure 1 shows a system 11 for obtaining hydrogen front water piped from a depot or tank (not illustrated) to an inlet 13 of an electrolysis cell 15. The water is saited, such as by adding sodium chloride in the water depot, to ionize it and enable electrolysis upon energization by electric power applied to a pair of terminals 17. As disclosed in more detail further on herein, the power applied to

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[11]

United States Patent [19]

Gunnerman .

- [54] AQUEOUS FUEL FOR INTERNAL COMBUSTION ENGINE AND METHOD OF COMBUSTION
- Rudolf W. Gunnerman, 4100 Folsom [76] Inventor: Blvd., 9D, Sacramento, Calif. 95814
- [21] Appl. No.: 695,304
- May 3, 1991 [22] Filed:

Related U.S. Application Data

- Continuation-in-part of Ser. No. 689,988, Apr. 23, [63] 1991, abandoned, which is a continuation-in-part of Ser. No. 440,224, Nov. 22, 1989.
- [51] Int. CL⁵ F02P 23/02; F02M 31/04;
 - C10L 1/02
- 123/1 A; 123/143 B; [52] U.S. CL 123/556; 123/DIG. 12
- [58] Field of Search 123/1 A, DIG. 12, 25 R, 123/25 E, 3, 143 B, 556, 670, 25 A, 25 B, 25 F; 44/301; 431/4

References Cited [56]

U.S. PATENT DOCUMENTS

1.926,071	9/1933	Vance 44/301
2,460,700	2/1949	Lyons 123/1
2,656,830	10/1953	Houdry 123/670
2.671,311	3/1954	Rohrbach 60/16
3.208,441	9/1965	Ottofy 123/556
3,749,318	7/1973	Cottell 431/2 X
4.048,963	9/1977	Cottell 123/25 R
4.088,450	5/1978	Kosaka et al 23/288 L
4.110.973	9/1978	Haeflich et al 60/39.05
4,158,551	6/1979	Feuerman
4.170,200	10/1979	Takeuchi et al 123/3
4,185,593	1/1980	McClure 123/1 A
4.227,817	10/1980	Gerry 123/25 E X
4,230,072	10/1980	Noguchi et al 123/1 A
4,244,328	1/1981	Lindstrom 123/3
4,266,943	5/1981	Lo
4.333,739	6/1982	Neves
4,369,043	1/1983	Han 44/313
4.385.593	5/1983	Brooks 123/1 A
4.418.654	12/1983	Keiun 123/25
4,476,817	10/1984	Lindberg 123/3
4,563,982	1/1986	Pischinger et al 123/1 A
4,565,548	1/1986	Davis et al 44/51
4,594,991	6/1986	Harvey 123/557
4 831 971	\$/1080	Ott et al 123/25 A

FOREIGN PATENT DOCUMENTS

0025298 3/1981 European Pat. Off. .

US005156114A.

5,156,114 **Patent Number:**

Date of Patent: Oct. 20, 1992 [45]

0095823	12/1983	European Pat. Off	
2421940	11/1979	France	44/301
69908	6/1977	Japan	44/301
10308	1/1979	Japan	44/301
8804311	6/1988	PCT Int'l Appl.	
205582	10/1923	United Kingdom	•
669037	3/1952	United Kingdom	
		enter milleon .	•

OTHER PUBLICATIONS

Brochure dated Jan. 1990 by Gunnerman Motor Corporation.

Chapter 6, pp. 215-228 entitled "Hydrogen" in the Advanced Inorganic Chemistry, A Comprehensive Text by F. Albert Cotton and Geoffrey Wilkinson, 4th edition.

"Physical Chemistry for Colleges", by E. G. Millard, 5th Edition, 1941, (no month provided) pp. 340-344. Book entitled "Chemistry of Dissociated Water Vapor and Related Systems", p. 187 by M. Venugopalan and R. A. Jones, 1968 (no month provided).

Article entitled "Environmental Decade's Answer to Henry Ford", p. 18 in the The Daily Times, Salisbury, Md., Thursday, Dec. 27, 1990.

