

A Practical Guide to 'Free Energy' Devices

Part D6: Last updated: 18th October 2007

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5. If hydrogen can be efficiently split, then energy is available when it is recombined

Stan Meyer, Henry Puharich, Paulo Mateiro, Charles Garrett, Archie Blue, Bob Boyce, Peter Lowrie, etc.

Hydrogen, when mixed with a critical amount of air, is a dangerous substance to handle. The molecules of hydrogen are small enough to pass through materials generally thought to be suitable for containing gases. It can make metals brittle. It is considered a 'green' fuel because when it is burnt with oxygen, it does not produce carbon dioxide. While this is true, it is not the whole picture. Hydrogen burnt with oxygen produces a flame inconveniently hot and in mobile applications, you have to carry the oxygen around as well as the hydrogen. Unfortunately, the flame temperature can be lowered conveniently by burning the hydrogen in air, which also dispenses with the need to carry the oxygen around. Burning hydrogen in air or an oxygen/air mixture, produces nitrous oxide which is a major pollutant - and if you do that, it is no longer a 'green' fuel unless the nitrous oxide is burnt in the process. No matter what the mix is, a mixture containing hydrogen produces less pollution than petrol (gasoline) or diesel.

If you opt for a ready-mix of hydrogen and the oxygen it needs to burn, the resulting mix is explosive and highly dangerous. This difficulty is overcome if water is carried and split into a gas mixture only when needed for burning. An additional possible power source is "flash-steam" where water vapour is converted to a much larger volume of steam very suddenly.

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We need to stop burning fossil fuels. If we do so, it leaves us with two problems, namely, a way to generate power to run our electrical equipment and heat or cool our homes, and a way to power our vehicles. In this document, we will consider the question of powering vehicles, though it is perfectly possible to run an internal combustion engine which drives an electrical generator to do these other tasks.

There are two main options. The first is to achieve a reduction in the amount of fossil fuel burnt. The second is to eliminate the use of fossil fuel altogether. Both have been achieved. As an example of the first option, consider a car powered by a petrol (gasoline) engine. In the average car, only 35% or so of the fuel is burnt in the cylinders of the engine, the remaining 65% burns in the catalytic converter or is pushed, unburnt, out of the exhaust pipe as major pollution.

Reducing the fuel used:

It is possible to reduce the amount of fuel used, by utilising any or all of the following :

1. Improving the quality of the burn.
2. Reducing the amount of fuel in the cylinder.
3. Introducing water vapour into the cylinder.
4. Improving the quality of the spark.
5. Improving the streamlining of the vehicle

1. The burn quality can be improved dramatically by replacing some or all of the air drawn into the engine, by a mixture of hydrogen and oxygen. This can be done by sacrificing a small amount of engine power to drive an electrolyser to split water into the hydrogen/oxygen mix needed, passing it through a safety 'bubbler' and feeding the gas into the air intake of the engine. This causes a dramatic improvement to the burn, increases the power of the engine, reduces the pollution and improves the miles per gallon achieved (provided that the vehicle's fuel computer is prevented from pumping excess fuel into the engine when it detects far less pollution in the exhaust).

2. The fuel mix can be made leaner. If more air is used, the engine will run hotter. If a hydrogen/oxygen ("hydroxy") mix is used, then there is a general improvement all round. If the vehicle has computer control

of the fuel/air mix, it is necessary to add an extra circuit to prevent the computer injecting more fuel to offset the leaner mix required, and the companion document D17.pdf explains in considerable detail how to do this.

3. Adding water vapour to the air intake can give up to 25% improvement in the miles per gallon and can make the engine run cooler, which extends the life of the engine.

4. If the power of the spark is increased by adding extra circuitry to the electrical system, the fuel burn is improved. However, this tends to lead to greater plug wear. The "FireStorm" plug gives a major improvement in burn quality without any additional circuitry, but it is not yet offered as a commercial product.

5. If driving speed reaches 60 mph for much of the mileage covered, then a "Ram Wing" clamped on top of the car, and/or other passive devices can give a major improvement in fuel consumption through reduced wind pressure. Details of these devices are shown later in this document.

6. If the petrol for a petrol engine is converted to vapour before being passed to the engine, then very dramatic increases in mpg can be produced. The improvement can even reach 200 mpg on a US gallon (the UK gallon is 20% greater in volume). There are some 240 patents for these designs, some of which form other documents in this set of information. However, the oil companies are not keen on this decrease in their sales and so nowadays, they put additives in petrol. There are some 103 different varieties of additive, and while they are included to reduce evaporation in summer and freezing in winter, another function is to clog up carburettors which convert the fuel to vapour.

If using hydroxy gas to improve the burn quality and improve the mpg of a vehicle, no timing adjustments are normally necessary. However, all recent cars in the USA are fitted with an **Electronic Control Unit** and if nothing is done about that, a decrease in mpg may actually occur as the Controller may start pumping more fuel into the engine when it sees a change in the quality of the exhaust.

Eliminating fossil fuels altogether:

If no fossil fuel is used, then some practical details have to be dealt with. It will necessary to retard the engine timing as hydrogen burns 1,000 times faster than conventional fuels. Retarding the timing of recently constructed vehicles by as much as 35 degrees is very difficult as they are usually computer controlled and do not provide that degree of spark control. The Yahoo Groups 'hydroxy' and 'watercar' give information and help for anybody who wishes to take this further and can be found at <http://groups.yahoo.com/group/hydroxy> and <http://groups.yahoo.com/group/watercar>

It is difficult to run a vehicle with water as the only fuel but it has been done by several people. **Daniel Dingle** of the Philippines has succeeded but has not yet released details of how he does it. **Stanley Meyer** ran two different vehicles using a different technique for each. He obtained patents for both systems. **Peter Lowrie** has run an internal combustion engine on gas from electrolysis of water. **Herman Anderson** made an on-board electrolysis system to provide the gas to run his car. He also used micron-sized water mist using a pond fogger and fed that into the engine via a standard vehicle propane regulator. His car is a 1971 LTD V-8 on which he got 38 miles per gallon running on water. A 'WaterFuel1978' Group member, an American mechanic who, at this time, prefers to be known by his e-mail ID of "**s1r9a9m9**" states that he has run a vehicle on water alone for some 30,000 miles and has released most of the details to the Group. His vehicle has not been shown to anyone and no pictures have been released, but his system has been replicated on a stationary engine by a Russian experimenter. **Bob Boyce** has powered his entries in boat racing events using just water as a fuel, but with batteries charged on shore. He has also powered car engines by 'pulsed' electrolysis driven by the alternator of the vehicle receiving the gas (construction details in the 'D9.pdf' document of this set). **Paul Zigouras** recently developed a system which, in one minute can convert five US gallons of water into gas, and he has run a marine motor at 200 horsepower output, in spite of much of the gas being steam and water vapour.

It is also highly likely that others have done this as well. **Juan Agüero** has patented a system for running internal combustion engines using a combined hydrogen/oxygen/steam mixture. As he states the specific amounts of fuel mix needed for a 1400 cc engine, it is highly likely that he determined the amount by running an engine of that capacity. Reading **Henry Puharich** was awarded a patent for his water-splitting system. It is said that he ran his motorhome for thousands of miles using water as the only fuel. **Charles Garrett** was reported to have run his car on water alone, although I strongly suspect that his patent does not disclose the full details of how he did it. **Dan Voss** managed to drive his car around on water alone, using a modified version of a Bob Boyce electrolyser.

So, how did they do it and why can't we buy their systems for our own use? The answer is not technical but is financial. In the UK, successful people have the bulk of their income taxed at 40%. They then buy a car which has an 'import tax' of some 15% on it and on top of that, Value Added Tax at 17.5%. Then they are charged 'Road Tax' of about £160 per year (85% of which is not used on building roads). Then they have to buy petrol or diesel at about £4 per gallon (well in excess of the cost of fuel in the USA) of which somewhere between 55% and 85% is tax. If they drive into London, they are charged an extra £8 for the privilege of using the roads for which they have already been overcharged. To summarise: every year, the government takes a very, very large sum of money from motorists. How do you think they would react to motorists using water instead of fossil oil would they be for it or against it? Not a difficult question to answer, in spite of politicians wanting to appear to be all for "green" policies. Also, one typical oil company, Shell, has just announced that their profit in the last year amounted to some US \$3,000,000 **per hour** for the whole of the year, and it is only one of many such companies. How much do you think any one of those companies would pay to stop a water-powered car going into production? It is said that Paul Zigouras was paid US \$6,000,000 not to publicise how his successful system works, and that represents just two hours of profit for just a single oil company.

So what has happened to the inventors? Stanley Meyer ran his VW car on several of his pulsed electrolysis cells for four years. He then developed a sophisticated water plasma injection system and drove a converted dune buggy from coast to coast across USA on 28 US gallons of water. He was reported to have just received an assurance of production funding when he died suddenly and unexpectedly, claiming that he had been poisoned. That was very convenient for the oil companies.

Daniel Dingle of the Philippines, has not released any details of his system. He has shown his design to his president who wished to put it into production, with the profits providing free health care for the poor people of the Philippines. Before that could happen, there was a change of government. Daniel then showed his system to the new president, who was also impressed, and would have liked to have put it into production. He is not able to do so, because the Philippines has received a loan from the World Bank, and one of the conditions for the loan is that no technology will be allowed in the Philippines if that technology would reduce the sale of fossil fuel oil there. It looks therefore, as if Daniel's design will never be manufactured unless Daniel changes his mind and gives the design away freely. You can see a video of Daniel's design at the web site <http://www.youtube.com/watch?v=UVhXrvCCILw>.

I understand that it has been declared illegal in the USA to manufacture or sell water-powered cars. Nobody cares as much about hydrogen-assisted cars as the users still have to go on buying fossil fuels from the oil companies, but even they have been legislated against in the USA, so you are not allowed to manufacture and sell any kind of hydrogen booster in many states in that country.

Peter Lowrie of New Zealand, has produced enough gas by electrolysis to run an engine and he and others are making adjustments to his, and other, electrolysis systems under test. As their developments have not yet reached the production stage, they have been left reasonably alone. Bob Boyce of USA, reached the full-use stage of development. His workshop was broken into repeatedly, some of his electrolyzers were stolen, some were smashed. This continued until no more electrolyzers remained in his workshop. Then, his workshop was broken into again but nothing was taken and nothing smashed - get the picture?

Guess why "s1r9a9m9" does not want excessive publicity. He has come up with another system, where hot water is fed into the engine through a carburettor and with the use of a 110V inverter to boost the sparks, the engine runs well. It is quite possible that the motive power in his system is flash-steam rather than any form of electrolysis occurring inside the cylinders. All of the details which he has released to date are in the "D13.pdf" file which forms part of this set of documents. Many related patents are included in this set of documents, which can be downloaded free from <http://www.panaceauniversity.org>.

It has been suggested that if you want a car which runs with water as the only fuel, then you will have to make the electrolyser yourself. This may well be the case at this time. It can be done in at least three different ways. Let me fill you in on some of the basic information on the processes.

Electrolysis:

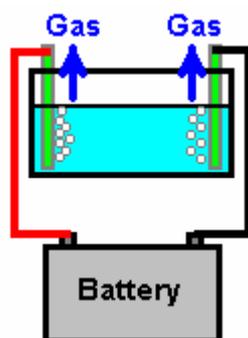
There are two main types of electrolysis; 'straight DC' and 'pulsed'. Straight DC electrolysis was researched and described by Michael Faraday many years ago. It consists of placing two electrodes in an electrolyte solution and passing a current through the solution. An electrolyte solution is just some water with a little additive of acid or some other useful substance which improves the current flow without being used up in the process. DC electrolysis is very easy to achieve but it is frequently not very efficient. Faraday specified the maximum possible amount of gas production using DC and this figure is taken by current scientific teaching as being the maximum possible. However, that is not the case, Bob Boyce having achieved more than 200%

of Faraday's "maximum" figure, and Shigeta Hasebe has been awarded a patent for a spiral DC cell in which he records figures of 1,000% of Faraday's "maximum", and Shigeta was disappointed with his results as he calculated that he should have been getting 2,000%.

"Pulsed" electrolysis is very much more efficient with enormously reduced input power requirements but it is difficult to achieve and maintain the optimum frequency setting. Stanley Meyer achieved it. Bob Boyce achieved it. With Bob's help, you may very well achieve it, but it is definitely the difficult option. Bob gets from 600% to 1,000% of Faraday's "maximum" figure, and with that level of gas/power efficiency, it becomes possible to run an engine on gas produced by electrolysis of water using only electricity produced by the power of that same engine.

Straight DC Electrolysis:

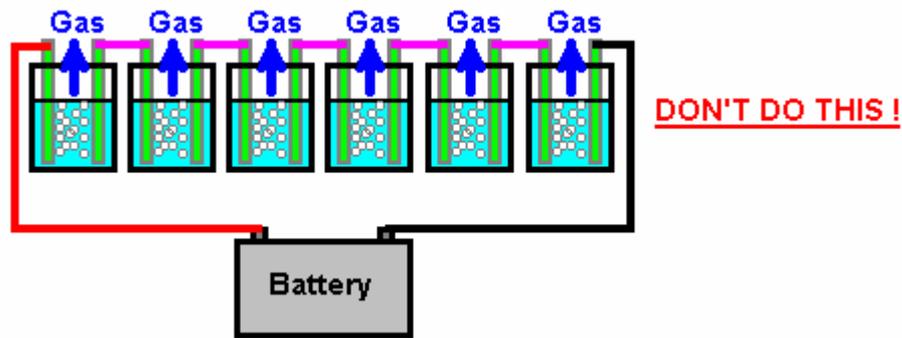
This technique has been known for a very long time and it appears very simple. Faraday described the method and defined the gas output for 100% efficiency of the process. Members of the 'watercar' Group have achieved twice Faraday's theoretical maximum output per watt of input power. Straight DC electrolysis works like this:



Here, a current flows through the liquid inside the electrolysis cell, moving from one plate to the other. The current breaks the bonding of the water molecules, converting the H_2O into hydrogen H and oxygen O. There are various forms of hydrogen and oxygen and mixtures of the two. H on its own is called "monatomic" hydrogen, and given the chance, it will join with another H to form H_2 which is called "diatomic" hydrogen. The same goes for the oxygen atoms. The monatomic variety of hydrogen has four times the energy and just under 4% of it mixed with air, is capable of powering an engine without using any fuel oil.

If the liquid in the electrolyser is distilled water, then almost no current will flow and almost no gas will be produced. If you add two or three drops of battery acid to the water, the current and gas production increase enormously. Putting acid in the water is a bad idea as it gets used in the process, the acidity of the water keeps changing, the current keeps changing, the acid attacks the electrodes and unwanted gasses are given off. Putting salt in the water, or using seawater, has nearly the same effect with poisonous chlorine gas being given off. Baking soda is also a bad choice as it gives off carbon monoxide which is a seriously toxic gas. Instead of using these additives, it is much better to use a "catalyst" which promotes the electrolysis without actually taking part in the chemical process. The best of these are Sodium Hydroxide ("Red Devil lye" in the USA, "caustic soda" in the UK) and even better still, Potassium Hydroxide ("Caustic Potash").

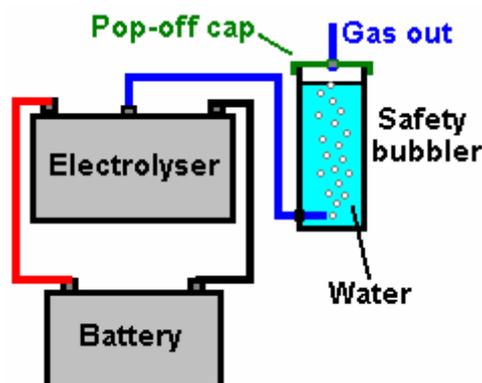
The process of electrolysis is most unusual. As the voltage applied to the plates is increased, the rate of gas production increases (no surprise there). But once the voltage reaches 1.24 volts across the electrolyte between the electrodes, there is no further increase in gas production with increase in voltage. If the electrolysis cell produces 1 litre of gas per hour with 1.24 volts applied to the electrolyte, then it will produce exactly 1 litre of gas per hour with 12 volts applied to the electrolyte. Even though the input power has been increased nearly 10 times, the gas output remains unchanged. So it is much more effective to keep the voltage across the electrolyte to 1.24 volts or some value near that. As there is a small voltage drop due to the material from which the electrodes are made, in practice the voltage per cell is usually set to about 2 volts.



The electrolyser shown here produces six times as much gas for exactly the same input power. This is a serious gain in efficiency. As all of the cells of this electrolyser are identical, each has approximately 2 volts across it when a 12 volt battery is used. The amount of gas produced depends directly on the amount of current passing through the cells. As they are “in series” (connected in a chain), the same current passes through all of them. For any given battery voltage and electrode spacing, the current is controlled by the amount of catalyst added to the water. The liquid in the electrolyser cells is called the ‘electrolyte’. In practice, there is a distinct advantage in having a large surface area for each electrode, and a small spacing between the electrodes of about 3 mm or 1/8”.

There is a strong tendency for bubbles of gas to remain on the surface of the electrodes and impede the electrolysis process. If there were enough bubbles on an electrode, it would not actually touch the electrolyte and electrolysis would stop altogether. Many methods have been used to minimise this problem. The electrode plates are normally made from 16 gauge 316L-grade stainless steel and it is recommended that there be between 2 and 4 square inches of plate area on every face of every electrode for each amp of current passing through the cell. Some people place an ultrasonic transducer underneath the plates to vibrate the bubbles off the plate surfaces. Archie Blue and Charles Garrett made the engine suck its input air through the electrolyser and relied on the air drawn through the electrolyte to dislodge the bubbles. Some people use piezo electric crystals attached to the plates to vibrate the plates and shake the bubbles free, others use magnetic fields, usually from permanent magnets. The best method is to treat the electrode plates with cross-hatch scouring, an extensive cleansing process and an extensive conditioning process. After that treatment, bubbles no longer stick to the electrodes but break away immediately with the need for any form of additional help.

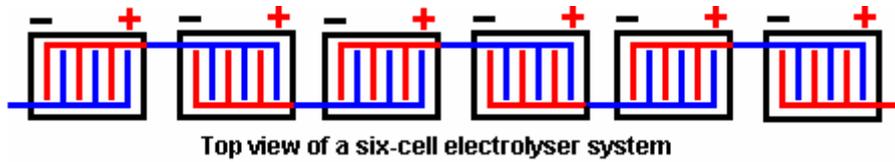
As indicated in the drawing above, you MUST NOT perform electrolysis with the gas escaping freely, unless you are out of doors with very good ventilation. Hydrogen and hydrogen/oxygen mix gasses are HIGHLY dangerous, easily ignited and can easily injure or kill you. They must be treated with a high degree of respect. You need to keep the amount of gas held at the top of each cell to a minimum, and ALWAYS use a bubbler as shown here:



The deep water in the bubbler stops any flashback reaching the electrolyser and should the gas at the top of the bubbler be ignited by some accident, then the tightly-fitting cap should blow off harmlessly. If equipment of this nature is being installed in any vehicle, NO component containing hydrogen or “hydroxy” gas must ever be placed inside the passenger compartment. The engine compartment should be used to house this

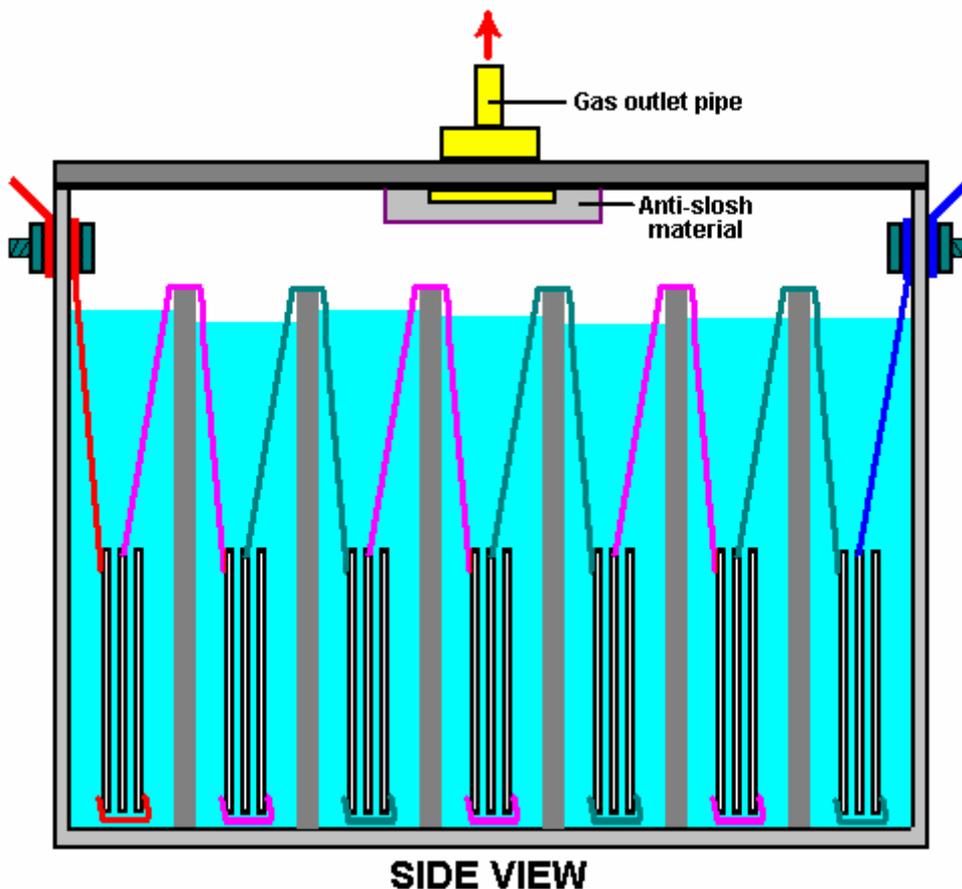
equipment or, if you really must, the boot (trunk) and no pipe containing gas should run through any part of the passenger area. Staying alive and uninjured is much more important than reducing fuel consumption.

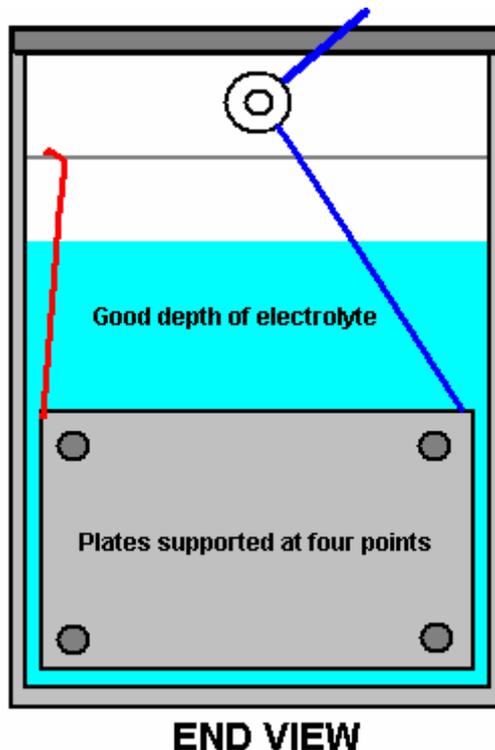
There are many different ways of constructing electrolysis equipment. A fairly conventional electrical set-up is shown here:



Three plates are used for each electrode and the cells are connected in series. This is a perfectly good arrangement and it has the advantage that the plates can be submerged deeply in the electrolyte, the cells are fully isolated from each other and they can be positioned in convenient locations scattered around the engine compartment. Also, the gas from each cell can be drawn through the electrolyte of the other cells, and this helps to dislodge gas bubbles and improve the operating efficiency of the system.

