Solovey Developments

This presentation is only for experienced developers who are familiar with high voltage circuits. If you are not familiar with electronics there is a tutorial here: www.free-energy-info.com/Tutorial.pdf.

The South African developer says: I have built the Solovey replication as close to Solovey's version as I am able to do with the materials available to me.

Solovey's original circuit:

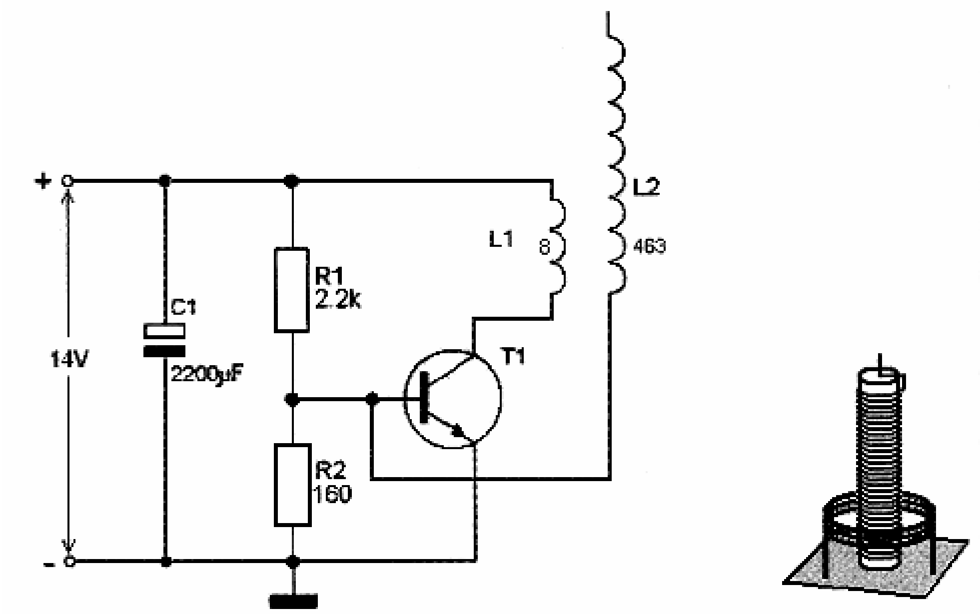
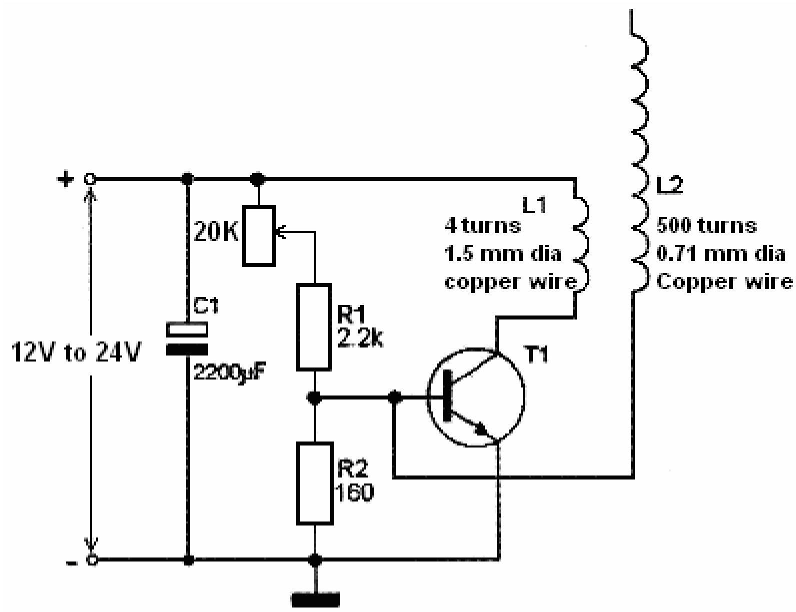


Fig. 2. Schematic of windings L1 and L2

This is my slightly modified version: I have introduced a variable resistor to control the current etc. to the base of the transistor.

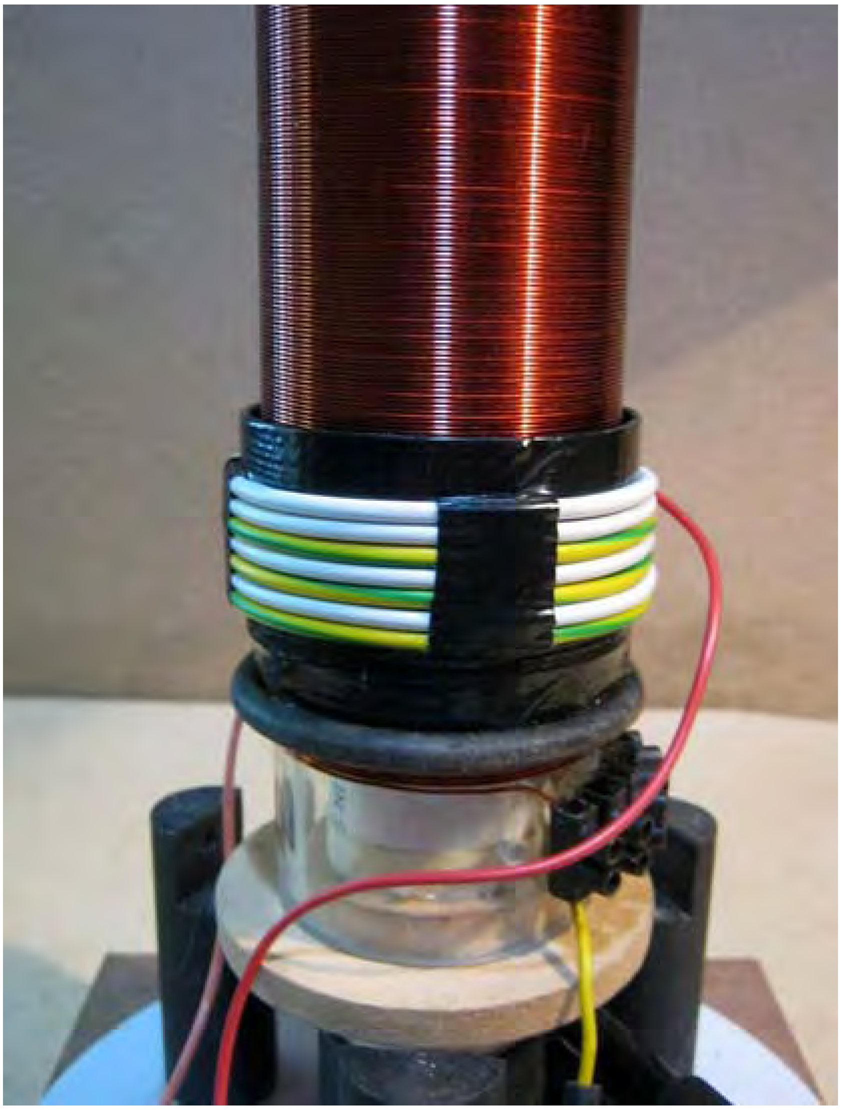


I am using a TIP3055 transistor. I have tried a range of transistors, MJE13009, TIP132 and all sorts of others, and the only one's which work at all are the 2SC3552 (1000V) and the TIP3055, which is the best by far.

