MANUFACTURING

A

DUAL ANODE TUBULAR TESLA SPARK PLUG WATER INJECTOR

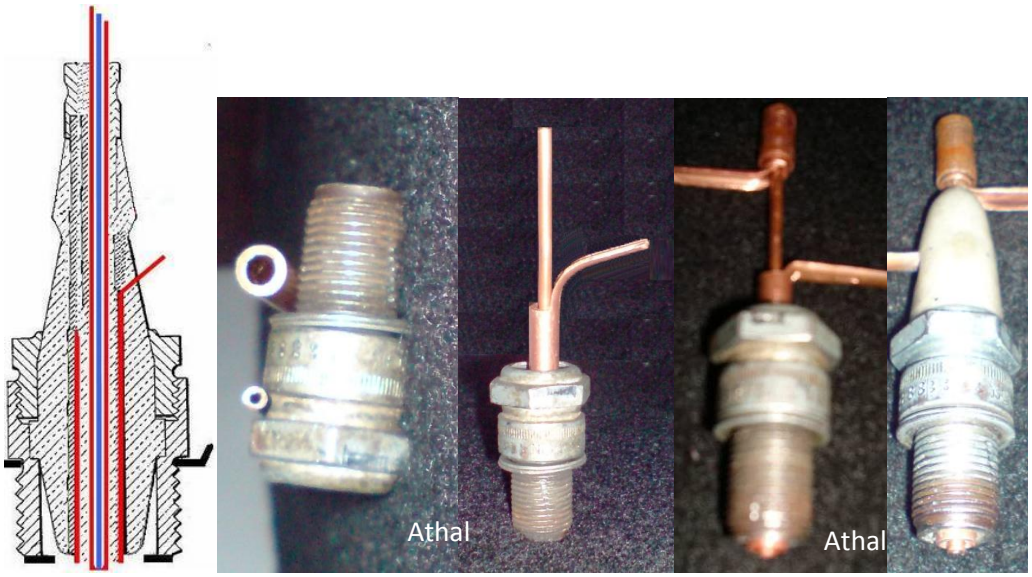
1.- Advantages.

2.- Ten step manufacturing.

3.- Connection scheme.

4.- Implementation phases.

Attachment: Coaxial center rod mod.



1.- Advantages:

The advantages of this DUAL ANODE TUBULAR TESLA SPARK PLUG WATER INJECTOR are:

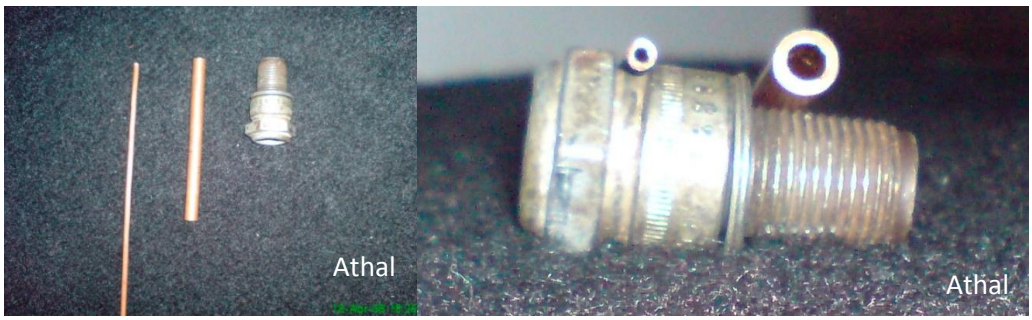
- ✓ Makes possible mix in the head of the cylinder two electric flows one DC High Voltage (HV) low amp and other AC Low Voltage (LV) high amp, without timing devices or relays.
- ✓ Allows water (or H2O vapor, or HHO result of an hydroxy generator cell, or a Joe Cell) injection without mixing with fuel. Makes possible hybrid transition phase.
- ✓ Uses two kind of spark: a Tesla positive one HV – LV, and ground spark of the mix of these two flows. AC LV high amp flow is constantly ionizing the fuel (whatever it is), until it follows the DC HV low amp spark path when fired from distributor, resulting in a plasma discharge.
- ✓ Allow the use of high energy discharge avoiding insulation problems in ignition wires when HV reaches more than 34.000 volt. In this device HV is mixed with LV high amp, only at the end of electrodes at the end of the spark plug.
- ✓ As Rufus FX said: *"… and electrons love to travel in the shape of a tube... IE the outside layer of a wire, leaving the core relatively untraveled. Flat conductor plates always puzzled me for their linearity... but then the world is flat then isn't it?".* This spark plug represents a new tubular-coaxial concept.