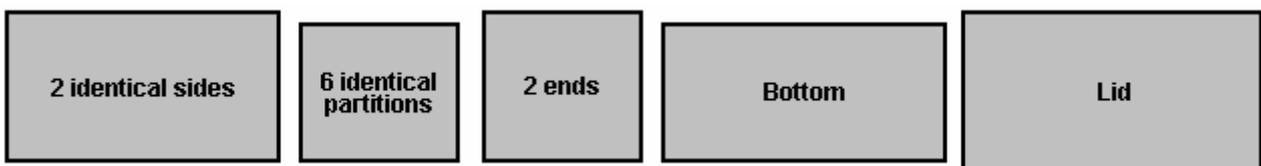
It is not necessary to have these containers as separate units. A single housing can contain all of the plates needed to make a very efficient "series" electrolyser, as shown here:



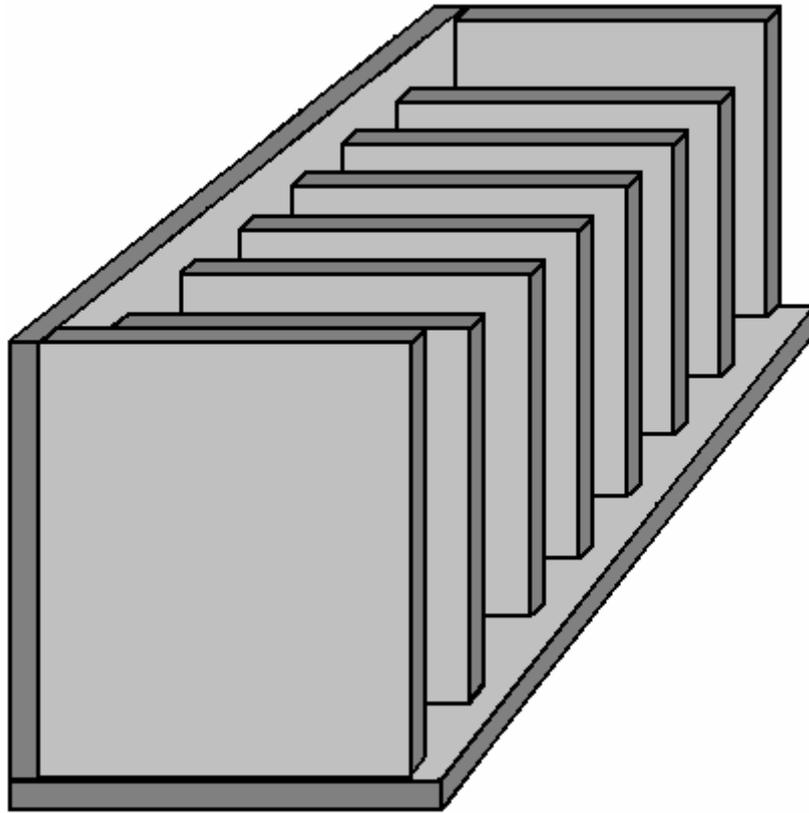


This design has several advantages. The level of electrolyte in each compartment is not critical, so a considerable volume of electrolyte can be held above the plates. This also means that topping up with water need only be done very occasionally, and so there is no need for a complicated filling mechanism. The method of construction is very simple. The unit is fairly compact. The electrode plate area can be made as big as you wish. The cell has seven compartments as when a vehicle engine is running, the alternator produces nearly 14 volts in order to charge the 12 volt vehicle battery. This means that there will be about 2 volts across each of the seven cells and gas production will be seven times that of a single cell.

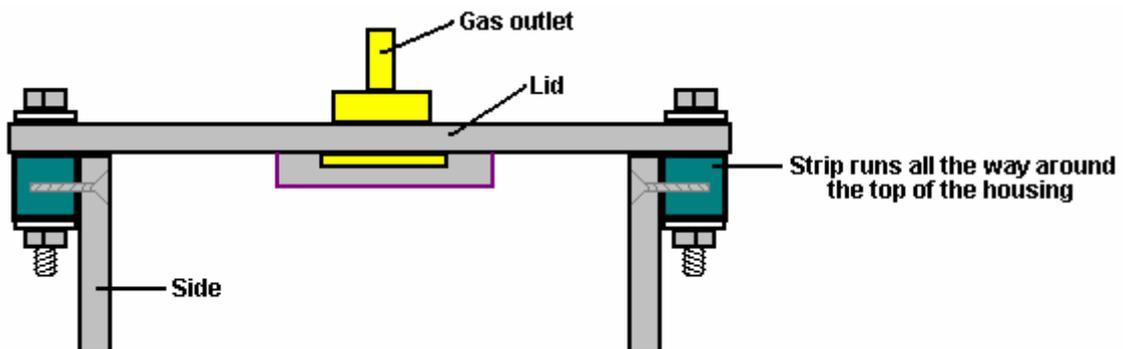
Construction of a housing is not difficult. Pieces are cut out for two sides, one base, one lid and eight absolutely identical partitions. These partitions (which include two housing end pieces) must be exactly the same so that there is no tendency for leaks to develop.



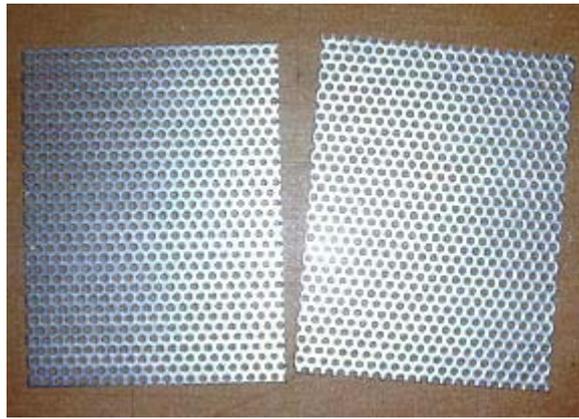
The Bottom piece is the same length as the Sides, and it is the width of the Partitions plus twice the thickness of the material being used to build the housing. If acrylic plastic is being used for the construction, then the supplier can also provide an adhesive which effectively "welds" the pieces together making the different pieces appear to have been made from a single piece. The case would be assembled like this:



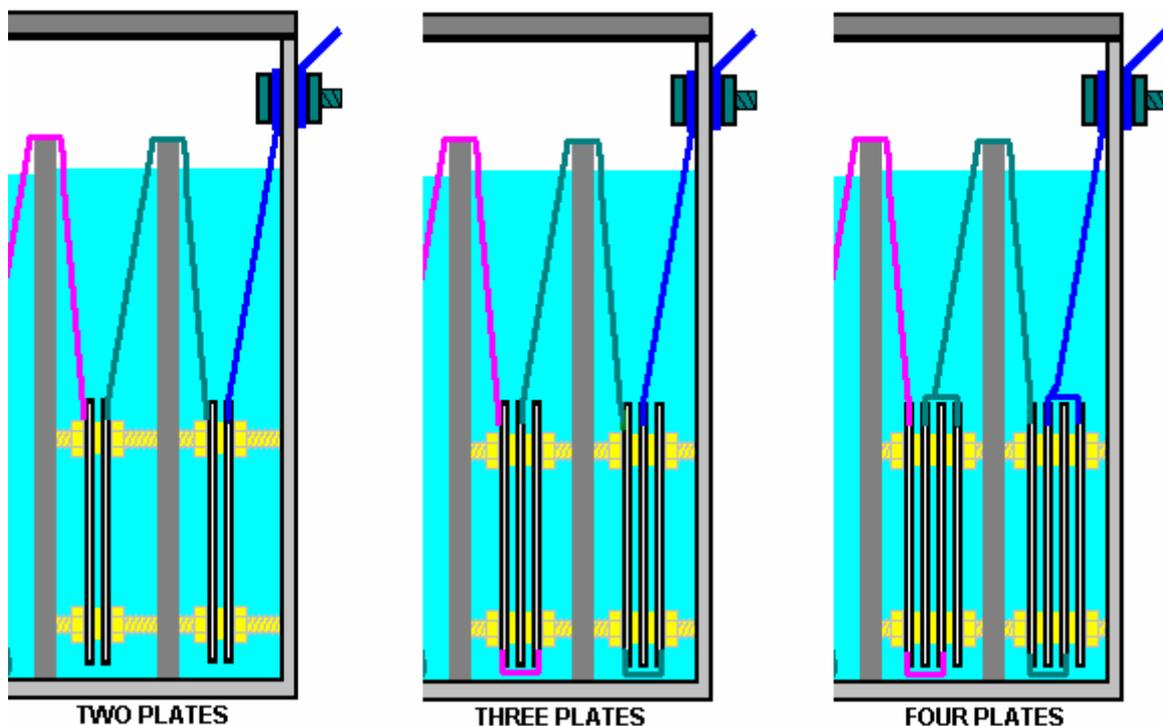
Here, the partitions are fixed in place one at a time, and finally, the second side is attached and will mate exactly as the partitions and ends are all exactly the same width. A simple construction for the Lid is to attach a strip all the way around the top of the unit and have the lid overlap the sides as shown here:



A gasket placed between the sides and the lid would assist in making a good seal when the lid is bolted down. The electrode plates for this design are made from stainless steel mesh as this material can be cut by hand using a pair of tin snips:



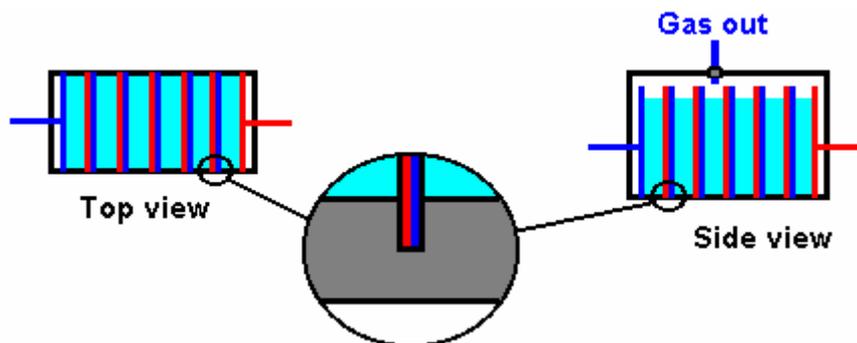
These plates should be held 3 mm (1/8 inch) apart for the best gas-producing performance. This can be done by using plastic threaded rod and bolts positioned at each corner of the sheets. The sheets are spaced accurately by placing plastic washers on the threaded rod between the plates. If the threaded rods are cut to just the right length, they can be a push-fit between the partitions and that holds the plates securely in position inside the cell. There are various ways of connecting the plates which are placed in each compartment of this cell. The connection method depends on the number of plates in each set. The most simple arrangement is just two plates per compartment, but there can just as easily be, three, four, five or whatever number suits you:



The electrolysis takes place in the gaps between the plates, so with two plates, there is just one area of electrolysis. With three plates, there are two inter-plate spaces and electrolysis takes place on both sides of the central plate in each compartment. With four plates, there are three inter-plates spaces and electrolysis takes place on both faces of the two inner plates in each compartment.

If each plate has, say, 20 square inches of area on each face, then with two plates, the electrolysis area is 20 square inches allowing up to 10 amps of current. With the three plate arrangement, the electrolysis area 20 square inches, allowing a current of up to 20 amps through the electrolyser. With the four plate arrangement, the electrolysis area of the electrode plates is 60 square inches, allowing up to 30 amps to be passed through the cell. The higher currents are not a problem with this design because with seven cells in series, there is little heating of the electrolyte and the cell operation remains stable.

There are many different styles of cell. It is possible to dispense with the partitions shown above, if you are willing to sacrifice the large volume of electrolyte above the electrode plates. This style of design is necessary if instead of having just seven partitions in the cell, there are to be seventy or more. This leads to the style of construction shown here:



Here, the outer casing is slotted to receive the electrode plates. The build accuracy needs to be high as the electrode plates are expected to form an almost watertight seal to create separate cells inside the housing. In this diagram, the central electrode plates are shown in red for positive and blue for negative voltage connections. The plates are just single sheets of stainless steel and to a quick glance, it looks as if the central plates do nothing. This is not so. Because the electrolyte is not free to move between compartments, it produces the same electrical effect as the arrangement shown here:

An alternative arrangement

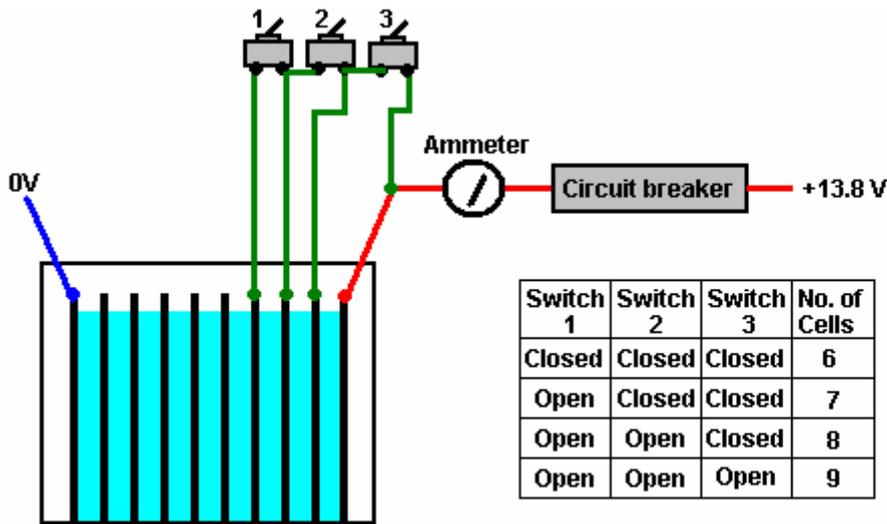


While this is the same electrically, it requires the production and slotting of five additional plates. Each extra plate is effectively redundant because the space between the internal pairs is empty (wasted space) and one steel plate is just wired directly to the next one. As the plates are wired together in pairs, there is no need to have two plates and a connecting wire - a single plate will do. The reason for pointing this out in detail is because it is quite difficult to see how the standard arrangement is connected electrically with the opposite sides of a single plate forming part of two adjacent cells and in addition, the electrical connection between those two cells.

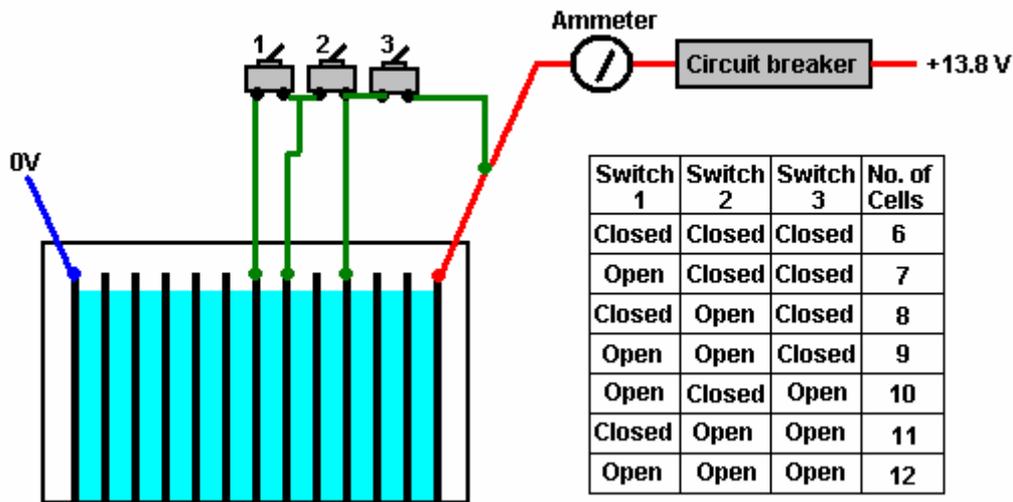
When straight electrolysis is being used, the rate of gas production is proportional to the current flowing through the cells. With 12 volt systems, the current is usually determined by the concentration of the electrolyte and its temperature. When an electrolyser is first started, it usually has a fairly low temperature. As time goes by, the electrolysis raises the temperature of the electrolyte. This increases the current flowing through the electrolyser, which in turn, heats the electrolyte even more. This causes two problems. Firstly, the gas production rate at start-up is lower than expected as the electrolyte is not as hot as it will become. Secondly, when the electrolyser has been going for some time, a temperature runaway effect is created where the current gets out of hand.

There are various solutions to this situation. One is to accept that the gas production will be low in the early stages of each run, and adjust the concentration of the electrolyte so that the maximum running temperature gives exactly the design current through the electrolyser. This is not a popular solution. Another solution is to use an electronic "Mark/Space Ratio" circuit to control the current. This rather impressive name just means a circuit which switches the power to the electrolyser ON and OFF many times each second, more or less the same as a dimmer switch used to control lighting levels in the home. This solution places an ammeter to show the current, and a Mark/Space Ratio control knob on the dashboard of the vehicle, and the driver lowers the current manually if it starts to get too high.

Another, very effective alternative is to add in extra electrolysis cells. As well as controlling the current, this raises the efficiency of the gas production. This can be achieved in various ways. One option is to install extra cells with a heavy duty 12V switch across them. When the switch is closed, the cell is starved of current and effectively is not operational at all. Heavy duty switches of this kind can be bought in ship chandlers at reasonable cost as they are used extensively in boating for switching engine and lighting circuits in power boats and sailing yachts. An alternative is to use a high powered semiconductor to replace the switch and use cheap, low power switches to control the semiconductors. This last option adds unnecessary circuitry but it holds out the possibility of automating the process where the electronics circuit switches the cells in and out automatically depending on the current being drawn by the electrolyser. Firstly, using heavy duty switches, the arrangement could be like this:



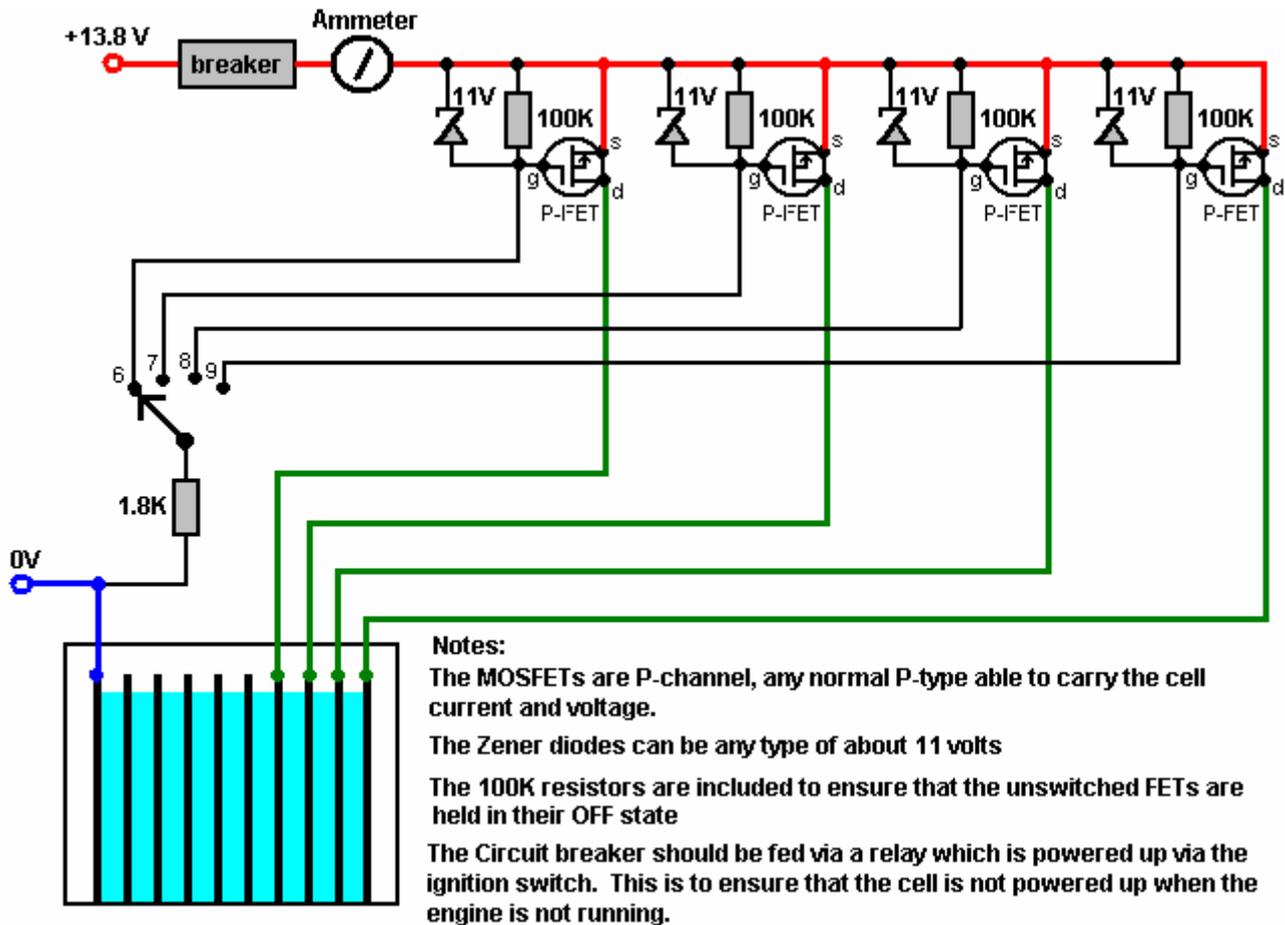
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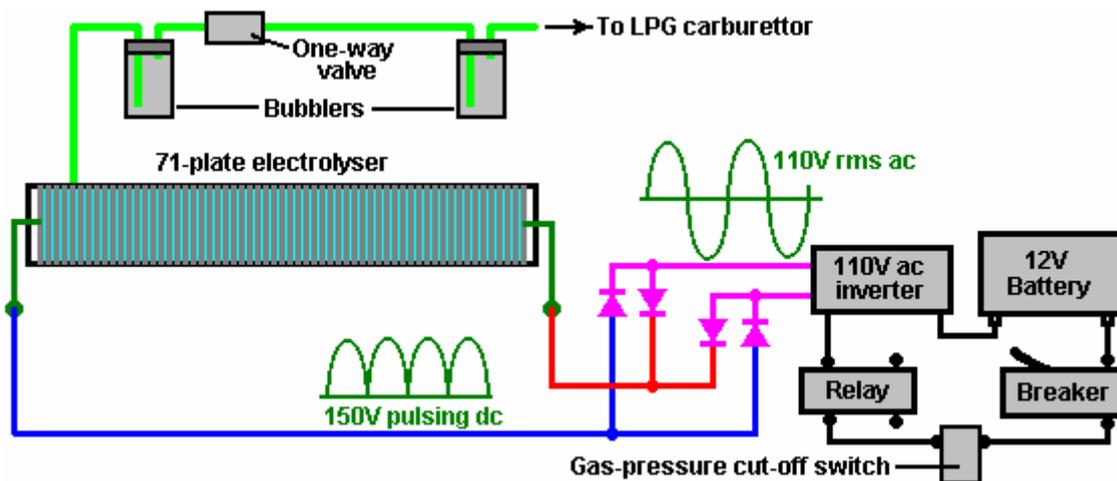
In the first option, the arrangement is very simple with three switches adding in three additional cells - one switch per cell, very easy to understand and operate. The second arrangement uses the same three switches but it allows twice as many extra cells to be switched in. However, the switching arrangement is more complicated when driving along with one switch having to be opened and another having to be closed.

With the electronics option, the switch arrangement inside the vehicle is very straightforward with a single rotary switch mounted on the dashboard being used to select the number of additional electrolysis cells to be used. The diagram here shows the switching for three additional cells, but the circuit can be continued for more cells if desired. The only practical limit is in the rotary switch where twelve positions is the normal

maximum for a standard wafer switch. That would give eleven additional cells which far more than would be realistic in practice. In fact, the three additional cells shown is probably as much as would be used if this method were adopted.



Bob Boyce has used the multi-plate series-cell arrangement to great advantage with electrolyser containing 101 separate plates. This forms 100 self-contained, interconnected cells within the electrolyser and he places approximately 1.5 volts across each cell by using a 300 watt, 110V ac sine-wave inverter driven from the vehicle's 12V battery system. Bob then uses a bridge rectifier to convert the 110V ac to 150V pulsing DC before applying it to the electrolyser as shown here:

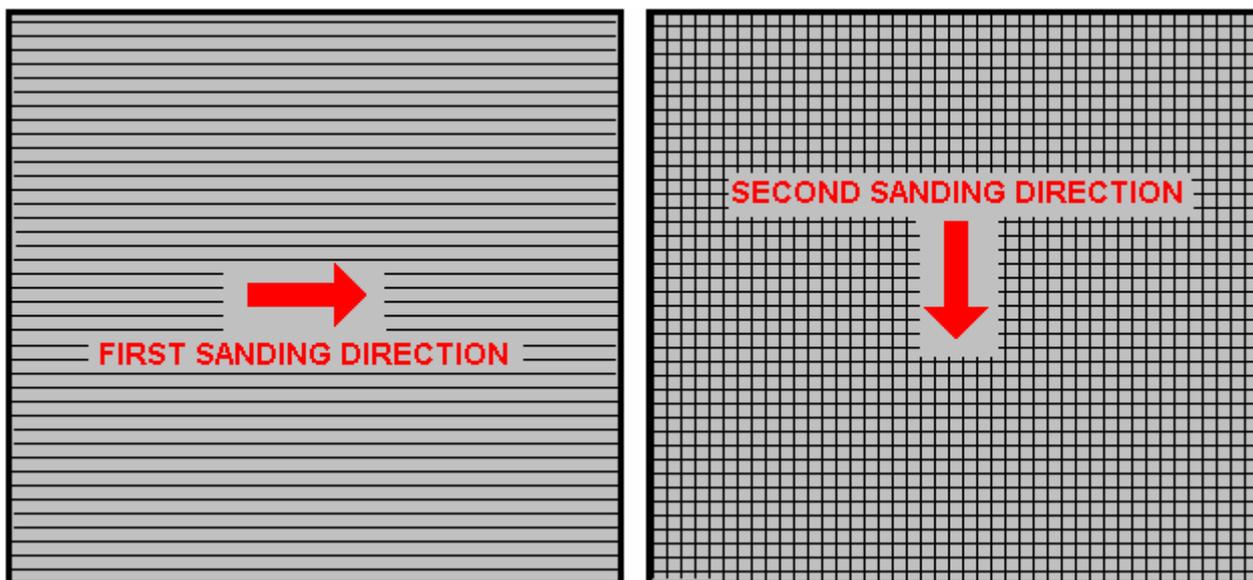


For full water-only operation, Bob then further enhances this system with his design of electronics board, the details of which he has freely shared with everybody. Further details of this are in the D9.pdf document of this set and full details can be found on Bob's dedicated Yahoo web forum Group which is at

<http://tech.groups.yahoo.com/group/WorkingWatercar/> and which also has very valuable support and advice available from the members of that forum, including Bob himself.