These are my coil details:

Specification	Primary L1	Secondary L2	Additional L3
Coil length, cm	3	40	8
Number of turns	4	500	6
Version 1 Diameter cm	7.5	6.1	7.5
Version 2 Diameter cm	11		
Active resistance, ohms	.1	5	.1
Copper wire length per winding		95 M	3.6 M
Version 1 Diameter cm	94		
Version 2 Diameter cm	138		
Wire diameter, mm		.71	1.5
Version 1 Wire diameter mm	1.5		
Version 2 Wire diameter mm	3		

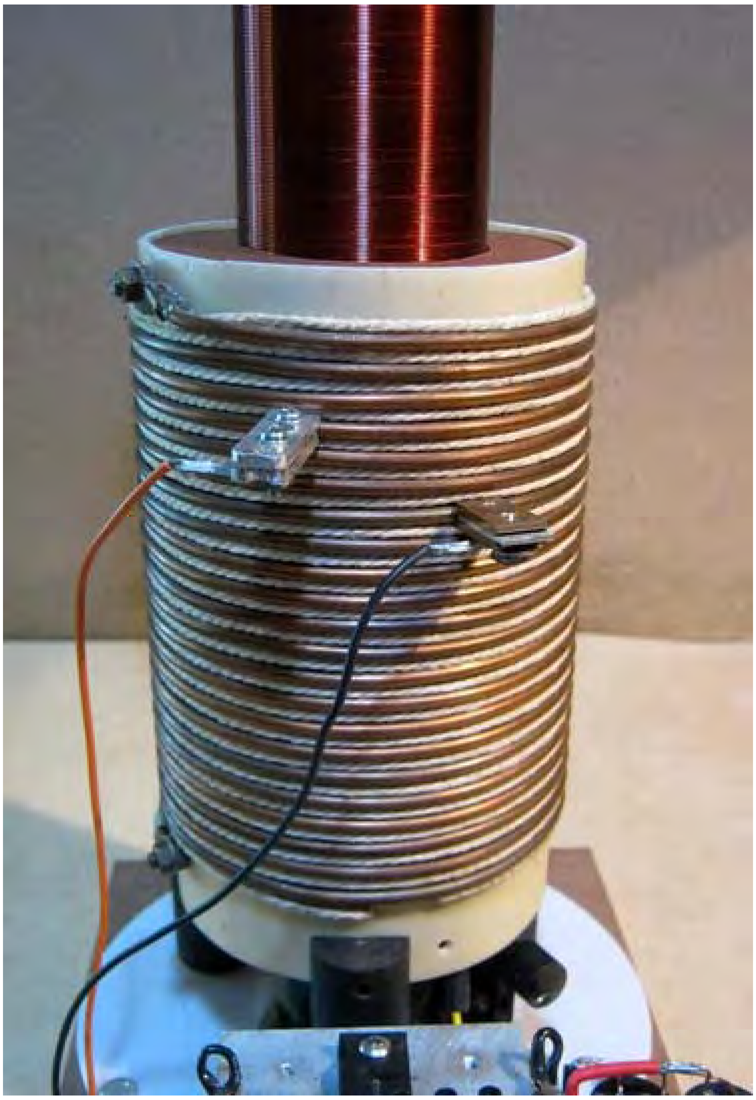
Initially I tried Solovey's Primary coil L1 with 8 turns and a diameter of 7 cm, but had far better results with only 3-4 turns. My criteria were the strength of the corona at the top of the secondary coil L2, and the degree of fluorescence produced in a nearby hand-held Compact Fluorescent lamps as well as the distance of the lamp from the coil.



The white wires are not connected - they are just spacers.

I then tried a larger primary L1 coil, with many more turns of thicker copper wire on which I could vary the number of turns and also the position vertically of L1 relative to L2.

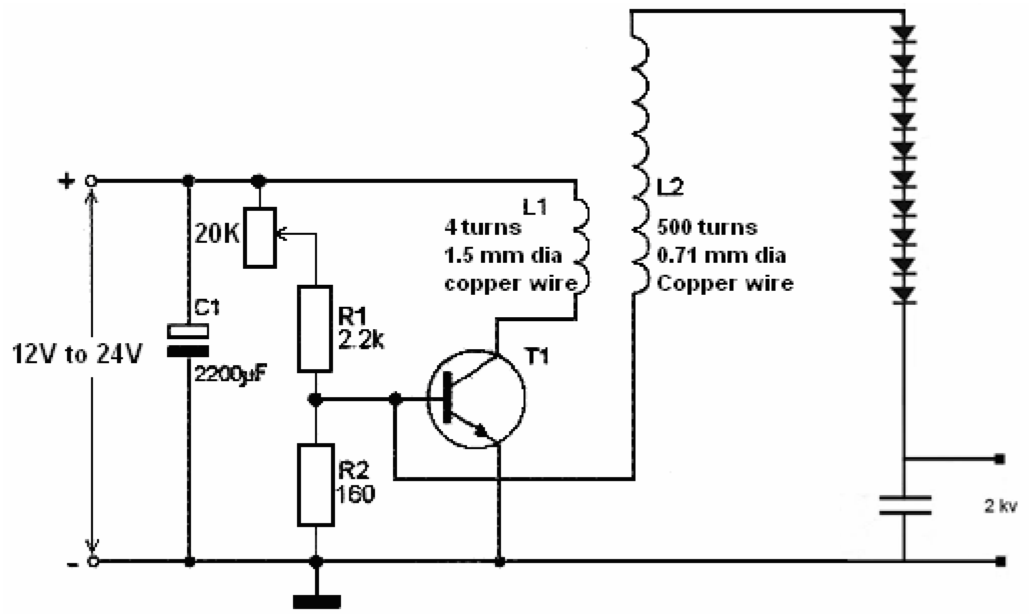
I found that the larger diameter seemed to produce an enlarged magnetic field which was better, but the wire thickness and the vertical position ***in this instance***, was not at all critical. Interestingly though, in every variation, the optimum number of turns in the L1 coil was 3-4. I presume this is the best resonant match with the secondary L2 coil in it's present form.



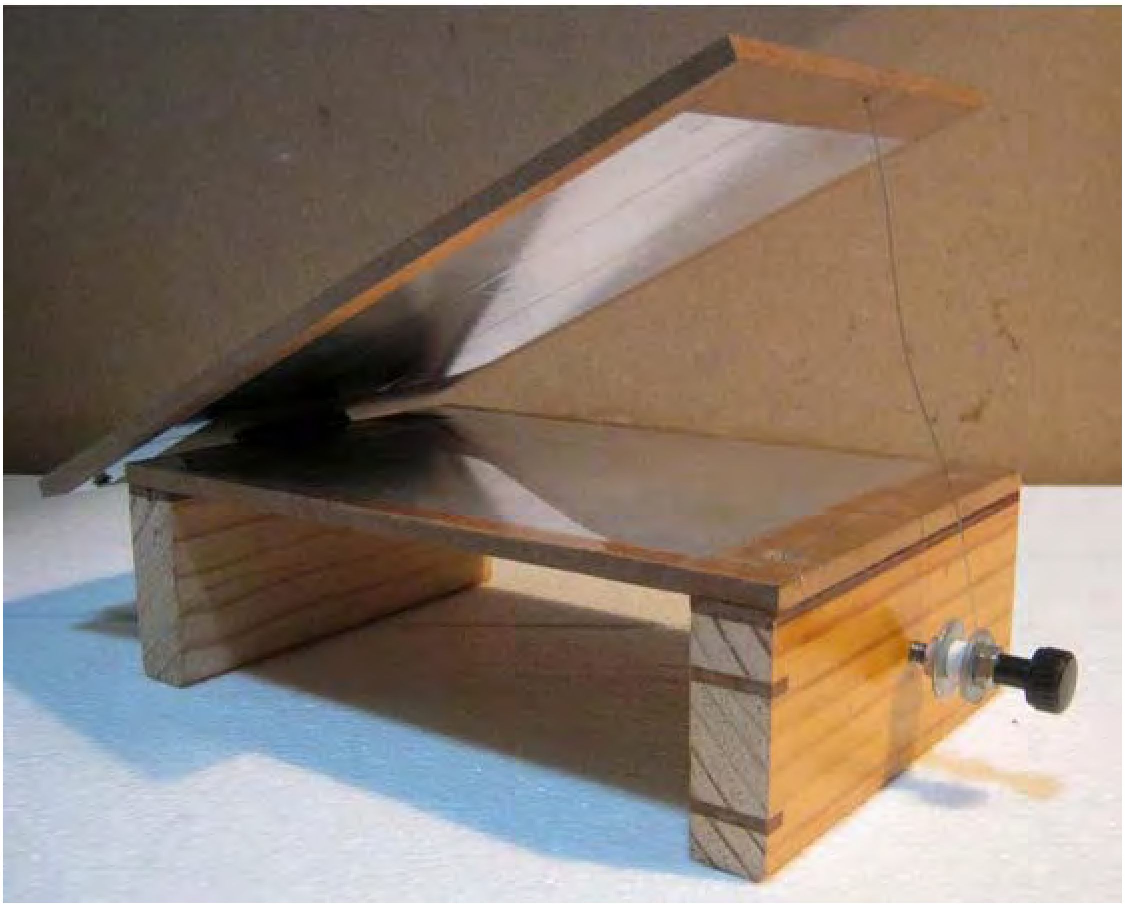
This is typical of the fluorescence and the corona:

I then measured the voltage at L2 empirically, and found it able to charge a 1 microfarad capacitor rapidly to 2,000V. I presume the rectified AC voltage to be far higher, at least in the multi-kilovolt range. I feel that the formula mentioned by Solovey, U2 = Um / N1.N2, does not necessarily apply to this type of Tesla configuration, so I question his calculation of 700-800V.

