

## **Watercar Part 10: Magnetic Electrolysis By Thomas C. Kramer December 2003 What is a 'Magnet'?**

**A polarized piece of iron. Close enough, but there are other kinds of magnets too.**

**What is an 'Electromagnet'?**

**A piece of iron with copper wire wound around it and with the wire ends connected to a DC power source. Close enough, but there is a large variety of electromagnetic devices to choose from.**

**What is "Magnetism"?**

**It's the thing that holds the Universe together. There are a whole lot of different theories as to where magnetism comes from. Some say it's a result of particle spins. Others say it's a wave effect. Still others say that it manifests as a result of cosmic pulses. And there may be positive, neutral and negative magnetism and a whole lot of degrees in between. Some even go so far as to say that gravity is "compressed magnetism". But no one seems to know for sure except the Creator. But we do know that it manifests itself as a duality in most forms.**

**It is clear that magnetism manifests itself as a polar effect, positive and negative, north and south, plus and minus. But when scientists cut a magnet in two to find just north or just south, they always get both and just ever smaller and smaller magnets. This goes right down to the smallest particles known. They all end up with a top and a bottom polarity regardless of spin direction or overall charge.**

**This magnetic force can, in N-S configurations, form magnetic bonds, as has been demonstrated by Professor Santilli and others in forming "magnecules" or magnetically bonded atoms in gases, liquids and even solids. In 'magnecules' the atoms and molecules align themselves in a N-S manner as a result of exposing them to strongly induced electromagnetic fields.**

**Repulsive and Attractive Forces**

**We also all know that N-to-N poles and S-to-S poles repel each other and N-to-S or S-to-N poles attract each other. This causes a PUSH-PULL EFFECT, which is used to either generate electricity or to turn an electric motor or do other work.**

**It is this polarity and push-pull effect that actually cause electrons, positrons, protons and anti-protons to bond together forming various chemicals and neutrons (an electron and proton pair) or anti-neutrons. These form in a N-S and positive and negative manner for the most part (those that don't generally decay very quickly)**

**This N-S alignment can form into complex layers of atoms and molecules all generally forming polar alignments like heads and tails. These are called 'dipoles'. Even our DNA forms a dipole antenna. Water is also one of the great magnetic dipoles.**

**And from Professor Santilli's plasma research, we now know that a whole new world of chemical reactions can be created called 'magnecules' and 'magnegases' and 'magneliquids' and 'magnesolids' that form as a result of 'magnetic bonding' and not traditional valence bonding. These highly magnetized and polar aligned atoms allow for a whole new world of chemistry and physics to be explored.**

**Understanding magnetism is thus one of the most important elements of human knowledge as it goes to the very core of our existence.**

**Types of Magnets:**

**Generally there are several types of natural magnets with the most common being those associated with iron (Fe) or ferrite compounds originally found in 'magnetite', an iron ore that got hit by lightning. Iron when exposed to a DC electric field naturally aligns its atoms in a N-S polar fashion.**

Iron mixed with various other materials such as some other metals or even plastics can also be magnetized. These magnets, however, generally are not as strong.

Relatively recently a newer class of stronger and longer lasting magnets have been discovered and are now in regular manufacture. These are called 'rare earth permanent magnets' as they retain their magnetism much longer (except when overheated). These are made from various rare earth elements and are often mixes of several rare earth and conductive metals, including iron.

The most common type of magnet, however, is the "electromagnet". This is a magnetic device that has an iron core wrapped with insulated wire (usually copper) and takes many forms from simple electromagnets used in almost all electric motors, to electrical transformers and generators of all sizes. Electromagnetic coils generate the high voltages that drive your TV or monitor screen and then adjust the electron beam that creates the picture.

These are sometimes wound as "solenoids" that when charged force the iron core to move in one direction or the other. Your automatic doors and car locks used these.

#### Electromagnetic Coils

The neat thing about an electromagnet is that it can be wound around just about any core shape. These can be as simple as winding a copper wire around a nail, or a horseshoe, or as complex as multi-legged transformers or donut shaped rings.

S Coil N Horseshoe + - DC + N S Spiral Cone

#### Pancake Spiral

(OK you draw a spiral using Word)

Generally coils can be made in a whole variety of shapes and sizes and this is where the fun begins. And then you have left-handed and right-handed windings.

The strength of an electromagnet is based on the number of winds in the coil, the size of the wire used and the amount of volts and amps applied in the circuit to drive the coil. Simply the more times you wind the wire around the core the higher the voltage will be and the more resistance you will encounter.

Resistance also generates some heat, which is a problem with electromagnet design. Pulsing also causes heat build up as a result of resistance in the wires and the core.

The number of wraps will also determine the natural frequency of the coil, but this can also be influenced by the frequency of the power source (50-60 Hz for households, rectified to 25-30 half wave Hz for DC) and other electronic circuitry.

Victor Walgren has kindly added a formula and a website where you can easily calculate the number of winds needed to generate a specific frequency. This is based primarily on the length of the wire needed for wrapping your cores. The formula is –

$f$  (frequency) = kHz (kilohertz)

$L$  (length of wire) =  $300,000 / f / 4 * (3 / 0.9144)$

And I haven't the foggiest as to who figured out this formula, but apparently it works. But if you want a simpler way, just go to –

<http://www.csgnetwork.com/w1fmcoilfreqcalc.html> (DEAD!now)

Victor has also contributed some key resonance frequencies that you might try in your preliminary windings. These are –

| Magnetic Resonance | Frequency (f) | Length of Wire            |
|--------------------|---------------|---------------------------|
| H (hydrogen)       | = 106.663 MHz | 2' 3 11/16" (27.6875")    |
| H2                 | = 15.351 MHz  | 16' 0 11/32" (16.029118') |
| H3                 | = 106.663 MHz | 2' 3 11/16" (2.3069193')  |
| O2 (oxygen)        | = 13.557 MHz  | 18' 1 13/16" (217.8125")  |

If you use the website calculator, be sure to adjust your figures in 'kilohertz' particularly if the resonance frequencies are in 'megahertz'.

Here are a few more frequencies for you to try as taken from my chapter on resonance electrolysis.

"The first to do this was John Wesley Keely way back in the 1800's. He accomplished this by using tuning forks placed in water. He found that resonance dissociation occurred around 600 Hz and specifically at 620 Hz (1st octave) and 630 Hz (2nd octave) and 12,000 Hz (3rd octave) and 42.8 kHz.

A century later Dr. Andrija Puharich independently discovered these and other frequencies using his own designed resonance device and using AM amplifiers and AC current in a saltwater solution. He found his greatest success at only 25-38 mA and 4-2.6 volts or a power input of 0.1 watts was needed to create resonance within an output range of 59.748 kHz-66.234 kHz.

The interesting thing that happened though was that the frequency input in the reactor cell with distilled water in it DROPPED from the 66.234kHz to 1.272 kHz to 1.848 kHz and the waveform changed from a sine wave to a rippled square wave. He also noted that if he removed one lead (created an open circuit) the frequency would jump back up to 5-6 kHz, and the cell would generate unipolar pulses of 0-1.3 volts, noting that the water was acting as a capacitor with a charge cycle of .0002 seconds (which happens to correspond to how the human nervous system works!)

When Dr. Puharich added salt (NaCl) to create a 0.9% saline solution (seawater), the electrolyte resonance effect of course changed. At this point he was using 1mAmp and 22 volts and testing at various frequencies for saltwater resonance. The waveform in the saltwater changed from the rippled square wave to a rippled sawtooth wave, which apparently is the best waveform for maximum efficiency. The resonance frequencies and their harmonics using this electrolyte solution were noted as:

|                   |           |
|-------------------|-----------|
| Initial frequency | 3.98 kHz  |
| 1st Harmonic      | 7.96 kHz  |
| 2nd Harmonic      | 15.92 kHz |
| 3rd Harmonic      | 31.84 kHz |
| 4th Harmonic      | 63.69 kHz |

One of Dr. Puharich's friends and brother outcaste from the scientific community was Dr. Bob Beck.

The importance of Dr. Beck's research in low frequencies is that he found that hydrogen naturally resonates at about 8 Hz. This is a primary healing frequency. However, what I find more interesting is the following relationship-

|   | Multiples of | 8Hz       | Keely (f) | 8.152 Hz  |
|---|--------------|-----------|-----------|-----------|
| X | 75           | 600 Hz    | 610 Hz    | 611.4 Hz  |
| X | 78           | 624 Hz    | 630 Hz    | 635.9 Hz  |
| X | 150          | 1.2 kHz   | 1.2kHz    | 1.223 kHz |
| X | 5250         | 42.0 kHz  | 42.8 kHz  | 42.8 kHz  |
| X | 13750        | 110.0 kHz | na        | 112.1 kHz |

These directly relate to the tonal harmonics at the resonance frequency of water and should be able to be extrapolated to other harmonics at even higher frequencies.

In fact there are many 'harmonics' that can be used to dissociate water. Our search is to find which ones work the best. Try different windings and find out based on these and other posted frequencies.

Also note that the use of various electrolytes and varying concentrations in your reactor cell will result in variations in coil wrappings or wire length.

The strength of an electromagnet is also influenced by its shape, and how the “electromagnetic field” is timed, shaped, focused or directed. “Timed” refers to how long the coils are turned ON or OFF by the power source, that is, the pulse rate, if any. “Shape” refers to the physical shape of the electromagnetic field, which generally forms concentric arcs from the North pole to the South pole of ever decreasing intensity the farther you get from each pole. This follows the “Inverse Square Law”. This field is seen by placing a magnet under a piece of paper and then sprinkling iron filings over the paper. Magnetic fields also form around the wires that make up the wrappings of the coil causing secondary interference patterns in the primary field. This distortion can vary considerably based on the type of wrapping style used (parallel, twisted, overlapping, braided, looped, etc.). Most commonly used wrapping is just simple parallel windings, but even these get pretty confusing with multi-layers and interlinking with multiple electromagnets, as can be seen in even a simple electric motor winding. Just know that different winding patterns will alter the shape of the EM field and if you want to see the shape, just use the paper and iron filings trick. “Focus” refers to the ability to focus an electromagnetic field by using other electromagnets. Your TV picture tube is a good example of such focusing ability. Coils can thus be used to focus an electromagnetic field into a specific shape based on just varying the strength and design of the electromagnets, noting that the repelling nature or attracting nature of magnetic fields are used to focus other EM fields in order to concentrate the field effect. Pancake (disk) coils and cone coils have particular focusing effects. Tesla coils (very high voltage coils) also produce some spectacular effects using secondary induced coils and various shaped toroids that emit wild sparks. Once a magnetic field can be created and focused it can then be “directed” in specific directions based on the respective polarities. This is how large electromagnets are used to pick up whole cars in scrap yards for crushing. Similarly, large ring magnets switched in high-speed series form atom smashing cyclotrons or magnetic levitation trains. Turning electromagnets ‘ON’ or ‘OFF’ in a series of magnets induces directional flow and this is the fundamental basis of pulsed ion engines, which simply squeeze ion particles so that the ions are forced or ‘jetted’ out of a nozzle to create thrust. The same principle applies to simple solenoids and ‘rail guns’. Working with magnets opens all kinds of new and inventive applications. It is these applications that we will be exploring in designing a watercar magnetic reactor. Watercars and Magnetism But how does magnetism relate to the production of a watercar? If you have read my previous chapters you will have seen that I have suggested the use of electromagnets in a number of different applications and even clearly noted that an anode-cathode relationship is nothing more than an electromagnetic field. Electrolysis is just subjecting water to an electromagnetic field. The natural magnetic polarity of water molecules causes them to align themselves head-to-tail so that additional electrons can be added or subtracted in order for the chemical bonds between the oxygen and hydrogen atoms to be broken and the respective gases formed. Basic electrolysis is traditionally enhanced by increasing the strength of the EM field by increasing the DC voltage being applied to the anode and cathode. It can also be improved by narrowing the distance between the electrodes up to a limit of about 1 millimeter (otherwise spark shorting occurs thus closing the circuit). The field can also be enhanced by the introduction of various ‘electrolytes’, either acids or bases, which provide more free radical ions in the water solution thus allowing for easier electron flow in the solution. Electromagnetic Electrolysis Electrolysis is thus fundamentally an electromagnetic water separation process. + \_ S N S N H H O O H H Anode Cathode Magnets cause the naturally polarized water molecules to realign themselves along the natural lines of magnetic force between the attractive N-S poles. In weak magnetic fields this N-S field strength usually is not enough to pull the water molecules apart unless there is a circuit connection between the magnets as shown below. S N S N Running a wire between the ends of the magnets will create a loop circuit that will supply electrons on one end and collect electrons on the other, thus allowing for the dissociation of water to occur. Again, however, using weak magnets will only result in very little electrolysis occurring. However, if you use very strong permanent magnets, a reasonable electrolysis reaction can occur. Permanent Magnet Electrolysis This