Primary Examiner-Tony M. Argenbright

Attorney, Agent, or Firm-Christie, Parker & Hale

[57] ABSTRACT -

An aqueous fuel for an internal combustion engine is provided. The fuel comprises water from about 20 percent to about 80 percent by volume of the total volume of said fuel, and a carbonaceous fuel selected from the class consisting of ethanol, methanol, gasoline, kerosene fuel, diesel fuel, carbon-containing gaseous or liquid fuel, or mixtures thereof. A method for combusting an aqueous fuel in an internal combustion engine is provided. The method produces approximately as much power as the same volume of gasoline. The method comprises introducing air and aqueous fuel into a fuel introduction system for the engine. The fuel comprises water from about 20 percent to about 80 percent by volume of the total volume of the fuel, and a carbonaceous fuel from ethanol, methanol, gasoline, kerosene fuel, diesel fuel, carbon-containing gaseous or liquid fuel, or mixtures thereof, and introducing and combusting said air/fuel mixture in a combustion chamber or chambers in the presence of a hydrogen producing catalyst to operate the engine.

113 Claims, No Drawings



_oca inventor ives car

Water powered

its first road test

By Shannon Hamons According to local inventor Stan Meyer, he had been waiting 10 years for what happened last Friday. That is when he drove his 'water powered

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Cur, powered by the Waler Fuel Cell, in public for the Brut Mine Waler Among the witnesses whre the Grova City Becord, several friends conventional cir under actual road and anistents of Mayer; Jack Cook of conditions, Jack's VW Service; and Lt. Col. Edward Pathinson of the United

States Air Force. . To everyone's astonishment, Meyer drove his Water Fuel Cell powered dane buggy several times at distances reaching nearly one mile, at speeds in existent of 50 MIPH. The demonstration chose nearly one year after Meyer operated the car in an idling condition for the Record. ..

Meyer said since those tests a year age, he has been working on the soration controls and the method by which to accurately control the burn rate of the hydrogen gas. Although the system is not perfected, he said he is planning a demonstration for the national press within the next several,

Up until recently, we had the car hooked to the Water Fuel Cell sitting on the ground and ran static testing," Mayer said. "Then we began working on the acceleration controls to learn

how to mix the hydrogen gas, exhaust gas, and ambient air, for actual road testing under load conditions. That had to be done before the car could be driven. It is one thing to operate the car under lab conditions, but it is a horse of a lifeterant (play as quetain the car within the personation of a

Air Force to examine

According to Lt. Col. Parkinson, he said there is no doubt that, "the water in the fuel cell is breaking down into its component parts vis the Waber Fuel Cell and operating the duce buggy.

Parkinson has degrees in industrial and systems engineering and is a 25 ear Air Force veteran. He has spent the last 16 years as an Air Force program manager and systems engineer in research and development and aquisition of weapons avatems.

"Technically, from my viewpoint, there is no doubt that the water is quickly broken down into hydroge and in workable in the system. His demonstration shows the system can work, but I knew that anyway."

"It will still take some thme to cfine the system-I can't tell how long that will take. It may be right around the corner. He may have a mountain or hill to climb, but it appears they may be climbed. Now he and has to get further control of the

Just has to get further control of the born mitthery of the gales and he will have a real wirner. "Particular the start as an in-dependent spitch from the further Meyer's invention for the Federal Government, "The Ar Force will do an Meyenders" scientific Teabling" study for the government, then the government can decide how it wants to get into the project. I am not in a position to say what kind of time frame they are working on however."

How the test was conducted

The test began Friday in Grove City. Local mechanic Jack Cook inspecied the engine he had rebuilt for Meyer about two years ago and vertiled the engine had not been altered in any way. Cook then filled the Water Fuel Cell with water for use as fuel and Meyer generated hydrogen gas and built up 14 pound of back pressure and demonstrated racied gas production."