I was unable to measure the frequency accurately with my hand-held oscilloscope, but the reading which it displayed seemed to hover around 300 kHz. It may be much higher.

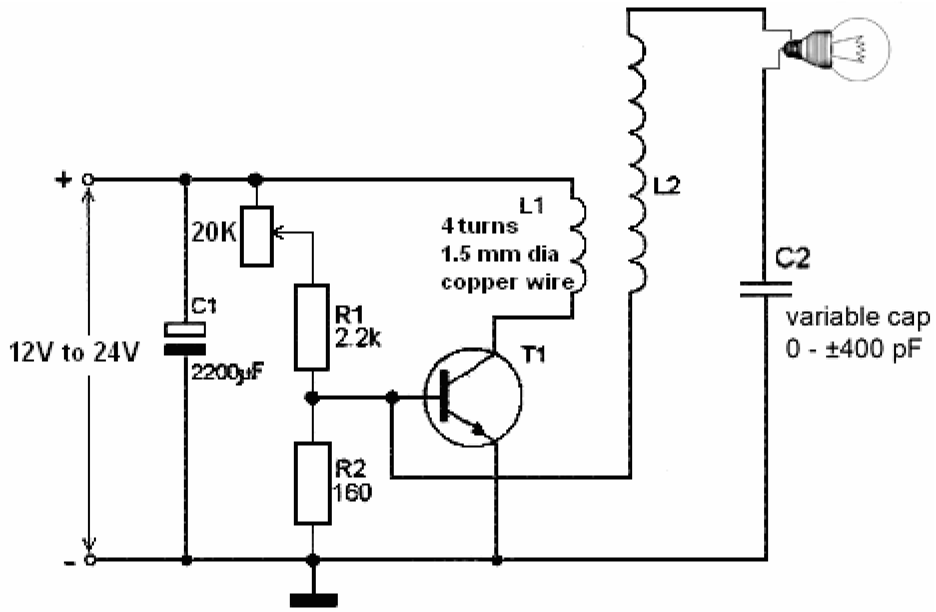


I then constructed a capacitor (to withstand the high voltages) of by calculation variable between 0 pF and 800-900pF.



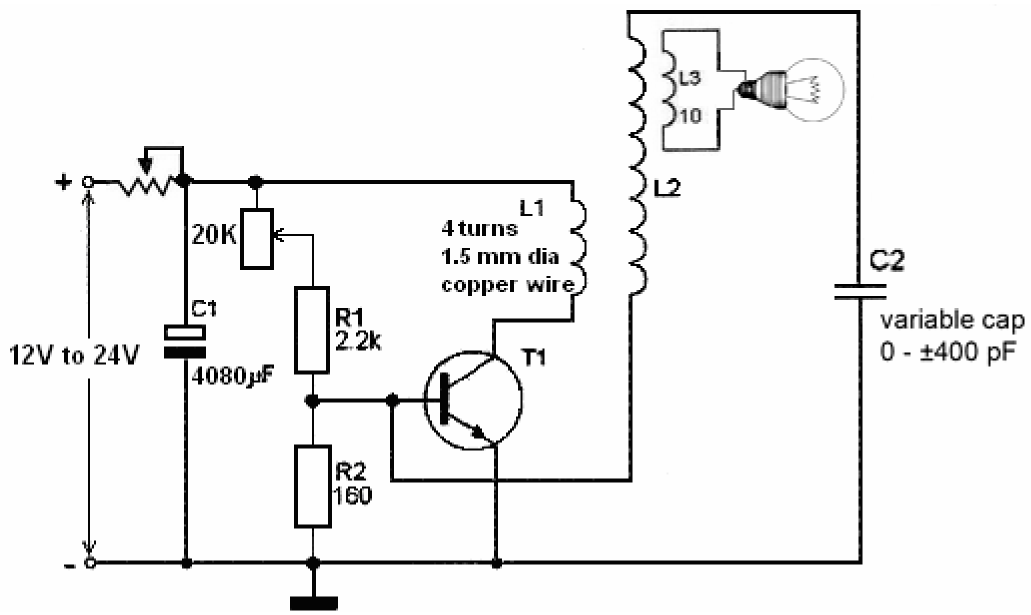
In all subsequent tests I found that the introduction of this capacitor between L2 and ground (*which admittedly I could tune to optimise resonance*) increased the current draw from the supply battery to such a degree, that three TIP3055's in parallel exploded and burnt out in seconds. They can handle 15 amps each so I measured the current as accurately as I could with both digital and analogue meters, and found that it could easily exceed 40 amps. This is why I have used such a massive heat-sink. Also, the voltage present at the top of L2 immediately drops when the capacitor to ground is present. This cannot be good as far as coil 3 is concerned.

I used the same lamps as Solovey had used, 21 watts 12V, in series with the capacitor from L2 to ground.



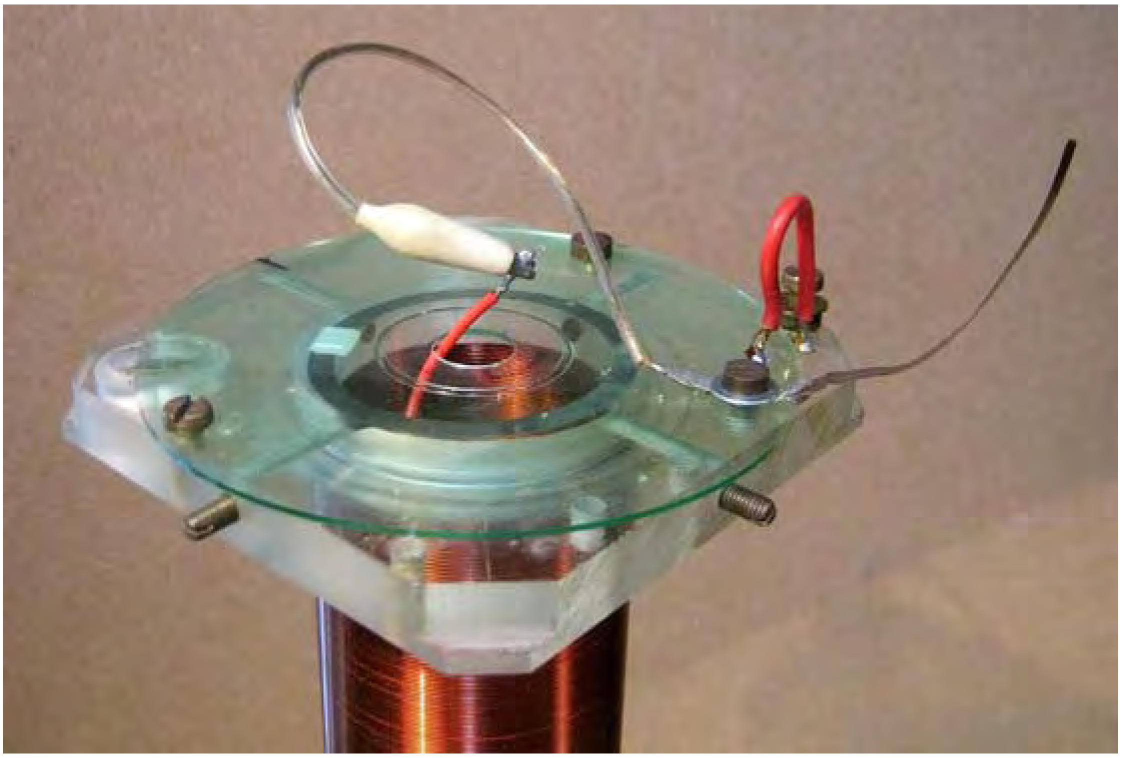
The lamp burnt out in seconds, but what I feel that Solovey has failed to indicate, in the paper that I have, is that the current draw does ***not*** remain at his measured 0.3 amperes drawn from the supply battery, when a capacitor is connected to ground as shown. This means that although the lamp is experiencing a current of 2 or more amps, one cannot calculate overall wattage based on the product of the voltage x current, when the supply current is now extremely high.