was demonstrated in the Chinese Patent No. ZL 95220793 in which permanent magnets were placed at either end of a chamber filled with water and a 20%-30% sodium hydroxide solution. This invention does not require any external energy or power source to maintain the electrolysis process. This is because it is a closed loop, self-sustaining process. In this Chinese patent the permanent magnets charge electrolysis plates in series in the chamber and use a membrane separation to isolate the hydrogen and oxygen. In a watercar application this separation is not necessary and thus can be eliminated because a mixed gas is used in combustion. There, of course, can be several variations on this permanent magnet electrolysis unit. These variations will relate to the shape of EM fields created and the use of multiple permanent magnets or plates charged by permanent magnets as noted below.

### **Multiple Permanent Magnets Permanent Magnet Plate Configuration**

Of course you can shape the permanent magnets into bars, plates, rods, tubes, half-tubes, cones or any other shape that you want in order to better shape the EM field in order to maximize the electrolysis effect. There is a lot of room for experimentation here. You can also vary the electrolyte solution type (such as potassium hydroxide or stronger acids) and concentration, vary the type and strength of the permanent magnets and even use coils to enhance the field effects by simply coiling the connecting wire circuits or wrapping them in various ways around the reaction chamber. The plates above can also be substituted with coils (or even screens). Permanent magnet electrolysis is a relatively slow process and is not suitable to hydrogen-on-demand (HOD) as there is no control over the rate of gas production (though this can be adjusted by using a variable resistor on the interconnecting wires). This process is more applicable for creating individual gases or mixed gases for bulk storage and then usage. The fact that the permanent magnet electrolysis runs continuously **WITHOUT** any external or additional power supply makes the development of this type of electrolysis unit interesting for remote or stationary power supply applications, particularly in combination with fuel cells. But it is not suitable for vehicles **UNLESS** it is in combination with stronger and controllable electromagnetic devices.

### **Electromagnetic Electrolysis**

Electromagnetic electrolysis is the same as permanent magnet electrolysis except that the permanent magnets are replaced with electromagnets. Electromagnets also have the advantage that the magnetic fields that they create can be 'controlled' by simply varying the DC voltage or pulse rate to increase the strength and duration of the EM fields. This is essentially what we have been doing in creating 'resonating' electrolysis. Simply, we create a polarized field, pulse that field and then oscillate the field at various frequencies that cause the hydrogen-oxygen bonds to flex, twist, bend, stretch and then break. Using electromagnets in this process can be done in many different and creative ways. They can be used to strengthen the water polarization field by placing electromagnets behind the anode and cathode plates, or even by using the anodes and cathodes as electromagnets themselves! Electromagnets can also be wrapped around the electrolysis chamber to create a polarized chamber (Aussie Units) or be wrapped around in-coming water supply lines (to charge and polarize the water first) or on the out-going gas lines to magnetize the gases ('Magnegas'). They can be placed at the top and bottom of electrolysis chambers, or at various angles to the electrolysis plates to create more twisting and turning actions on the water bonds. This effect can also be timed or pulsed in relation to the timing or pulsing of the electrodes, being in-phase or out-of-phase or neutral or anywhere in between! The strength of the EM field can also be varied or alternated between the cathode and anode to perhaps pull stronger in one direction than the other or to cause an alternating "pull-and-tug" movement which when oscillated at specific frequencies may cause resonance dissociation. The shape and field strength of the coils used can also have a significant effect on the electrolysis process. The use of disk or cone coils will certainly have a different effect than standard wound bar coils. Has anyone tried using a helix wound design for the cathode/anode? (Use two combs glued

together and wind a pair of wires alternatively between the teeth.) Experiment! Experiment! Experiment! What I have suggested above is a whole new line of electromagnetic electrolysis experimentation that very few people have done to date. This is a wide-open field! Electromagnets are easy to make in many different sizes and shapes. When applied to what we already know about electrolysis, it is clear that in various combinations, the use of electromagnets can only enhance the electrolysis process.

How much?

This we will have to determine by experimentation. And this is where the fun begins! My challenge to you is to just sit down and build your own electromagnets and test them in a simple electrolysis cell. For this you will need a glass of water, 2 electrodes of whatever design or material you want, a transformer (preferably a variable voltage type) and some type of electrolyte (acid or base). This is your traditional electrolysis cell. **WRITE DOWN EVERYTHING** as you use it, particularly voltage used, electrode materials and design, and electrolytes used and their concentrations. Now get some scavenged wire (enamel or plastic coated, copper or other type of conducting wire) and wrap yourself some magnets around an iron or steel core (an old nail or piece of rebar will do to start). You will probably also want to use a separate transformer or battery for your electromagnets too. One end of your wire will be connected to the positive transformer lead and the other to the negative. Several magnets can be connected at the same time to the transformer leads. When making your coils **ALWAYS** write down the size and type of wire used, the type and size of the core material, and **ALWAYS** the number of wraps or windings used (as this will determine magnet strength and resonance frequency). Now throw the switches! The normal electrolysis can be seen to happen in the glass. Now take your properly insulated and mounted beautifully hand-wound brand-new electromagnets and place them at various angles in relation to the anode and cathode in the glass of water. **OBSERVE AND RECORD WHAT YOU SEE!** Now vary the strength of the electromagnets by increasing their voltage. **OBSERVE AND RECORD WHAT YOU SEE!** In most cases you will observe very little changes. The gas bubbles may be moved in different directions, but there probably won't be any significant increase in electrolysis observable. However, if you substitute the glass with a plastic water bottle and capture the gases in a calibrated bottle as previously described, you may be able to record some small increases in actual gas production as a result of using various electromagnetic strengths or alignment positions. For all 'watercar' experiments you will want to restrict your power source to a maximum of only 12 volts and about 20 amps (240 watts). This does not mean that you have to restrict the actual voltage pushed through your EM coils. Simply, you can increase your electromagnets strength by running the 12 volts through other power coils (like your ignition coil) or step-up transformers. Transformers are made by winding a second coil over the top of a primary coil. The primary coil induces a voltage in the secondary based on the ratio of the number of turns in the primary to the number of turns in the secondary (i.e., 1:1, 1:2, 1:10, 1:100, etc.). In this way you can increase the voltage in block jumps and then regulate it with variable resistors.

### **Winding Coils Made Easy**

Anyone can hand wind a coil. Just tightly wrap a wire around a core. But that can become a bit tedious after about 100 wraps and somewhere along the way you loose count! And it is no fun to undo and start counting all over again especially if you have over 1,000 wraps. One of the easiest ways is to build yourself a wrapping machine that simply turns your core slowly and allows you to feed your wire on smoothly. This is just a simple lathe-type device that will hold your core in place and then turn it slowly. You will need to mount a counting device that clicks over with each revolution but these are quite commonly available and can be scavenged from a number of different devices like old photocopy machines, turnstiles, or other types of counting machines. This lathe design can be turned either by hand or by a small motor. I scavenged a box fan motor that turns the directional vanes as it turns very slowly and can be plugged right into a wall socket. Variable speed motors can also be used, but never go too fast

and have a big cutoff switch (one of those big red button types that you can hammer real quick.) A lathe unit will work well with straight, bar and cone type coils and for winding simple step-up transformers. An old record player turntable (remember those?) works very well in forming disk coils. And as mentioned above, there are many ways of doing your windings to get different effects. These fancier winding techniques, however, are only for more advanced applications and people who want to experiment with weird coil designs. The fun, however, is in building your own coils and then playing with them. When you finish your coil winding you may want to put a final coating either of enamel, varnish or clear acrylic over the coil. This is mainly to just gum things in place so the coils don't come loose during handling. You may also want to wrap the final product with a non-conductive coating like paper, rubber or some plastics so that you can pick them up by hand without shocking the hell out of yourself. Simple non-conductive stands are also recommended for mounting and positioning your electromagnets during tests. A wooden stand made from your wife's (mother's) old broomstick would do just fine.

### **Pulsing Circuits**

An electromagnet can be pulsed by simply turning it 'on' or 'off'. This requires a 'switch'. This can be accomplished manually, or by using a motor-driven rotary switch, or by electronic switching mechanisms. Flicking a switch by hand is OK for simple ON-OFF observations, but it isn't very practical for timing oscillations. For slow to medium speed oscillations it is easiest to just build a simple rotary switch that you mount to a small variable speed motor. This rotary switch is just a disk (or drum) that you mount various contact points to and then mount a contact brush to make the switching contact. ++ Brush ON Brush ++ OFF 2nd Brush Long Cycle Short Cycle A rotary switch uses both the length of the charged track and the speed of rotation to control the ON-OFF switching cycles. A rotary switch can also be used to switch ON-OFF multiple circuits just by adding additional brushes. This makes it easy to synchronize in-phase or out-of-phase timing of individual electromagnets. Normally brushes are positioned at 90 degree angles, but experimentation can also be done in 5, 10, 15, 30 or 45 degree increments and with varying lengths of duration. An old record turntable can be used for this. Just glue equal length copper strips to an old record and rig up some brush armatures and you are ready to switch! So you want higher speed? Use an old hard disk drive or CD drive. But glue your copper strips on the side of the CD not used. No need to ruin a good blue movie, right? You can also go out and buy ready-made rotary switches too (now he tells me!), but that isn't nearly as much fun as making your own from some salvaged rotating devices ("No Dear, I haven't seen the fan.") Workshop experimentation should be fun. So come up with your own rotary switches. Remember that Keeley found resonance at only 300-330 Hertz (on-off switching per second), so you may not need a real ripper of a rotating switch. But for the electronics buffs, there's the "555 solution" and super-high speed switching. This requires a simple timer chip (the 555) and a circuit to go with it. Many of these are already posted to the net and the watercar databases, so I won't go into these electronic switches in detail. The importance of using an electronic switch, however, is that you will be able to switch the electromagnets at kilohertz rates and time them to known water dissociation resonance frequencies much easier. This is done with simple variable resistors (pots). There are also a number of other electronic timing circuit options that can also be used, particularly those using capacitors to discharge high voltage pulses. Tank circuits can also be used. The electronic switching side has lots of options that I am leaving up to the individual experimenter to make based on his/her own level of knowledge and experience. Have fun making different electronic switches too. For those that take this or any other switching route WRITE IT DOWN so that it can easily be replicated by yourself and others.