Mayer then drive the dune buggy on muchine, out in the country with the Grove City Record reporter as a passenger. Mayer met the other in-terested people at a predetermined

Stan Meyer drives his water powered car as assistant Charlie Holbrook manually adjusts the hydrogen flow. spot. Then the gas tank was removed from the car, the hydroget gas valve, was opened, the Water, Foel Cell was started and gas production began again. Meyer then drove the car, with A color of the second s

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of more thin 's half, mile MPH. Cook was given a ride of about 7 mile at speeds in excess of 30 MPH. The Record reporter then rode along twice at about .7 mile between 45-55 MPH. Finally, Meyer drove the car almost a full mile at 50 MPH with Holbrook and another briend.

Although Mayer was excited by the performance of the car, the demonstration highlighted some areas that need improvement. He operated the car up grades with more than 940 pounds of passenger, and equipment payload. The car ac-celerated well, but each time the dune buggy maneuvered around several small curves, Holbrook had difficulty maintaining constant hydrogen flow. When Meyer had to slow down, the hydrogen flow remained the same, thus flooding out the engine.

Also, before each test run, the car had to be started with gasoline, and then switched to the hydrogen gas. Continued on pg. 5

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AUTHOR(S) ALY H. SHAAP	JAN; Ph.D.			
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Tribune de Ganève du lundi 22 septembre 1980

Page 9

Il roule (presque) à l'eau l Un Genevois va développer la voiture «anti-gaspi»

Nous avons en de la peine à garer la volture de M. Hector-Pierre Vaes dans la cour de la Tribune. Une grosse Chevrolet à plaques belges, venue de France, et ani cache un secret sous son capot.

Cette machine roule au gaz, ce qui n'a rien de très sorcier. Une bonbonne, un détendeur, le reste du moteur est classique. En Belgique, c'est évidemment du gaz de houille comprimé, ailleurs on trouve du gaz de bois parlois, mais surtout du gaz extrait du pêtrole, ce qui



Lucien Vuffrey (à gauche) et Hector Plerre Vaes. (Photos J.-C. Mayor)

ne prépare évidemment pas le chemin de l'indépendance vis-à-vis de l'or noir.

Qu'est-ce que le «maser»?

Mais en plus, dans la voiture de M. Maes, il y a de l'eau, et cette eau est un combustible. Un réservoir de 4 litres d'eau distillée, et une drôle de petite boite contenant des membranes fabriquées au Japon. Un système électronique crée et surveille la décomposition de cette eau en oxygène et en hydrogène. C'est le « maser » (« microwave amplifi-cation by stimuled emission of stimuled emission of radiation »).

Le «maser», en bret, accélère une décomposition qui est très lente lors-qu'elle se fait (souvencz-vous des expériences de physique à l'école) avec deux électrodes. L'oxygène et l'hydrogène libérés sont mélangés avec le gaz à l'entrée du moteur. Et ça fonctionne.

Au Japon, dájà...

M. Vaes le dit, il n'est pas le premier à essayer ce « truc » déjà largement utilisé au Japon. Non, son idée, c'est de le entre 3 et 4 litres d'eau, et la grosse -Chevrolet roule an prix d'une mobylette.

Alors, pourquoi ce système ne s'est-il pas repandu plus vite chez nous? Ici, M. Hector-Pierre Vaes devient sibyllin. Il évoque la toute-puissance des grands producteurs et distributeurs de pétrole,



qui n'aiment pas ça du tout. Et l'Etat aussi (il parle de la France) qui craint une perte énorme sur les taxes prélevées sur les carburants.

Du bricolage à l'industrialisation

En fait, il existe d'autres éléments. Les fabricants de voitures, par exemple, n'ont pas toujours l'audace nécessaire pour modifier en profondeur leur fabri-cation. Et puis, à leur décharge, il faut reconnaitre que le système existe, qu'il

manquent de précision. Un véhicule est en voie d'équipement à Genève, avec is collaboration de M. Vaes, et sera doite, d'instruments de mesure précis. Une sorte de laboratoire roulant, qui sera pi dans deux mois environ. »

Le secret

M. Vuffrey sjoute: . Une chose est sure : le courant consommé dans la mem brane du véhicule de M. Vaes est de 10 milli-ampères. Ce qui donne une puissance, pour une tension de 12 voits de batterie, de 127 milliwatts, soit bien moins qu'un feu de position. »

Le « secret » réside là : pour décomp ser l'eau en oxygène et en hydrogène, faut normalement un courant électriqu fort. Mais avec la membrane japonaise avec le «maser», le processes est entan différenment, avec une extraordinai économie de courant.