2.- Ten step manufacturing:

1.-Take a normal spark plug, break the porcelain, and drill inside to empty the metal jacket.

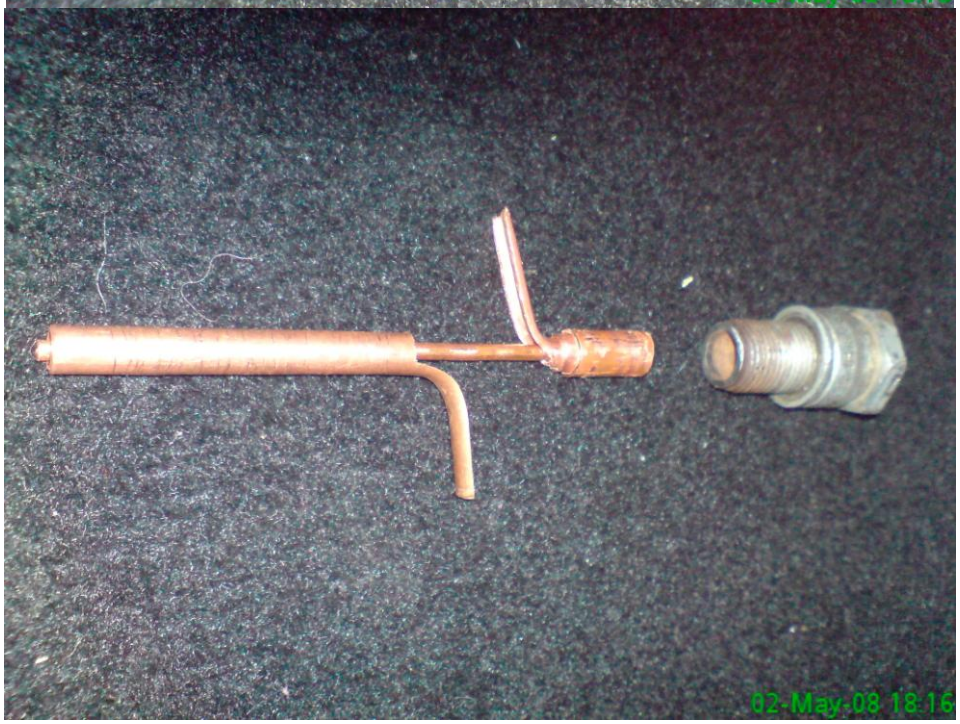
2.- Remove the ring seals.

3.- Select two perfectly aligned copper tubes: one ¼" and other thicker one from an old freezer.