### **Testing and Recording Equipment**

For the kitchen table enthusiast, you probably won't have much more than a multi-meter and perhaps some old volt or amp meters you salvaged from a junkyard. That's a start and you will be able to see what may be happening at various locations. Serious guys have all kinds of sensitive and calibrated metering devices, frequency counters and oscilloscopes. My advice is simply use what you have or what you can borrow. Your interest is to see if you can find electromagnetic resonance FIRST and that just takes a bit of eyeballing. Later you have to find out just how you got there so that you can do it again.

## Recording and Posting Results

The purpose of this watercar electromagnetic experimentation is to see if we can find new ways to increase or enhance the electrolysis process by using various types of electromagnets in various configurations to induce increased gas production or resonance. We already know that electrolysis can occur in an electromagnetic field, thus our objective is to find out how best to increase that reaction with the least amount of energy input, electrical or mechanical. We are also interested to find out if we can produce enough gas on demand to operate an internal combustion engine in an automotive application. This theoretically is possible. We now need a practical working model that has commercial potential. My challenge to you is to just go out and try to do this with what you have available. Wind some coils and electromagnets and have fun experimenting. But please do properly record your efforts and post your FAILURES SO OTHERS WON'T REPEAT THEM. And if you are successful..... post that too so we can all repeat your success. You may want to file for patents first, but in the spirit of seeking knowledge and sharing that with others, I hope that you will follow my open lead in trying to make this a better world for all. Thank you.

-----1----- Water Car – Kramer Version By Thomas C. Kramer -  
August 2003 Plan 1: Basic Electrolysis Units

### 1. Bubblers:

The starting point of making your car run on water is a 'Bubbler'. A bubbler is a simple device that just bubbles air through water to create water vapor that is fed into your engine. This can be done by either blowing air through water or sucking the air through water. Sucking works better because this creates a low pressure over the surface of the water making it easier for the water to vaporize. Low-pressure sucked air can be done using a small pump or much easier by taking a vacuum feed off your engine's intake manifold. The intake manifold is the easiest, but pumped systems are used where water vapor and fuel gases are blown into the carburetor like in a supercharger system. Both systems will be discussed below with different types of electrolysis units. The purpose of a bubbler is to add water vapor to your fuel mix. That is, to make your car a 'steam engine'. This causes your fuel to burn slower and cooler, and the water vapor, when heated in the combustion process, expands thus giving you more power with less fuel. A bubbler system on any car should thus give you 10%-15% better gas mileage and a cleaner engine. Hydrogen and oxygen gas tends to burn too fast and too hot, thus running a water car you may have to add a water vapor 'bubbler' to your system to add additional water vapor to your fuel intake. This will cool the process and retard or slow down the oxygen-hydrogen burn. Some bubbler designs heat or even boil the water, using placement over the exhaust manifold or by running your air intake into the bubbler from the exhaust pipe! Remember that exhaust gases are only water vapor in a water car. And you will get a positive pressure push too. You can even coil tubing around your exhaust pipe. A bubbler can also be attached to your gas feed line, bubbling the gas (hydrogen/oxygen/LNG/propane) through a water bath. This is a good idea as a backfire arrestor and even a small cup size unit like those found on air compressors could do the trick. You can even do this with a gasoline feed provided you vaporize the gas first. This can be

done by first running your gas through a vaporizer. A vaporizer is just a radiator-type coil where your gas is looped back and forth through some tubing a number of times, like the radiator at the back of your refrigerator. This vaporizes the fluid gas before it reaches the carburetor. You can make one out of copper or s. steel tubing by coiling or looping the tubing and placing this after your fuel pump. The gas vapor can then be run through a bubbler to cool the gas and add water vapor before running this into your LNG adapter in front of your carburetor.

**A Simple Bubbler Design Air IN Water Vapor OUT To Carburetor or Intake Manifold**  
**Water IN SIMPLE BUBBLER** The engine vacuum at the carburetor or intake manifold will create a low pressure at the top of Air Stone the bubbler causing air to be sucked in and water vapor to be produced. Large bubblers made specifically for generating quantities of water vapor are made from cheap water filters. These are run in reverse with the water IN being the vapor OUT and the water out becoming the air IN. The air IN will require a pipe and an air stone to the bottom of the bubbler and usually a control valve to control the amount of air being sucked through the unit. Several bubblers can also be linked together to provide more water vapor. **Bubblers Using Off-the Shelf Water Filters OUT IN OUT Air IN Water IN Cap/Plug Filter Material**

You will require a water-IN hole to be made in the old water filter so that you can top it up with water occasionally. Water can be sucked in through your air-IN hole but that can bugger up your air stones, so it might be wiser just to drill a hole in the side of the filter or filter cap and insert a tank adapter with a screw plug or rubber stopper in the end. Tank adapters are just small diameter pipes that are threaded all the way and have 2 nuts and rubber washers that seal the connection through the wall of the filter. If you only want a small hole use a short piece of the metal tubing used in lamps. If you come in from the side, use an elbow before your cap so that it will be easier to fill. For hand filling, use a squeeze bottle like the ones used for topping up battery water, but don't waste your money on distilled battery water, as ordinary tap water will do just fine in a bubbler. Fancy bubblers may have water level sensors that activate solenoid valves that are connected to your main water tank feed line, branching off after the pump and filter. Who wants the extra cost? The main idea of a bubbler is to create 'bubbles' of water vapor. The low-pressure vacuum from your intake manifold will cause water to vaporize quicker, but this requires more water surface area in contact with air, thus the more bubbles the better. Aquarium air stones generally work fine but these may cause too much resistance and can clog up with dusty or dirty air intake (Use a sponge filter). You can also use several other techniques for bubble making such as, just drilling small holes in the end of your intake tube, using a number of spacer plates with holes in them up the length of your intake tube, placing stainless steel scouring pads (loosened up a bit) inside your bubbler, and so on. The idea is to reduce airflow resistance but create bubbles of the smallest size possible. It is thus easier to make big bubbles and then break them up a bit, than to try to squeeze out tiny bubbles. The bubbler may need a control valve for better control. The vacuum on your intake manifold is enough to suck your water tank dry in a few minutes if you are not careful. You may also want to insert some plastic filter material at the top of the bubblers to prevent sloshing around when you drive and sucking water directly into the engine. This can be a loose sponge or the plastic filter-mat material used in aquariums. Since internal combustion engines work fundamentally on temperature variations, with the bigger variation the better, you might consider cooling the water vapor before entering the engine. This is done again with a radiator, looping tubing or tubing with fins on it (used in floor heating) before the engine intake. Finally, if your engine is still running hot, even on lean fuel and with a bubbler, you might consider a bigger radiator or an additional radiator fan. This all depends on the climate that you live in.

## **2. ELECTROLYSIS**

Creating a water car requires the splitting of water (H<sub>2</sub>O) into hydrogen and oxygen gas. This is traditionally done using 'electrolysis', which is also called 'hydrolysis', which is nothing more than running DC current through 2 electrodes placed in water, one positive (anode) and the other negative (cathode). This you learned in high school chemistry. Oxygen Hydrogen

Electrolyte

Battery or DC Transformer Anode (+) Cathode (-)

The process usually results in one of the electrodes being eaten up and heat generated. And you get oxygen on one side and hydrogen off the other electrode. Simple, huh? I used to do this with my electric train transformer and then make soap bubbles that we would ignite with a Bunsen burner on a long stick. My chemistry teacher thought it was a neat trick, but the principal was none too happy with the loud explosions we were creating. As with all normal electrolysis units, the cathode (-) must be of a different metal than the anode (+). The cathode shown in one example system is an iron (Fe) pipe, but other electrode materials such as carbon, stainless steel, lead, magnesium, copper, aluminum and so on, can be substituted. Anodes are usually carbon or stainless steel. The cathode will be destroyed by the electrolysis and thus will require eventual replacement, thus your design should take into consideration the 'ease' of replacement of the cathode and/or anode and the cleaning of the reaction chamber. The electrodes should also have as much rough surface area as possible, such as threads, grooves or rough sandpapered surfaces, in order to encourage easier and more gas formation. Screen material can also be used. Shown is the possible use of steel wool (kitchen scouring pads) or iron shavings as a possible insert into the hydrogen cell electrode (cathode) to increase reactor surface area, however, care must be taken so that the filaments won't fall down and short the cell. A screen or plastic cap with holes should be sufficient. As plating of the reaction chamber will eventually occur because of water impurities and cathode reduction, it is important to design the chamber so that it can be easily cleaned. The designs below allow for the tops to be taken off for easy access. These tops can be secured with stainless steel bolts or by clamps like those used in metal ammunition cases, or be screwed tops as in the bubblers. A normal electrolysis unit will be enhanced if operated in either an acidic or basic condition. This creates excess ions in the solution (H<sup>+</sup> or OH<sup>-</sup>) allowing for better electrical conductivity in the water. Some people use old battery acid or alternatively caustic soda (sodium hydroxide -NaOH) or potassium hydroxide (KOH). (Don't use both acid and base as they cancel each other out.) Cheaper still is old white distilled vinegar! You don't need much in any case. And be careful of these chemicals because they can burn your skin and eat nice little holes in your clothes. A bit of salt can also be used, even mineral salts (Epson salts), as these add ions to the water creating an electrolytic solution. A pinch is all that is really needed unless you are making a saltwater electrolysis unit (discussed in Part 3). Salts, acids and strong bases are all corrosive and can eat up the metal parts in your engine, so USE A BUBBLER as a bath before having your gases enter your engine, then change the water in this bubbler occasionally. Under normal electrolysis the electrodes are normally eaten up in the process as the oxygen and hydrogen ions are highly reactive with most metals used as a catalyst. For this reason make the anode out of carbon or stainless steel 316. The hydrogen electrode can be made out of many other metals. Shown is an iron pipe that slips inside a stainless steel pipe. Lead seems to work the best. The trick, however, is to create an electrode with a high surface area, for example the scouring pad. Cella uses old iron bolts that have nice groovy threads. You can also thread an iron pipe all the way at a plumbers shop. And you can always go to your local plumbing supply shop and buy a chunk of lead and make your own molded designs. Carve your design into a candle or use one of those swirled fancy ones, coat the candle with plaster or cement, leaving a hole on one end, then heat the mold melting the candle wax out and pour in the lead. But don't cook the lead in your wife's

favorite pot on the stove. A steel ladle and propane torch will do just fine. But don't show the candles to your wife, as she will want them for decoration. Electrolysis does require between 5-15 amps of power, which is supplied by your car's battery and alternator/generator. When hooking up the system, make sure that you test it first outside the car using a battery or 12 volt DC converter (battery charger) with an 'on/off' switch (ignition key) and a 20 amp fuse. In your car you can wire this to your main fuse panel by adding another fuse on the bus bar that is turned on by your ignition key. Make sure that you have the right bus though, as some connections, such as lights, are not activated by the ignition key switch. Simply, you don't want your electrolysis unit to run continuously, so check your circuits. Electrolysis also creates heat that needs to be dissipated. In flow-through systems, the water is constantly pumped through the reaction chamber and back to a water storage tank, possibly through finned tubing to cool it down. This is the best approach. Closed systems that just 'top-up' the water tend to over-heat and can cause the water to boil or create excess water vapor mixed with the hydrogen/oxygen gas. This you don't want to have happen. Flow-through systems also have the advantage of removing some of the impurities from the reaction chamber, flushing them back to the main water storage tank and then through a water filter before returning to the chamber. This is a real good idea. And it uses those filters that you took out to make your bubblers in another water filter from the main water tank. A small water pump is required from the tank to the filter, and most 12v fuel or aquarium pumps will do.