I then moved on to the next phase which included a lamp across L3.

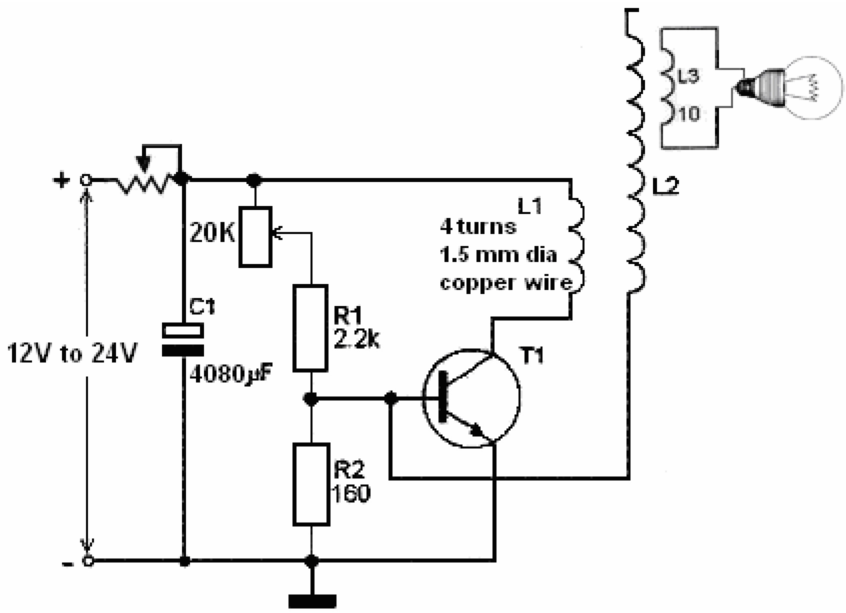


The lamp burnt out again and I introduced a high wattage variable resistor (100 ohms) on the supply line to limit the possible current flow and protect the transistor. I used it mostly set at 50 ohms.

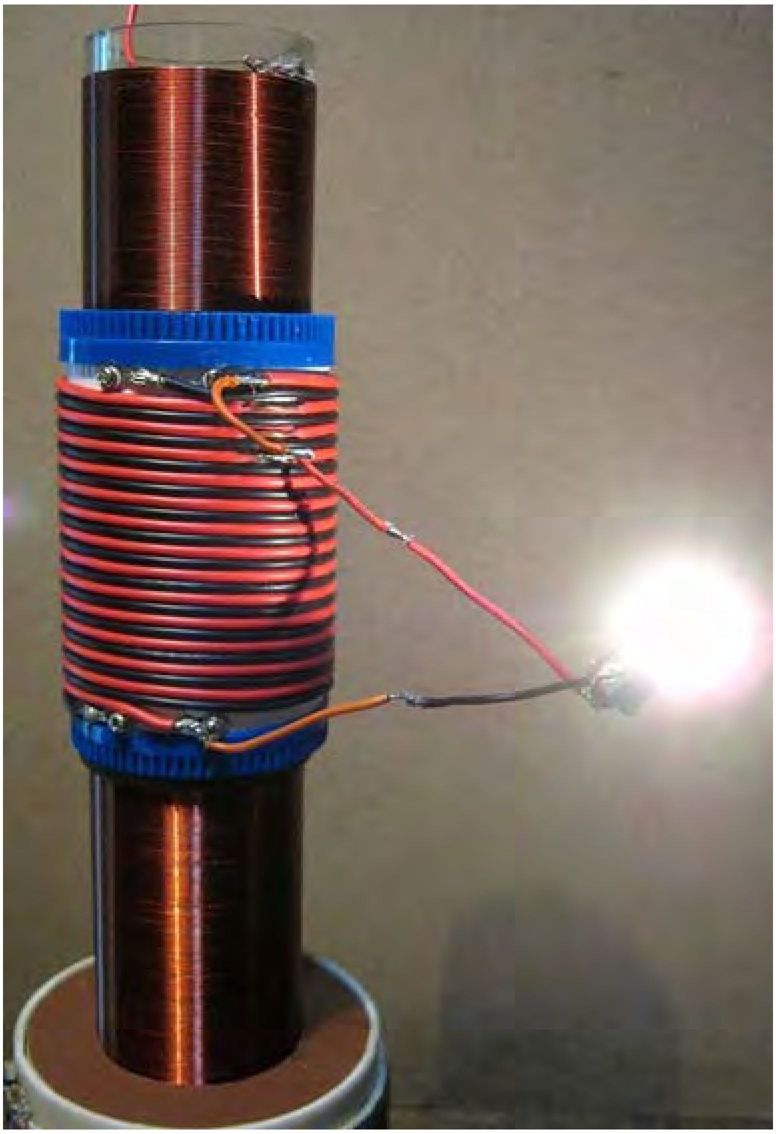
I then decided to remove the capacitor to ground and replace it with a spherical aluminium globe. This provides capacitance to the ambient surroundings, which proves to be a considerable improvement as far as the performance of L3 is concerned. It also reduces the corona discharge losses, so that the lamp now burns brightly and the CFL still fluoresces when held near to L2. This indicates that the voltage at L2 is no longer dropping in spite of the load imposed by L3 and the lamp.



I was also able to dispense with the 100 ohm resistor, as the current draw from the 12V supply battery was now down to 2 amps, which is much more reasonable, but still more than Solovey's 0.3 amps.

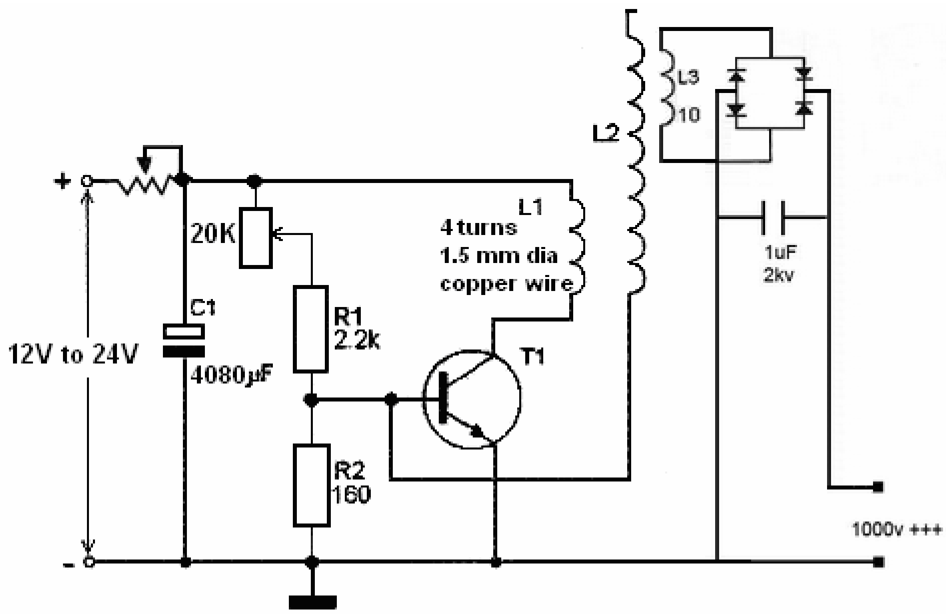


Having got thus far I moved on to Don Smith's next stage, which was to replace the lamp with a bridge rectifier on coil 3. The black wires are in this case just spacers:



The voltage across the capacitor rose well over 1,000V, so I stopped the experiment as I was afraid it would damage my digital meter.