Whether making a booster or a full-blown water-only system, the preparation of the plates is one of the most important steps in producing an electrolyser which works well. This is a long task, but it is vital that it is not skimmed or hurried in any way. Surprisingly, brand new shiny stainless steel is not particularly suitable for use in an electrolyser and it needs to receive careful treatment and preparation before it will produce the expected level of gas output.

The first step is to treat both surfaces of every plate to encourage gas bubbles to break away from the surface of the plate. This could be done by grit blasting, but if that method is chosen, great care must be taken that the grit used does not contaminate the plates. Stainless steel plates are not cheap and if you get grit blasting wrong, then the plates will be useless as far as electrolysis is concerned. A safe method which Bob much prefers is to score the plate surface with coarse sandpaper. This is done in two different directions to produce a cross-hatch pattern. This produces microscopic sharp peaks and valleys on the surface of the plate and those sharp points and ridges are ideal for helping bubbles to form and break free of the plate.



Bob uses a 6-inch x 48-inch belt sander which is great for preparing the plates and he uses it all the time now with 60 or 80 grit. Always wear rubber gloves when handling the plates to avoid getting finger marks on the plates. Wearing these gloves is very important as the plates must be kept as clean and as grease-free as possible, ready for the next stages of their preparation.

Any particles created by the sanding process should now be washed off the plates. This can be done with clean tap water (not city water though, due to all the chlorine and other chemicals added), but only use distilled water for the final rinse.

The plates are now slotted into the case. The case is constructed from thick acrylic sheet ("Plexiglas" or "Perspex") and details are given in the D9.pdf document. The next step in the preparation process is to make up a weak solution of potassium hydroxide. This is done by adding small amounts of the potassium hydroxide to water held in a container. The container must not be glass as that is not a suitable material in which to mix the electrolyte.

Potassium hydroxide, also called KOH or "Caustic Potash", can be bought in small quantities from soap making supply outlets. One suitable outlet is Summer Bee Meadow at www.summerbeemeadow.com in their "Soapmaking Supplies" section. Another provider who supplies small quantities at reasonable cost is https://www.saltcitysoapworks.com/newshop/product_info.php?cPath=25&products_id=106&osCsid=07d7db_a060277e6c8a157be165490541 While Potassium hydroxide is the very best electrolyte, it needs to be treated with care:

Always store it in a sturdy air-tight container which is clearly labelled "DANGER! - Potassium Hydroxide". Keep the container in a safe place, where it can't be reached by children, pets or people who won't take any

notice of the label. If your supply of KOH is delivered in a strong plastic bag, then once you open the bag, you should transfer all its contents to sturdy, air-tight, plastic storage containers, which you can open and close without risking spilling the contents. Hardware stores sell large plastic buckets with air tight lids that can be used for this purpose.

When working with dry KOH flakes or granules, wear safety goggles, rubber gloves, a long sleeved shirt, socks and long trousers. Also, don't wear your favourite clothes when handling KOH solution as it is not the best thing to get on clothes. It is also no harm to wear a face mask which covers your mouth and nose. If you are mixing solid KOH with water, always add the KOH to the water, and not the other way round, and use a plastic container for the mixing, preferably one which has double the capacity of the finished mixture. The mixing should be done in a well-ventilated area which is not draughty as air currents can blow the dry KOH around.

When mixing the electrolyte, **never** use warm water. The water should be cool because the chemical reaction between the water and the KOH generates a good deal of heat. If possible, place the mixing container in a larger container filled with cold water, as that will help to keep the temperature down, and if your mixture should "boil over" it will contain the spillage. Add only a small amount of KOH at a time, stirring continuously, and if you stop stirring for any reason, put the lids back on all containers.

If, in spite of all precautions, you get some KOH solution on your skin, wash it off with plenty of running cold water and apply some vinegar to the skin. Vinegar is acidic, and will help balance out the alkalinity of the KOH. You can use lemon juice if you don't have vinegar to hand - but it is always recommended to keep a bottle of vinegar handy.

For plate cleansing, prepare a 5% to 10% (by weight) KOH solution and let it cool down. As mentioned before, never handle the plates with your bare hands, but always use clean rubber gloves. Put the sanded and rinsed plates into the slots in the electrolyser case. Fill the electrolyser with the KOH solution until the plates are just covered.

A voltage is now applied across the whole set of plates by attaching the leads to the outermost two plates. This voltage should be at least 2 volts per cell, but it should not exceed 2.5 volts per cell. Maintain this voltage across the set of plates for several hours at a time. The current is likely to be 4 amps or more. As this process continues, the boiling action will loosen particles from the pores and surfaces of the metal. This process produces hydroxy gas, so it is very important that the gas is not allowed to collect anywhere indoors (such as on ceilings).

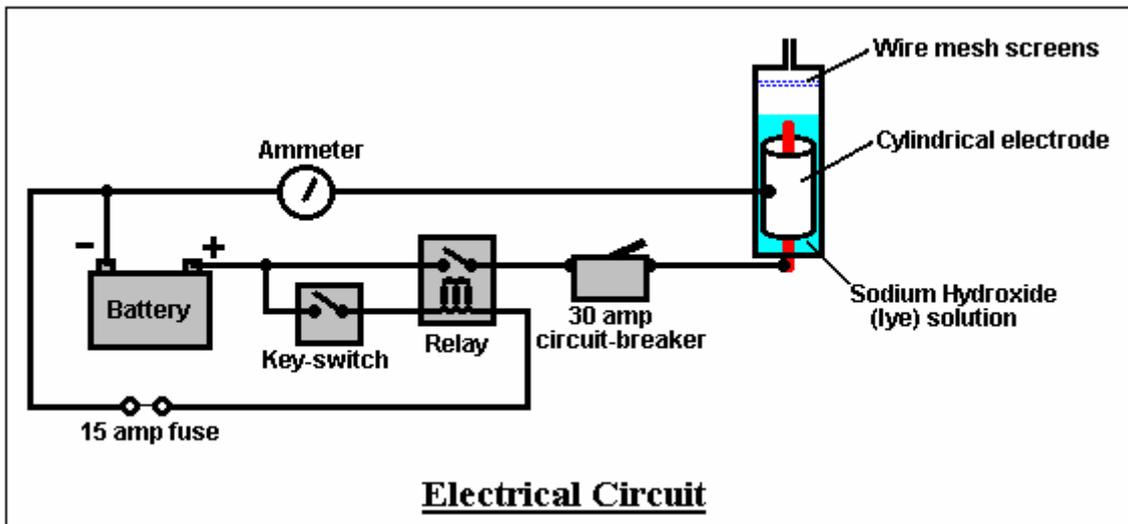
After several hours, disconnect the electrical supply and pour the electrolyte solution into a container. Rinse out the cells thoroughly with distilled water. Filter the dilute KOH solution through paper towels or coffee filters to remove the particles. Pour the dilute solution back into the electrolyser and repeat this cleaning process. You may have to repeat the electrolysis and rinsing process many times before the plates stop putting out particles into the solution. If you wish, you can use a new KOH solution each time you cleanse, but please realise that you can go through a lot of solution just in this cleaning stage if you choose to do it that way. When cleansing is finished (typically 3 days of cleansing) and no more particles come off the plates, do a final rinse with clean distilled water.

For plate conditioning, use the same concentration of solution as in cleansing, fill the electrolyser with dilute solution up to 1/2" below the tops of the plates. Do not overfill the cells. Apply about 2 volts per cell and allow the unit to run. Remember that very good ventilation is essential during this process. The cells may overflow, but this is ok for now. As water is consumed, the levels will drop. Once the cells stabilise with the liquid level at the plate tops or just below, monitor the current draw. If the current draw is fairly stable, continue with this conditioning phase continuously for two to three days, adding just enough distilled water to replace what is consumed. If the solution changes colour or develops a layer of crud on the surface of the electrolyte, then the cell stack needs more cleansing stages. Do not allow the cells to overfill and overflow at this point. After two to three days of run time, pour out the dilute KOH solution and rinse out the electrolyser thoroughly with distilled water.

The full step-by-step instructions for making a very simple single-cell booster design from "HoTsAbI" - a member of the Yahoo 'watercar' forum Group are included in this set of documents. This is a very neat and simple electrolysis booster unit which has raised his average mpg from 18 to 27 (50% increase) on his 1992 5-litre Chevy Caprice. As you can see, he has made a very neat and professional installation which works very well:

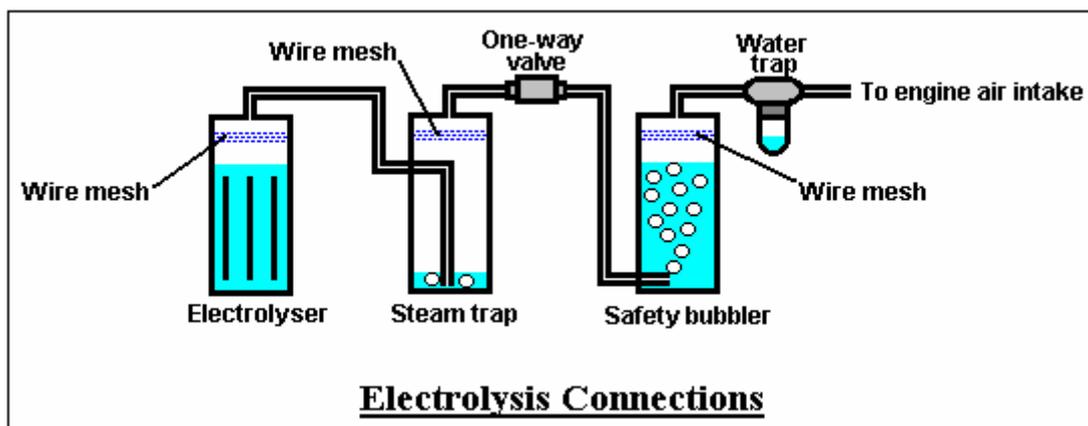


The unit draws only 15 amps which is easily handled by the existing alternator. The construction uses ABS plastic with Sodium Hydroxide ("Red Devil" lye, 1 teaspoon to 8 litres of distilled water) and the gas-mix is fed directly into the air intake filter of the car engine. The electrodes are stainless steel with the negative electrode forming a cylinder around the positive electrode:



The circuit is wired so that it is only powered up when the car ignition switch is closed. A relay feeds power to the electrolyser which is three inches (75 mm) in diameter and about 10 inches (250 mm) tall. The electrolyser circuit is protected by a 30-amp circuit breaker. The electrolyser has several stainless steel wire mesh screens above the water surface.

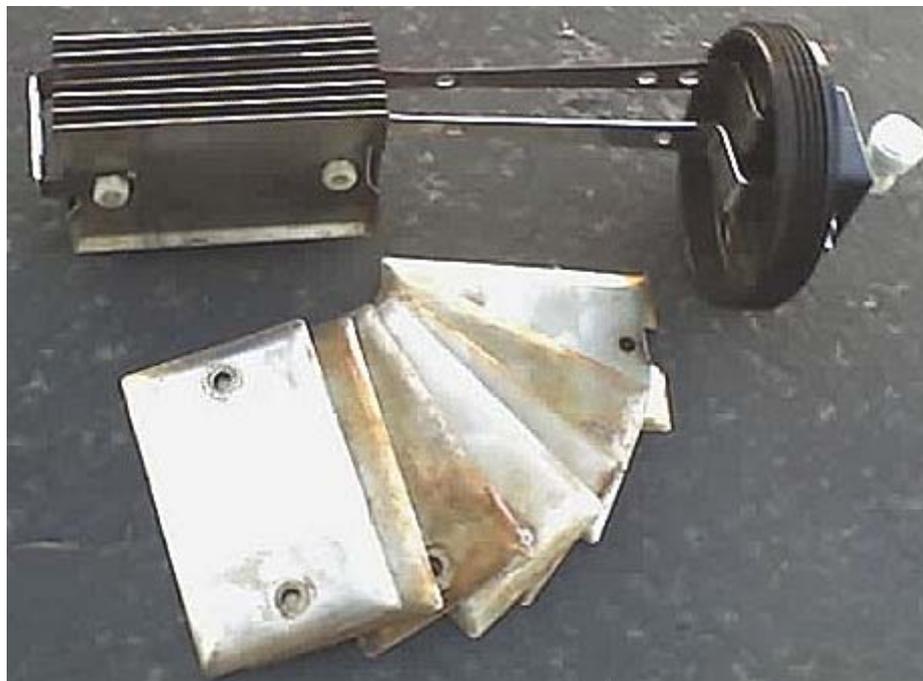
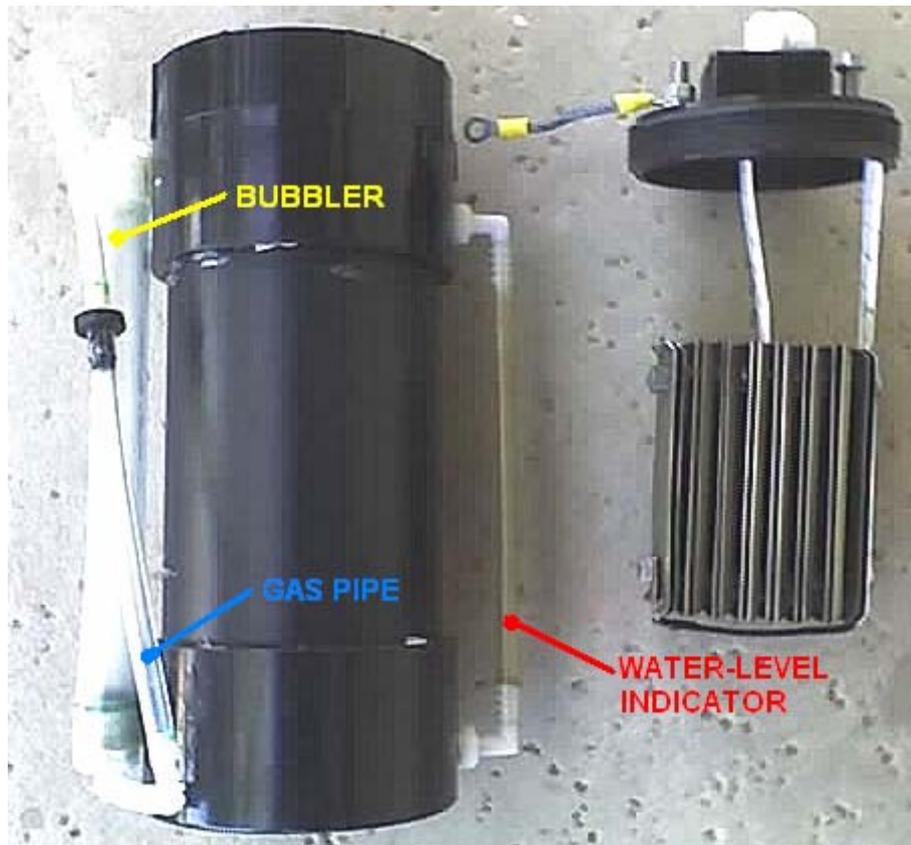
The output of the electrolyser is fed to a steam trap, fitted with several stainless steel wire mesh screens, and then on via a one-way valve into a safety bubbler:



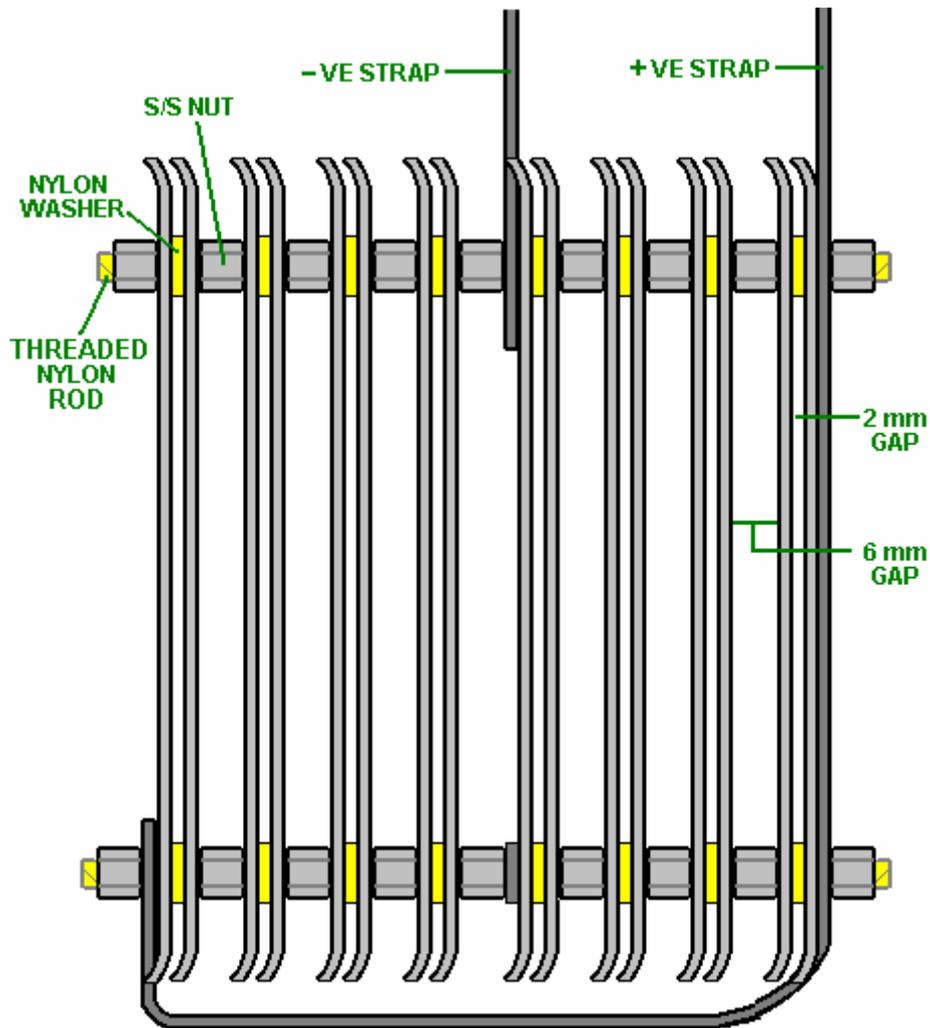
The bubbler also has stainless steel wire mesh screens which the gas has to pass through before it exits the bubbler. The gas is then passed through a compressor-style water trap to remove any remaining moisture, and is injected into the air intake of the vehicle. Although not shown in the diagram, the containers are protected by pop-out fittings which provide extra protection in the extremely unlikely event of any of the small volumes of gas being ignited by any means whatsoever.

The ammeter is used to indicate when water should be added to the electrolyser, which is typically, after about 80 hours of driving and is done through a plastic screw cap on the top of the electrolyser cap (shown clearly in the first photograph). This unit used to be available commercially but the designer is now too busy to make them up, so he has generously published the plans free. These very detailed step-by-step plans can be downloaded free, as can all of the large number of other documents in this set, from the web site <http://www.panaceauniversity.org>

Another booster design of higher efficiency is the "Smack's Booster" which produces 1.7 litres per minute ("lpm") which is about optimum for boosting. There is a separate document on this booster, showing the construction step by step, along with the list of components needed and suggestions for the suppliers. This design uses stainless steel switch covers as the electrodes and readily available plastic pipe for the housing:



In this neat design, the plates are connected in an unusual way. Although a single container of electrolyte is used, not all of the plates are connected to the electrical power supply:



SIDE VIEW OF PLATE ARRAY

It is possible to have this booster made up for you by the designer, and the details of how to do this are in the main "Smack's Booster" document.

Pulsed Electrolysis:

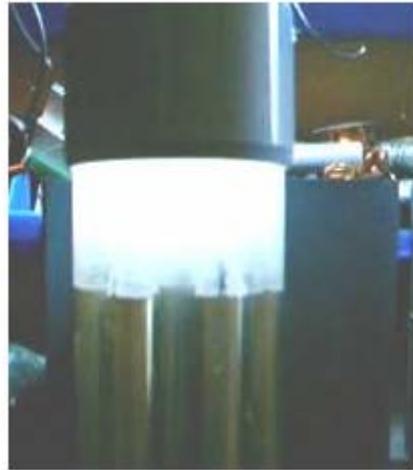
Stanley Meyer.



On 17th December 1995, the UK "Channel 4" television series "Equinox" ran a programme which included an interview with Stanley Meyer of Ohio, USA. This shows Stan Meyer demonstrating his new method of separating water into its components of hydrogen and oxygen. His method is some 17 times more efficient

than conventional electrolysis. With conventional electrolysis, the temperature of the water (plus additives to help the process) rises substantially during the process. With Stan's method, the water temperature does not rise at all and no additives are needed. This strongly suggests that his method utilises zero-point energy to provide the extra power needed to break down the water. Zero-point energy shows a temperature *drop* as the current increases.

Stan received several patents covering his process, including US 4,798,661; 4,936,961; 4,826,581; 4,798,661 and 4,613,304. His first patent was very difficult to obtain as the US Patent Office said it was impossible to do and demanded to see a working model. Stan gave them a demonstration but even then, they took a further three years of stalling before they issued the patent. While Stan is no longer alive, his demonstration "Water Fuel Cell" has been replicated by Dave Lawton and Dave's methods have since been copied very successfully by others. Details of Dave's build and circuitry are in the "D14.pdf" document of this set. Using just tap water and low current, the gas production is rapid:

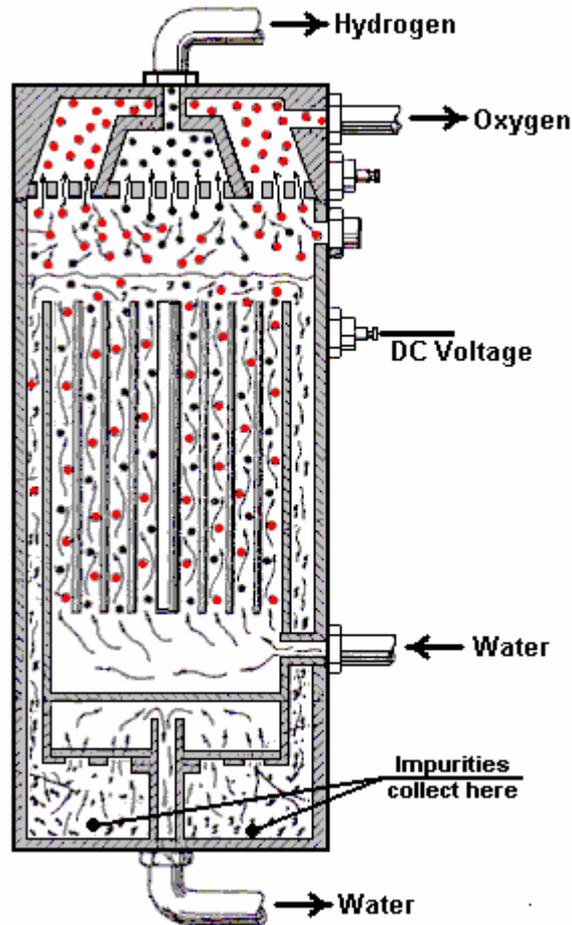


The electrodes in this design are cylindrical stainless steel pipes:



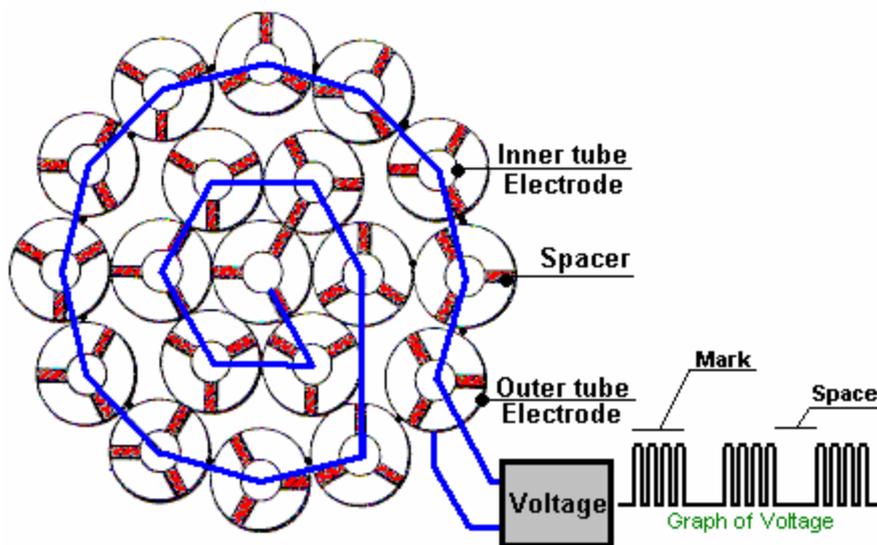
This water-splitter design uses a simple pulsing circuit, shown in detail in the D14.pdf document.