### **Flow-through Electrolysis System Chamber + - Water Tank Water Filter Pump**

#### **Controlling Gas Production:**

The electrolysis process is controlled by varying the voltage supplied to the electrodes. The higher the voltage, the more gas produced. This is done by inserting a variable resistor, better known as a potentiometer or 'pot', into the electrical line charging the unit. A 'pot' is the same as the volume control on a radio and they come in sliding or rotating versions. You will need one that is rated for 12 volts and the amp range you will be using. Get one that is properly sealed, as it will be exposed to water and heat in the engine compartment. The type and mounting of the 'pot' depends on your carburetor linkage point that you intend to use. A gas pedal mounting may use a sliding type, whereas, rotating pots are used when attached to rotating linkage points. You will have to look and see what fits best in your water car. And you will have to make a mounting bracket for your pot. If possible, try to isolate your pot from metal mountings that can heat up. This is not a 'cooking pot' so don't over-heat it if at all possible. The pot will be adjusted later based on engine running conditions thus your mounting should be adjustable. This is usually done with the mounting nuts, but a 'slider pot' needs a mounting track. Pressure Switches, Valves and Gauges: Electrolysis units are usually low-pressure 'gas-on-demand' systems, thus there is little gas pressure build up in the system. For low-pressure systems a simple pressure release valve or a pressure-activated switch may be used to control upper pressure limits. A pressure switch is probably the simplest to use as it just cuts off the power to the cell when the pressure gets to high and switches the cell back on when the pressure drops. Car brake systems often have pressure switches that indicate brake failure, but what you need is one that trips at about 5 p.s.i. or is adjustable. For high-pressure hydrogen gas systems you will need pressure relief valves, pressure switches and, if you like to see if the system is working, pressure gauges. These are usually mounted on the reactor cell or gas feed line(s). Gauges are usually dashboard mounted and linked to the gas feed line before the carburetor. There are also pressure switches that have digital readouts if you want an electronic dashboard display. And if you really want to go fancy, get a multi-sensor unit that gives pressure, temperature, pH, and water levels all in one! All pressure relief valves must be vented safely to the atmosphere away from the car. A bit of hose does this. 3. Which Gas to Use? 4 Different Electrolysis Systems Electrolysis produces hydrogen (H<sub>2</sub>) and Oxygen (O<sub>2</sub>) gas and you can collect either one or both for burning in your engine. Some units can also

produce unstable mono-hydrogen or mono-oxygen gas called 'Brown's Gas'. A third gas, however, is produced when you convert a bubbler into an electrolysis unit and this is a variation of nitrous oxide (NO) called nitrous hydroxide (N(OH)<sub>2</sub>, which forms when the oxygen or hydroxide atoms combine with the nitrogen in the air in the bubbler. Nitrous oxide ('laughing gas') or 'nitro' fuel is what they use in top fuel dragsters to give that extra boost to the fuel. A fourth type of fuel is produced by creating a high voltage plasma discharge in water. This is called 'Bingo Gas' (Naudin) and is also a hydro-nitrous mix of NOH<sub>2</sub>. All 4 electrolysis systems are discussed below or in other Parts of this report. Some of the electrolysis systems described are also designed to collect just the hydrogen gas as the principal fuel. Others used all the gases produced. I prefer mixed gas systems as you generally get a bigger bang (more energy release and more power) from a mixed gas and a slower burn (requiring less engine adjustments).

#### **A. A Mixed Gas Reactor**

The simplest electrolysis reactor just splits water into hydrogen and oxygen gas and both gases are collected together and fed to the engine. Below is a unit made from an old car battery. This unit probably won't produce enough gas to run your water car solely on hydrogen and oxygen, but it can easily boost your present gas mileage. The gases produced should be fed through a bubbler, as a backfire arrestor, and then directly into your carburetor. This can be through a hole drilled into your air filter. You can also hook the gas line to your intake manifold, as this will increase performance due to the vacuum created but this adaptation will be discussed in the next section. Mixed Gas Old Battery Electrolysis Unit Mixed Gas Line to Carburetor

#### **Water Water IN OUT**

Get an old car battery and pour the acid out into a plastic basin. You will use a bit of this acid later, so scoop it out carefully and put it into a properly labeled bottle ("DANGER! ACID! Skull'n'Cross Bones") then keep it out of reach of kids. Flush the battery out with water a number of times to make sure that there is no residual acid. Do this over a drain as there will always be some acid left and it will burn almost anything it spills on. Now you have to figure out how to pry the top part of the battery off. This is the colored plastic top part from the bottom casing. These are usually glued on, but with a trusty penknife and a screwdriver you should be able to break the seals without damaging the casing, too much. If you have too much trouble, just cut around the bottom with a hacksaw blade. It is better if you can pop the top off as it will seal better later, but you can make a rubber gasket later if need be or use lots of silicone sealant. Once opened you will find 'lead plates'! Great electrode material! Pull these out and inspect them. You may have to clean them off with a wire bush to remove sulfur deposits. Then set the plates aside. Now clean the casing. The casing usually has 6 cells that are individually divided. We will be building a flow-through system, thus you will have to cut some holes in these dividing walls. More and bigger holes should be along the bottom, as you will be flushing the system from the bottom to remove sediments. But you will require holes all along these dividers so that the water can easily pass through. **DO NOT DRILL HOLES IN THE TOP PORTION.** This is your gas collection area. You will also need Water-IN and a Water-OUT holes. The IN hole is drilled at the top of one end of the casing and the OUT hole is at the bottom on the other end of the casing. Use plastic or stainless tank adapters and rubber gaskets with a sealant to affix these pipes. Note that the OUT pipe is immediately bent 'up' so that it reaches the level of the IN pipe. This is so that you maintain a constant water level in the reaction chamber. The height of the OUT pipe can be adjusted a little bit by swinging it off vertical or by using flexible tubing.

You may also want to make the OUT pipe a bit bigger in diameter than the IN pipe as the IN pipe will be pumping water in under mild pressure and this will be coming in faster than what may be coming out, thus causing the cell to flood. Flooding can also occur if your main water tank is higher than your electrolysis unit, so make sure it isn't. This is a gravity feedback in this system. Now let's work on the top plate. This is the gas collector system. Each battery cell has a threaded cap through which you pour water. These caps have a tiny little hole in them to release hydrogen and oxygen gas that is produced when you charge your battery when the car is running. You are going to need a bigger hole for your gas supply line. The size of the holes you drill in these caps is dependant upon what materials you will be using for your gas delivery. You may use stainless steel or copper flex tubing, plastic hoses or PVC pipes. These are usually 1/4" to 3/8" in diameter. Choose the tubing that you can easily get fittings for, as you will need 1 - elbow and 5 - T's and 6 tank fittings. The important seal is at the cap, thus make sure this is sealed with silicone or epoxy glue. The tank fitting through the cap can either be threaded or be a piece of tubing that is flared on one end. You do have a tapping, threading and flaring set, right? OK, just make a big enough hole and use lots of glue. When your caps are ready, screw them back into their holes tightly. Now you are going to have to decide how to link your cells together. I prefer soft linkages versus hard ones, as you may want to clean them or take them apart or tighten the caps later. For soft linkages use short pieces of surgical rubber tubing to link your L's and T's together. Insert nipples into each fitting so that the rubber tubing will have something to slip over. These nipples (short pieces of pipe, guys) are glued or soldered into each fitting and may be just long enough so that later you can use a 'coupling' to hard-link them in place. L T

### Rubber Tubing Cap

Once your gas collection manifold is complete and the glue dried you are ready to make your cell plates. As mentioned above, the anode plates should be made out of carbon or stainless steel 316. Stainless steel plates are the easiest to get as you can just buy sheet metal and cut it. You can usually find this (or similar food grade stainless) at sheet metal shops that make commercial kitchen tables for restaurants. And they will have big mechanical shears for cutting the sheets. And if you tell them what you are doing and offer to make a unit for them too, they might just give you the plates for "free"! They usually have 'off-cuts' that are just tossed away as scrap too. Measure your battery casing to see what size plates you will need, giving some room for water circulation around the outside edges. Don't make them too tight fitting. And don't worry too much about the thickness of these plates. Use what you can easily get. You can even use a stainless steel foil glued to a plastic plate. You will need at least 6 plates but you may want to have more (12, 18, 36, 48, etc.) Make extras if you can afford them. These will come in handy in later modifications. Now we need the cathode plates. What did you do with those lead battery plates? Used battery plates are usually chewed up a bit and may not be in the best of condition, thus you may need to refurbish them. Start by making a plaster mould of the best plate that you have. This is an open half mould made by just pressing a plate into the drying plaster. When the plaster is dry, pop the plate out and then use this mould for making new plates, trimming the edges and even creating groovie patterns. How? Melt down your old plates and some new lead (from a plumbing supply shop or old fishing lead sinkers) and pour the molten lead into your new mould. Now you can make as many new plates as you like, whenever you like. There are also 2 cheats that you can use here if you like. The first is to con your local plumber into using 'his' lead pot and cooker to help make your plates. Hey, he may want a water car too! The second is to go down to a battery reconditioning shop and buy new battery plates all ready-made! Now why didn't I think of that first? Now you have your anode and cathode plates and you are ready to stick things

together. Well, almost. The plates have to be mounted in the casing so that they don't touch each other and are not touching the bottom of the casing. One of the easiest ways to keep the plates apart is to glue thin vertical plastic strips onto the stainless steel plates. How far apart, you say? Well, that depends. It depends on how many plates that you intend to use in each cell. The closest you can get is about 1.0-1.5 mm or about 1/8"-3/16" apart, but normal electrolysis will take place even if the plates are far apart. Better results occur when the plates are closer together, as the molecules have less distance to travel in solution. Keeping the plates off the bottom can also be done with glued in spacers, but these should not block the drainage holes or cause pockets for sediment to build up. You might even try some old plastic combs that you glue between the walls. The plates will be naturally spaced between the teeth of the combs too! Just cut them down to size and glue them in place off the bottom a bit.