I then thought of trying two extra coils simultaneously, by putting a 2nd bridge rectifier over the black wire which had previously just been used as a spacer:

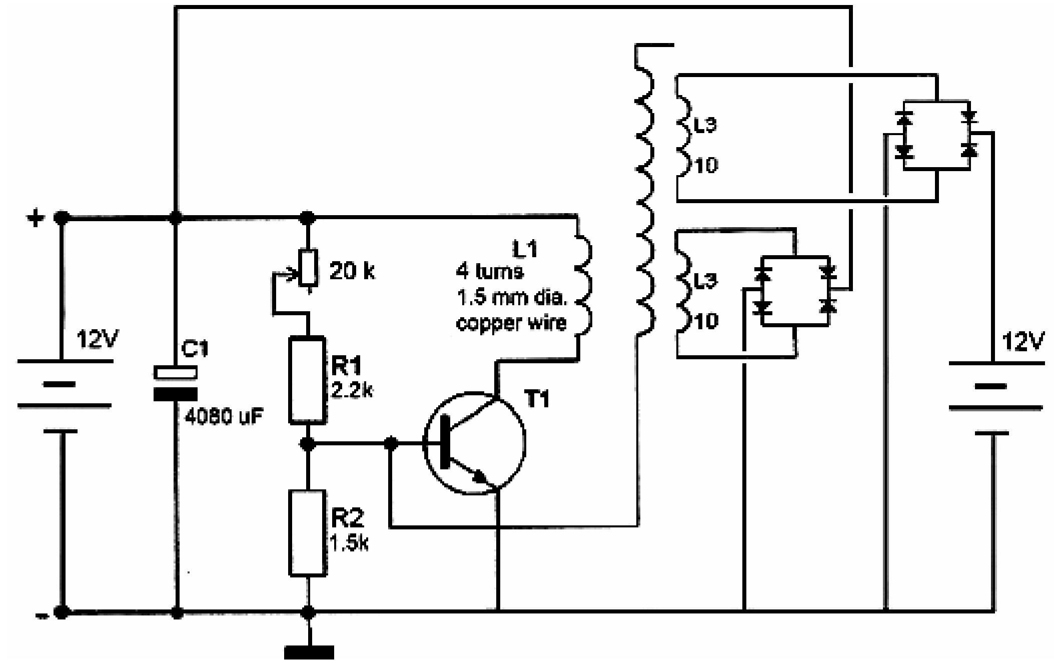


There are now two simultaneous DC outputs of 1,500V each. (I put a voltage divider across my analogue meter to measure this). Here you can see my meter set to the 1,000V range.

I realise that this is a low power version of Don Smith's circuits and one cannot expect much from it. I know that Don Smith, in order to achieve very high outputs in terms of kilowatts, relied very much on resonance in his circuits. What I am investigating here is simply Solovey's attempt to demonstrate that a greater output than input is possible. He did not seem to carry it any further as he had achieved his objective as part of his university degree attempt.

From my experience with these high voltage pulse, or in this case, high frequency AC circuits, is that it is possible to achieve very high voltages from a simple 12V system, but that in general there is not very much power available unless one can achieve the advantage of resonance in some form or another.

In a very basic experiment I have tried the following circuit which is just simple battery charging, but not powering any load directly.



After one hour of operation, the drive battery dropped from 13V to 12.9V, and a *very dead* 12V 7AHr battery has risen from 3.3V to 6.3V, and is holding that 6.3V. I am sure that a battery in better condition would have charged even better, and I will try it. When a battery charge load is applied to the extra coils, the CFL will no longer fluoresce. I observe that a real earth connection has helped a little. My current draw from the 12V battery supply using both extra coils in this configuration, is only 0.4 amp. (400 mA).

This experiment suggests to me that one might make many extra pickup coils like the above, of 10 turns each, placed along the length of L2, with L1 at the very bottom. *This would bear out Don Smith's claim that one can draw multiple sources of energy from an inductive magnetic field without increasing the load on the supply.*

There is obviously much more scope for experimentation with this type of lower voltage, solid state Tesla coil.

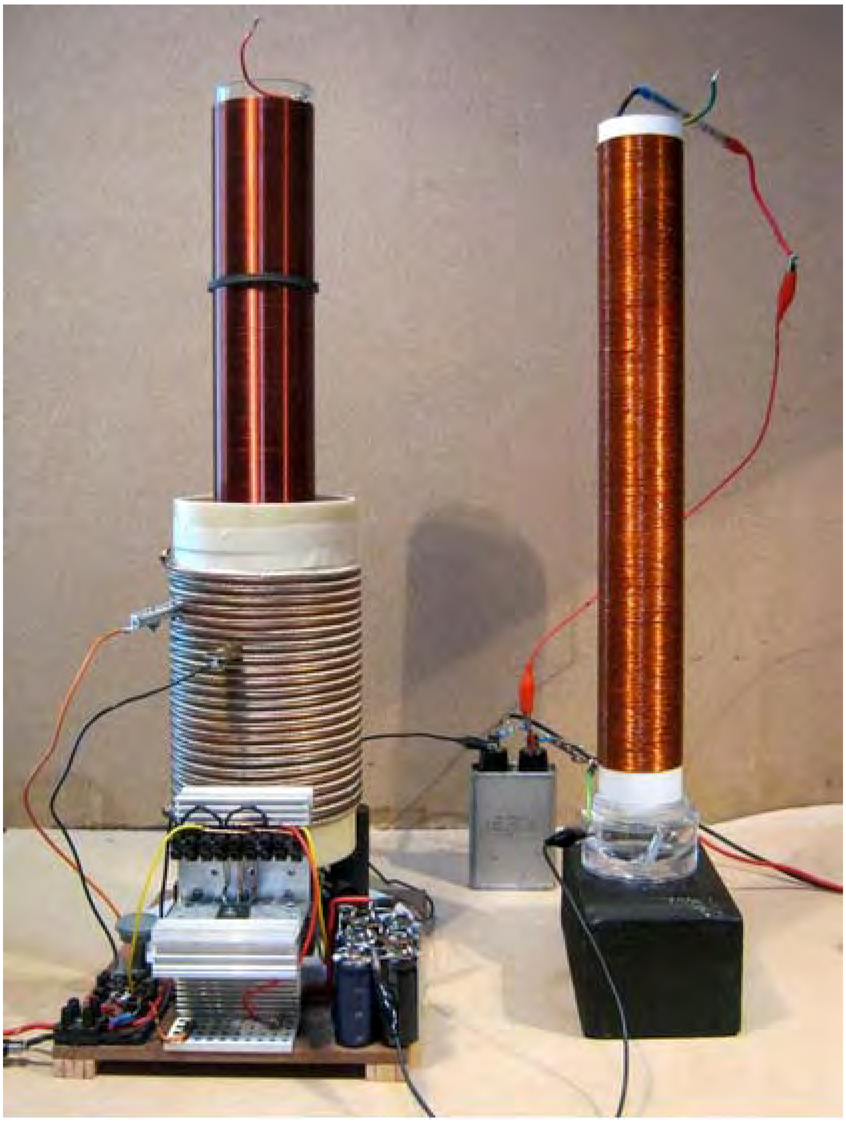
I have re-tested and duplicated my results so far and in the process have discovered something of small significance. Developer 'Ming Cao' has mentioned in his comments (www.free-energy-info.com/Chapter3.pdf page 186) that he had found an improvement when he placed the primary coil and the pickup coil far apart on opposite ends of his secondary coil. I did this, and found a definite increase in voltage output. What I think is happening is that the section of L2 between L1 and L3 is being increased.