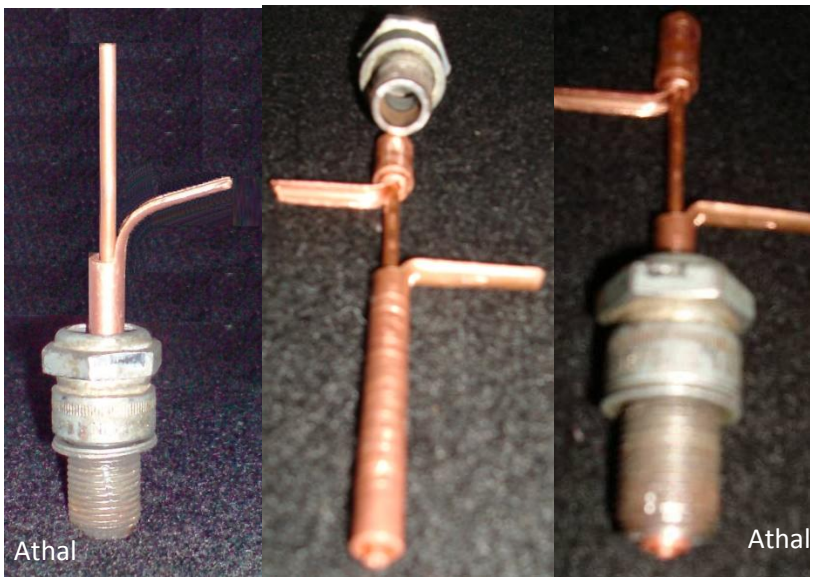


The thick copper tube must enter inside the ¼" copper tube, and left enough space for the application of insulation composite.

4.- Cut longitudinally the ¼" copper tube and bend in an "L" shape to allow the attachment of the LV high amp connector.



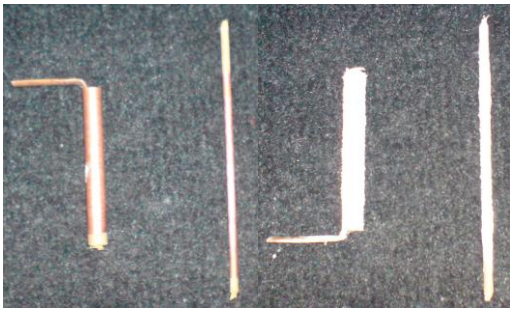
5.- This is an example of the dual anode tubular spark plug injector *before* being assembled with insulating composite.



6.- Take a wasted fluorescent tube and crash it in small pieces. You can use also porcelain. Put the glass into a metal milk can bended in a plane form and seal with tape. Hit it with a hammer to obtain a very fine glass dust, use also a strainer to have a homogeneous sand size. Take care: not damage yourself during the process.

7.- The composite used to build this dual anode tubular spark plug injector, can be made using polyester and glass dust (Micarta) or liquid Epoxy and porcelain dust (Syntactic, as Rufus suggested).