Parallel or Series? What's that? Your cathode and anode plates can either be hooked up with all leads hooked to the same wire bus (in parallel) or attached one after the other (in series). The original diagram above showed the plates connected in series, which is the most common way of doing it. Parallel connections usually use thicker wires or rods, which are charged positive or negative, and to which each plate is individually attached. Parallel connections theoretically spread the charge more equally to each electrode, whereas, in a series connection there may be a drop in voltage from one plate or cell to the next. To me it is a toss-up in the end as the voltage drop is the same using both wiring techniques. All your plates will require some sort of connecting lead, which is usually just a copper or stainless steel wire soldered or glued to the top corner of each plate. These wire leads are then connected in series or parallel from one plate to the next. All the anode plates would have their leads on the right side and the cathode plates would have their leads on the left side.....well, it depends which end of the casing you are looking from. Hey, just make them opposite each other, OK? Now insert all your plates alternating anode-cathode-anode-cathode, and wire them appropriately together. The wire you use should be fairly thick and PVC coated. You will be running quite a few amps through these wires and the cell may heat up and you don't want your connections to be eaten up by acid. Coat your connections with epoxy or silicone when finished. The last wire connection will be your positive and negative leads. These will come out through the old (+) and (-) battery terminals at the top portion. You may have knocked the old lead terminals out when you took the top off so the holes left may be a tad bit bigger than the wire you are using to link your cells together. You will thus have to fill in the holes and make sure that the fill material doesn't leak under pressure. I prefer either using the old lead terminals, which you can salvage, or just epoxy a wire into the hole. Using the old lead terminals you will have to drill a small hole and screw a wire into the bottom of the terminal. The wire on the inside of the top doesn't have to be very long, but it should have a terminating clip on the end so that it can be connected and disconnected easily from the anode or cathode wires respectively with their corresponding connectors. This will allow for easier cleaning and replacement of cathodes later on. When finally connecting, however, use a dab of silicone to coat the connectors to seal them. Now we are ready to test the reactor. Start with the top off and with the casing with the electrodes in place and wired up, and fill the casing first with distilled water. Check to make sure that your water level completely covers your electrodes. Add one teaspoon of battery acid, a little bit to each cell. Let this sit and go on to your connection circuit. Your testing power source will be either a 12 v battery or battery charger or if you have one, a variable voltage transformer (an AC/DC transformer with a pot attached). Attach the negative (-) terminal or black wire to the cathode wire (the lead plates). Attach the positive (+) terminal or red wire to an 'ON/OFF' switch first, making sure the switch is "OFF"! From the switch, wire your own pot (variable resistor) to the anode (stainless steel plates) connector and turn it all the way down. You may have to make a simple mounting for your pot, and make sure that you use a plastic knob (never touch the pot with your bare fingers! They are electrically isolated, however, shorts can occur.) For safety reasons also wear rubber shoes and don't sit on metal chairs when you play with any electricity. Now you are almost ready to throw the switch! But first, take a deep breath, thank the ALMIGHTY.....NOW! DO IT!

**Don't be disappointed. All that you will see is a bunch of little bubbles forming on your plates. Probably no great froth of foam or anything really very exciting at all. Now twist your pot slowly and see if more bubbles appear. Woah! Magic! Now turn everything OFF. It's time to put the top back on. Disconnect your wires from your power source. Connect the top wires to the anode and cathode leads. Now put the top back on. The top needs to be re-sealed to the casing. If you were able to separate it without breaking the casing then you should be able to do this with just a bit of silicone sealer all around the edges. If not, then make a rubber gasket and a simple clamp-frame, the kind used to hold your battery in place in your car. Making a clamp-frame may even be a wise idea as you will eventually want to attach your reactors somewhere in your car and this can be used as a mounting just like the one for your battery. See? These clamp-frames usually have 2 long bolts with wing nuts at either end that hold the battery in place. In this case the nuts and bolts squeeze the top to the casing to create a firm seal. Test the seals all around with some soap bubbles by plugging off the gas and water OUT lines and blowing into the Water IN line. Better yet, have some idiot kid do the blowing while you do the checking. Now get a 1.0-1.5 liter plastic drinking water bottle, a pail of water and some hose to connect your gas manifold to the drinking water bottle. Fill the water bottle full of water, then turn it upside down in the bucket. Run the hose into the bottle and wait. Now hook up your positive and negative wires again, turn your pot down and go out and find a watch with a second hand. You are about ready to see how much gas your reactor is able to produce. What you are going to be doing is testing the reactor at various voltage settings to see how much gas you are actually producing. You will first have to blow out the air in the reactor by turning it on and letting it run for a few minutes at full throttle. You will see bubbles coming out of the tube in the water bucket. After running for a few minutes most of the old air will be blown out and a reasonable test can be made. Now, Mr. Science, you are ready. Reset your pot to its lowest setting. Now turn the switch on and start timing. When the water bottle is full of gas stop timing and record how long it took. Using a 1-liter bottle you can easily calculate liters/minute in gas output. Now repeat this test setting the pot open a bit more each time until it is fully opened. Your test results should give you a rough curve as to your reactor's performance. This can also be tested noting variations in temperature, atmospheric pressure, higher voltages and amps and with varying amounts or types of acid, base (lye) or salt in your electrolyte solution. This simple test is how you find out how to maximize your gas output. NOW FOR SOME FUN! Get one of those kiddy bubble pipes, the kind that you blow into and lots of bubbles come out. You already know where I'm taking you, huh! Hook this up to your gas hose and blow bubbles! Now with your trusty Bic cigarette lighter in hand.....go blow your fingers off! It's a New Years' kind of a celebration! Have fun! You deserve it for all the hard work you put in. And when you finished celebrating the fact that you are a genius.... Now you have to install your unit in your car! Oh yeah!**

### **Installation Instructions**

**The installation has 2 parts: one is the main water tank and supply system and the other is the reactor system. As we are proposing a flow-through system, the main water tank will have to be located lower than the reactor so that water can drain back to the tank easily and not flood the reactor. This tank will most likely be located in the trunk (boot), but you may find space under the hood (bonnet) for locating this tank in front of the radiator or even under the reactor unit. The main water tank doesn't have to be that BIG. One gallon (or 5 liters) is enough water to take you a very long way, so an old plastic milk jug may do just fine. You will have to drill a hole in the cap for the water OUT hose and another hole for the water IN or return hose, and a third hole for your vent-cum-refill hole. Valve Vent/Refill To Reactor Valve Pump Water Filter**

Plastic or rubber hose is all that is needed for these through tank connections, but you should seal the holes with epoxy or silicone after you run your tubing through. You should also have a reasonable mounting for your tank so that it won't fall over. Rubber or canvas tie-down straps should be sufficient. I also recommend that you use 2 small plastic ball valves on either side of your tank so that you can easily disconnect it for cleaning or later for installing a bigger tank. These connections just use ordinary hose clamps so that things come apart easily. You may be experimenting with different types of water, acid or base mixes and different electrode materials, thus tank cleaning between each experiment may be required. The vent tube has to be vented to the outside of the car. You may have to drill a hole in the body for this but there are many inconspicuous places that this can be done. You may also want to stuff some plastic matting material into the tank to prevent sloshing around, but this is optional and dependant upon tank design used. And if you want to get fancy, install water level detectors and a dashboard display just like your fuel gauge. Your local junkyard will have these. The 'el cheapo' version is to use an old coffee urn with one of those glass tubes on the side that you can see the water level all by yourself or make one with some clear plastic tubing along the side of your tank. The pump is any small 12v electric pump. Electric fuel pumps work just fine and don't create too much pressure. You do not want a pump that pushes out thousands of gallons a minute, just a simple little thing that can push the water through the water filter and then through the tubing to the reactor. The ball valve can be used to regulate this pressure and flow to keep it down to reasonable levels. The water filter is the same as the cheap one you got for your bubbler. The filter cartridge that you took out of your bubbler is used as a spare for this filter. The pump and filter will also require a secure mounting but this is fairly easy to find as these are small parts. The pump is wired to your ignition bus with a red wire and to negative or ground with a green or black wire. You should be able to go through an existing fuse connection or add a new fuse to this bus. Now you need some tubing. The length is dependant upon where your water tank system is and where you locate your reactor/bubbler system. You will be running 2 parallel tube lines from your water tank to the reactor and back. If your water tank is in the trunk (boot) then you can either run your lines through the passenger compartment or underneath the car body. I prefer underneath as the lines will be out of site, are easier to attach and you won't have to drill through your firewall. If you have room in your engine compartment, it is that much easier. Flooding going downhill? Your reactor will work fine while driving on flat or uphill grades, but you may get flooding going downhill as your water tank may become higher than your reactor. To avoid this you may need to install a small mercury switch that will turn your pump 'off' if the grade reaches a preset level. A mercury switch is just a small tube with a little glob of mercury in it and an electrical contact at either end. When the mercury glob touches the contact at the end of the tube a circuit connection is made. Simple? This switch goes between the positive wire lead to the pump and must be securely mounted so that it can be adjusted for the angle of the car body. The alternative is to use level sensors in your reactor and use these to turn the pump on and off, noting that the setting should be fairly close in order to maintain a flow-through effect. Hooking Up Your Reactor: Before you built your reactor and bubbler you, of course, measured these and found enough space in your engine compartment. Right? Let's see, if I take out the battery, remove the radiator, disconnect the aircon and power steering....AHHH! Enough space! So much for compact cars, huh? Into the trunk (boot) you go! Actually, putting the reactor in the back is much easier as all the other components are already there and you will save on tubing. You will only need to run your gas line to the engine. And you can easily mount your reactor above your water tank just by eyeballing your mountings. Your reactor requires the water IN/OUT connection and the electrical connections as described above for the cells and for the pressure control switch. The gas OUT should be connected to a bubbler, but in this case there should be very little water in the bubbler as there is not much pressure being generated and the purpose is basically just as a flame arrestor in case of a backfire. This bubbler should be in the engine compartment and as close to the injection point as possible. You may also have a second water vapor bubbler attached to your intake