One of Stan Mayer's many different cells designs is shown here:

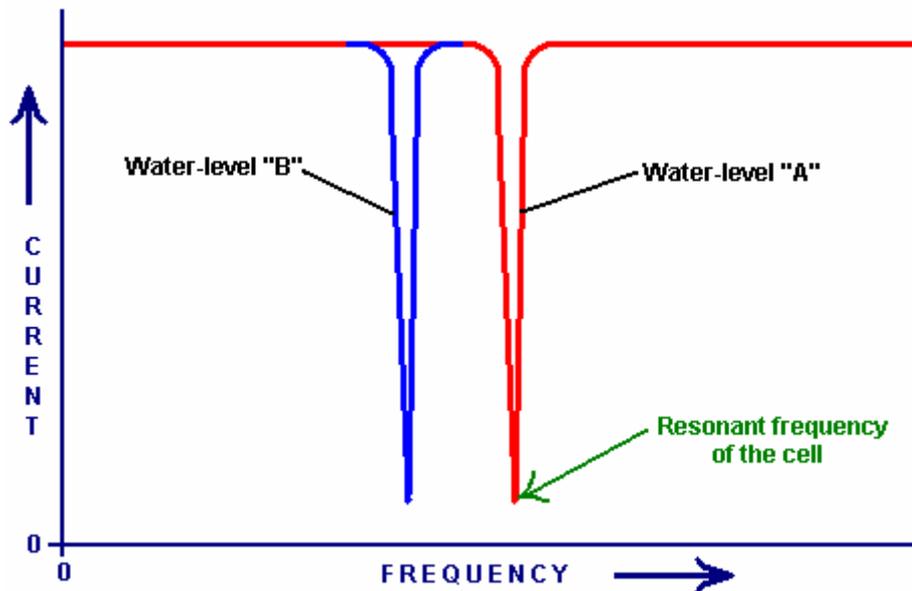


You will note that he uses a DC voltage on the wall of the cell to move the dissociated hydrogen atoms outwards and the oxygen atoms inwards, to produce separate gas exits from the cell.

One of his pipe electrode arrangements is shown here, and while it is taken directly from one of his patents, it should be understood that the pipe spacers shown in red are actually very narrow as the spacing between the pipes is very important for good gas production and is usually set at 1.5 mm:



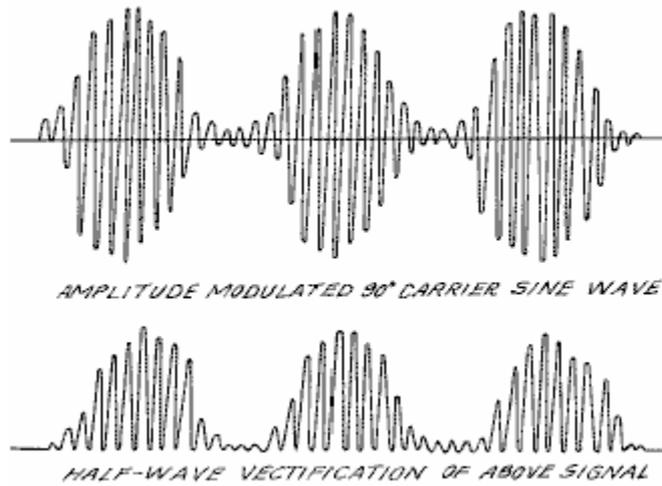
It should be understood that while Stan's system of splitting water is very high efficiency indeed, it is not easy to maintain its tuning at the optimum level. The resonance of the cell is very sharp indeed, and can generally only be found by careful monitoring of the current while adjusting the pulse frequency very, very slowly. The diagram shown here indicates how narrow the resonance 'notch' is:



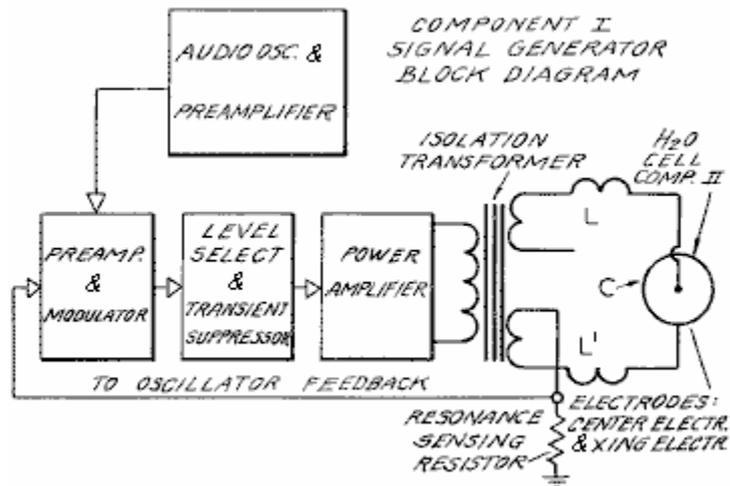
Even at frequencies very close to the resonant frequency, there will be no indication whatsoever that the frequency has almost been reached. When the correct tuning point has been found (at water-level "A"), the water-splitting accelerates to a high level. and unless the water supply is being pumped through the cell as Stan shows in his patent drawings, then the water-level starts to drop. Unfortunately, as the water level drops, say to water-level "B", the resonant frequency of the cell alters and the pulse train is then at the wrong frequency and the process stops to perform correctly. To maintain maximum low-current gas production, either the cell conditions have to be held constant to a high degree of accuracy, or sophisticated electronic control is needed to keep re-adjusting the pulse frequency to the exact resonant frequency, faster than the cell characteristics can change.

This is probably the reason why Stan Meyer moved away from this type of cell in favour of direct water injection into his car engine, creating the combustion conditions inside each cylinder just before ignition. The injection system has the enormous advantage of not needing to handle gases of any type but just move and manipulate ordinary water. Stan died suddenly just after perfecting and demonstrating his water injection system and before it went into production - an amazingly convenient occurrence for the oil industries. As far as I am aware, nobody has managed to replicate Stan's injection system, in spite of there being patent information on it.

Henry Puharich. Henry also used a pulsed signal to split water molecules in an efficient manner. His technique is rather different in that he starts with a modulated audio sine-wave signal and uses half-wave rectification to cut off the negative voltage components. The result is a pulsed DC signal which has a whole range of different amplitudes as shown here:

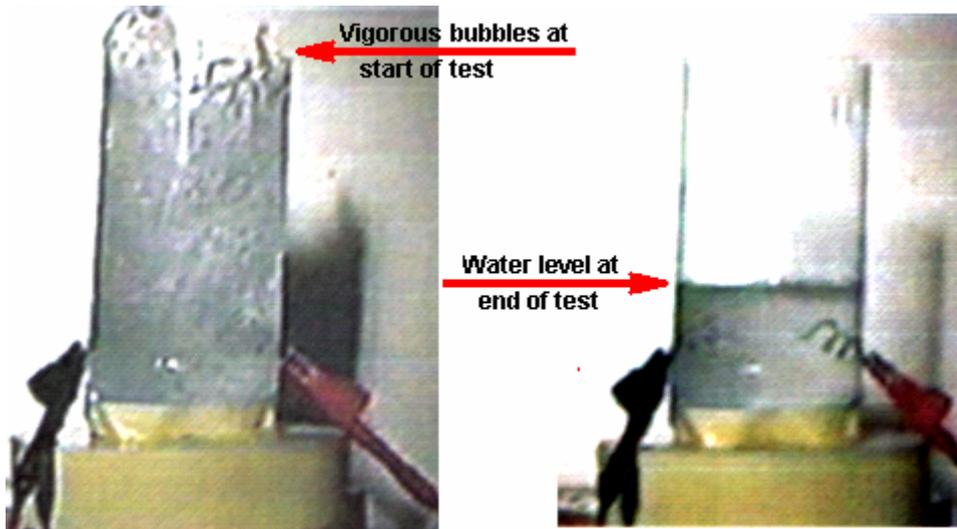


This waveform is generated using the arrangement shown here:



The details of his process can be found in his patent, a copy of which forms part of this set of documents.

Paulo Mateiro. It is reported that water has been efficiently split by Paulo Mateiro, using the most simple electrodes possible, with only 4.8 Volts from a 555 timer circuit. Different frequencies from 200 Hz to 1,100 Hz have been used and for the cell in the test, the optimum was 923 Hz. The current was 300 mA and the hydrogen production was so great that the bubbles were almost tossing the water out of the top of the container as shown here:

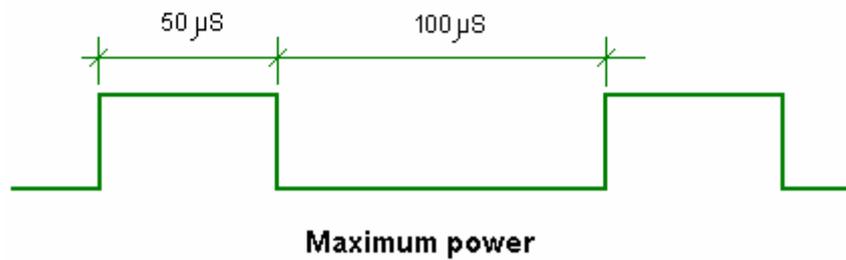
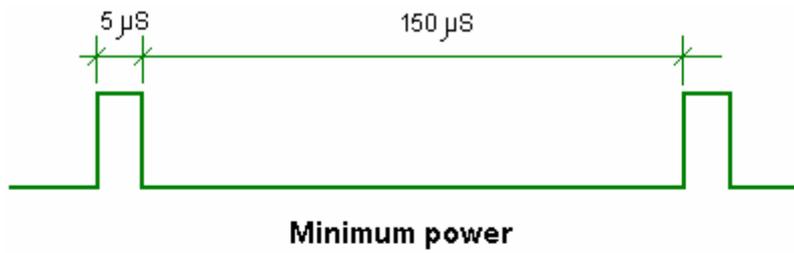


This is said to split one litre of water per minute in a single cell with just bare wires for the electrodes and a straight square wave between the electrodes. In a system of this type, using just a square wave, the quality of the square wave is absolutely critical (as pointed out recently by Paul Zigouras). The rise and fall times of the waveform must be very short indeed and there must not be any overshoot - it has to be a "perfect" square wave. Replication attempts will fail if the quality of the waveform is just not good enough, and it is surprisingly hard to get a really good quality square wave.

Paulo used 10% sulphuric acid solution (probably unnecessary). Anode and cathode were 35 mm (1.4 inch) long, silver-coated copper wire. Paulo ran his internal combustion lawnmower directly from water using this method:



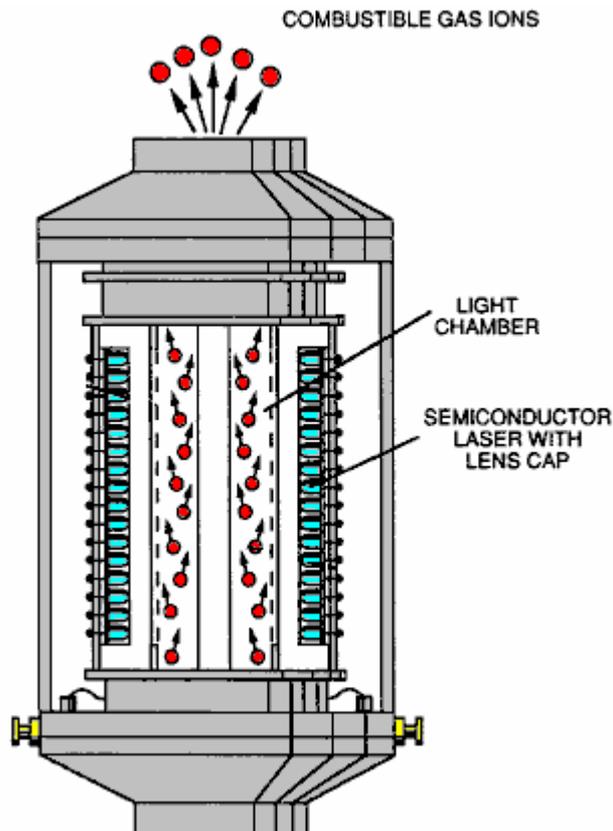
Kiyoshi Inoue (Tokyo). Kiyoshi has been granted US Patent 4,184,931 for an efficient pulsed electrolysis system. His recommendation is for a pulse waveform which has an "on" period of from 5 to 50 microseconds (500 microseconds at a push) and an "off" time of 2 to 30 times the "on" time. His circuit provides independent adjustment of both the "on" and "off" times (a simple circuit to do this is in the electronics tutorial section of this set of documents). His electrolysis voltage will therefore adjust anywhere between the two waveforms shown here:



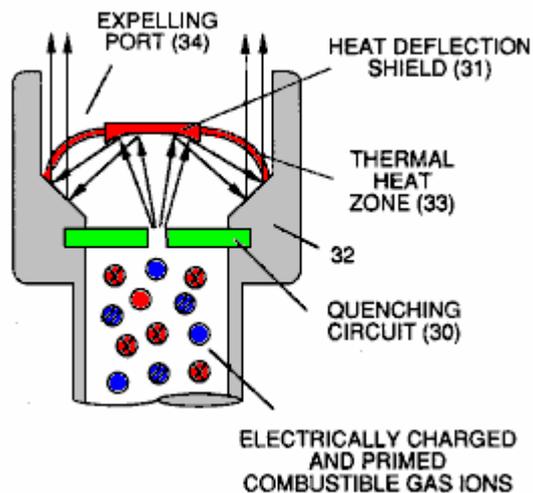
Fuel Injection systems:

Stanley Meyer

The most advanced way to power a vehicle is using injection straight into the cylinders. Stanley Meyer did this and put a vehicle on the road. Stan's system is very advanced. He starts by pumping energy into the water molecules by passing them through transparent tubes using arrays of solid state UV lasers to radiate energy into them:

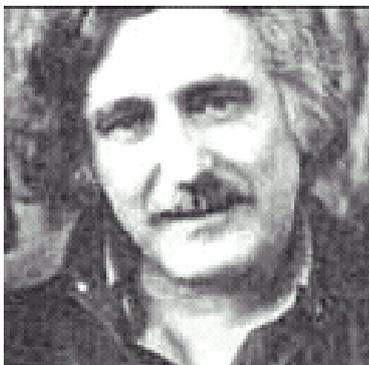


He then adds more energy to the water molecules by pumping both heat and magnetic energy into them with a special assembly heated by the previous power strokes in the cylinder:

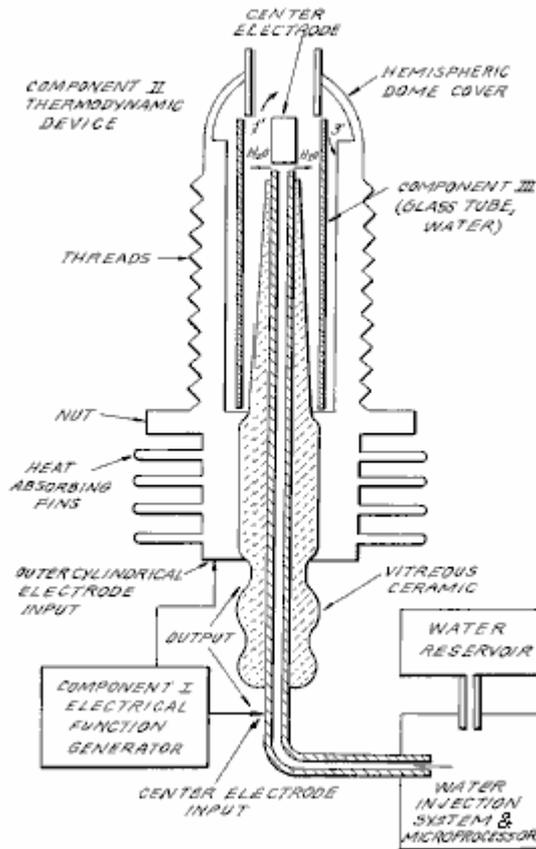


At this point, the mixture is ready for injection into the cylinder for compression and ignition. Stan's system is very effective and can power a vehicle engine directly from water as the only fuel. The full details of his patent form part of this set of documents accompanied by a very extensive discussion of how Stan saw the energising process and some of his other patents.

Henry Puharich

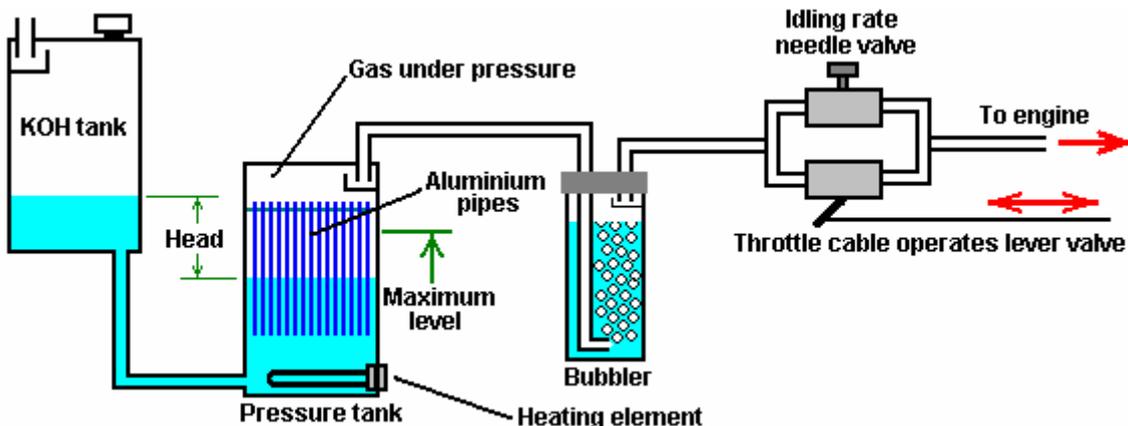


Henry gives a very detailed description of how he sees water bonding, energy levels and splitting process in his 115% efficient water-splitting patent, a copy of which forms part of this set of documents. He too, opts for injection of hydroxy gas directly into the cylinder as shown here:



Rothman Technologies. Since 2003 Rothman Technologies of Canada have been running a 12 HP petrol motor on hydrogen produced by a chemical process. This is a cheap process in which metal is consumed and so, although of great interest, this is not a 'free-energy' engine. A recent patent application by William Brinkley proposes a system where aluminium pipes are consumed by a 25% solution of Potassium Hydroxide heated to 180 degrees Fahrenheit. William remarks on the non-polluting nature of the system, but this is not really so in that a very large amount of energy has to be put into producing the aluminium metal in the smelting and refining process, and the pollution is just moved from the end user to the industrial plant. Francis Cornish of the UK has a system where electrolysis of water is combined with a chemical process consuming aluminium wire. The system works well, but I have reservations about using consumables which tie you to industrial manufacturing, also concerns about the reliability of mechanical feed systems when they are being used by non-technical people (most car drivers). There is also the issue of removing and recycling the chemical residue generated by the process.

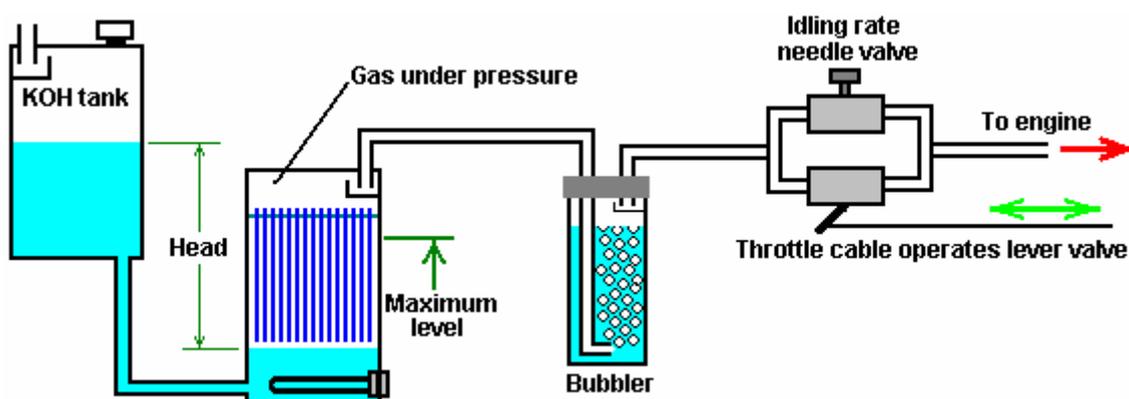
I personally am not keen on chemical processes and I do NOT recommend that you construct anything based on the following description. However, it might be possible to adapt the Brinkley system so that it operates with no moving parts:



Here, there is a header tank containing a 25% mixture of Potassium Hydroxide (KOH) in water. This tank is positioned higher than the pressure tank where the hydrogen gas is generated and the venting pipe is protected by a baffle. The venting pipe should provide an outlet to the air outside the vehicle or building which contains the system.

Initially, the KOH solution in the pressure tank is heated by the heating element, but when the process gets started, it generates heat to maintain the chemical reaction. The gas generation then builds up pressure in the strongly-built pressure tank. The raised pressure pushes some of the KOH solution back into the header tank, against gravity. This reduces the area of aluminium exposed to the KOH solution and reduces the rate of gas production. This effectively creates an automated gas production rate control which has no moving parts.

If the rate of gas taken by the engine increases, that lowers the pressure in the pressure tank, allowing more KOH solution to run into the pressure tank, increasing the rate of gas production. When the engine is stopped completely, then the KOH solution gets pushed into the header tank until all gas production stops, as shown here:



This looks as if the pressure tank is under considerable pressure, but that is not so, as the header tank is open to atmospheric pressure. I have concerns about controlling purely chemical processes rapidly enough for practical use. The above system would be more suited to a fixed engine, such as an electrical generator, where the gas requirement does not fluctuate greatly. The KOH tank shown above should be large enough to contain all of the KOH solution in case the gas production just does not stop when it should. The vent from the header tank should be capable of venting excess hydrogen with no possibility of it ponding on a ceiling and forming an explosive mixture with air. As far as I am aware, the above system has never been constructed and it is just shown here for discussion purposes.

Only 5 pounds per square inch of pressure is needed for electrolyser systems to feed a car engine satisfactorily, so a relatively low pressure is quite satisfactory, provided that the piping is of reasonable internal diameter. It should be remembered that the car engine will be applying a slight vacuum through the bubbler. As with all of these systems, it is vital that at least one bubbler is used between the gas production and the engine, to guard against flashback from the engine ignition if faulty ignition should occur. All bubblers should have a tightly fitting pop-off cap which can ease the effect of an explosion, and they should contain only a small amount of gas. The method of connection to the engine and the necessary timing adjustments are shown and explained in the 'D9.pdf' document which forms part of this set.

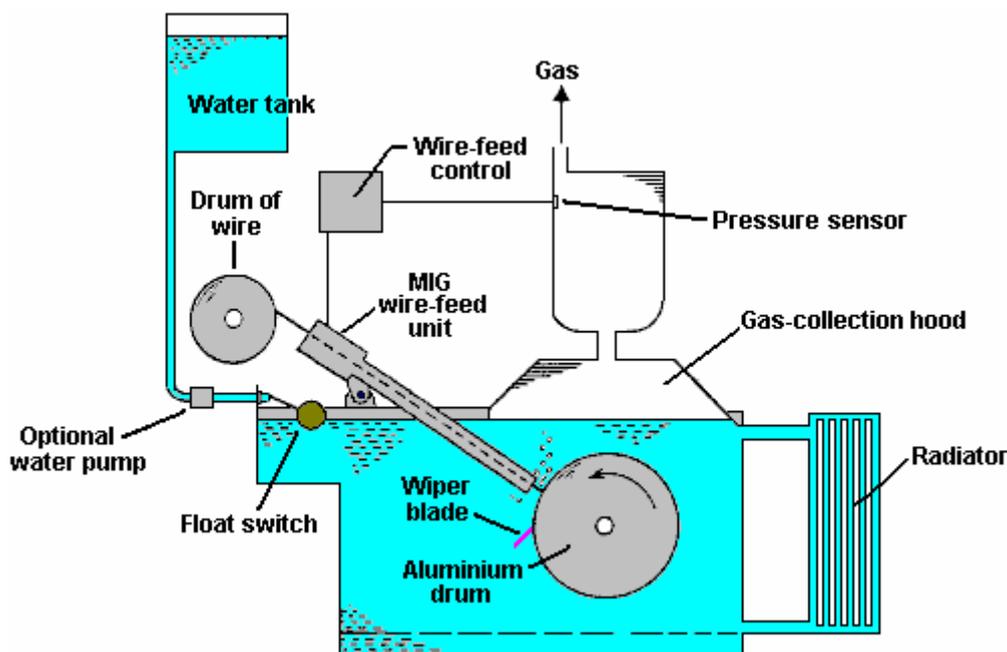
Francois Cornish. The method of using aluminium for a fuel in an on-demand hydrogen system for vehicle propulsion has been presented in detail by several people. One of the best known is the 1987 US Patent 4,702,894 by Francois Cornish, where he uses a feed mechanism for aluminium wire to maintain an underwater electrical arc which raises the water temperature high enough to make the aluminium react with the water. The rotating drum is made of aluminium but as it has a much larger thermal capacity than the aluminium wire being fed towards it, the drum temperature is much lower than that of the wire. As a result of this, the wire reaches the temperature required to make the aluminium react with the water. The chemical reaction releases hydrogen and converts the aluminium wire to aluminium oxide powder, which settles on the bottom of the tank, passing through a grid just above the bottom of the tank.