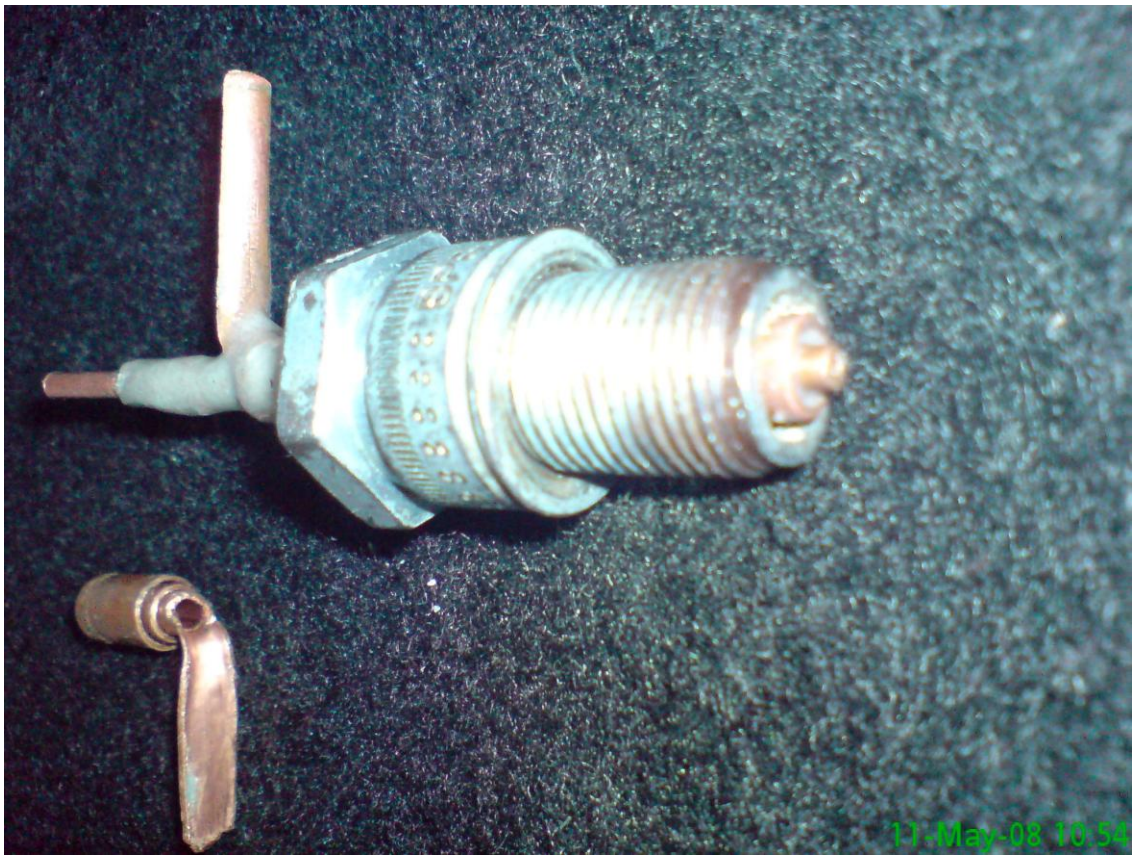
Make some transversal marks in the copper tubes to improve composite adherence. Protect with tape each side of the tubes. Apply a thin layer of liquid epoxy and roll the tubes over a plain surface covered with glass dust. Repeat this process in the ¼" tube until you are near to obtain the internal spark plug jacket diameter.



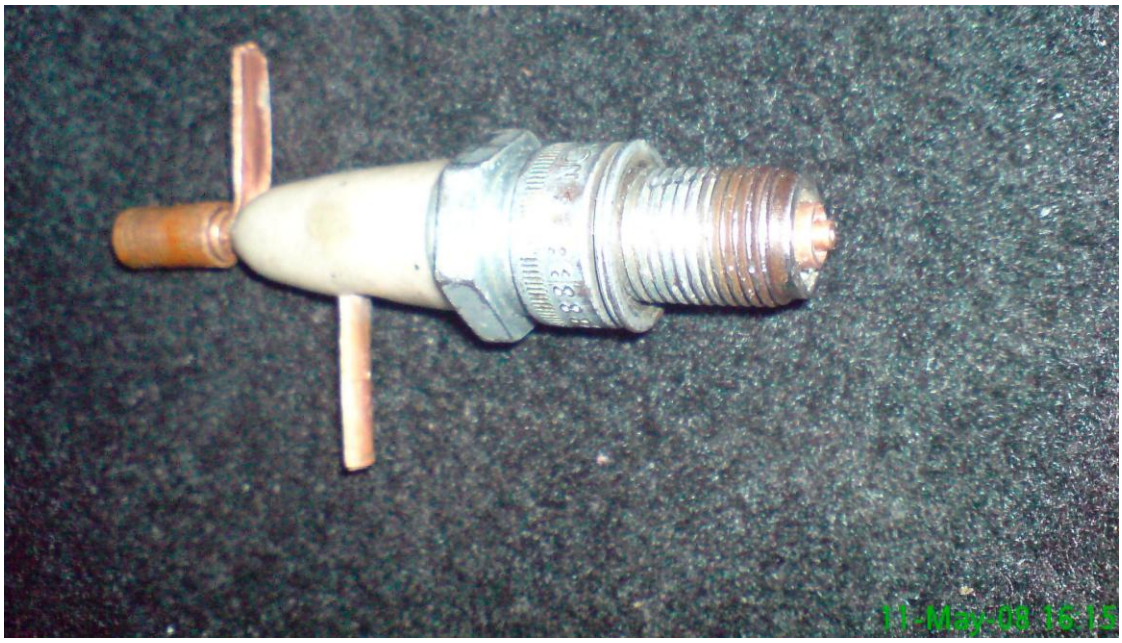
Take the thick tube and apply a thin and homogeneous layer of epoxy in the external side, without obstructing the holes, and roll the tube in a plain surface with glass dust. Repeat the process in the thick tube until you are near to obtain the internal ¼" copper tube diameter.