manifold already, so don't confuse the two. The gas line should be made out of flexible stainless steel or copper tubing for safety reasons. You can cheat with plastic or rubber tubing with this low-pressure system but think safety first and double-check all connections with soapy bubbles before and after some use. The mixed hydrogen-oxygen gas in this preliminary system will be fed directly into your carburetor with the air intake. This type of reactor doesn't produce a whole heck-of-a-lot of gas, so this is just added fuel to the engine that will allow you to lean down your gas (petrol) intake, resulting in much better gas mileage. The "pot" will control the gas output to engine speed so that when you lean down your petrol it will be more balanced through the rpm range. (If you ran your reactor on full all the time the idle would be too fast and leaning adjustments would be more difficult.) The easiest connection for the mixed gas is to drill a hole in your air filter and run the hose link through there to as close to the carburetor intake as possible. You can play around with this distance a bit to see if you can create a bit of suction on the gas pipe that may produce a bit of negative pressure on your mixed gas manifold. Don't expect much, but a proper setting distance can improve gas production. Now, if all the water and fuel lines have been attached and tested, wiring connected and checked and everything looks ready.....you made sure that you put some acid or base in your water....all the valves are open.....switches 'on'.....you are not ready! First jack the car up, particularly the drive wheels must be off the ground. You are going to be adjusting the engine in running condition, so it isn't too safe for you to be hanging in the engine compartment while your wife or girlfriend drives you around the block. Right? With the car jacked up, start the engine and let the engine warm up for a few minutes. It should be running normally as the 'pot' is set at its lowest setting and little or no mixed gas is being added. Now turn the pot up a notch or two. The engine should speed up a bit. If it doesn't, turn the pot up a bit more. When the rpm's go up, lean down the carburetor a little bit until the rpm's go back to normal idle (600-800 rpms). You are going to have to tickle and tweak these 'pot' and carburetor settings a little bit till you get the optimum mix at idle. Now, step on the gas! If you are too lean, the engine will slowly rev. And do note that this type of reactor does not respond immediately with a lot more gas production. It will take a few seconds for the gas to come down the line, even if sucked a bit. If the engine revs fast, even on a lean carburetor setting, you are ready to roll! Drop the jacks and take the car for a spin. Road response is often much different and you will probably have to adjust your pot up another notch when you get back to the garage. But drive around and see if things are working as expected. Tweak some more and experiment with different settings until you feel comfortable and the engine runs smooth. The next thing you are going to do is to keep a record of your gas and water mileage! Every time you fill-up, record the amount of fuel put in, the mileage and top up your water tank with that 1-liter or quart water bottle, measuring as close as possible the amount of water used. This record is very important, as you will be using it to compare various settings and other variables that you may use when experimenting with your system. Hopefully you will be able to post your results up to the Internet for others to see as well! With smiling faced pictures! Now, go out and drive around a bit.... Show off your new invention to all those guys that supplied you with parts.... Boast to your buddies..... Then write on your car door, "THIS CAR RUNS ON WATER!" Then DUCK! The men in black will be visiting you soon. Maintenance: All normal electrolysis units will require periodic cleaning due to impurities in the water and the degradation of the cathode. This cleaning duration is lengthened when using a flow-through system with a filter on it, but it does not eliminate the need for eventual cleaning, replacement of cathode plates, and changing of water filter cartridges. As the cathode plates deteriorate or become plated, you may notice a drop in reactor gas output. The simple test of this is your old bucket, 1-liter bottle and your watch. Just pull your gas line and test the output, then compare this to your previous test results. If there is a significant drop, then it is time for some maintenance. Maintenance is just a system flush and popping in new plates and filters. It doesn't take too long, but it is wise to give your plates and reaction chamber a thorough scrubbing. Routine maintenance of your water should also be done by simply flushing out your water tank every few months, or when

you notice that the water is getting a bit murky in color. Just disconnect the water tank and flush it out. Then refill with water and a bit of acid (or base) and off you go again. Another trick to be able to keep your reactor going all the time is to use only half the cells at one time or to leave one cell manually disconnected. When the cells that you are using start to fade you just attach the wire to the un-used cell(s) and off you go again. This can be done by wiring each cell individually, then connecting these to a separate bus bar having individual flip switches. Copper Bus Wire or Bar OFF ON CELL 1 2 3 4 5 6 If you alternate the switches or turn on 1 and 6 you may still get electrolysis off of the other in between plates due to the ionization of the water, but this will eat up your amps as there will be longer distances between the charged plates.

## **WATER! WATER! WATER?**

One final comment that applies to all electrolysis systems.....not all water is the same! I recommended using distilled water initially to test your reactor because this is without contaminants. Then you “contaminate” this water with acids, bases or salts, and pollute it further with the degradation of your cathodes. The distilled water is appropriate for initial testing in order to calibrate your system. Then you calibrate your water supply using varying amounts of acid, base or salt, making sure that you record the amounts used in each case. You may like to continue using distilled water if your are diligent in your record keeping, however, most of us are too lazy or too cheap to go out and make or buy distilled water all the time. So what water to use? Tap water? Not such a good idea, because this is usually contaminated with chlorine and other additives that will plate out on your electrodes real quick. But if you must, use ‘hot’ water and let it cool first. This will boil off some of the chlorine and fluorine and other dissolved gase

### **Photolysis Frequencies**

|                  |                             |                            |
|------------------|-----------------------------|----------------------------|
|                  | <b>Symmetrical Stretch:</b> | <b>185 nm (nanometers)</b> |
| <b>Bending :</b> | <b>193 nm</b>               |                            |
|                  | <b>Asymmetric Stretch:</b>  | <b>248 nm</b>              |

There are other frequencies that also contribute and may be harmonics. These include 218.5 nm, 222 nm, 239.5 nm and 308 nm. Apparently, 248 nm and 308 nm cause florescence to occur as well (the water lights up by shedding photons.)

It has also been proven that water dissociates at several other well-known frequencies:

### **Other Water Dissociation Frequencies**

1,575 nm  
3,657 nm  
3,756 nm

Stanley Meyer experimented with laser light in his water cells by using fiber optic cables inserted into his reaction chamber. Apparently this did improve gas production, but at what light frequencies and how did he generate the specific light frequencies needed? He didn't say....before the MIB killed him. (True story) In the lab this is done with a number of expensive lasers and mirror arrangements that would not be practical in a family sedan. LED's, however, may be a solution if the right frequencies in the UV range can be generated. I don't know anyone making such UV LED's at this time, but it should be possible. Visible light doesn't seem to have enough energy, however, there should be specific harmonics in the visible range that could assist in this process. Using light as a principal source for splitting water, however, has proven to be inefficient and thus the search has turned to other resonance

sources. The first to do this was John Wesley Keely way back in the 1800's. He accomplished this by using tuning forks placed in water. He found that resonance dissociation occurred around 600 Hz and specifically at 620 Hz (1st octave) and 630 Hz (2nd octave) and 12,000 Hz (3rd octave) and 42.8 kHz. A century later Dr. Andrija Puharich independently discovered these and other frequencies using his own designed resonance device and using AM amplifiers and AC current in a saltwater solution. He found his greatest success at only 25-38 mA and 4-2.6 volts or a power input of 0.1 watts was needed to create resonance within an output range of 59.748 kHz-66.234 kHz. The interesting thing that happened though was that the frequency input in the reactor cell with distilled water in it DROPPED from the 66.234kHz to 1.272 kHz to 1.848 kHz and the waveform changed from a sine wave to a rippled square wave. He also noted that if he removed one lead (created an open circuit) the frequency would jump back up to 5-6 kHz, and the cell would generate unipolar pulses of 0-1.3 volts, noting that the water was acting as a capacitor with a charge cycle of .0002 seconds (which happens to correspond to how the human nervous system works!) When Dr. Puharich added salt (NaCl) to create a 0.9% saline solution (seawater), the electrolyte resonance effect of course changed. At this point he was using 1mAmp and 22 volts and testing at various frequencies for saltwater resonance. The waveform in the saltwater changed from the rippled square wave to a rippled sawtooth wave, which apparently is the best waveform for maximum efficiency. The resonance frequencies and their harmonics using this electrolyte solution were noted as:

|                   |           |
|-------------------|-----------|
| Initial frequency | 3.98 kHz  |
| 1st Harmonic      | 7.96 kHz  |
| 2nd Harmonic      | 15.92 kHz |
| 3rd Harmonic      | 31.84 kHz |
| 4th Harmonic      | 63.69 kHz |

I rather like Dr. Puharich's approach in using saltwater, as this is the most abundant resource on the planet, also, because the electrolyte assists in the polarization of the water molecules and specifically in the flip-flop of the odd hydrogen bond. See more on Dr. Puharich in Part 8 of my watercar briefs. One of Dr. Puharich's friends and brother outcaste from the scientific community was Dr. Bob Beck. Dr. Beck was a physicist who studied devices that could influence brainwaves and directly promote healing using electromagnetic stimulation through the skin (particularly over the veins in the wrist) to polarize and alter viruses and other things in the blood so that they could be killed and excreted from the system. He has CURED addictions of all kinds in 3-5 days without withdrawal symptoms and CURED AIDS, cancers and almost all viral and other infections with these stimulation devices. Naturally he joins as an 'outcaste' as the pharmaceutical, medical, tobacco, alcohol and other medical care syndicates certainly don't want CURES as it is bad for business. He also reported that high-tension wires cause cancer in people living near them, which is true but doesn't make friends with the power companies. The importance of Dr. Beck's research in low frequencies is that he found that hydrogen naturally resonates at about 8 Hz. This is a primary healing frequency. However, what I find more interesting is the following relationship-

| Multiples of | 8Hz           | Keely (f) | 8.152 Hz  |
|--------------|---------------|-----------|-----------|
| X 75         | 600 Hz 610 Hz | 611.4 Hz  |           |
| X 78         | 624 Hz 630 Hz | 635.9 Hz  |           |
| X 150        | 1.2 kHz       | 1.2kHz    | 1.223 kHz |
| X 5250       | 42.0 kHz      | 42.8 kHz  | 42.8 kHz  |
| X13750       | 110.0 kHz     | na        | 112.1 kHz |

These directly relate to the tonal harmonics at the resonance frequency of water and should be able to be extrapolated to other harmonics at even higher frequencies. These also correlate