Attendons deux mois, pour savoir ce ue la voiture-laboratoire nous révélero, Et revons au jour où nous pourrons



Sous le capot: 1. le réservoir d'aau (en plastique); 2. Le boîte contenant le membranes d'où pertent les deux tubes, l'un pour l'hydrogène, l'eutre pou l'oxygène; 3. Le «maser». (Photo J.-C. Nieyor)

fonctionne, mais qu'il n'est pas encore, techniquement, au point. Pour l'instant, c'est de l'ingénieux bricolage. Et du bricolage à la réalisation industrielle, il y a pas mai de bureaux à traverser. Y compris ceux des législateurs.

Un Genevois, M. Lucien Vuffrey, qui habite Meyrin, a accompagné M. Vaes. C'est un technicien, il ne veut pas se laisser raconter des histoires. Il a pris dans une valise des instruments de mesure précis, et la grosse Chevrolet devra bien révélor ses petits secrets.

M. Vuffrey nous dit : « Les mesures de

saluer le pompiste poliment, passer de vant lui sans nous arrêter, et aller faire le plein à la fontaine voisine! Jean-Claude MAYOR.



Index

Acetvlene 19 **AIM West Milford 72** AirGen Corp. 127 Anderson, Eugene 78 Anderson, Herman 110-Anode 12, 116 Andrews, John 49 Arthur C. Clarke 121, 127 Balloons, hydrogen 7, 23 **Billings, Roger 81-85 Biosfuel 49, 50** Blue, Archie 86-89 Brisby, Donald 110-113 Boyce, Bob 90, 131 Brown, Yul 90 **Brown's Gas 90 Carbon rods 38 Carlisle, Anthony 10** Cathode 11, 116 Cavendish, Henry 7, 27 Cecil, William 14, 15 Cella, Carl 120 Chain Reaction 27, 121 Chambers, Stephen 122-124 **Chatgroups 126 Chemalloy 78 Chemical additives 49 Clem engine 132** Coal 42 Coal gas 13, 14, 21, 22, 29 **Cold fusion 118 Colloidal metal catalysis 127** Cornish, Francois 99, appendix Corona discharge 116, 118 **Covalent bond 11** Davy, Edmund 19 Davy, Sir Humphry 16 De Rivaz, Isaac 13 **Decomposition reaction 49 De-ionized water 116** Deuterium 79, 118 Diatomic 11, 18 Dingel, Daniel 79, 80 **Dirigible 26** E-gas 90 **Eagle Research 119** "Edison Device" 122

- 500

Eldridge, Clark, Blum 38-41 Electrolysis 11, 12, 22, 100, 101 Electrolyte 11, 66 **Electrolyzer 12** Electromagnetic frequencies 96, 116, 118 **Electronic fuel injection 119** Engine, internal combustion 13, 14, 32, 43 Erren, Rudolph 66, 81 Faraday, Michael 16-19, 133 Faraday's Law 17 Feedback loop 100 Franch, Guido 49 Frazer, Charles 44-48 Free for All 49 **Freepatentsonline.com 28** Freedman, Samuel 78 **Fuel Cell 20** Garrett, Charles Henry 54, 55, 60-64 Garrett, Henry "Dad" 54-69 **Gasometer 38** Genader, Ann 72 **Genesis Scientific 122** Green Machine 115-118 Griffin, Linnard 127 **Grove, William Robert 20** Haenline, Paul 26 **Hindenburg 26** Honnef, Hermann 66 Horvath, Stephen 96-98 Hydrogen 5, 16, 21 Hydrogen bond 11 Hydrogen booster 44-48 Hydrogen Technology Applications 127 Hydrostar 122 **Implosion 16** Injector sparkplug 118, 119 **Internet 122** Joe Cell 126 Keely, John Worrel 26, 27, 100 Kettering, Charles 43 Kilgus, Alfred 66-69 Klein, Denny 90, 127-130 Land speed record 13, 115 Lavoisier, Antoine 8 Lavoisier, Marie Anne 8 Leach, Sam Leslie 96 Lenoir, Jean Joseph Etienne 21, 22 Lowe, Thaddeus 22-24, 26 Lowrie, Peter 86 Magnetism 66-71