8.- Block the neck of the spark plug metal jacket to avoid composite enter in. If you fill the neck with composite, it may be difficult to ensure heat dissipation in the cylinder head. Fill the spark plug metal jacket with 50% composite. Protect with tape the head of the dual anode assembly and introduce it into the spark plug metal jacket by the upper side. It is essential keep everything perfectly centered in a coaxial way to avoid shorting.

9.- Make some 50% composite apply in the thick tube and fill the ¼" copper tube. Introduce it into the ¼" copper tube. It is essential keep everything perfectly centered in a coaxial way to avoid shorting.

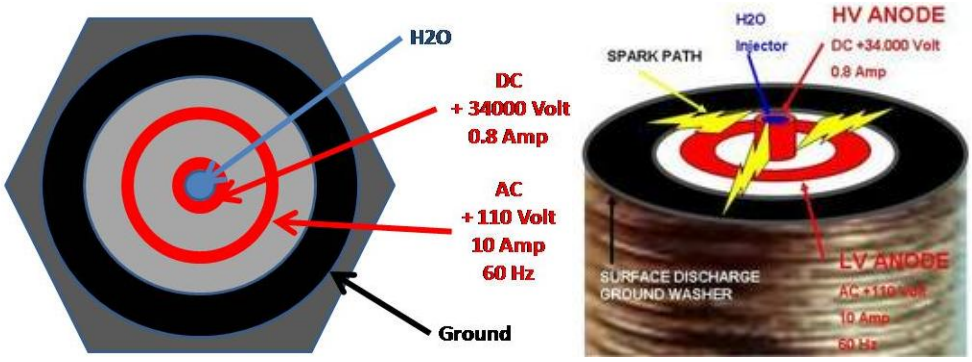


10.- Cover with composite the external part of the dual anode tubular spark plug injector respecting the diameter of a spark plug tool. Weld the water intake fitting three small pieces of copper tube 3/16”, ¼” and 5/16”. Prepare HV and LV connectors to let the spark plug tool enter. When attach HV coil and LV connectors keep everything in god contact and isolate to avoid sparks and energy leaking.



As far as I know this is the prototype of the first spark plug dual anode with coaxial tubular concept, designed to mix two positive flows (HV-LV) with the purpose of producing a Tesla spark, and also allow water being injected in the engine's cylinders.

Other dual anode sparks have been invented I.E: Patent# US1165492, US4308487, US7309951, US20060082275 (coaxial), and the closest one, patent *US2969500* (coaxial). But no one of them was designed to mix two different voltages, and no one of them used to inject water. Pat.# *US2969500* has been a good inspiration to me because of its coaxial design and provided enough insulation between diodes (US20060082275 will not work as insulation is poor). Pat.# *US2969500* spark plug was designed to be connected to a light bulb to detect misfires in the sparkplug.



Tubular concept is new. 100 years with the same spark plug concept is enough, the addition of several ground cathodes is not such a big thing.

I don't have any intention to have a patent on this, and I don't want anybody getting this patented. This is free, for everyone.