to Puharich's findings when the frequency in his cell dropped to 1.272 kHz to 1.848 kHz. A variable range is indicated by the oscillating capacitance of the water itself, variations in temperature and atmospheric pressure and other impurities from the chamber or electrodes. This is close to the 1.2 kHz harmonic and within an acceptable resonance range for hydrogen as noted above. Dr. Puharich's addition of a salt electrolyte will, of course, change the resonance frequencies according to those noted above due to the ionic influence on the water molecules in the electromagnetic field being applied. I see the same approach being used by Professor Santilli in his 'PlasmaArcFlow' devices that use saltwater feeds. Hmmmm. Do great minds think alike? What I am arriving at in the logical progression of base frequencies and their tonal harmonics, is that the most efficient resonance device for splitting water would be one that emits a variety of frequencies into an electromagnetic reaction chamber. The efficiency will depend on the base frequency used and the purity of the water or concentration of the electrolyte used. I prefer a general approach to taking real world situations (water samples) and then adjusting your equipment to handle these variable conditions. Maintaining resonance or a plasma arc is not easy and requires constant adjustments as the conditions in the water change due to increased chemical concentrations, temperature variations, bubbles, etc. For example, under observed resonance conditions the temperature in the reactor chamber actually decreases to a point where the reaction stops. That is, energy is drawn out of the water faster than is being replaced by the frequency stimulation energy being applied. At resonance, these reactors run cold and thus require heaters and temperature control devices to function properly or alternatively computer control circuits to constantly adjust frequencies to maintain resonance. I would thus think that if you generate a plasma arc at a frequency multiple of 8 Hz and in harmonic to that frequency, you may create a cool reaction, hence the name 'cold fusion'. This seems also to be the general direction, Prof. Alexander Chernetski, at the Moscow Georgi Plenknanof Institute has been doing. His over-unity (OU) plasma generators use strong electromagnetic fields to create a CRITICAL DENSITY. But I am intrigued by this 'critical density'. It may be more efficient to magnetically and/or physically compress water at the point of resonance (arc) than to create solely an anode-to-diode polarized field. AND THIS IS WHAT Santilli and Chernetski DO IN THEIR ARC REACTORS. Clever boys. I have also seen EM coils used in other resonators, either on the outside, or as coiled electrodes! (Meyer and Xogen patents) This leads me to believe that you should not have to go all the way with a high voltage plasma arc to create enough gas to power an engine. But the efficiency will be more if PRESSURE, either physical and/or electromagnetic is applied. And by the way, a Chinese fellow has patented an electrolysis unit that only runs on electromagnetic fields. Not that efficient, but it works with no moving parts. Creating a specific frequency is done the same way as your cellular phone works. You have an oscillating crystal that you tune to a particular transmitting frequency (or receiving frequency), and then you amplify the signal to transmit it. Crystals vibrate at a constant frequency, thus in order to get the frequency you want, you either have to divide or multiply the crystal vibrating frequency to attain the desired frequency range or ranges that you want to work with. Frequency is a wave, like in the ocean, and it has peaks and troughs. Electronic waves can control the height of the wave or 'amplitude', again through a 'pot', thus you can have strong waves or weak waves. The circuit that you really want is one that can produce a number of different wave heights at different frequencies. What you really want to create is a 'frequency soup' that produces the key frequencies and their harmonics that disassociate the water molecules AND other frequencies that disassociate the hydrogen and oxygen molecules from recombining into H<sub>2</sub> and O<sub>2</sub>. Simply, you want to make 'Brown's Gas' if possible. Bob Boyce did this with an "adjustable frequency modified pseudo-sine-wave inverter and a series of bridge rectifiers". Woah! What was that! Black boxes again!?! Not so bad, boys. The 'adjustable frequency' is a number of variable resistors (pots). The 'modified pseudo-sine-wave inverter' is your digital square wave (on/off) that is ramped up and down in amplitude to mimic a sine wave (shaped like an ocean wave) and comes as an off-the-shelf unit. And the "bridge rectifiers" are 4 diodes that convert AC current to only go in one direction as in DC

current. AC AC

DC DC

Diodes may be a bit confusing, but they are only a one-way valve that has current flowing in the opposite direction of the 'arrow'. Simply negative current flows from right to left in the above diagram. Alternating current, however, moves back and forth, thus the diodes will block current flow in one direction each way, only allowing a half-wave to pass into the DC circuit. Bridge rectifiers are used to convert AC current into DC current and they are most often encased in black plastic so that you cannot see the cheap diodes (only the 4 legs sticking out from under the covers.) Then they print some funny numbers on the plastic and call it an IC (integrated circuit) and charge you 10 times the price of the diodes. Fancy ones even hide a resistor or capacitor inside the plastic too! But they cost even more! Make your own. Diodes are cheap.

AC DC DC DC

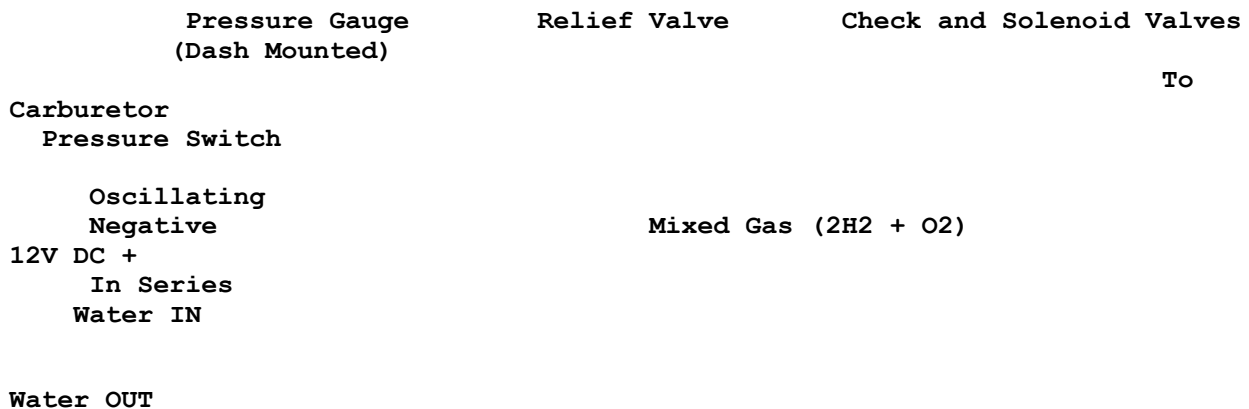
The bridge rectifiers allow you to split the electrical flow in 3 different directions without changing the frequency. The frequency is then controlled with variable resistors. Linking a number of bridge rectifiers together means that you are able to increase the number of splits and thus have more and more possible frequency outputs. This allows you to create a specific 'frequency soup' in your water by simply adjusting your variable resistors to different settings until things boil over. Bob Boyce started with an off-the-shelf 300-watt inverter that he 'modified' to have a base frequency of 700-800 Hz. He then ran this base frequency through the bridge rectifiers to create 8-16 new frequency channels that he could individually tune to a specific frequency. Each of these adjusted frequencies is amplified and then fed into the reaction chamber via the reactor plates. There is a problem here that you should be aware of. Splitting frequencies on the same circuit can result in some sections of the circuit getting more power than others, causing overloads and surges that can bugger everything up. One way to avoid this is the way your radio or TV works. You have one circuit for each frequency (channel or station) that you wish to broadcast. Yes, this means duplicating the same circuit several times for each frequency, but ONLY the frequency portion. This all sounds complicated, but it is nothing more than a walkie-talkie that broadcasts on several channels or your radio or TV that receives many channels. Soon you will see hand-phones that will be able to send and receive multiple calls all at the same time, switching between one call and the other. Sorry, I have to put you on "hold"! And speaking of 'hold', you will quickly find that your resonance settings that you so carefully adjusted to attain resonance, will only work in set positions for a brief period of time. Getting a 'hold' on resonance is difficult over time as temperature, pressure, electrolyte concentration, bubble size, spacing and other factors are VARIABLES that keep changing as the reactor is in operation. One solution is to mount your electronics on the dashboard and adjust your pots till LED's indicate resonance. That ought to be fun in traffic. Alternatively, use a computer to maintain proper adjustment based on sensor inputs. This is the actual direction things are going, but it requires a computer engineer/programmer and knowledge of sensors and electronics. This will be a team effort to come up with an appropriate black box, and I don't know any car manufacturer or oil company that will sponsor this R&D.

Voltage

Your frequency soup is then mixed together and then amplified through an "amplifier". Simply you make the waves bigger by running them through some power transistors. The 12V DC voltage from the battery through your throttle pot controls this. Now if you build your electronic unit from the designs that you get off the Web, IT PROBABLY WON'T WORK!

Most electronic designers cheat by NOT telling you everything you need to know. Their drawings may be minus a resistor, capacitor or a diode, or the IC's or transistors are not properly rated for 12 volt systems or the amps that you are running, and so on. My advice.... get professional help! Building the Gas Generator An oscillating frequency gas generator produces both hydrogen and oxygen gas at the same time and at pressure. Once you hit the right frequency a mixed gas is produced. The amount is determined by the pulse width (duration) and voltage applied. This can be in copious amounts but limited by pressure switches and pressure relief valves as above to a maximum of 40-45 psi or other pressure setting as you may determine optimum for our engine size and acceleration demand. Often a second storage chamber is used for these mixed gases just to act as a buffer gas supply. Very high pressure systems, however, should be avoided when using a mixed gas as this can cause self-ignition and a dandy explosion (as in your car's engine). High pressure systems also require more expensive regulators to step-down the pressure coming into your carburetor (something like a scuba regulator or those used for 3,000 psi hydrogen gas supplies).

#### Mixed Gas Generator



The chamber can be made out of just about anything that can withstand the applied pressure. Some use 6"-8" PVC water pipe with cleanouts on both ends through which electrode wires and fittings are attached. If metal containers are used make sure that the electrodes are properly isolated. It is also possible to electrically charge the cylinder positive (+) and connect the positive electrodes directly to the casing, but the casing will have to be properly isolated from the car frame (-). Shown above is the old battery casing model. Preferred are stainless steel 316 electrodes, however, other metals can also be used but may suffer from corrosion due to the normal acidity or alkalinity of tap water in various locations. Anyone for gold electrodes? Electrodes work best between 1mm-1.5mm apart. That isn't very much so use isolating spacers like 1 mm plastic washers to keep the electrodes apart. If you are on the cheap, go out and buy old plastic combs and insert the plates between the teeth. Any number of electrode pairs can be used. The importance is not the number of plates, but more in the total surface area exposed and the distance between plates. The thickness of the electrodes also doesn't seem to matter as the 'action' takes place between the electrode surfaces. Plates or tubes should be thick enough to stand on their own and not be effected by bubble action, that's all. And scratched, grooved or rough surfaces create even more exposed surface area and areas for bubbles to form. The distance between plates should be 1.0-1.5 mm and spacers

should be used as described in previous Parts. The distance between plates is determined a bit more by bubble size than anything else. Bigger bubbles will displace more water and thus slow the reaction (and cause all kinds of funny measurements within the reaction chamber). The electrodes must also be raised off the bottom of the tank so that water can be drawn up through the plates or tubes. This will be automatic as the gas bubbles rise to the surface of the water. The best results are obtained in systems that are designed to allow a circular water flow current in the reaction chamber. Any number of plates can be used or the system can use tubes of varying diameters nested inside each other. Stanley Meyer ran his old VW on 6 double tube cells only. ++ \_\_

Double-double tubes do create a better circulation within the cell, but the tubes have to be spaced at least 5 mm apart unless inner and outer charging is altered. (Same charges repel.) There is a conflict of opinion as to whether or not the electrodes should be fully immersed in the cell or not fully immersed in the electrolyte solution. I'd go for fully immersed. There is also dispute as to the electrolyte used. Some say just use tap water. Hmmm. That should crud up things pretty fast. I'd go with sodium hydroxide (NaOH or common lye) or potassium hydroxide (a bit more expensive but better performance). Acids or mineral salt solutions might also have some benefits. Electrolyte solutions should always be topped up with distilled water if possible. I also prefer a flow-through system for the electrolyte, but the flow only needs to be minimal unless you are conducting a flush. This approach has very few precipitates, thus flushing will be seldom unless you are using cruddy water. As this is a self-pressurized container, water entering and exiting must be valved and the water pump should be strong enough to pump water into the container at maximum pressures. This isn't absolutely necessary because as the water level drops less gas is produced and pressures drop. Level switches inside the chamber control the water pump which goes through a backpressure check-valve. A water pressure release valve is then set higher than the gas relief valve and this controls water flowing out, if any. In operation the water in the chamber will become 'dirty' due to the eventual concentration of water impurities and precipitates that will form. This dirty water can be occasionally 'flushed' out by simply lifting the water pressure relief valve and dumping the water to the ground. It is probably best that this be done every time you fill-up with more water in the main tank. If you are lazy, put a solenoid activated relief valve in and a button on the dash. Dirty water may hamper the process as it can create ionic reactions and cause sparks to jump between the electrodes. It is thus best to flush occasionally and clean the plates or tubes whenever you notice a drop in performance. A dashboard pressure gauge will tell you if you are producing gas, usually within a pressure range suitable under normal engine operating conditions and pressure switch settings. If the production pressure is higher, then you are producing too much gas and you need to adjust your throttle resistor.