The bubbles of hydrogen gas released by the reaction tend to stick to the rotating aluminium drum, so a

wiper blade is provided to sweep the bubbles off the drum. The bubbles then rise to the surface of the water and are directed into the gas collection chamber by a funnel located above the arc. If the engine demand drops and the pressure in the gas collection tank rises, a sensor located in the tank causes the wire-feed control electronics to stop the wire feed which cuts off the gas production.

At first glance, a system like this appears to have limited appeal. It uses aluminium wire which requires manufacturing by a process which uses substantial amounts of energy and while a vehicle using hydrogen produced by this method will generate very little pollution, the pollution occurs at the point of manufacture. Also, the device uses a mechanical wire feed and any device of that nature will need regular maintenance and may not be 100% reliable. In addition, the aluminium oxide powder will have to be cleaned out of the generating tank on a routine basis.

But, having said all that, the system has some very significant advantages. It does not use any fossil fuel (directly). It can be readily installed in a vehicle and the consumption of aluminium wire is surprisingly low. Figures quoted indicate that typical consumption is of the order of 20 litres of water, plus one kilogram of aluminium used to cover 600 kilometers distance (1 pound per 170 miles). This is probably a good deal cheaper than using fossil fuel to drive the vehicle. The system is set up like this:



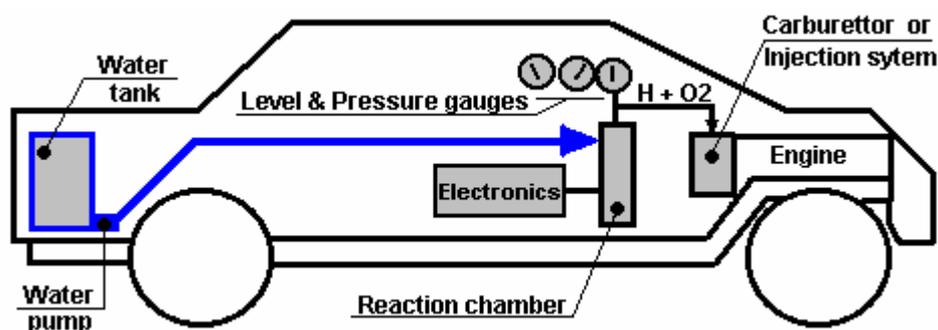
Another system of interest is the self-powered electrolysis system of the 1992 US Patent 5,089,107 granted to Francisco Pacheco where sacrificial anode plates of magnesium and aluminium are placed in seawater opposite a stainless steel cathode. Electrical power is generated and hydrogen produced on demand. There is also surplus electrical power available to run a standard electrolyser if so desired.

Car Applications. It appears that the most popular application based on splitting water is to run a car, either as a supplement to petrol or as a full replacement for it. There are some practical issues involved in using a hydrogen/oxygen mix to run a standard car engine. Firstly, the timing is likely to have to be adjusted to a different setting. Secondly, hydrogen has a high energy content and is likely to cause the engine to run hotter. Thirdly, the pistons and exhaust system are liable to rust unless coated or replaced with stainless steel components. There are various sets of plans for car conversions. These plans assume a reasonable level of mechanical skill on the part of any person or group who undertakes this sort of work. The plans shown here can be downloaded from <http://www.panaceauniversity.org/P62.pdf> and they are intended for free use by anyone who wants to utilise them. They stress that should you decide to undertake any work of this nature, both they and I are in no way responsible for any loss or damage which might result. They also stress that they themselves have not done a conversion of this type, and while they see no reason why these plans should not result in a perfectly workable vehicle, they themselves cannot guarantee that the plans do work. Most of the experienced members of the 'waterpower' and 'hydroxy' Groups do not believe that this

system would produce sufficient hydrogen to run an engine, but that the mechanical details shown can be useful to constructors. The full manual for an essentially updated version of the design is included under the name "HydroGen" <http://www.panaceauniversity.org/P61.pdf>.

It is recommended that should experimental work be undertaken on a car, then the car chosen should be of little value and that all existing parts be kept so that the vehicle can be restored to its present fossil-oil burning status should you choose to do so. It is also suggested that you use a car which is not important to your present transport needs.

It is claimed that the modified car will travel 50 to 300 miles per gallon of water depending on how well it is tuned. The system is set up like this:

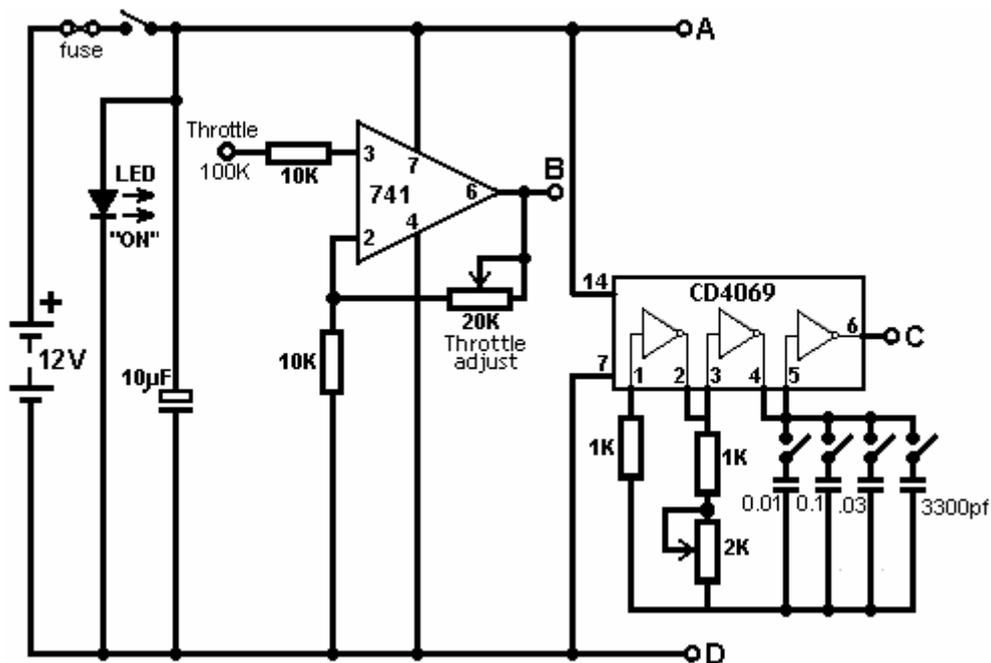


Here, the car has an extra tank installed to contain a reserve of water. This is used to maintain the water level in the reaction chamber which contains the electrode plates. The electrodes are driven by the electronics which applies a pulsed waveform to them in the 0.5 to 5.0 Amp range. The electronics box is powered directly from the existing car battery. The Hydrogen/Oxygen mix which is the output from the reaction chamber is fed directly into the existing carburettor or fuel-injection system.

The start-up procedure is to power up the electronics and wait for the gas pressure to reach the 30 - 60 psi range. Then the car ignition is operated as normal to start the engine. The accelerator pedal is wired into the electronics to give more power to the electrode plates the further the pedal is pressed. This increases the gas production rate as the throttle is operated.

Electronic Control Circuit:

The diagrams show a simple circuit to control and drive this mini-system. You are going to make a 'square-pulse' signal that 'plays' the electrodes like a tuning fork; which you can watch on an oscilloscope. The premise given by the literature is: the faster you want to go down the road, the 'fatter' you make the pulses going into the reaction chamber. Duty cycle will vary with the throttle from a 10% mark/space ratio (10% on and 90% off) with the pedal up, to a 90% mark/space ratio with the pedal fully down.



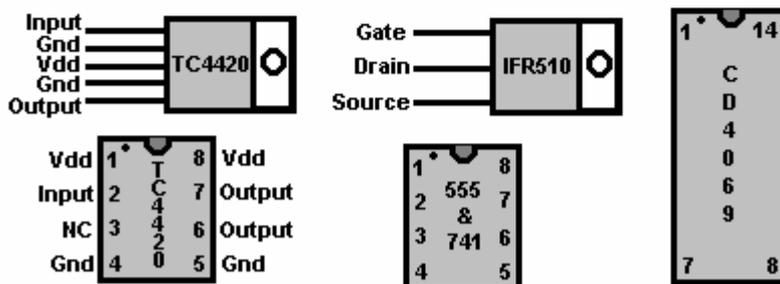
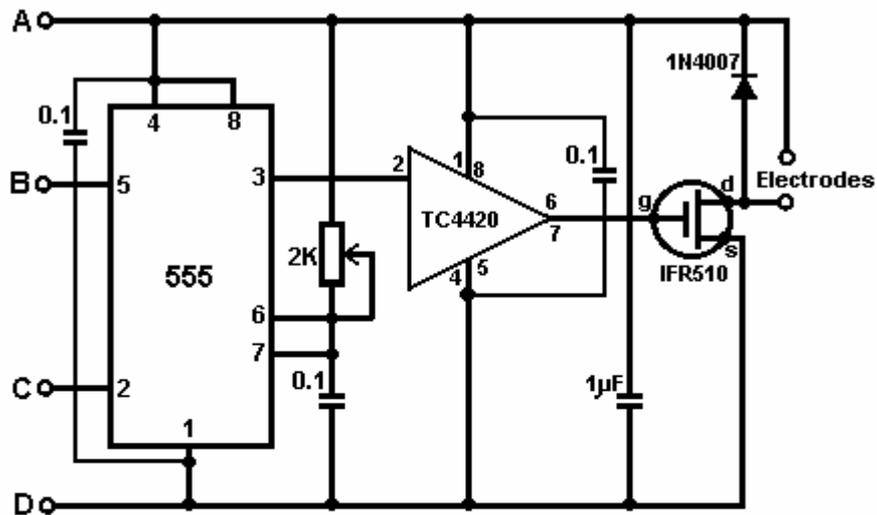
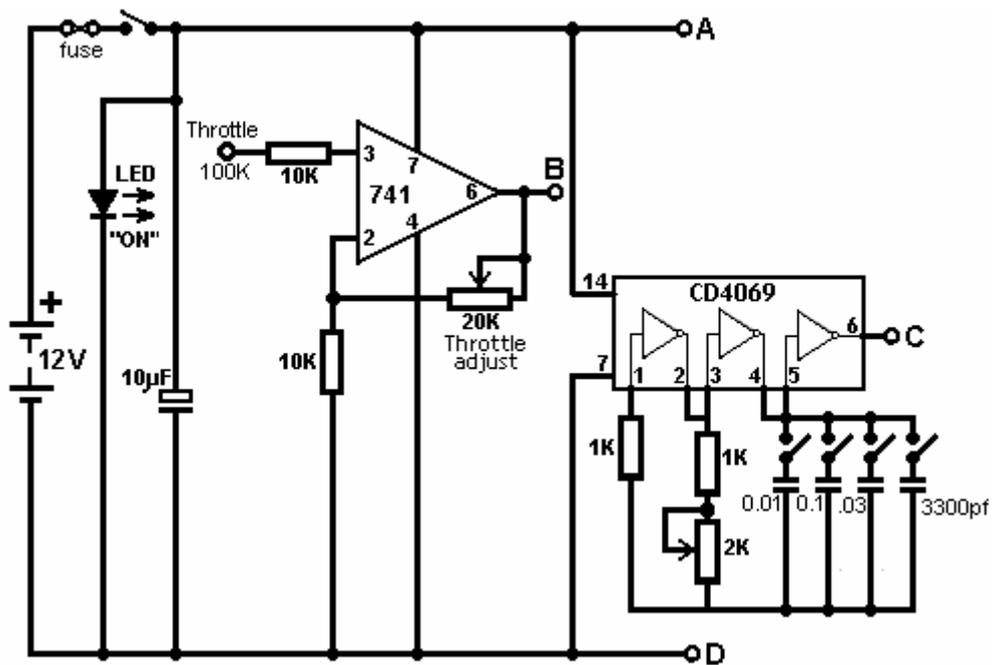
There are many ways to generate pulses. This circuit uses an NE555 integrated circuit. The output switching transistor must be rated at 5 Amps, 12V for pulsed operation. Be sure to use a circuit board with a built-in ground plane, and leave room to mount 2 or 3 of the gauges. Mounting the reaction chamber in the engine compartment will require running a stub to your pressure gauge where you can watch it. You will want to get your chamber level sensor verified before you epoxy the cap on.

If there is a throttle-position sensor on the car, you should be able to take the signal from the sensor itself OR from the computer connector. This signal is then fed into the circuit as the primary control (i.e. throttle level = pulse width = gas rate).

If you don't have such a signal available, you will have to rig a rotary variable resistor to the throttle linkage (i.e. coupled to something at the accelerator pedal or throttle cable running to the carburettor or Fuel-injection system. If you make the attachment at the carburettor/fuel-injector, be sure to use a variable resistor which can handle the temperature to which it will be subjected. If it is subject to high temperatures, get one rated for long life and mechanical wear; mount it securely to something sturdy and stationary that will not fall apart when you step on the accelerator pedal. The throttle operation needs to generate a voltage swing of some 4 Volts to give a 10% to 90% mark/space ratio swing on the oscillator. The oscillator frequency should be matched to the resonant frequency of the plates in the reaction chamber. This is likely to be somewhere in the range 10 kHz to 250 kHz. The resonance is shown when the gas production rate is maximised.

If the voltage produced by the throttle resistor is increased it puts more electrical energy (broader pulses) into the electrodes. Verify that a 10% mark/space ratio can be got. This will show on the oscilloscope (2 - 100 microseconds on the horizontal time-base). A digital voltmeter will display the corresponding voltage across the output transistor (measuring source to drain). reconnect the multimeter to measure current and check the current range passed to the electrodes. This should be 0.5A to 5.0A when the throttle resistor is set between its minimum and maximum settings.

When you build the circuit board, mark each connection off on the circuit diagram with a highlight pen. All variable resistors in the circuit, other than the accelerator resistor, should be of the board-mounted miniature type. The LEDs are there to give you a quick visual check of the normal operation of your circuit. You should check the operation of the reaction chamber water-level sensor before epoxying the cap in place.



The output of the 741 integrated circuit is adjusted via its 2K variable resistor, to give an output voltage (at point 'B' in the circuit diagram) of 1 Volt when the car throttle is fully up, and 4 Volts when the throttle is fully down.

The CD4069 is just an IC containing six inverters. It can handle a supply voltage of up to 18V and is wired here as an oscillator. Its four capacitors are likely to be used in just four combinations: C1, C1+ C2, C1+ C2 + C3, and C1+ C2 + C3 + C4 as these are the most widely spaced tuning ranges. There are, of course, eleven other capacitor combinations which can be switched with this arrangement of four switches.

The CD4069 oscillator is used to switch the NE555 oscillator on and off in exactly the same way that Stan Meyer did. Pin 2 of the 555 IC is the trigger input and in this circuit is used to alter the frequency of the 555

oscillator as the car throttle is pressed.

The TC4420 is an 18V 'Pulse Transformer Driver' IC which is used to amplify the 200 mA output of the NE555 IC to drive the electrodes. The TC4420 can handle 100 Volts at 4A continuous or 16A when pulsed and it has a 20W dissipation rating. The package connections for these ICs is shown above. Remember that you can get the specification and pin details on most ICs from the website: <http://www.alldatasheet.co.kr/>

Important Note:

Gary of G. L. Chemelec commenting on "The HydroStar" circuit which sounds to be based on the same style of circuitry, states that the circuit and design are riddled with serious errors, some of which are:

1) The use of the 741 WILL NOT WORK! Pin 5 is a Voltage Control pin that already has its own voltage of 2/3 of the Supply voltage so it requires a pull down resistor, not an IC to control it.

2) The 2K Pulse width adjust will blow the 555 timer if adjusted all the way down. It needs an additional resistor to limit current to those pins on the IC.

3) The output of the 555, Pin 3 is fed to the CD4059 as well as a TC4420CPA (Mosfet Driver). This driver is a waste of money as it is not needed.

4) The Output of the TC4420CPA is then fed to the IRF510 Mosfet which is now obsolete, however you can use an RFP50N06 (50V, 60A).

5) There is no schematic of the CD4059. They should have shown pin 1 as in, pin 23 as out, pins 3, 10, 13, 14, and 24 connected to 12 volts and pins 2, 4, 5, 6, 7, 8, 9, 11, 12, 15, 16, 17, 18, 19, 20, 21, and 22 connected to ground.

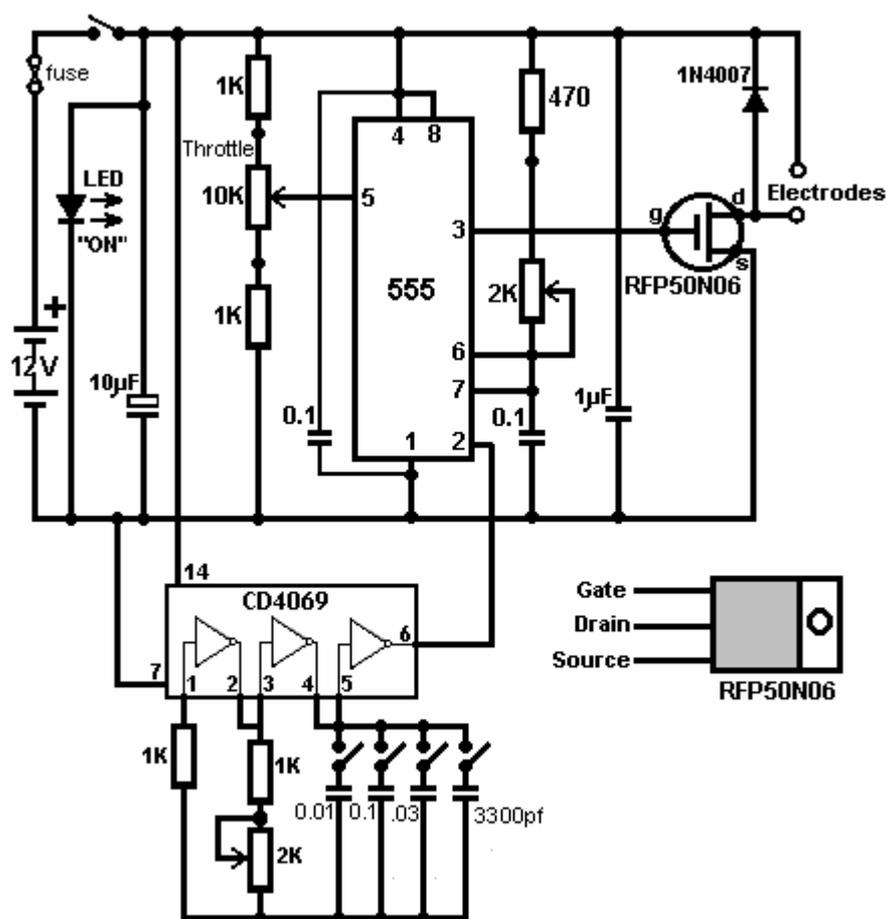
6) The "Strength Adjust" Only Needs the variable resistor connected to Pin 5 and the Ground. The Connection of this control to the Supply Voltage Make Absolutely No Difference in the Output Waveforms, as the IC only needs a 2/3's voltage on this Pin and this is supplied internally, Within the IC.

7) The "Frequency Adjust", Connects to Pins 6 & 7 of This 555. Supply to the battery Will Destroy the 555. so another resistor is needed to prevent this from happening.

This is just a small list of what is wrong. There is MUCH MORE and even after the thing is built it does NOT WORK! If you want to experiment then please do, but I would suggest you just make your own Pulse Width Modulator.

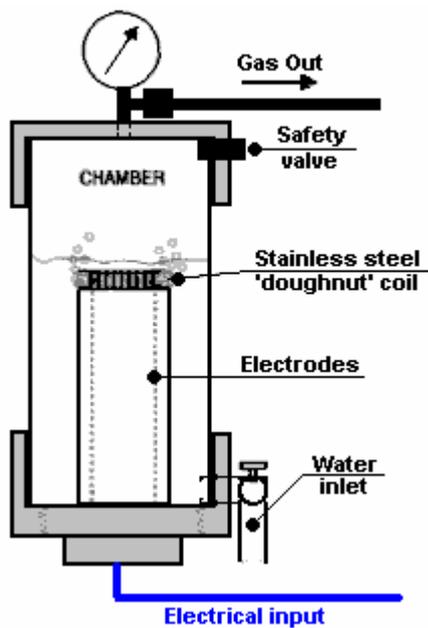
There are also many problems with the design of the reaction chamber and simply put, even if you did get it to work you would need more of these units than you could ever fit in your car to even think about running the engine. Simply put, the unit will NOT create enough gas to run much of anything. Don't get me wrong, I do think that the idea is GREAT and that it can be done.

Bearing these comments in mind, the above circuit should probably be modified and simplified to become:



Reaction chamber:

The suggested reaction chamber arrangement is:

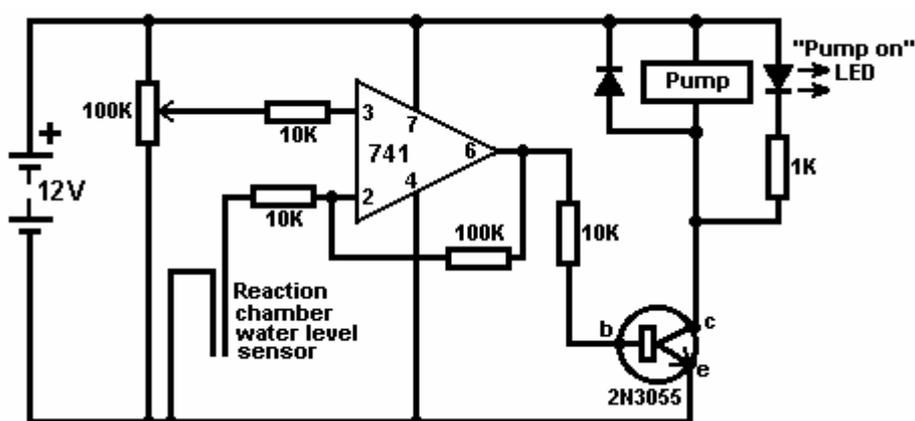


It is suggested that you use a section of 4" PVC waste pipe with a threaded screw-cap fitting on one end and

a standard end-cap at the other. Make sure to drill-and-epoxy or tap threads through the PVC components for all fittings. Set and control the water level in the chamber so that the pipe electrodes are well covered and there is still ample headroom left to build up the hydrogen/oxygen gas pressure. Use stainless steel wires inside the chamber or otherwise use a protective coating; use insulated wires outside. Ensure that the epoxy seals are perfect or alternatively, lay down a bead of water-proof silicone sufficient to hold the pressure.

The screw fitting may require soft silicone sealant, or a gasket. Its purpose is to maintain the pressure in the cylinder and yet allow periodic inspection of the electrodes. Make sure that there are no leaks and you will have no problems. Make sure you get a symmetric 1.5 mm gap between the 2 stainless steel pipes. The referenced literature suggests that the closer to 1 mm you get, the better. Check that the chamber water-level sensor is working correctly before you epoxy its cap in place. Make your solder connections at the wire/electrode junctions nice, smooth, and solid; then apply a waterproof coating, e.g. the epoxy you use for joining the pipes to the screw cap. This epoxy must be waterproof and be capable of holding metal to plastic under pressure.