Mallove, Eugene 121 McAlister, Roy 78, 119, 132 Mever, Stanley 103-110, 119 Meyer, Stephen 103, 104, 106, 109 **Monoatomic 18 MTSU 115** Munsters, The 49 Mysterious Island, The 24, 25 **Nexus Magazine 120** Nicholson, William 10 Oil embargo (1973) 80, 103 **One Step Beyond 49 Ozonated water 116** Pacheco, Francisco 72-77 Paine, Henry 29 Paracelsus 6, 7 **Perris Smogless Auto Association 81** Poe, Edgar Alan 3, 20, 21, 22, 26 Pogue, Charles 65 Potassium hydroxide (KOH) 66, 116 Puharich, Andrija (Henry Karl) 100-103 Radiolysis 96, 116, 118 **Resonance 26, 27, 100-102, appendix** Retort 38 **Ricketts, Cliff 115** Rhodes, William 90-93 **Rommel, Erwin 65** Ruben, Samuel 50-54 Ryan, Steve 49, 50 Safety 116 Santilli, Ruggero 38, 94-96 Science fiction 121 Single replacement reaction 6

Snake oil 23 Solar hydrogen 8, 115, 132 Sparkplug gap 119 Sparkplugs, platinum 119 **Supercharging 116** Suppression 44 **Taxation 116** Tesla, Nicola 42 Thermal cycle 116 **Thermodynamics 100 Thermolysis 8 Timing, ignition 116** Titanium oxide 132 **United Nuclear 115 USPTO 28** Vaes, Hector Pierre 96, appendix Vapor carburetor 65 Verne, Jules 24, 25 Volta, Alessandro 9, 10 Water 5 Water Engine, The 121 Water gas 24 Water injection 32, 81-85, 116 Wattles, Luther 32 Wiseman, George 90 Xogen 122 Yogef, Amnon 133 Zees must be zee end!



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[hydroxy] Re: Hydroxy Resonance

— In hydroxy@yahoogroups.com, "James E. And: wrote: > Based on the physics of resonance, I wonder if the resonance monitoring circuit is constantly adjusting the output frequency which is never perfect? This would result in harmonics that are constantly "breaking" the resonance. After all, a glass does not break due to resonance being achieved. The glass breaks when it is in resonance and the driving frequency is shifted suddenly. If the cell is in resonance, and the resonant frequency shifts slightly due to the gas volume changing, then the frequency shift causes gas to generate similar to the glass breaking.

> The analysis of this would require the expertise of a really good sound engineer with an open mind. I am not sure Stan's resonance monitoring circuit would react quick enough to always achieve the perfect frequency match required for pure resonance as the cell would be constantly changing. Maybe it is not pure resonance that improves efficiency, but the changes from pure resonance to just slightly mismatched.

> My 2 cents,

> James

>

James, sounds like you may be beginning to see the light there. Now carry that thought another step and think about what happens when there are 2 resonances running, the first one at a primary frequency, and the second one at the second harmonic of that primary frequency. What happens as those two beat against one another slightly out of phase of true harmonic relation? Now add another one at the third harmonic of the primary frequency. And what happens when that is brought slightly out of phase with primary and second harmonic relation. Do you see where I am heading with this? See if you can picture this in a 3-phase relationship. If you can, then you may understand the underlying principle behind the operation of my PWM3 system, and the next generation version, the HexController.

I cannot go into greater detail on an open public forum at this time, but suffice it to say, there is an additional observed anomylous reaction that takes place that carries it beyond the resonant electrochemical reaction that I was researching all those years ago.

Bob

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