## Electromagnets

One of the variations used by Miller and Chambers (Xogen) is to place an electromagnetic coil in the path of the exiting mixed gases. This electromagnet is just coiled stainless steel wire isolated from the tubes or plates and pulsed at a different rate. This apparently has the effect of re-aligning the electron spins in the hydrogen atoms so that they are in the same direction. This is supposed to create 'parahydrogen' from the normal 'orthohydrogen', noting that the 'para-' version tends to burn slower. This is more of a gimmick to get a patent than anything else. If you want to slow down the reaction in combustion, just add water vapor. No big deal. Alternatively, if you want the 'para-' version, just wrap an electromagnet around your gas fuel line. That's easier than dunking it in the water. Another modification that I haven't seen anybody try yet is the coiling of an electromagnet around the outer tube in a tube reactor using coated copper wire. The effect will be the same as in the 'Aussie Reactor' to create a polarized field and most likely you will end up getting a multi-mixed gas containing some nitrous hydroxides, particularly if you bubble some air into the reaction chamber in small

quantities or use a vacuum approach to drawing off the gases. “Gas” Tanks: You might also want to consider installing a small cylinder for gas storage along your fuel line. This is usually nothing more than a 1-2 liter bottle that acts as a temporary gas storage vessel that creates a buffer in your fuel delivery system on start-up and rapid acceleration. Generally, your reactor will have a slight time lag from the time you press the pedal till more gas is produced. Having a ready supply simply buffers that time lag. This temporary gas storage can be in the form of a bubbler container or a separate canister placed somewhere along the fuel line. You don’t want to contain much gas, as this is explosive, thus keep the size down to a level that is most appropriate for your engine size.

### **Engine Modifications:**

As with the hydrogen cell engine modifications previously described, you will need a gas regulator and an “anti-rust-proofing” of the engine and exhaust system. Timing will have to be set even further ahead as no other fuel is used. Water Injection and Steam Engines You will also need to install a “bubbler” or some other water vapor injection system, particularly one that uses your exhaust in order to vaporize the water used to retard the combustion. This can be done by coiling copper or stainless steel flexible tubing around your exhaust pipe from your water supply. This will create steam or at least hot water. Using a bubbler, the hot water vapor is sucked into your engine at the intake manifold. This is easy with a normally carbureted engine. If your car is fuel injected, you might just run your hot water/steam into the fuel injectors as these inject direct to the intake manifold just before the intake valves. Fuel injectors vaporize the water to a certain degree and the heat in the manifold does the rest. You can also create your own water injection system by just getting a fuel injector and drilling a hole in your intake manifold for this. Hook this up to your water supply line (not your electrolyte water supply) usually from a water tank with a small electric pump. Use normal tap water only. If you want to create a lot of steam fast, use a microwave generator from an old microwave oven in a sealed container. Be sure and use a pressure switch here though to turn the microwave generator on and off. As an aside, did you know that the first radar that was designed using microwaves didn’t work. They tried it in the lab and it worked fine, but when they took it out for testing along the coast to spot ships, they got no reflection. Somehow the scientists had managed to hit the resonance frequency of water on their first try and they were just heating up the ocean! They changed the frequency and radar became a reality, but so did “radar ovens”. If you want to make a microwave boiler, make sure that the system is properly shielded, as you really don’t want to boil the water in your engine’s cooling system, or even in your own personal system. A grounded metal casing is sufficient. A microwave boiler can produce steam very fast and thus run dry very fast, so you will have to balance on/off cycles with water intake and steam outflow. The microwave frequencies for boiling water do not cause the water bonds to be broken, but there may be specific high frequencies that do split the water molecules. I don’t know any as yet, but there will be harmonics that will promote or assist in this process. This will take some experimentation and adjustment to the microwave frequency output signals, but this experimentation is not for beginners as microwave devices are very dangerous to work with. You can fry yourself if you are not extra careful! How much water to inject will depend on your gas/air/water mix ratios. The more that you can squeeze in the better, but give yourself some leeway. Also, the water injection system will work better when the engine is hot versus cold, so you may want to use a thermal switch to trigger the system. This approach may not work in cold climates where freezing of the water may be a problem (add some alcohol to the water to lower the freezing temperature and still get a bang in the cylinders or put electric heaters in your water tanks). I would recommend a little moonshine mix in any case just to add some carbon to the combustion process to coat the cylinders and exhaust system a little bit. But don’t waste Southern Comfort on your car. A little methanol or ethanol will do just fine. Water vapor in the combustion cylinders does 3 things: (1) it retards the combustion (slows it down) and (2) it

creates high-pressure steam, which creates more force on the top of the piston during the power stroke. This creates more torque and power in your engine. Just what you wanted. (3) The third thing is that it displaces some of the fuel needed to run your engine. Simply, you run on less fuel. This reduces your gas intake and subsequently your need to produce gas (i.e., the size of your reactor). You will not be able to run your engine as a compete steam engine, but you should get a lot more mileage from your fuel. This water/steam injection system can thus be used even on any existing reciprocating engine to improve performance as noted in the first section concerning bubblers. Various people over the years have tried water injection on gas and diesel engines with success. They have been able to reduce fuel consumption by 40%-60% in lean conditions with no ill effects to the car. The only thing you get is a nice plume of steam out the exhaust. Really cool effect on a cold day!

**Over-unity** This oscillating frequency system, particularly in conjunction with a water injection system, may be an over-unity system. Over-unity means that you get more useful energy out than what you put in. In this case, the frequency generator uses very few amps of power to generate the gas, which powers the engine and alternator, which runs the frequency generator. Simply, you technically use less energy to create more energy. And you can even re-circulate some of this energy back from the exhaust heat. That is really neat! In business it is called “profit”! Proper scientific bench testing will confirm this over-unity, but that is up to the engineers and mathematicians. Let’s just be happy that it works really well for us.

**System Adjustments:** This oscillating frequency system can easily be designed and adjusted to produce more gas than any car engine can consume. All that you do is add more plates or tubes or have multiple generating units all operating off your car battery and alternator. The draw on the alternator/battery is only in milliamps so no worries there and no heat is produced. You will still have to adjust the fuel production to throttle demand in static and road testing. This will also have to be adjusted to water injection ratios. But these are easily fiddled with until you get a reasonable mix. Tuning your resonator will be a bit more difficult depending upon how many frequencies you intend to produce in your frequency soup. Target the known key frequencies and then their harmonics, then shut these off and tune in others that work. Then combine all together and fiddle with your pots some more. This is like a cooking class, isn’t it? In the end you will want to mount your electronics in a waterproof box and mount it somewhere convenient. A plastic box with holes for wires to go in and out of and some silicone sealer is all that is required. A screw on lid is preferred, as you will want to tinker with your settings from time to time, but these can be adjusted from pots that you run through the sides of the box. Label each pot and switch clearly because you are bound to forget what-does-what. There is no final adjustment for a tinkerer, so just have fun fiddling with your circuit and system adjustments. Keep a record of water consumption and mileage. Then change the settings again and see if you get any improvements. Trial and error will get you to some thing that will work best. And the first one to get 10,000 miles on a gallon of water will get the Kramer Prize! What is the Kramer Prize? Don’t ask.

**BIG Cars are BETTER!** The use of a simple electrolysis, oscillating frequency or plasma water fuel system simply means that you can now afford to operate a BIG CAR for FREE! You are no longer limited to small engine sizes just to save fuel. You make your own fuel for FREE and on demand! So up-grade your car to that 6-liter V-12 engine you have always dreamed of and muscle your way down the highway! Where’s my old GTO? 427 Shelby Cobra? This seems a bit unreal but it really works! And the bigger the car the better! You normally have more room in the engine compartment and trunk with a big car too. **Design Modifications:** A modification noted by Meyer was that gas production seemed to be increased in the presence of laser light. What frequency, he did not say. Did he use LED’s inside the reaction chamber? Don’t know. If LED’s work, fine and dandy, but heck if I’m going to invest in a high-voltage argon laser system for my old Volvo. Laser light is a mono-

frequency, which should have an effect on the water molecules alignment. Again the right frequency of light will also be a harmonic of the frequencies that split the water molecules, but producing the 'right' light frequency is often very difficult. UV light (black light) might also work, but again this is a broad frequency spectrum that is difficult to isolate specific harmonic frequencies needed. A third modification is to use an ultrasonic generator. This really isn't needed on an oscillating system, as the bubbles are never attached to the electrodes. In fact, the oscillating system is essentially ultrasonic by design! But there may be harmonic frequencies that aid in the disassociation process. Experiment! Magnets can also be used around the water line before or after the reactor and around the fuel line to polarize the fuel mix before entering the carburetor. Experiment with either alternating fields or preferably monopoles (i.e. north or south only). These magnets are available for standard gas feed lines at most car accessory shops or you can make your own with some insulated copper wire. The injection of sound as noted above for normal electrolysis units is another method. Keeley recommends generating sound at one or all of the following: 620 - 630 - 12,000 - 42,800 hertz. You can sing the first two yourself. Mmmmmmm! Bob Boyce's systems are also worth looking at as he generates a number of different frequencies and their harmonics to split the water and create mono-atomic hydrogen (H) and oxygen (O) called Brown's Gas. This gives a bigger bang and you use less, but it is very unstable and has to be made on demand close to where it will be used. Yull Brown's US patent for 'Brown's Gas' is No. 4,014,777, but he just uses a normal electrolysis unit and then runs the gases through a plasma arc under water in order to disassociate the molecules. Disassociating with the right frequencies is the cleaner and more economical way to go. Other Water Car Designs One very old patent uses a caustic soda bath built right into the carburetor and does the electrolysis right there! Great way to eat up your engine. Then there are commercial "Brown's Gas" generators, which are used in welding. These are a bit big to fit into the boot (trunk) but if you find a cheap one??? And I really don't want to get into "Joe's Cells". Too many weird claims. But these are just multi-tube cells. And if Thomas Bearden can ever get his "over-unity" magnets to produce enough power to run a car.....well, you can throw away your water and your engine and go all electric! A few other options involve a similar 'over-unity' or 'zero point' machines that have promise, but commercial reality is not there yet. Most are based on rare earth (expensive) permanent magnets, that once you get them spinning, well, they just keep on going ..... forever! Our industry is still stuck with old reciprocating engines for a while longer, so think WATER for the time being and save money and the environment! Now, lets see.....how can I FLY using WATER? That I already know how to do but that will be another report for some time later....