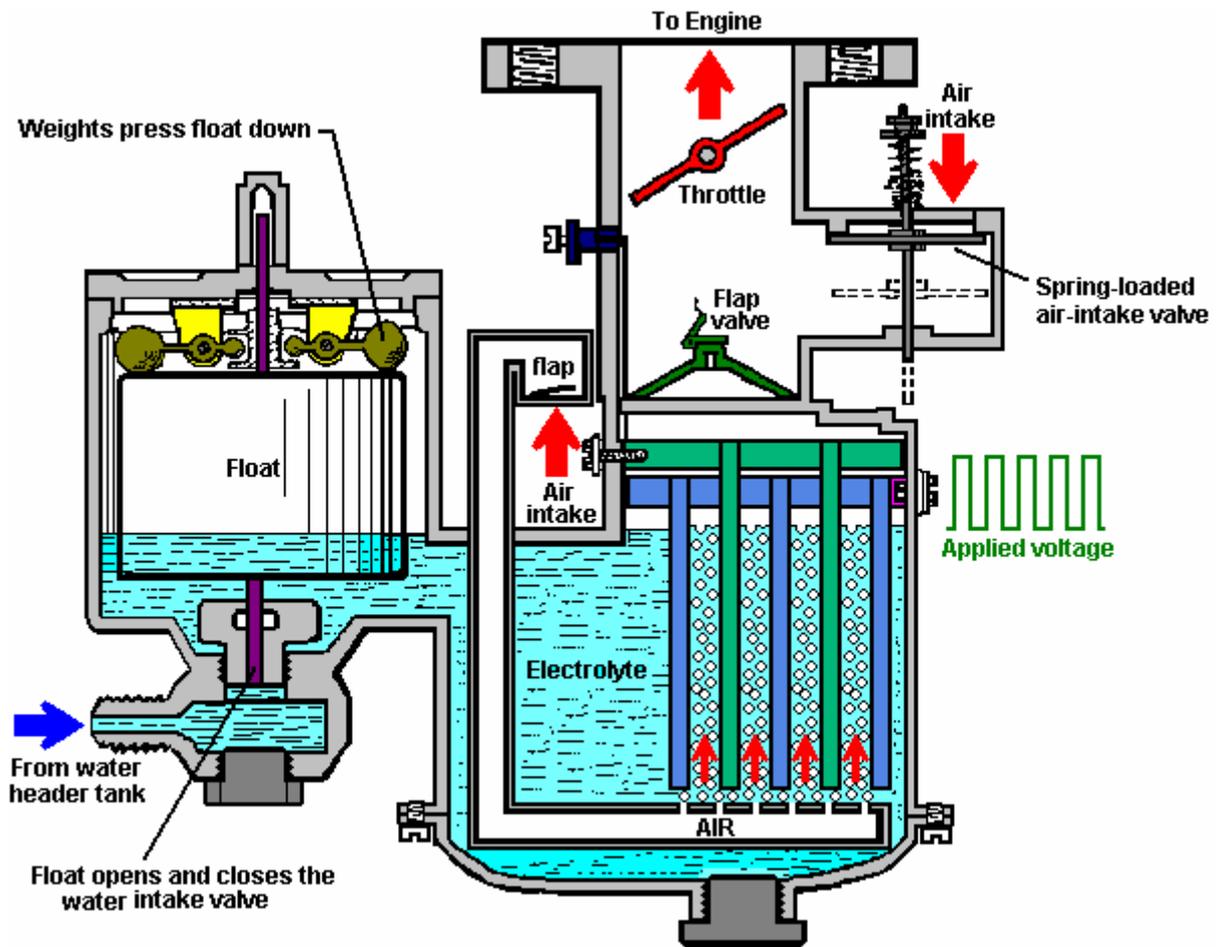
The suggested circuit for the reaction chamber water-level pump control is:



Charles Garrett. One of the problems with electrolysis of water is said to be caused by bubbles staying on the face of the electrodes. Charles Garrett was granted US Patent 2,006,676 on 2nd July 1935 in which he shows some impressive details.

Firstly, he generated an extra electrical input by fitting a second (6 volt) alternator to the car. While the drawing shows the applied voltage swapping over in polarity, this was not done rapidly, just occasionally to even up any deterioration of the electrodes.

He maintained the water level in the electrolysis chamber with a neat carburettor-style float and pin valve arrangement. He improved the electrolysis by introducing a perforated tube below the electrode plates which allows the engine to suck air up past the plates. This cools the electrolyte (water with a few drops of hydrochloric acid) introduces water vapour to the gas mix and dislodges any bubbles on the plates, without the need for any extra mechanical device. Considering that he did this seventy years ago, it is an impressive piece of work. Please note that while only five electrode plates are shown in the diagram, in reality it is probable that many such plates were used since the gas volume is directly proportional to the plate area.

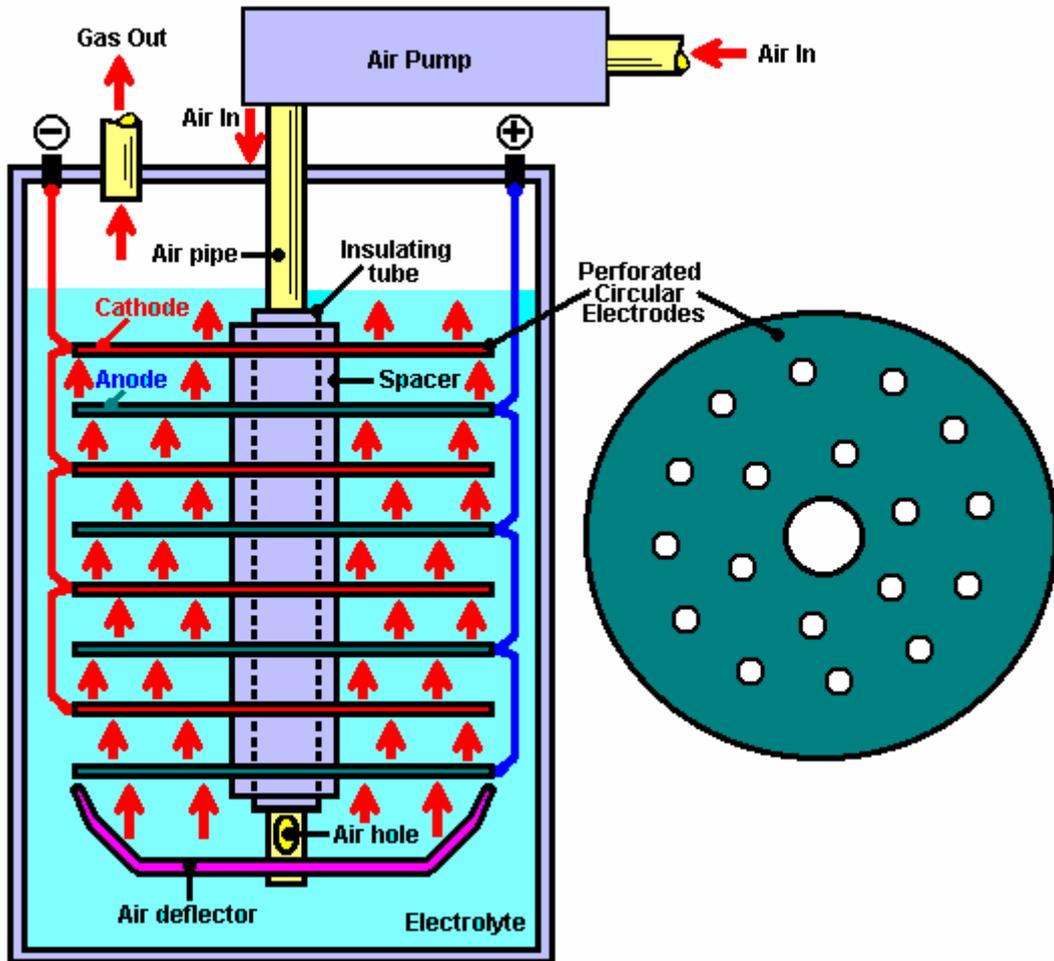


Archie Blue.



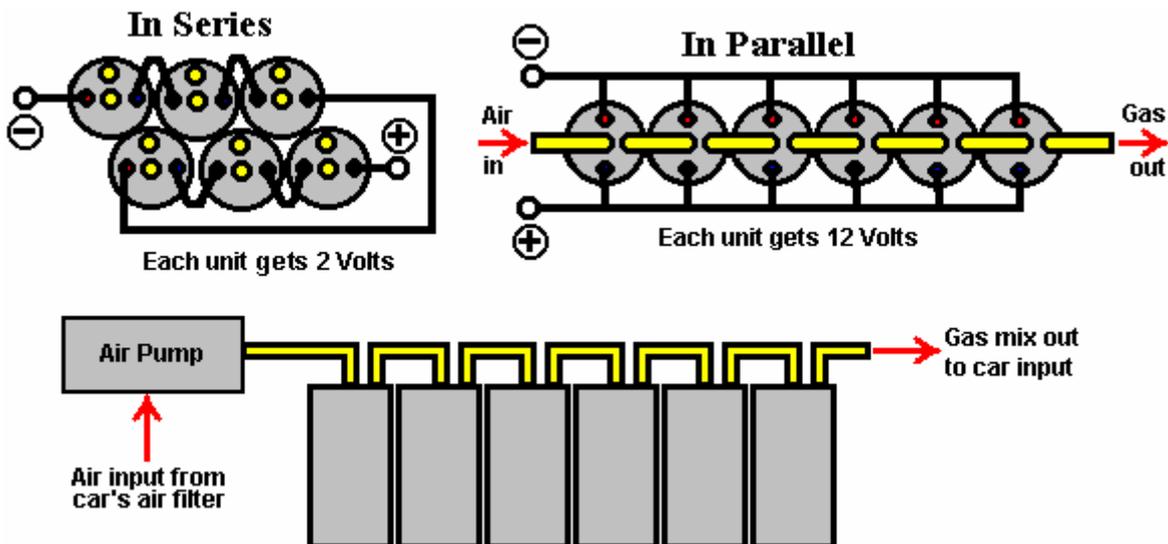
More than fifty years after Charles Garrett was granted his patent, another one was granted to Archie Blue. The equipment described in the two patents operates in more or less the same way. Archie's equipment is very simple to construct and uses straight electrolysis with no attempt at pulsing the electrical supply:

Archie Blue's Device



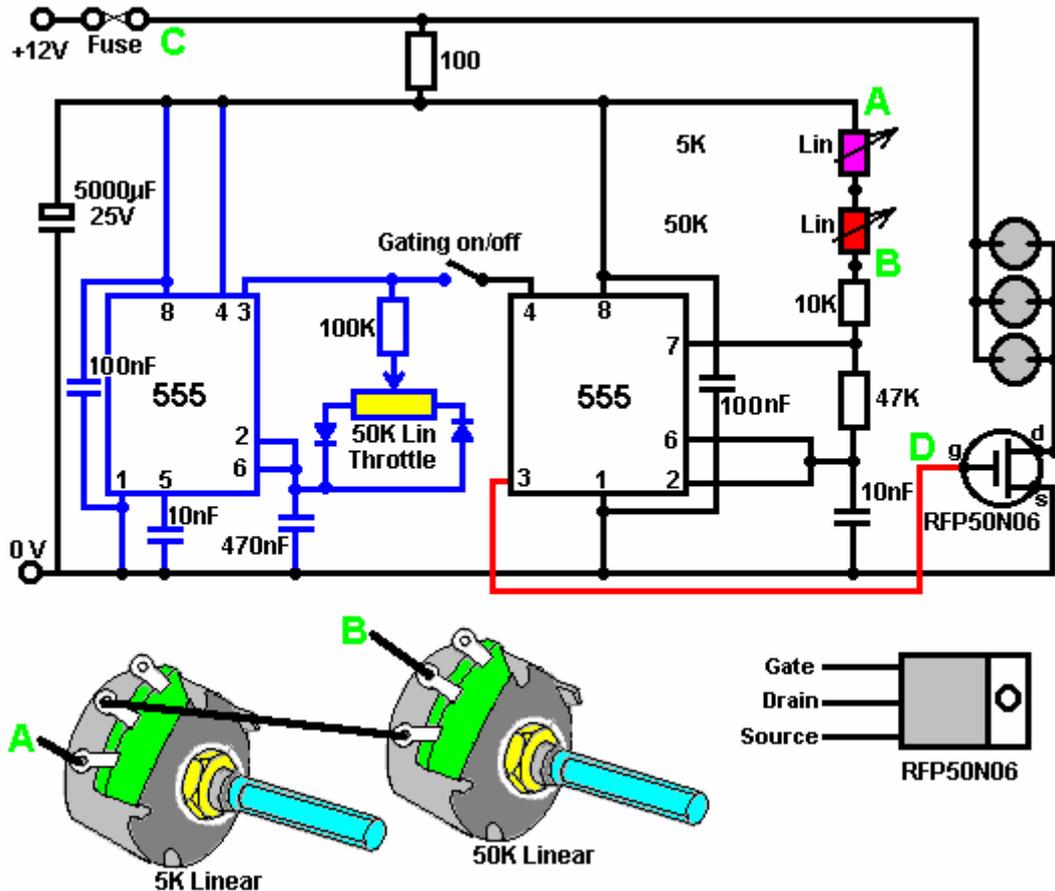
With this unit, air is sucked out of the exit pipe by the vehicle engine. This draws air down the central pipe and forces it up through the non-aligned holes in the electrode plates. The air bubbles stir the electrolyte into vigorous motion, dislodging the hydrogen and oxygen bubbles which form on the plates through electrolysis.

It is said that six of these electrolysis units are sufficient to run a car using just water as the fuel. It has been stated that electrolysis of water is optimum at 1.5 Volts, so it might be more efficient to connect the units in series where each unit receives 2 Volts rather than in parallel where each unit receives 12 Volts:



The air connection is the same for either method of wiring the cells. If wired in series, the voltage drop across each cell may not be the same although they were constructed in an identical fashion. As Paulo

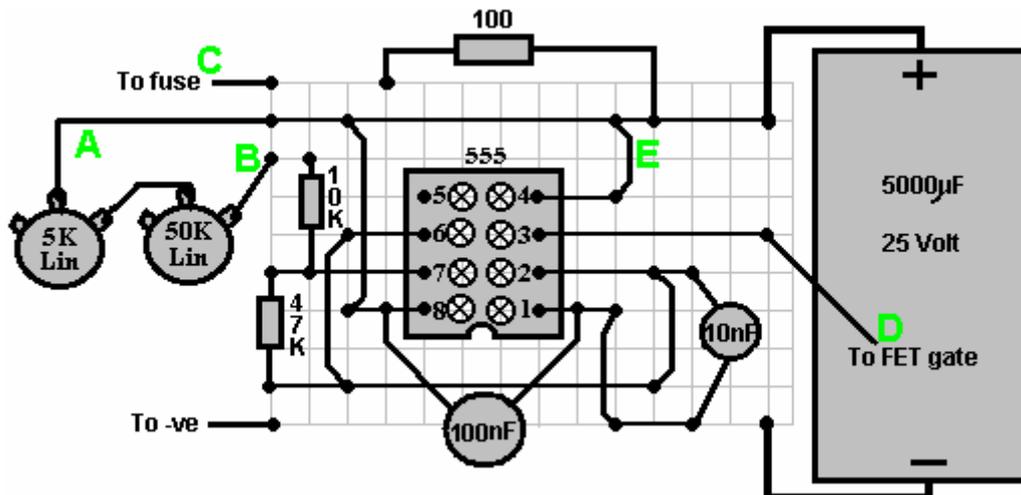
Mateiro got such good results with just a simple square-wave generator, these cells would probably give a much better output if they were fed a 12 Volt pulsed supply (either gated or not gated). The output of any of the circuits in the electronics section can feed the gate of a power FET transistor which then can drive the electrodes. Here is a suggestion:



This is just a crude circuit which could easily be improved by giving the 555 chips a stabilised and/or smoothed power supply of say, 9 Volts or so. The gating part of the circuit is marked in blue and is optional - Paulo Mateiro did not use one and claimed spectacular gas production.

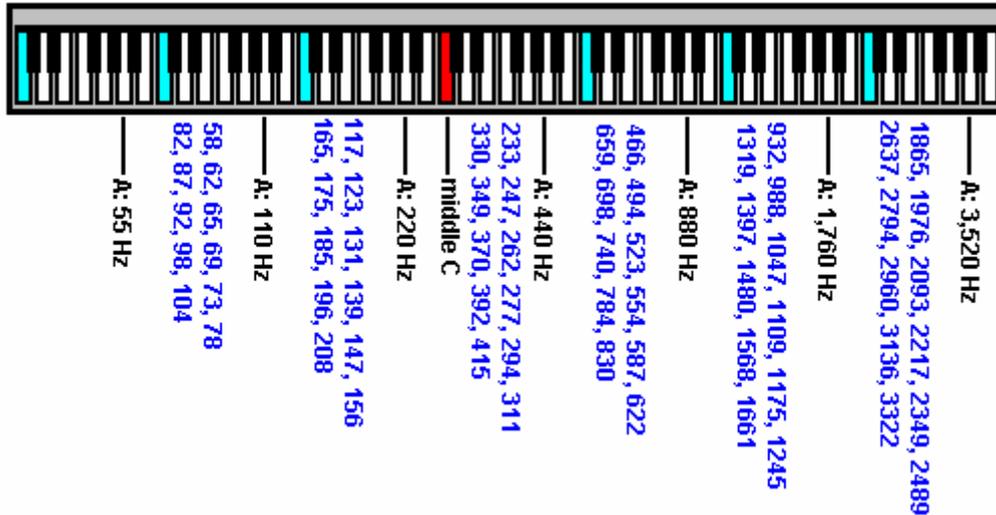
The diagram shows how the variable resistors can be wired. The 50K is marked with red in the circuit diagram and is the main frequency control. The 5K variable resistor allows fine-tuning adjustment of the frequency. Initially, set the 5K to its mid position, tune in with the 50K and then fine-tune with the 5K.

A possible physical layout for the oscillator section could be like this:



The jumper from pin 4 of the 555 chip (point 'E') which is shown going to the positive line, would instead be taken to the on/off switch of the gating 555 if gating is used.

If you wish to check the frequency of the output, just connect a loudspeaker in series with a 100 ohm resistor across the output. This allows you to hear the pitch of the note being produced. Paulo found the optimum frequency for his unit to be quite low, so if you opt for the same sort of frequency, you can use a piano or keyboard to determine the approximate frequency for any setting of the resistors:



The numbers shown in blue are the frequency of every intermediate note, including the sharps. For example, G above middle C has a frequency of 330 cycles per second or 330 Hz. Not every instrument is tuned to exact 'Concert Pitch' so there may be a minor variation for any given instrument.

Please bear in mind that should you modify a vehicle to run on hydrogen, either as an additive or as a replacement for petrol, you need to clear it with your insurance company before using it on a public road, otherwise, you will be driving without insurance since any alteration to the vehicle automatically invalidates the insurance if the insurer is not notified and agrees the change. You may, of course, modify any stationary engine or any vehicle which you only run on private property.

Shigeta Hasebe. Shigeta, a Japanese inventor has been granted a patent for a new system of electrolysis and the patent forms part of this set of documents. His method has given him results which are ten times more efficient than Faraday's theoretical maximum gas output. The theory indicates that his results could be twice as efficient as his already very impressive test results.

His cell uses two spiral electrodes with powerful permanent magnets mounted on them to create a magnetic field between them:

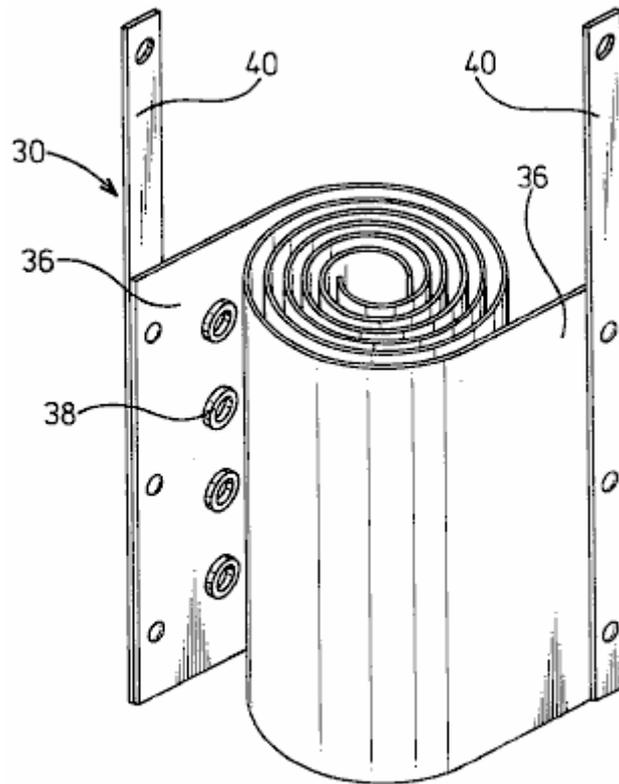


FIG.2

Water is pumped between the plates while they are powered up for electrolysis. The water brushes the gas bubbles off the plates which keeps them operating at maximum efficiency and the magnetic field has a major effect in promoting the generation of the gasses. It is worth reading through the patent where his electrolysis cell is shown in more detail and his actual test results are displayed.

Peter Lowrie: Peter is developing a water electrolysis system for internal combustion engines. To date, he has managed to run a 1600 cc engine for 17 minutes on water alone. The engine block remains cool but flame comes out of the exhaust pipe, which causes it to become very hot. Also, the engine runs flat out and cannot be throttled back. Presumably, this is due to excessive amounts of hydrogen entering the engine, so a method of increasing the proportion of air in the mix appears to be needed. The really important point is that there is excess energy in the system. There are two possibilities: either the water contains energy which has not yet been discovered and documented, or additional energy is coming from somewhere else. Consider the facts:

Going into the engine you have:

- (1) Water (from the fuel tank, through the carburettor and into the cylinders)
- (2) Air

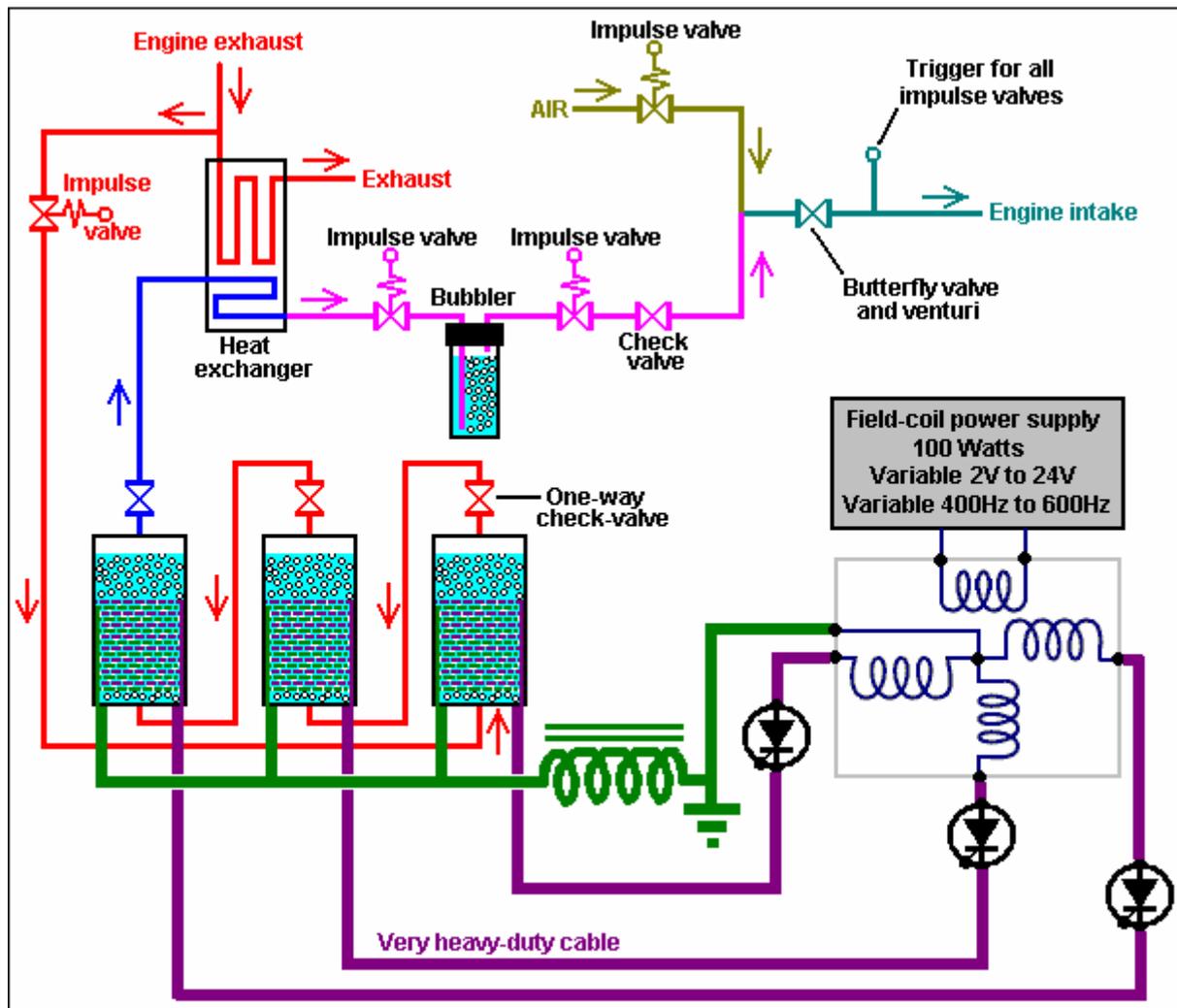
Coming out of the engine you have:

- (1) The same volume of water (coming out of the manifold)
- (2) The same mass of air (coming out of the manifold)
- (3) Large amounts of mechanical energy
- (4) Heat
- (5) Sound
- (6) Mechanical wear (it takes energy to grind metal down)

Common sense says that there is more coming out than **we** are putting in. The extra has to come from somewhere. I think it is reasonable to call this 'over-unity'.

So, if Peter is able to run an engine 'flat-out for 17 minutes' using only water as the fuel, where is the extra

energy coming from? The system which Peter is using is unusual:



Peter uses a GEC delta-wound, marine alternator which he modifies by removing the diodes and leading each of the three phase-windings out to his electronics. He uses each of the three phase-windings to power one electrolysis cell. As he only wants about 1.5 volts across each cell, he applies about 2 volts to the DC winding of the alternator, which is about the minimum for the alternator to work.