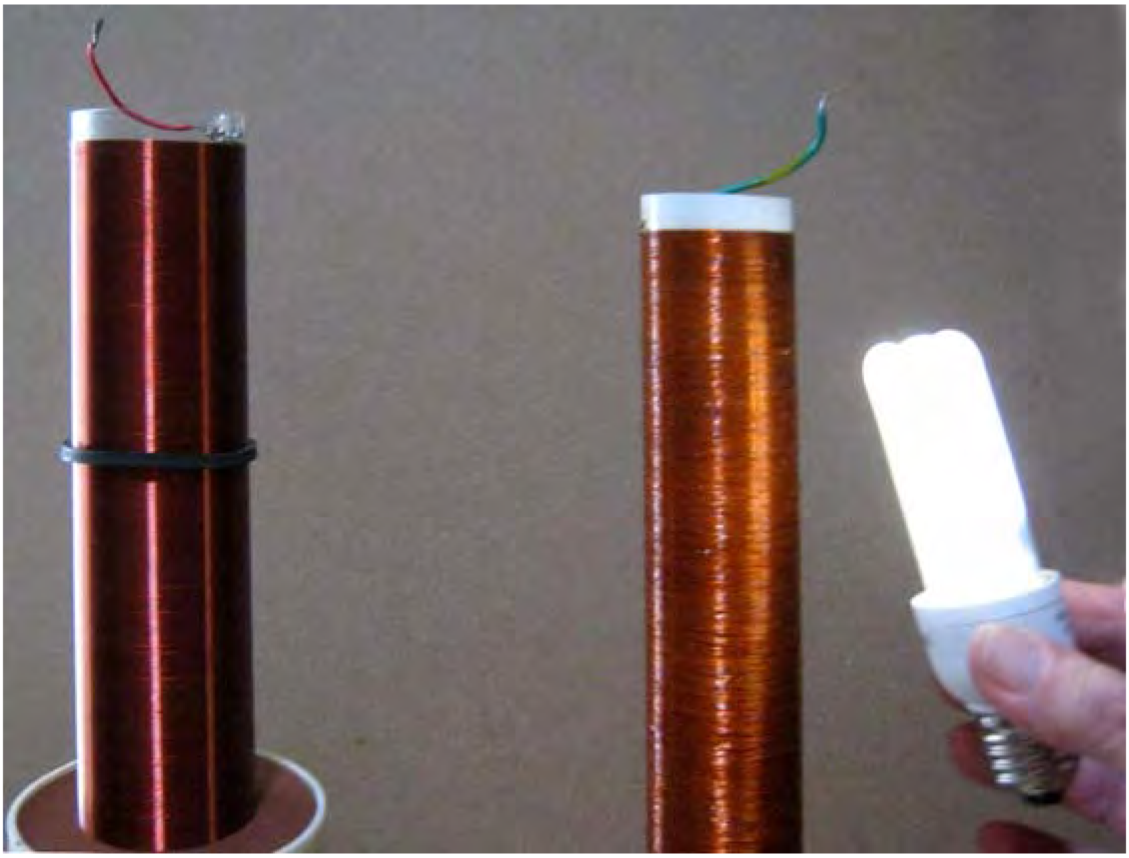
I have vertically flipped coil L1 so that the 3 active windings are now at the bottom, and moved the pickup L3 right to the top of L2. I also noticed that the output in this configuration increased substantially when I removed the aluminium globe and just left the open end of the Perspex tube at the top pf L2. This is good news as these metal spheres are not easy to find.

What has taken place as I have experimented, is that I have gradually dispensed with all capacitive components, with improved results. This is important to me, as I seem to have moved from LC resonance, to resonance between the coils winding's only. As LC resonance is very difficult to achieve in complex circuits whereas coil to coil resonance can more easily be achieved by calculation and careful measurement, this discovery is welcome.

The last stage is an interesting one. Since I now felt that I was no longer dealing primarily with LC resonance, and therefore the *magnetic field* was more dominant in energy transfer than was the electric field, I thought of Don Smith's multi-coil power source. I wound another coil with materials I had, in order to try coil to coil energy transference. The new coil is 50 mm in diameter and the winding is 400 mm in length. Wound with 0.5 mm diameter enamelled solid copper wire, this has resulted in 800 turns. I will call this coil L2B.

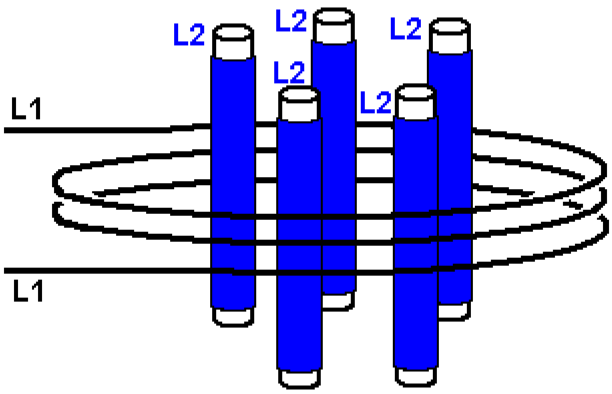
I have it standing as you can see, next to the primary device and the only connection is from the base of L2B is to common ground.





At the top of the second coil in the first picture, is a string of ten 1N4007 diodes in series, and the voltage output to ground of both coils simultaneously, is 2,100V (at each coil.)

I have moved the L2B coil up to 70 cm away from L2, (which is as far as my wires would reach) and at that distance the voltage output of L2B remains 2,100V. What this demonstrates to my satisfaction, is that Don Smith's suggestion based on the following drawing, will work in practice:



I have not yet come across any really successful replications of Don Smith's devices, so this is reassuring to me. What is interesting is that as I move L2B away from L2, the voltage drops and rises by increments of around 5-10% at incremental distances of about 20 cm. For convenience, the coils in a real construction would need to be much more closely spaced, but the width of the field is amazing. It also suggests that the arrangement of the coils should be done carefully and empirically.

Something I wish to stress in closing, is that I have *in no case* paid any attention to the quarter or half-wavelength issue of the relative lengths of the primary to secondary wires, or ratios. None of my coils have any calculated wave-length ratios or measurements, and yet have achieved for a low power solid state device, quite demonstrable results. I think that Richard Quick's essay on the practical aspects of resonance is most impressive and useful (reproduced below).

But an issue I find unresolved is this: if the LC component of resonance is replaced by the magnetic component, then we are dealing with a ***longitudinal*** wave.(which is as I understand, a defining characteristic of cold electricity), and not a transverse wave. A standing wave as determined by wave-length resonance, is essentially a *transverse wave* phenomenon, with clearly defined nodes. A ***longitudinal*** wave will not have nodes. *This is a contradictory issue which is not yet clear to me, and maybe is a field worth investigating by other developers?*

Solovey's details are here: www.free-energy-info.com/Solovey.pdf.

"Quarter-Wave" Resonance; Standing Electromagnetic Waves"

One of the two main types is electrical resonance is referred to here as quarter-wave resonance. This type of resonance depends almost entirely on the length of a wire element For reasons described below, if a segment or length of wire is one quarter as long as the "voltage waves" which are travelling through the wire, then a set of "reflected" waves will be added to the emitted waves, in a synchronised alignment which creates stronger "superimposed waves".

Accordingly, an understanding of the "quarter-wave" phenomenon will help a reader understand how a straightforward and easily-controlled factor (i.e., the length of a wire ribbon which will be used to form a spiral coil) can help create a "quarter-wave" resonant response, which will create the types of electromagnetic pulses and fields referred to as "standing waves".

The speed at which a voltage impulse is transmitted through a metal wire is extremely fast. It is essentially the same as the speed of light, which travels 300 million meters (186,000 miles) in a single second (that distance would circle the earth more than 7 times).

If wavelength (in meters) is multiplied by frequency (cycles per second), the result will be the speed of light, 300 million meters/second. Therefore, the wavelength of an "alternating current" (AC) voltage, at some particular frequency, will be the speed of light, divided by which frequency.

Therefore, using simple division, if an alternating voltage operates at a frequency of 1 megahertz (MHz), which is a million cycles per second, then the "wavelength" at that frequency will be 300 meters. If the frequency halves become 500 kilohertz, the wavelength becomes twice as long (600 meters); and, if the frequency were to increase to 2 megahertz, the wavelength drops to 150 meters.

It should be noted which the term "cycles" is what scientists call "a dimensionless unit", which drops out and becomes silent when other physical terms are multiplied or divided.

At AC frequencies of 10 kilohertz or greater, the common references to "alternating current" (AC) voltage begin using a different term, which is "radio-frequency" (RF) voltage. Accordingly, RF voltage is a form (or subset) of AC voltage, which operates at frequencies higher than 10 kilohertz. RF power generators are readily available, and are sold by numerous companies which can be easily located by an Internet search, using the term "RF power generator". For example, Hotek Technologies Inc. (hotektech.com) sells two RF power generators, called the AG 1024 and AG 1012 models, which can provide output power at frequencies ranging from 20 kHz to 1 MHz; the 1012 model has a power output of 1000 watts, while the 1024 model has a power output of 2000 watts. The output frequency of any such RF power supply can be adjusted and "tuned" across the entire range of operating frequencies, merely by turning knobs or manipulating other controls in a power supply of this type.