3.- Connection scheme:

Disclaimer: HV is dangerous. Even a small 60w inverter can be lethal. Take care, and always proceed with caution. Don´t modify or touch nothing with ignition or inverter on. Switch everything off and then also disconnect the battery. If you have any doubt, ask in WaterFuel1978 forum, members there, are excellent technicians.

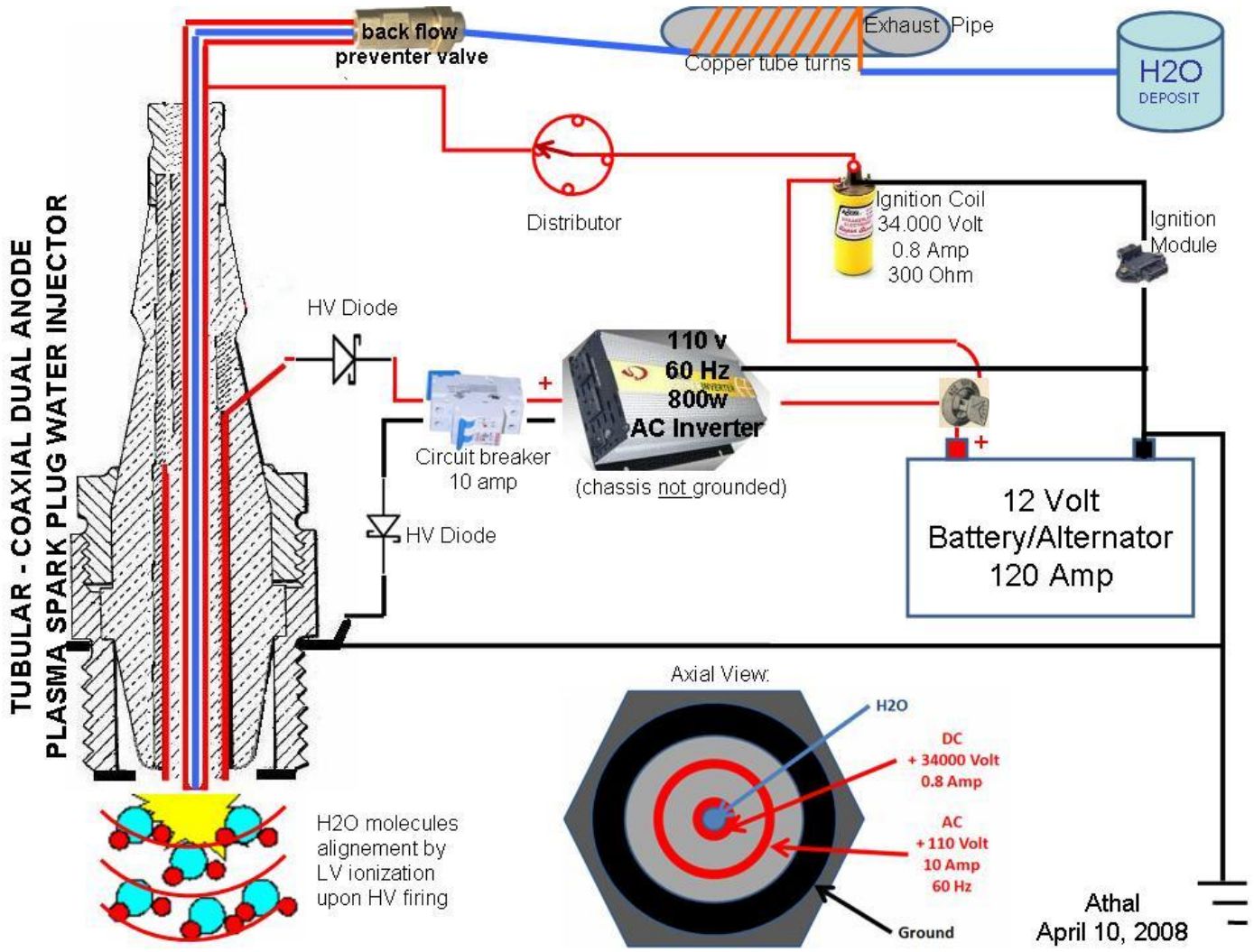
Some suggestions:

- It can be useful having an AC inverter capable of being modified to obtain several frequencies. 42.8 Hz seems to be the magic splitting water one. But it may be difficult to obtain this frequency in high velocity pressurized chamber. May be it can be done using a variable frequency drive (VFD, used as velocity control in electric motors). Frequency can be the key of all.
- An DC AC inverter with 800w (1600w peak) will consume 88 ampere/hour. The normal ampere consumption of a car is 20 to 30 ampere, and the inverter will consume 88

ampere/hour. So the dimensioned configuration would be an alternator of 120 ampere with a 120 ampere/hour battery.

headlights	10 to 15 amperes/H
parking lights	3 to 5 amperes/H
interior light	1 to 2 amperes/H
radio	1.5 amperes/H
air conditioner	15 to 30 amperes/H
cranking the engine	100 to 200 amperes/H

- Also is possible that old inverters working with square wave (instead of sine wave) are better for our purpose, as they are acting as a make-break circuit.
- The dual anode tubular plasma spark plug configuration is superior to a single anode common spark plug, as it keeps separated HV and LV until the moment of HV firing at the end of electrodes. Despite of this, the use of properly dimensioned HV diodes (or diode arrays) to the ignition voltage and amperage is highly recommendable.
- Non resistive (solid core) ignition wires are preferable as they are able to let pass through them more energy, and possible electromagnetic interference is not an issue now.
- The use of racing ignitions can help performance, and increase spark gap.
- When water is injected, ignition timing must be set to fire slightly after TDC. The more energy in the spark, the faster fuel (whatever it is) ignition, then retarded firing becomes possible. Compression in the engine cylinder reduces the gap that the spark can reach. TDC represents maximum compression. So we have two options: advanced ignition firing (too much advance can result in detonation and engine damages) and retarded ignition firing, which I think is the best option.



Spark energy calculations:

HV low Amp Ignition Coil		
DC Volt x	Amper =	Watt
34000	0,8	27200
Watt x	Seconds (time) =	MiliJoules
27200	0,004	108,8

Inverter 60 Hz		
AC Volt x	Amper =	Watt
110	8	880
Watt x	Seconds (time) =	MiliJoules
880	0,32	281,6

Total MiliJoules (3000 RPM) =	390,4

Engine RPM	Piston stroke (4 cylinder engine)	# ignitions per minute Otto cycle	# ignitions per second Otto cycle	Dicharge duration (seconds)
3000	750	187,5	3,125	0,32
5000	1250	312,5	5,20833333	0,192

4.- Implementation phases:

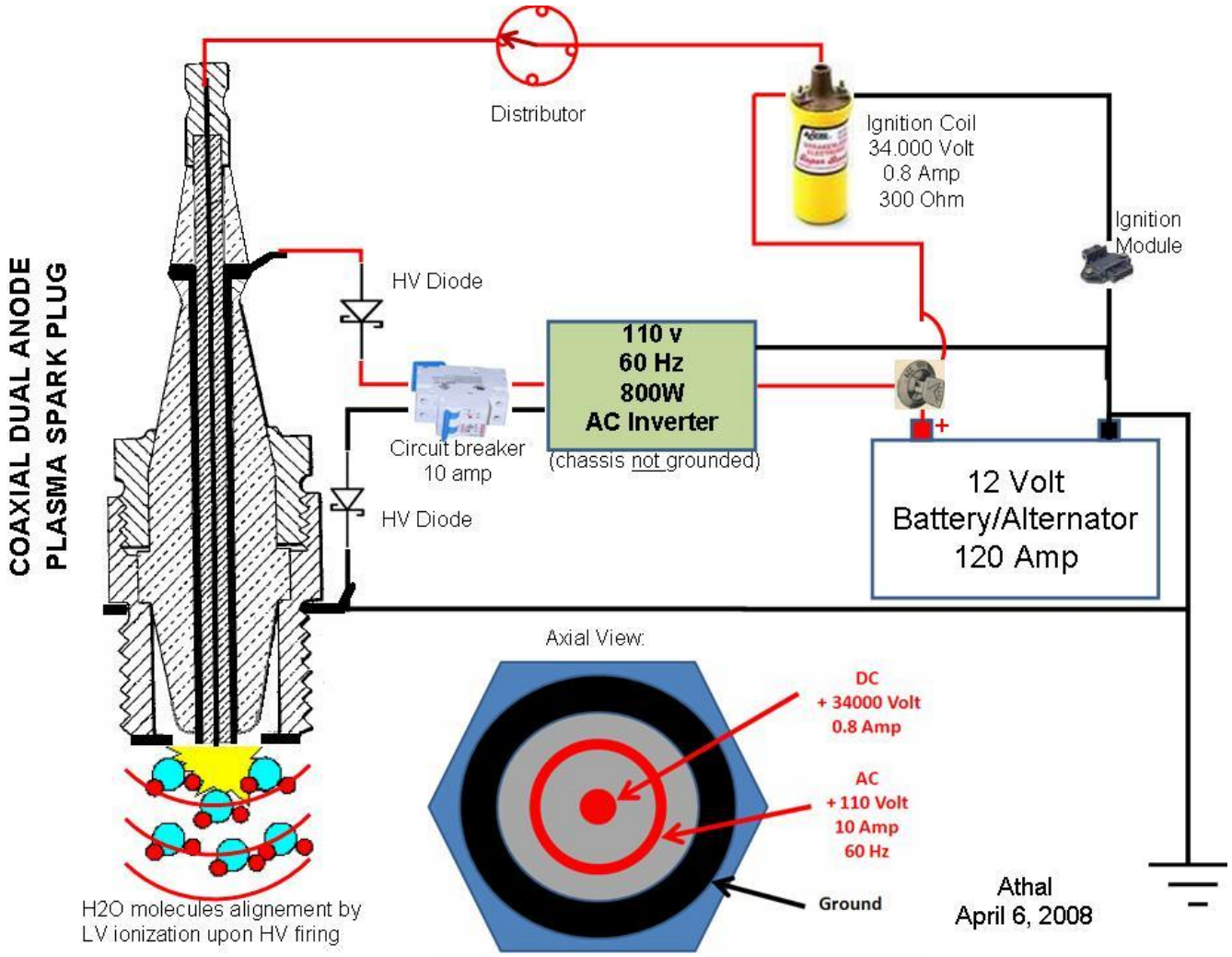
1.- First phase: In first phase of implementation, the scheme for a dual voltage dual anode tubular-coaxial spark plug can be used to improve fuel (gas, gasoline or alcohol) mileage, reduce emissions and provide better torque. Engine can run leaner, and rapid combustion avoids fuel burning lube oil at cylinder walls, creates less carbon deposits, and improves engine's life.

60% of fuel we put in our car deposits is burning inside the catalytic converter. The use of a tubular-coaxial plasma spark plug can burn more fuel inside the cylinder.

2.- Second phase: This is an hybrid phase. Water or water vapor should be injected and fuel also used. May be injecting HHO result of an hydroxy generator cell, even a Joe Cell… The tubular dual anode spark plug is the key to research and tune up a water fuel system.

3.- Third phase: Inject water alone…

Attachment: Coaxial center rod mod:



This mod is the same concept as tubular dual anode spark plug, but using a center solid core cable instead of thick tube. It doesn't allow water injection. The addition of water should be done mixed with fuel, or with air, spraying it in the air intake.

It's also a possible approach.

athalfridhu@yahoo.com

http://tech.groups.yahoo.com/group/WaterFuel1978/