The DC current supplied is less than one amp while the pulsed current to the electrolysis cells is much higher. When a snap-on ammeter surrounds the wires to the cells, a current of 800 amps is displayed. It is likely that this style of ammeter is calibrated for sine-wave alternating current, and so the actual RMS (average) current is almost certainly different to the displayed value. What is certain, is that the current supplied to the cells is enormously higher than the DC input, and it may well be in excess of the 800 amps displayed.

A point of particular interest is the inductor placed between the electrolysis cells and the windings of the alternator. Peter describes this as a choke out of a 3-phase industrial power supply. It is comprised of a laminated steel core with a sheet of copper wound around it. This is remarkably like the arrangement used by Edwin Gray's power tube which picked up sufficient Radiant Energy to power an 80 horsepower electrical motor. Edwin's device used two or three cylinders of perforated copper sheet surrounding a conductor which was fed with 80 microsecond unidirectional pulses. This inductor is so similar in construction that it might not be unreasonable to suspect that the steel core might have very short electrical pulses induced in it, generating radiating waves of Radiant Energy which are picked up by the copper sheet winding and fed into the system providing a major additional source of energy for the electrolysis. This may well be the reason that this system produces easily enough gas mixture to run an engine.

As the motor is supplying mechanical power to the alternator shaft, it is not possible to say that there is a current gain of 800 times. What is certain, is that there is indeed a pick-up of external energy in this system. This can be expected, as a sudden pulse of large current into each cell will generate a major magnetic pulse

which in turn may well tap the external energy field. This is very like the effect experienced by Ed Gray, Robert Adams, Tom Bearden, Floyd Sweet and others, when they produced large rapidly-changing magnetic fields. As remarked above, Peter's engine couldn't run on water alone without gaining extra energy from somewhere - don't forget that the engine produces the mechanical and DC power fed to the electrolysis units. To sustain the engine running, the system has to be over 100% efficient. As an Engineer, I can assure you that Peter's engine is **not** over 100% efficient, and yet it does run, which shows conclusively that it is picking up extra energy from somewhere. I expect that in the near future, we will be able to say from where the extra energy is coming.

A comment from a member of the Yahoo 'egaspower' Group: "When I joined this group in March, I saw for the first time Peter Lowrie's statement that the power out was 8 to 11 times that of the electricity required. I didn't quite believe it but thought that you might just get the engine to idle based on George Wiseman's calculations that the monatomic molecules were giving almost 4 times the energy of diatomic ones.

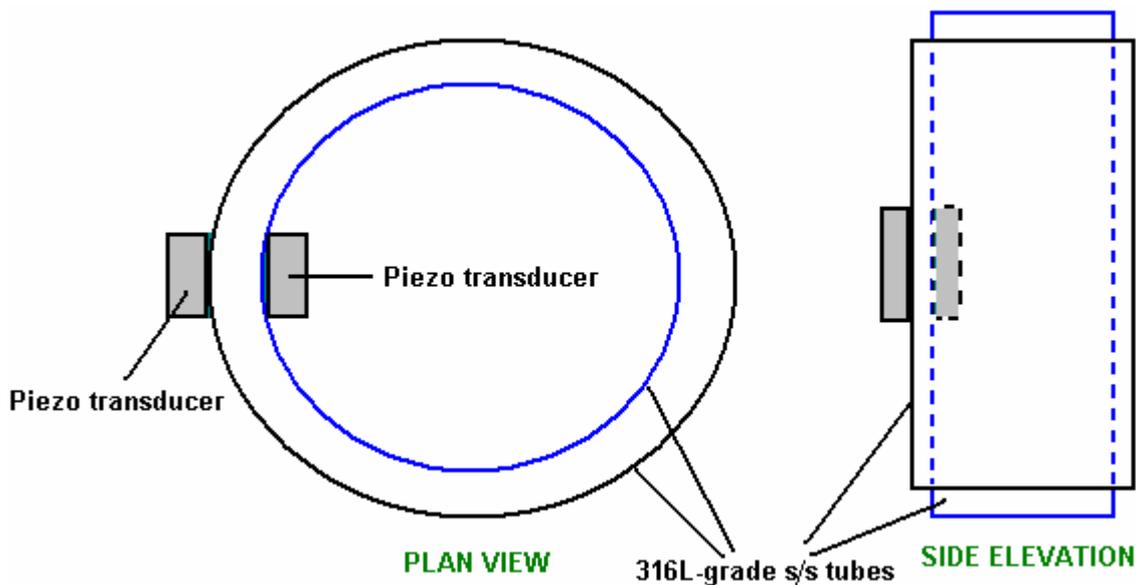
When I first tried it, my motor ran at the full 5,500 rpm and not at an idle as I had expected. The power generated in Peter's mode of operation is about 39 times what you put in if you allow for the fact that the motor is only about 25% efficient. I then loaded my motor to the full rated load and found that there was no lack of power. I have not completed the last step of returning the exhaust to the input of the cells, but I have every confidence that what he says he is doing is indeed a fact."

it is not a device whose output power exceeds its input power. However, this device is very significant in that it raises the efficiency of an internal combustion engine, and in doing so, achieves a reduction in the amount of fossil fuel being burnt in the engine. This makes it unpopular with the oil companies whose objective is to sell as much fossil fuel as possible, at as high a price as possible.

An Ultrasonic System:

I have been told of a very high-performance electrolyser system which produces enough gas to power a vehicle while only drawing 3 milliwatts at 3 volts which is a mere 9 milliwatts of power. I have never seen one of these units, and I have no evidence that the system works, other than word of mouth, so please treat the following entry as just a suggestion rather than a matter of hard fact.

The system is so interesting and simple that it is very attractive, Basically, you have two stainless steel pipes placed in a bath of tap water:



The objective is to get two stainless steel tubes resonating together at the same frequency. That is, they should both produce the same "musical" note when suspended on a thread and tapped. As the inner tube is smaller diameter, it will have a higher note than the larger diameter tube if they are the same length, so for them to match, it would be necessary for the inner tube to be longer, or the outer tube have a slot cut in it as Stan Meyer did.

The piezo transducers are presumably glued to the cylinders, perhaps as shown above, and they are fed with a 2.24 MHz signal. The tubes need to resonate with the electronics signal, so they are ground down very carefully until they do resonate. This will presumably be at a much lower harmonic of the electronics signal, one in the standard ultrasonics range. Presumably, there will be three spacers top and bottom, maintaining the gap between the tubes. If the frequency were down in the mains region of about 50 Hz or 60Hz, then the device would just act as a water heater of the type designed by Peter Davey. At ultrasonic frequencies, the result is quite different as cavitation bubbles form in the water. A highly respected textbook on ultrasonics points out that these cavitation bubbles have a positive charge on one side and a negative charge on the other side and these charges cause electrolysis of the water surrounding the bubbles. Lots of bubbles - lots of hydroxy gas produced.

What we have not been told is:

1. The size, length and thickness of tubes which work well.
2. The gap between the tubes.
3. The specific transducers used in the prototype.
4. What type of spacers were used.
5. Where and how the transducers were fixed to the cylinders.

However, even without this information, this could be an interesting investigation project using absolutely minimal power at trivial voltage levels.

The FireStorm Spark Plug:

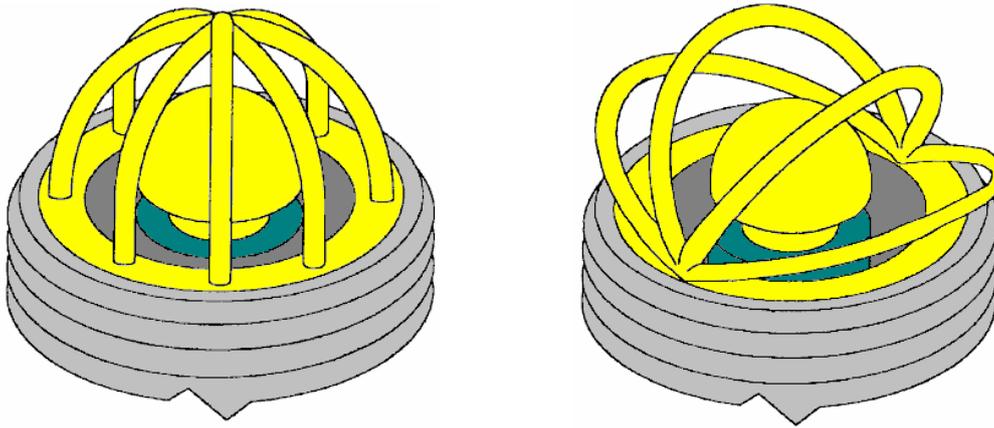
The "FireStorm" plug was developed by Robert Krupa and it is an innocuous looking spark plug which can be used to replace a standard spark plug in an ordinary production engine:



However, this plug is far from ordinary. The central electrode has been changed from a cylindrical post to a hemispherical dome, surrounded by four arched electrodes, each of which being positioned at a constant distance from the hemisphere. This allows a much greater spark area and results in very much improved performance.

The fuel/air mixture can be made leaner without any harmful side effects. If this is done using standard plugs, then the engine will run at a much higher temperature which can damage the engine. But when using FireStorm plugs, a leaner fuel/air mix actually results in the engine running at a lower temperature. Robert has measured this effect and found that under identical running conditions, the engine exhaust was 100⁰F cooler when using FireStorm plugs. A mixture ratio of 24:1 is used rather than the current 14.7:1 mix and polluting emissions are very much reduced by the use of this plug design. Mixtures of up to 40:1 can be used with this plug.

Robert has been awarded two patents for this plug design: US 5,936,332 on 10th August 1999 and US 6,060,822 on 9th May 2000. These show variations of the basic dual arch electrodes, two of which are shown here:



It is hoped that these plugs will go into production early in 2008. Robert gave Bosch of Germany a set of FireStorm plugs to test. After ten weeks of testing, their response was "This is unbelievable. We have never seen anything like this in all the time we have been building sparkplugs". When standard spark plugs fire for a long time, the spark gap increases and the spark is weakened. Bosch ran an eight-week endurance test on the FireStorm plugs and found that there was zero gap growth. They concluded that FireStorm plugs would never wear out.

Robert's first FireStorm plug was made in 1996 and he has encountered strong opposition to their introduction and manufacture ever since. This plug will not be popular with the oil companies as less fuel is burnt. This is probably a fallacy because, human nature being what it is, people are likely to keep spending the same amount on fuel and just drive more. For the same reason, the plug will not be popular with governments who tax fuel. The companies who make spark plugs will not like it as it does not wear out like standard plugs do. It uses less fuel and cuts harmful emissions dramatically, so it will be popular with motorists and environmentalists, if Robert can get it into production.

Water Vapour Injector System: Fifty years ago car engines were not nearly as powerful as they are now. In those days it was quite common for a driver to remark that his car ran smoother and more powerfully on wet days. This was not imagination as water vapour drawn into the engine along with the air, turned to steam at the moment of ignition, and expanding provided additional thrust to the pistons while lowering the running temperature slightly.

This fact was utilised in World War II when units which were effective standard bubblers used with hydroxy boosters were added to the vehicles. Roger Maynard has built and used these units extensively since 1978, and my thanks goes to him for providing this information and illustrations.



The unit is attached to the air intake of the vehicle, between the air filter and the engine. A small diameter plastic pipe is lead from there to a glass or plastic container holding water. In the above picture Roger is using a glass Mason jar with a screw-on metal lid which has a seal. Sometimes called a preserving jar, these jars are very convenient.

The air feed into the jar is by a length of the same plastic piping and terminated with a standard air-stone or "soap-stone" as used in a home aquarium, as this causes a large number of separate bubbles. It is good practice to glue the plastic fittings to the lid of the jar, but this can make the jar too airtight and if that happens it may be necessary to remove the rubber seal which is around the neck of the jar.



A glass jar has the advantage of not being affected by the heat produced by the engine. This is a very simple unit and it uses ordinary water which is not exactly a hazardous substance. The effect of using it is far greater than would be imagined. On Roger's 4-cylinder KIA car, the mpg rose from 320 miles per tankfull of fuel to 380 miles around town (18%) and 420 miles on the open road (31%) which is a very marked improvement. On his 6-cylinder Tacoma shows an 8% increase around town and a 12% increase on the open road. The water is topped up every 1200 miles or so.

However, some engines are suited to the air-stone and some are not. Smaller engines may work much better if a stainless steel screw is used instead of the air-stone:



Cam Timing: Another deceptively simple way of improving mpg performance has been discussed recently in the watercar forums, and that is the adjustment of the cam settings on American cars made since 1971. This sounds most unlikely, but it is a proven fact. For example, a 2004 Jeep Wrangler 2.4 litre received a 10

degree advancement on both cams, and that gave a 70% improvement on the mpg, much more engine power and an exhaust which runs much cooler.

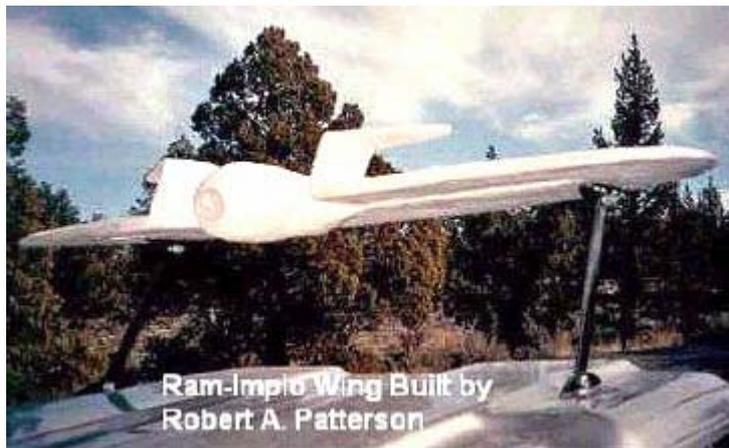
Over the years, one man experienced a 50% to 100% improvement in mpg over a range of personally owned cars and trucks, and the emissions were improved by nearly 90%. It is not suggested that everybody should make a cam adjustment, just to be aware that an adjustment of that nature can have a dramatic effect.

Another example: "Advancing the cam timing will make the engine run cooler. I have been messing with cam timing for about 25 years. I had a 1985 Ford Ranger with a 2.8 litre engine - it was a dog. The same engine used in the 1970 Mercury Capri had lots of power. The Ranger was a dog because the cam timing was set almost 10 degrees retarded. I gave it an 8 degree advance and the Ford Ranger came to life and hauled ass. Also, after-market ratio-rocker arms help a lot on late model cars. I changed the cam timing on my 1998 Chevy truck by 10 degrees. With it's 350 cubic inch engine and ratio rocker arms installed, it gained almost 90 horsepower and brought the power band lower giving more torque because the rocker makes the cam have higher lift and longer duration on the cam which makes it breath better."

Comment from a man with 25 years experience in this field: "Cam timing is when the valves open and close in relation to the crank shaft and piston movement. The number 1 piston is set at true Top Dead Centre. At this point the degree wheel is set to the front of the engine against the front pulley at the zero degrees mark and you install a pointer mounted to the engine block pointing at the zero mark on the wheel. When the crank is turned to about the 108 to 112 degree mark, the intake valve is fully opened. That is where most engines are set nowadays. This what I call retarded cam timing. The engine seems to run well but doesn't really to seem to have much low and mid-range pulling power. When racing, you would retard a cam for high RPMs, they also could breath and had no restriction in the exhaust. The power may come in at, lets say, 3000 - 6500 RPM and advancing a cam for more torque and power, that same cam may produce power at 1000- 4000 RPM and after all, who drives over 4000 rpm on the road?"

Another comment: "Our jeep has twin overhead cams. Advancing them does not make them stay open longer, they just open and close sooner. My reason for advancing both cams was, if I only advance the intake cam, the intake would open earlier causing more overlap if the exhaust wasn't advanced. Normally the intake valve closes after Bottom Dead Centre. Just by looking at the piston, sometimes it's almost one quarter of the way up on the compressing stroke before the intake closes. By advancing the cams, the intake closes closer to BDC. This produces higher compression. Years ago, when I did this to some of the V8s, I would switch to adjustable rocker arms and a solid lifter cam. I was able to adjust the overlap by backing off on the rockers. On an engine with one cam, advancing the cam will adjust both the intake and the exhaust. Rule of thumb is: lets say most engines are retarded by 4 degrees or more, you really don't want to advance the cams more than 4 degrees advanced. I sometimes push this as far as 6 degrees advanced for improved mpg. That is a total difference of 10 degrees from 4 degrees retarded to 6 degrees advanced. This works well with low compression engines. I also don't see a need to go to a higher compression ratio. Think about it: if you had a compression ratio of 12 to 1 and the intake closes a quarter of the way up the compression stroke, how much is compression will there be, compared to a 8 to 1 compression ratio where the full stroke compresses the mixture? If you had a engine that made it easy to get to the cam or cams by just removing a dust cover, like on our Jeep 4-cylinder, I would say to install adjustable timing gears. Then you could just remove the cover and play with the cam timing until you came up with the best power and mileage

Ram Implosion Wing: The next device may not be a "free-energy" device as such, but if not, it is very close to being such. It is a structure, which when mounted on top of a motor vehicle, improves the airflow to such an extent that the fuel consumption is said to be reduced by a major factor. The device was invented by Robert Patterson and is said to create a vortex which not only decreases wind resistance but may also create a forward propulsion force.



It is claimed that the effect created by one of these wings reduces the amount of dust stirred up when driving along a dirt road and if there is a paper bag sitting in the middle of the road, it is left unmoved when the vehicle passes over it at high speed. About a dozen people are testing this device at the present time. The biggest effect is at speeds of 60 mph or more. One researcher states that he installed the wing on the roof of his Lincoln Town car using a roof rack which allowed the wing to hang over the rear window by some six inches. He claims that his fuel consumption has improved from 17 mpg to 56 mpg.

Positioning of the wing, texturing of the wing surface, and the speed of the vehicle appear to be important factors in gaining an improvement. There is a research group and the website is in the 'websites' file and is at :

http://www.pureenergysystems.com/news/2005/03/08/6900067_RamWingUpdate/

Fuelsavers: A similar system is on offer from the website <http://www.fuelsavers.com.au/> where they offer small aluminium fins which mount on top of the trailing edge of the bodywork of a vehicle. The devices are reckoned to save some 10% to 12% on fuel consumption, they can be home-made, nine per vehicle is the recommended number. The device and mounting look like this:



A "Fuelsaver"



The mounting method

Do-it-Yourself Car Conversions: Again, while this is not free-energy information, there is a web site offering information on practical self-installed car conversions to run on natural gas, or various other readily-available gas types. The information appears to be very practical and well presented. This site also offers information on making your own low-cost, solar heating and solar cooling systems so I suggest that a visit is worthwhile.



The URL is www.knowledgepublications.com/hydrogen_car_dvd/h2_car_dvd.htm and is in the 'websites' section of this data.

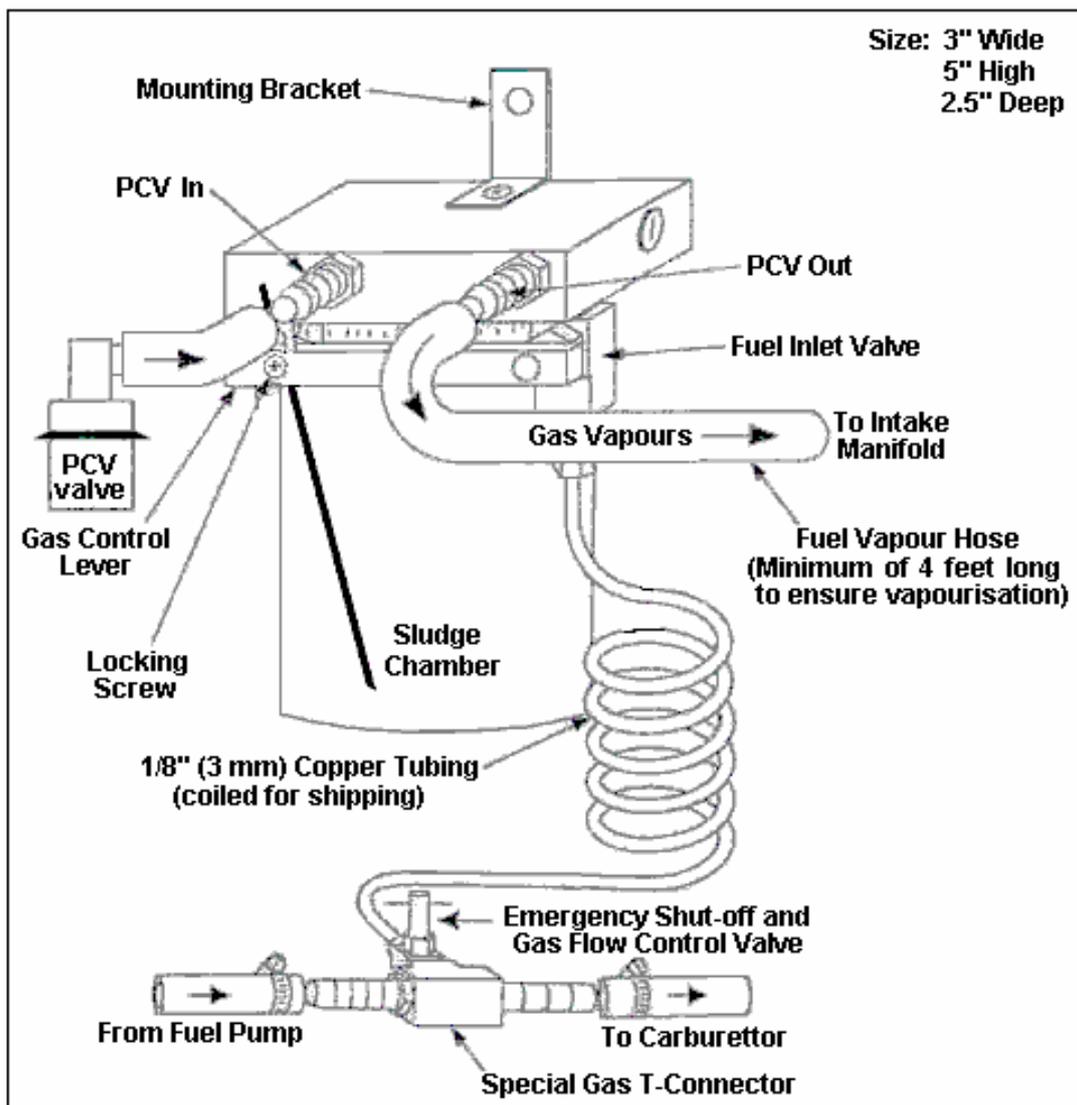
Wyoming Instruments. Since 1991, Wyoming Instruments have been marketing a device called the "Fuel Atomizer 2000" which is claimed to improve fuel consumption, reduce emissions, improve performance and reduce engine wear. They are so confident of their product that they offer a 60-day money back guarantee should any customer not be satisfied with the performance of the device. They quote improved mileage for six vehicles, ranging from 34% extra on a 1993 4-litre Nissan to 140% on a 7.5 litre Ford pickup.

It is stated that one vehicle with 100,000 miles on the clock, failed its emissions test. Four weeks after fitting the device, the test showed lower emissions than would be expected on a new engine. The device can be switched from vehicle to vehicle and works on engines with carburettors and on injection engines. However, it does not work with diesel engines.

It does not produce a leaner burn but instead provides a better atomisation of the fuel entering the engine. It is easy to fit, has no moving parts and only one adjustment. The device turns the liquid fuel into vapour which is then fed into the intake manifold. The liquid fuel flow is decreased to compensate for the vapour added. It would be reasonable to expect a minimum of 20% improvement in fuel consumption when using one of these devices. The price in winter 2005 is quoted as US \$75 on their website but their Sales division states that the price is \$150 and that there is no UK distributor. Their web address is:

www.wyominginstruments.com/gas_home.htm

The device looks like this:



Summary:

Please be aware that should you alter your car in any active way, such as adding hydrogen gas to the air intake or converting it to run on natural gas, then it is essential to inform your insurance company. Should you be involved in any form of car accident and the insurance company has not been informed of any change, the insurance company will deem your vehicle to be without any insurance cover whatsoever. May I also stress again, that if you decide to make any modification to your vehicle or to experiment with hydrogen, you do so wholly at your own risk and responsibility. Hydrogen is quite unlike petroleum vapour, with flame speeds some 1000 times faster and it forms a highly explosive mixture when mixed with oxygen (either from electrolysis of water or from the air). If released indoors, hydrogen will collect on the ceiling and be a serious hazard until the room is fully ventilated. I strongly advise you to avoid hydrogen production, but if you decide to do it against my advice, please take every safety precaution and be under no illusion as to the power of what you are producing.