In a wire having a fixed and unchanging length, the easiest way to create a "standing wave" is to adjust the RF frequency emitted by a power supply with an adjustable frequency, until the "tuned" frequency creates a wavelength which is 4 times as long as the wire. This principle is well-known to physicists, and it is commonly referred to as "quarter-wave" behaviour, since the length of the wire segment must be one quarter as long as the wavelength. Since it is important to this invention, the principles behind it are illustrated in a series of drawings provided in Fig.1 to Fig.4, all of which are well-known prior art.

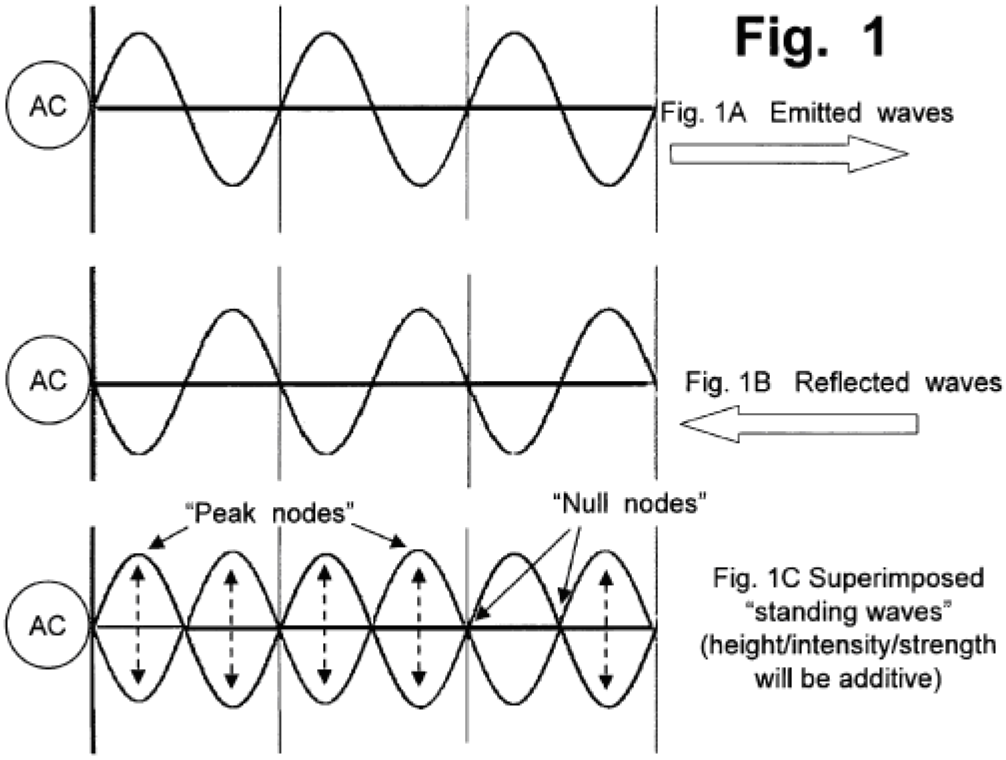


Fig.1A indicates an idealized wavelength of an alternating voltage, depicted by a sine wave which is being sent from an AC power supply (shown by a circle at the left end of a horizontal straight wire) into the "input" end of the wire. The voltage waves travel through the wire towards the right, as indicated by the block arrow in Fig.1A. When the waves reach the end of the wire, they cannot leave the wire (at least, not in a simplified and "ideal" system, which is being assumed and used here to explain the principle of how a simple straight wire can create a standing wave). Therefore, the voltage wave will effectively "bounce" or "reflect" back from the tip of the wire, and the "reflected wave" will begin travelling back through the wire, going in the opposite direction, as indicated by the left-pointing block arrow in Fig.1B.

Because of the laws of conservation of energy, the reflection and "return travel" of these types of waves, when they bounce off the tip of a wire, is actually quite good, and rather efficient, as discussed below, provided which the wire tip does not emit sparks, arc discharges, or other forms of "escaping" electrical energy.

Accordingly, Fig.1A depicts a set of "emitted waves" travelling towards the right, while Fig.1B depicts an idealised set of "reflected waves" travelling toward the left along the same wire. Fig.1C illustrates what happens when both sets of waves (emitted and reflected) are superimposed on each other. Since the two sets of waves are travelling at exactly the same speed, and since they have exactly the same wavelength, they will create a "standing wave" pattern when they are added together. As can be visualised from Fig.1C, there will be a set of locations, along the length of the wire, which can be referred to as "peak nodes", where the AC voltage reaches it's maximum.

At a location halfway between a pair of adjacent "peak nodes", there will be a spot which can be called a "null node", a "zero node", a trough or valley node, or similar terms. At each "null node" location, the AC voltage will appear to be not fluctuating at all. Those are the sites, along the length of the wire, where each "positive" hump (created by a sine wave travelling toward the right) will be counter-balanced and offset by a "negative hump" with exactly the same height, travelling at an identical speed toward the left.

As a result, this type of response within a wire creates a "standing wave". If the instantaneous voltage is measured at a "null node", it would appear that nothing is happening, in terms of fluctuating voltage. Furthermore, the "null node" will not be moving, along the length of the wire; instead, it will appear to be standing still.

This can be demonstrated, in a coil, by using a “grounded lead” to test for voltages along the length of a coil. If a “grounded lead” coupled to a volt meter is used to touch the surfaces of a series of strands in a non-insulated coil (such as a coil made of thin copper tubing, wrapped around a plastic cylindrical shape, as used in the types of large transformers used by hobbyists to create “Tesla coils” which will emit large and visually impressive electrical arcs), the “test lead” will detect no apparent voltage at a null node, which will occur at some particular strand in the coil. At a different strand of the coil, the “test lead” will detect an alternating voltage which has twice the strength and intensity of the voltage being emitted by the power supply.

If voltage is measured at a “peak node”, the voltage will be doing something which can be called, using vernacular or laymen's terms, “the full-tilt boogie”. The AC voltage levels will be moving back and forth, between: (i) a very high and intense positive voltage, to (ii) an equally intense negative voltage. This is indicated by the “bubble” shapes shown along the wire in Fig.1C.

The “bubbles” which are shown in Fig.1C can help someone understand how standing waves are created, and how they act in a synchronised manner. However, which drawing fails to show another result which is very important in what actually happens in a standing wave. For purposes of description and analysis at this introductory level, the system can be assumed to be “ideal”, which implies a perfect “mirror-image” reflection of each wave from the right end of the wire. An “ideal” system also implies that no reflections occur at the left hand end of the wire where the power supply is located, and all “reflected” wave activity simply ceases. In real circuits and wires of this type, second and third order reflections do in fact occur, and they are used to further increase the strength and power output of these types of systems; however, those additional factors and “harmonics” should be ignored until after the basic principles of this type of system have been grasped and understood.

In an ideal system, when the reflected waves (which are travelling toward the left, in the wire segments illustrated in Fig.1) are “superimposed” on the emitted waves (travelling toward the right), the “peak” positive voltage which will be instantaneously reached, at the highest point of each “bubble” shown in Fig.1C, will occur when the positive peak of an emitted wave crosses a mirror-image positive peak of a reflected wave, travelling in the opposite direction. Accordingly, when those two “positive peak” values are added to each other, the instantaneous positive peak voltage which will occur, in the wire, will actually be twice as intense as the “positive peak” voltage being emitted by the AC power supply.

An instant later, at that exact point on that segment of wire, a negative peak voltage will be created, which will be the sum of (i) the negative peak voltage emitted by the power supply, and (ii) the negative peak voltage of a reflected wave also will pass through, travelling toward the left. At which instant, when those two negative peak voltages are added to each other, the instantaneous negative voltage which will occur, in the wire, will be twice as intense as the “negative peak” voltage being generated by the AC power supply.