It appears that there is scope for improvement in vehicle efficiency and the possibility of eliminating petrol altogether as a fuel for engines:

1. If hydrogen is generated by electrolysis powered by a petrol engine, and then fed into the engine along with the air, the petrol vapour burns far more efficiently. This increases the miles per gallon and reduces the pollution of the exhaust. Such a system is a reasonable Do It Yourself project. If the electrolysis is particularly efficient as in the case of Bob Boyce, then fuel oil can be dispensed with altogether - but remember that parts of the engine and exhaust will tend to rust if you do not use any fuel oil at all.
2. For higher speed driving, the addition of an aerofoil on top of the vehicle is said to reduce the wind resistance by a major factor and so reduces the fuel consumption further.
3. If outside energy can be tapped when electrolysing water (as per Stan Meyer and Peter Lowrie), sufficient volume of hydrogen can be generated to run an internal combustion engine without the need for petrol. This system will cause rust problems unless the engine and exhaust components are upgraded. It should be noted that it is not easy to produce a reliable low-current water-splitter system, like Stan Meyer did.
4. It is possible to run an internal combustion petrol engine on water alone, using the same technique as "s1r9a9m9" where water vapour taken through the carburettor turns to steam inside the cylinder during the compression stroke, and then is converted to 'flash steam' by a high-plasma spark. This also will cause rust problems unless the engine and exhaust components are upgraded.

One thing should be made absolutely clear: the difficulties in producing and marketing free-energy devices or any device which makes a major impact on a vehicle's mpg, is political and economic, and most definitely **not** technical. We do not have an energy crisis, we have a political/big-business crisis. There **is** no energy shortage. Many, many people have produced devices which provide unlimited energy without the need for conventional fuels but they have not been allowed to market them. As this document deals mainly with vehicles, take the case of carburettors which are much more efficient than the current models. There have been designs around since the 1930's which will enable a vehicle to cover up to 200 miles per gallon. The big oil companies just will not allow these to be produced and will use any means whatsoever to prevent production. While 200 mpg is possible on the more efficient engines, vehicles which can only cover 8 or 10 miles per gallon, will not reach the very high mpg figures. A more realistic target would be somewhere between two and four times the previous performance, say 20 to 40 mpg instead of 8 to 10 mpg.

Another point of note is that in USA, gasoline today is not the same as it was when most of these carburettors were designed and built. Today, it contains additives which will not vapourise and burn. Consequently, a thick residue will build up inside a high-efficiency carburettor as they generally operate by converting the fuel into vapour before feeding it to the engine. This is what causes the removal of the additives inside the carburettor, generating the residue which will require removal from time to time. This set of documents includes several patents for carburettors which give massively increased mpg, under the names PatC1, PatC2, PatC3.....

For example:

Charles Pogue's patent 1,938,497 dated November 1932:

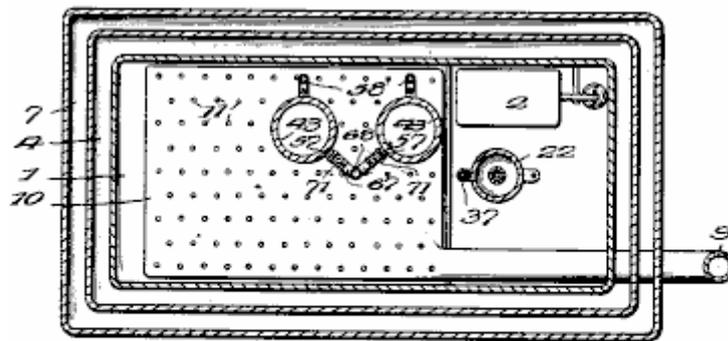
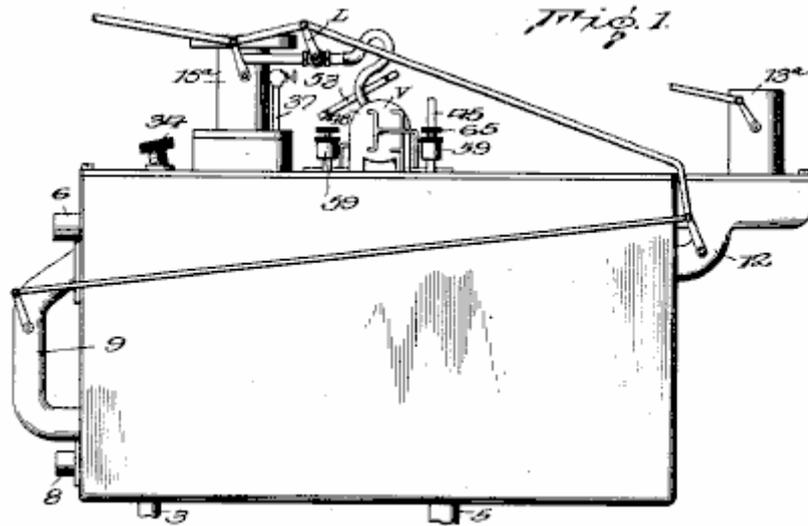
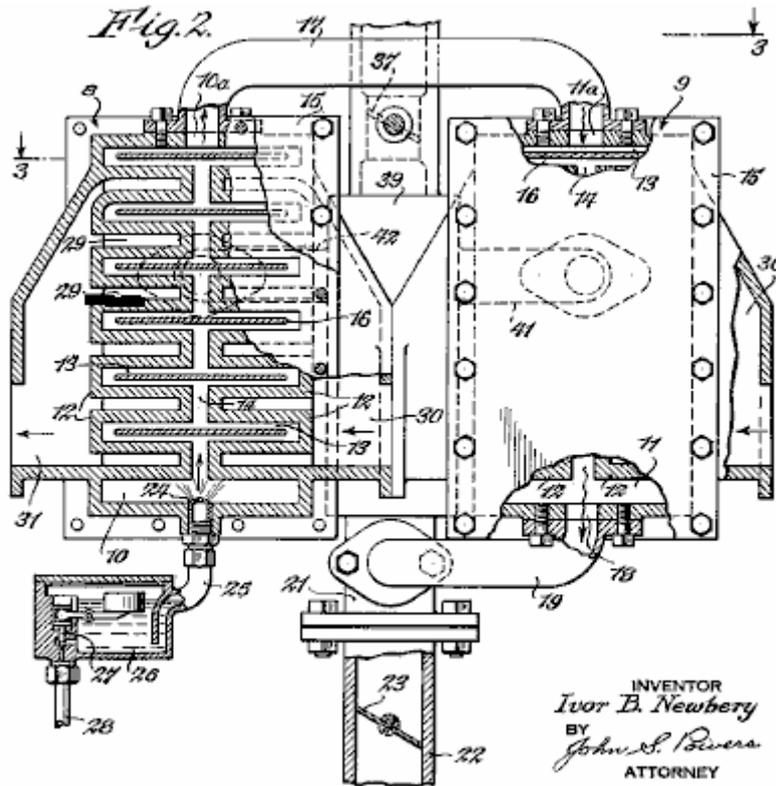


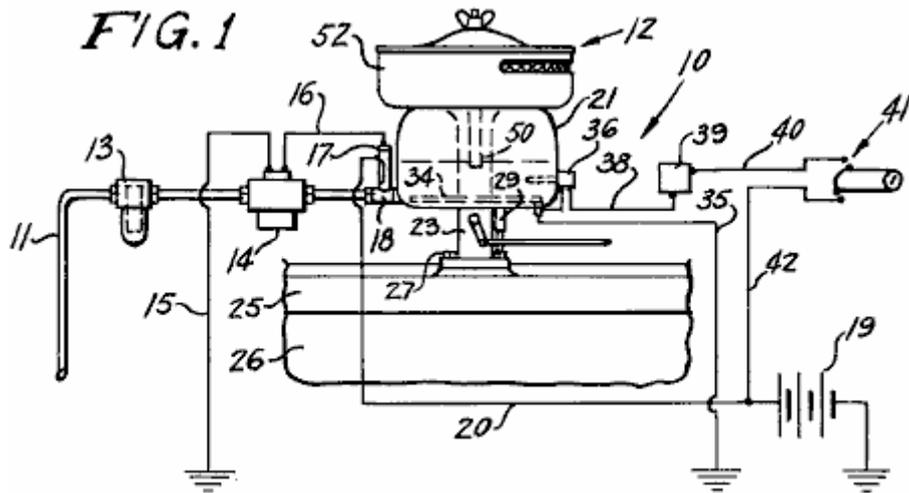
Fig. 3

Inventor
Charles N. Pogue,

Ivor Newberry's patent 2,218,922 dated June 1938:



Robert Shelton's patent 2,982,528 dated June 1958:



It has been suggested that the additives put into US gasoline prevent carburettors like this from functioning correctly, leaving a residue behind them. However, in 1997, an engineer working at a US Ford company plant witnessed a 351 CID V8 started at about 4:30 pm. with a 1 litre bottle of fuel. The next morning when he went to the factory floor, that engine was still running and had only consumed about one third of the one litre bottle. On asking about the fuel consumption, he was shown a display that read, " 248.92 mpg". He was shocked and said, "This must be a mistake" but the engineer said that it was true. He then asked when they would have it ready to be put in a new Ford, he was told that he would NOT see it in his lifetime. That 249 miles per US gallon is 298 miles per European gallon which is 20% bigger than the US gallon.

The high-mpg carburettor designs shown above and in the 'Patents' section, have not been marketed due to opposition from the oil companies. You are entitled to construct them for your own use as soon as the patent is published. To the best of my knowledge, the period of patent protection (against others manufacturing

and selling your design) extends for just seventeen years, so all of these patents have expired and consequently, you may manufacture and sell them without paying royalties. The question is - are you that brave? Also, it is quite likely that the gasoline sold today in the USA will have additives which will cause the carburettor to clog up quite quickly.

If you think that this is exaggeration, take the case of Allen Caggiano whose high-mileage carburettor patent and constructional details are included in this set of documents.



Allen is an inventive and stubborn man not readily blackmailed or browbeaten. In 1978 he produced the design for his first high-mileage carburettor, assembled the prototype and installed it in a 1973 Dodge Coronet station wagon. This gave spectacular results of 111 miles per gallon. Unfortunately, it failed after a short time. In 1979, he installed the second generation device on a 318 cubic inch Dodge V-8 engine and called it the "FIVS Gen II" standing for "Fuel Implosion Vaporisation System Generation 2". This second prototype proved very reliable and produced results as remarkable as the first, getting as much as 113 miles per US gallon (European gallons are 20% larger than US gallons so 113 miles per US gallon is 135 miles per European gallon).

The installation of the 'FIVS Gen II' required modifications to the carburettor and the removal of the catalytic converter. This was prohibited by EPA regulations. It was therefore a violation of Federal Law. Al ignored the regulations because he knew tail pipe emissions from his FIVS vehicle were much lower than the law required. He was upholding the spirit of the law, and he was willing to argue his case in court if it came to that. He wanted a confrontation, he wanted a chance to tell the world that his FIVS made pollution control devices obsolete. He painted the station wagon bright yellow and in bold black letters along the sides he wrote: "This Car Gets Over 100 Miles Per Gallon and Doesn't Pollute the Air".

On the third day of his new campaign, as Al got into the station wagon he noticed a car pulling up behind him. He got out to greet two men in suits flashing FBI credentials. While he spoke to one, the other slipped away, climbed in to his station wagon, and drove it off. Astonished, he turned to watch his vehicle going down the street. Then he heard the FBI car pulling out behind him. Al just stood there watching the two vehicles disappear around the corner. An old friend, his attorney, later called the FBI office. The FBI denied any knowledge of the incident. Angry and frustrated, but undaunted, Al said good-bye to the Dodge Coronet, and found another similar Dodge station wagon and set to work installing another FIVS system. He painted this one yellow, too, with bold black lettering.

Not long after the first car was stolen, he received an interesting offer from a California based corporation. This corporation wanted to purchase exclusive rights to his FIVS Gen II. Al asked his attorney to check it out. The corporation turned out to be a subsidiary of several other corporations, all of which were owned by an oil company. This arrangement is typical of the way contemporary monopolies are structured. Al had been doing some reading about other inventors in the past and other fuel saving devices that had never seen the light of day and he was determined that he would never allow the oil companies get control of his device.

After he refused the offer, two different FBI agents came calling. He was careful not to leave keys in his unattended vehicle this time. They informed him that he was violating Federal laws and should cease and desist. Defiant and excited that he might soon make his case in court, he told his wife, Deb, not to worry. A couple of weeks after the second FBI visit, unmarked brown paper envelopes began arriving, containing 8" x 10" photographs of the children and Deb. A child on the playground at school. A child getting off the school bus. Deb in the supermarket, and so on. She was terrified and the marriage broke up.

The FBI was behaving like the Mafia. He wrote on the side of his Dodge: "The Big Boys Are Trying To Make

Me And This Car Disappear! HELP ME!". One his oldest friends, his attorney, who was like a brother, refused to have anything else to do with him: "Wake up!" his attorney said, and then abruptly hung up the phone.

The Feds weren't going to give him his day in court to defend his FIVS. They had stolen his first prototype vehicle and they knew it worked as claimed. He had refused to relinquish his control, so they were going to send him to prison, but not for violating federal emissions regulations. On the face of it, the Environmental Protection Agency appears to be imposing regulations on the auto makers and the oil companies in the public interest of protecting the quality of the air we breath, and the quality of the air we breath is improved over what it used to be. But in fact, these special interests often write the legislation themselves. The regulations then create a profitable new area of business which allows the special interests to increase their control over the market. The public interest is best served by creative innovation in a free market. Al was learning Politics 101 the hard way. In the business of vehicles and oil, there IS no free market. In a monopoly-controlled market, there are anti-competitive regulations, dirty tricks, and active suppression. The Big Boys protected their turf and took control of or destroyed any potential competition in the hallowed tradition of John D. Rockefeller Snr. and the Robber Barons of the past. That wasn't hard to understand. But he was unprepared for the sophisticated tactics of today's faceless Robber Barons.

The Chief of Police for Brockton, planted stolen cocaine in Al's home during a drug raid that ultimately put Al in prison in 1986, for 15 years on a cocaine trafficking conviction, in spite of the fact that Al didn't use drugs, nor associate with those who did. He fought back. In prison, he fashioned a key in the prison shop and simply let himself out. He contacted a friend on the police force and then turned himself in on the same day. This police officer friend was able to uncover evidence of the chief's corruption. Two days later, the Chief was arrested for stealing cocaine from the evidence locker, most of which he had taken home to feed his addicted wife. He went to prison himself, which led to the reversal of over 300 drug convictions that had been decided during his tenure. The Massachusetts Supreme Court of Appeals overturned Al's conviction. For a moment, he thought he'd beaten the Big Boys and was a free man again.

But then the Federal Prosecutor stepped in and indicted him on new charges relating to the seizure of two shot guns during the phoney drug bust. A spurious interpretation of the US Code was applied. Al was sentenced to a total of 30 years in Allenwood Federal Prison, without parole.

Al's time in Allenwood was not wasted in self-pity or bitterness towards the Big Boys or the corrupted system that put him there. He was popular in Allenwood right away because of his role in exposing the dirty cop that overturned so many drug convictions. He developed a good relationship with the warden of facilities. As a licensed HVAC contractor, Al was able to fix the prison heating and cooling system that had never worked properly, saving the government a large amount of money. Honeywell Corporation trained him in the use of computers so that he could operate and maintain the system. The prison had an excellent machine shop which allowed him to continue working with his FIVS devices. He designed small FIVS for the prison lawn mowers and produced numerous FIVS GEN II's, with the collaboration of the warden of facilities, that were secretly distributed outside.

Al made many useful contacts, one of whom helped him secure US Patent 5,782,225, awarded July 21, 1998, for the FIVS Gen II. He designed a new FIVS, the "Gen III", which did not violate any Federal regulations, and he put together a plan to manufacture and distribute the Gen III. And then one day he was out, free for real in 1997. Sentenced to 30 years without parole, he was suddenly released after ten years with five years parole. The Federal appeals court had finally ruled that his possession of two shotguns was legal and that it had no jurisdiction over the matter in the first place. Several years later, because he was curious, he asked a police officer friend to do a background check on him. No record of his conviction and incarceration in Allenwood was found. The stain of systemic corruption had been discretely removed.

He didn't look back and went to work to develop a prototype Gen III device, applied for his new patent, and implement the strategy he had dreamed up in prison. He was no longer politically naive, no longer the blindly patriotic American he'd once been. He did not believe it would be possible to build the Gen III in the home of the brave and the land of the free, so he made arrangements to manufacture parts in the Ukraine, a former satellite of the defunct Soviet Union. He would then assemble the devices in Mexico. He had developed a global perspective in Allenwood. His network of supporters and investors was now called: "FIVS Gen III International" and he set up a website which was generating 70,000 hits a month from all over the world. He also offered the complete blue prints for manufacturing the earlier FIVS Gen II as a free download from his site so that anyone who wanted to could build their own. He thought this might distract the Feds and tie up their manpower as he implemented the Gen III strategy.

By 2002, the delivery date for the first beta testing group was set. The parts were shipped from the Ukraine

to Mexico where they were assembled. It was necessary for Al to travel South of the border to oversee the operation. He made the punishing drive from Massachusetts to Mexico several times in his FIVS equipped Pontiac Catalina and it functioned flawlessly, delivering more than 70 mpg with its 400 cubic inch engine. His friends warned him not to drive alone, but he made the last trip by himself and on the return leg of the journey, he noticed an 18-wheel truck following him. The intentions of this truck were soon obvious when it overtook him and forced him off the road. Al anticipated the manoeuvre, however, and was able to keep control of the Pontiac. He breathed a sigh of relief and continued on, believing he'd outwitted them once again. He made it all the way to Massachusetts and was nearly home again before the truck found him a second time and caught him unawares. The Pontiac rolled over several times, but landed upright. The driver's side door was crushed and the roof caved in, but the car still ran and Al was able to drive it home without further incident in spite of his injuries. He had to be cut out of the car with a torch. He had several broken ribs and a punctured lung and was immediately rushed to hospital.

The Gen III's for the first group of licensees were shipped from Mexico on time, however, by means of several different shippers. Some devices for US licensees were shipped via United Parcel Service. A total of 137 units were shipped around the world. Only those that went UPS in the continental US and Canada, a total of 44 units, did not arrive at their destinations. Every shipped item has a tracking number, of course, and when Al inquired about the missing 44 units and provided the tracking numbers he'd been given, he was informed the numbers he had did not exist.

The attempt to turn him into road kill was not completely unexpected, but Al was shaken just the same. He maintained his bravado, however, while friends and sympathisers reacted more predictably. When the intent of the suppression escalated from malicious to deadly, most began to slip quietly away and it was 'High Noon' again. Another complicating and aggravating factor was the appearance of a discussion group at the Yahoo website called "Get 113to138mpgNOT". This Yahoo Group was established by an individual calling himself "David Rodale". He was not a Gen III licensee. He (or she) was a freelance public servant dedicated to helping those who had been ripped off by the promoter of impossibilities, the unscrupulous scoundrel, Allen Caggiano. He provided advice and counsel to those disappointed licensees who had not received their Gen III devices. He assured them that they could find justice in the courts. Al spent much time and energy fighting back against this defamation.

Al was fully recovered from his "accident" by this time and had repaired the Pontiac. He was feeling every day of his 59 years, but he soldiered on with a grim determination towards whatever final confrontation awaited him. When a careful, bloodless voice on the phone proposed a compromise one day, he felt ready to bargain. His website was experiencing growing traffic. The voice told him that if he would just remove the Gen III from his site he would be left alone. It felt like a small victory, but he didn't relish the idea of backing down. If Gary Cooper had received such an offer in High Noon, he would have taken it.

He knew a bargain with the devil could never work in his favour, but he had to catch his breath, so he played along and removed the Gen III from his web site. It was a strategic retreat. If they would leave him alone, the beta testing of units already out there could go forward. The program was smaller than he had originally intended, but it was a start and if he could relax and gather his data, then he might ultimately win the game. However, a careful examination of the FIVS in his Pontiac one afternoon made his heart jump into his throat. He found a tiny hairline crack in the aluminium/titanium alloy canister. This Gen III unit had many thousands of miles on it. It presaged a potential disaster and he immediately notified all the licensees of the problem and recalled the units. He worked feverishly and discovered that he didn't have to redesign the canister. A simple alteration appeared to be the solution.

Al was then told that he required immediate surgical treatment. After the fact, this prognosis was shown to be false. While the surgery was underway, Al suffered a stroke. His heart stopped and he was technically dead on the operating table. In addition, the surgeon had damaged nerves in his spinal column. It was not his time to go, however, and he revived, but then lay in a coma for 30 days. When he finally came around in his hospital room, feeling more dead than alive, he was astonished to discover that he could not move his legs. It is possible, that Al's medical experience was not accidental.

On the local TV noon news on a sunny day in the spring of 2003 he watched a dramatic live report of a SWAT team in action. They were closing in around a familiar looking building. He thought to himself: "Hey! That's looks like my condo! Hey! That IS my condo!". He watched the police seizing his yellow Pontiac in the parking lot as the Channel 7 reporter explained that Chelmsford, Massachusetts, resident, Allen Caggiano, had defrauded investors in a fuel saver scam and then fled the country. He didn't see how that could be true since he was in the Intensive Care ward of the local hospital, not 20 miles away.

Meanwhile "David Rodale" at Yahoo Group "Get 113to138mpgNOT" had found 20 disappointed Gen III

licensees and was patiently building consensus for legal action at the state level in Massachusetts. It wasn't easy to turn disappointment into outrage and a desire for revenge. In spite of the resources available to the Big Boys, they hadn't been able to otherwise identify most of the testing program licensees. Al returned home to his condo to find his Pontiac with the repaired Gen III's in the trunk gone from its parking space. His premises had been ransacked, his computer hard drives removed. With his mind foggy from pain killers, Al tried to concentrate on getting used to a wheelchair. Nurses from the Visiting Nurses Association were with him around the clock. Gradually he stopped using the pain killers. He began to notice sensation returning to his legs.

Even as he felt himself improving, his diabetic condition inexplicably worsened. Twice he was rushed to the hospital in a comatose state. The third time this happened, a nurse checked his pill box and discovered insulin pills that should not have been there. He was now taking insulin through injection, but the old insulin pills were still in the medicine cabinet and had been put in his pill box with his other medications. The result was insulin shock. The nurse, Michele, who had done this, not once, but three times, did not again appear for her shift. Al tried to reach her to ask for an apology for her mistakes, but she had vanished. The Visiting Nurses Association denied having any record of her employment.

"David Rodale" was having success convincing the disappointed licensees to file suit, and with the newly acquired information about the FIVS Gen III International operations taken during the SWAT assault, a postal inspector launched a preliminary inquiry into the feasibility of action at the federal level for mail fraud. Rodale was confident that the threat to society posed by Allen Caggiano was now neutralised. He announced to the Yahoo Group members that he'd done his best and there was nothing more to do. He would leave the Yahoo Group in place for a while, but he planned to take it down in a couple of months. He was sorry that so many people had been taken in, and he hoped they'd be less gullible in the future. He was glad he could help.

That summer, the judge dismissed the charges against Al in the Massachusetts court. His lawyer petitioned for the return of his property, the Pontiac the local police had seized a year earlier. He was told it had been taken to Washington, DC, and was being examined to determine if it violated any Federal regulations. A grand jury in DC was convened to investigate the Federal charges of mail fraud, but it failed to return an indictment. The licensees who had paid their money and signed their licensing agreements had agreed to assume the risks of a testing program and most of them did understand that part of the risk involved the historical efforts of the oil/auto cartel to suppress new technology that could affect their profitability or control over the markets which they ruthlessly dominate.

Through his attorney, Al received an offer for exclusive rights to the Gen III. The amount of money involved beggars belief, and suffice it to say that Al again refused, as he had done in the early 80's when an offer was made for the Gen II device. The Big Boys have never attempted to prosecute him for the violation of Federal Emission Control regulations. He is clearly guilty on this score so far as the Gen II is concerned. To do so would result in the exposure of the fraud they are perpetrating on the public. Their technology is obsolete. As Al has pointed out on his website, they do not want a reduction in the demand for oil. This would mean a reduction in oil company profits. If the consumer used half or less of the oil now being used, government tax revenues would be reduced accordingly. If the Gen III were to become available the public interest in fuel economy and clean air would be served and Allen Caggiano would become rich beyond wild imaginings, but the oil/energy cartel and its partner in government would suffer. Therefore, the Big Boys will continue to do all that they can to stop Al and his FIVS and to keep the public ignorant of any technology they do not themselves control. If they don't control it, and if you don't buy it from them, then it doesn't work, or it's a fraud.

The "FIVS Gen III International" enterprise has been successfully suppressed. Al's fight to manufacture and distribute his invention and enjoy the great wealth it would have given him is over. The Big Boys have broken his bank, and his health. The struggle has nearly destroyed him. The money would have been nice, but it never was the money that kept him going. He is now donating his work of a life time to the American people. The Big Boys can harass, intimidate, and attempt to kill one man and his American Dream, but can they do the same to many thousands of Americans and others around the world? Al now gives away his "FIVS Gen III" plans free on his web site.

Al will allow his patent application for the Gen III to expire. He can no longer afford the large investment required for a patent here and in other countries. His main concern now is to prevent the FIVS from being patented by anyone and to keep the device "open source", so to speak, so that it cannot come under the control of the Big Boys and will remain freely available to the public. Though Al will not profit from his invention through licensing fees or royalties, there is considerable satisfaction for him in knowing that the Big Boys have not and will not ultimately win this game and destroy the work of a lifetime.