A more accurate and representative visual depiction of a “standing wave” in a wire would actually show the heights of the peaks as being twice as tall as the peaks of the emitted voltage waves, and the reflected voltage waves. However, which depiction might confuse people, so it usually is not shown in drawings of “standing waves”.

Accordingly, the instantaneous response in the wire, at a location halfway between two “null nodes”, is doing something which can fairly and properly be called “the full-tilt double double boogie”. The “double double” phrase (note which it contains not just one but two “doubles”) was added to that phrase, for two reasons: (i) To emphasise the fact that each and every voltage peak (maximum positive, and maximum negative) will be twice as strong, and twice as intense, as the maximum positive and negative peak voltages emitted by the power supply; and,

(ii) to point out that the frequency of the superimposed “bubbles”, shown in Fig.1C, is actually twice as fast as the frequency of the AC cycle which is emitted by the power supply, as discussed below. The “twice the intensity” result is directly comparable to what an observer will see, if a large mirror is placed behind a light bulb in an otherwise dark room. The mirror effectively keeps the room dark, everywhere behind the mirror, so there is no “magical doubling” of the light in the room; which would violate the basic law of conservation of energy. Instead, what the mirror does is to shift light away from the backside of the mirror, and keep that light energy on the reflective side of the mirror. Anyone standing in front of the mirror will see two apparent light bulbs. Both of those light bulbs (the original bulb, and the reflected image) will have the same brightness (if the mirror is perfect). Therefore, the mirror will double the intensity of the light energy reaching the observer.

That same effect, in a circuit, will happen if the end of a wire acts like a mirror. If a wire does not have any components which will cause it to become an active “emission source” (which is the behaviour of transmission antennas and certain other components), in a way which efficiently releases voltage-created energy into the atmosphere, then the basic rules which require conservation of energy will prevent that energy from simply disappearing and ceasing to exist. As a result, even if the end of a wire is not designed to be a perfect reflector, a large portion of the voltage wave will indeed reflect off the wire tip, and travel back through the same wire, in a “second pass”.

To understand adequately, the type and amount of “wave reflection” which occurs at a wire tip, consider what happens if a light bulb is shining in a room which has shiny, glossy white paint on all the walls and ceilings; then, consider how it would look if the same light bulb were located in a room with all of the walls and ceilings painted “matt black”. The total amount of light which would be available, to carry out a task such as reading a newspaper, clearly would be much greater in the white room, because light reflects off white paint, even though white paint does not even begin to approach the type of “reflection quality or clarity” which a mirror creates. The difference in what happens, when light intensity in a room painted matt black is compared to a room painted a glossy white, does not arise from the presence or absence of “reflection quality or clarity”; instead, it is governed by the laws of conservation of energy. When light shines on to a surface which is painted matt black, the light energy is absorbed by the paint, and it literally warms the paint up. In contrast to that, glossy white paint will not absorb light energy, so it reflects the light back out, for a “second pass” through the air which fills a room.

Because of the laws of conservation of energy, and without depending on any “quality of reflectance” characteristic of wire tips, electrical energy cannot simply disappear, when it reaches the end of a wire. Instead, there are only two things which can happen to that energy:

(i) the electrical energy can be emitted into the surroundings, such as by emitting sparks, arcs, or radio-frequency signals which will carry energy; or

(ii) if the energy is not emitted by the tip of the wire, then, by simple necessity and because of the basic law of conservation of energy, it must be reflected back into the wire, and it will be forced to travel back through the wire again.

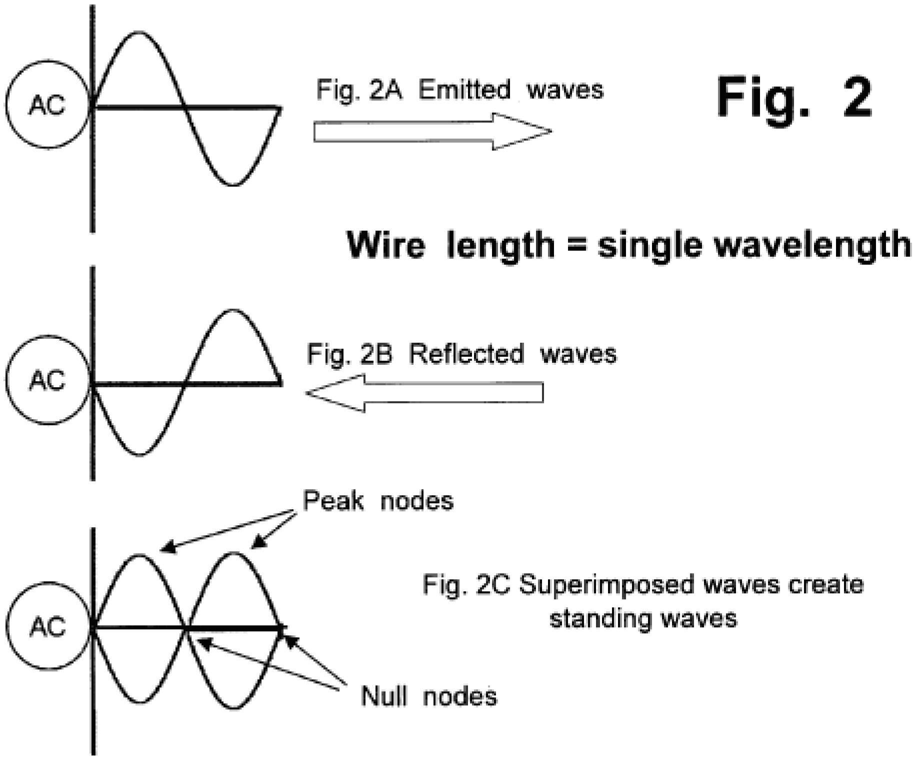
If a wire has a long and tapered tip, then the reflected wave might become somewhat diffused, and it might lose some portion of the “clarity” of the wave. However, since wavelengths in the frequencies of interest here are hundreds of meters long, the type of tip created by a conventional wire cutter will not create any significant diffusion, in a reflected wave. And, unlike the white-painted walls of a room, there is not a large area which is available, at the tip of a wire, which can create scatter, spread, or diffusion. As a result, the tip of a wire will be a relatively efficient mirror-type reflector, when an AC voltage is “pumped” into one end of the wire. The second factor mentioned above, when the “double-double” boogie phrase was mentioned, relates to a doubling of the frequency of a standing wave. When a standing wave is created in a wire by reflection of an emitted AC voltage wave, the frequency of the standing wave is, quite literally, double the frequency of the emitted wave.

This can be seen, visually, by noting that in the emitted AC voltage, shown in Fig.1A, a single complete wavelength contains both a “positive hump” and a “negative hump”. Accordingly, three complete sine waves, divided into three segments by the imaginary vertical lines, are shown in Fig.1A.

By contrast, each and every “bubble” shown in Fig.1C depicts a complete and total “wavelength”, in a standing wave. Six of those standing wave “bubbles” fit into exactly the same length of wire which holds only 3 emitted wavelengths from the power supply.

The “frequency doubling” effect of standing waves is important, because AC systems can convey and release energy in a manner which increases, as the frequency of the AC voltage supply increases. To some extent, this is analogous to saying that, if a motor can be run at twice the speed (while still generating the same torque), then the work output of that motor can be twice as great, at the higher speed. That analogy is not entirely accurate, since work output from an electric device which uses AC power depends on "area of the curve" functions which occur when sine waves are involved. Nevertheless, as a general principle, if the frequency of the voltage peaks increases, then power output will also increase, in many types of electric circuit components.

In the three panels of Fig.1, the wire length is three times as long as the wavelength of the voltage from the power supply. However, to create standing waves, a wire length does not need to be any particular multiple of the wavelength of an AC voltage. As can be seen by considering Fig.1C, the same types of "bubbles" would be created: (i) if the wire length were exactly twice as long as the wavelength; or, (ii) if the wire length were the same length as the wavelength.



Accordingly, Fig.2 (which includes Fig.2A showing an emitted wave, Fig.2B showing a reflected wave, and Fig.2C showing the superimposed "bubbles") shows what happens in a wire segment which has a length which is equal to a single wavelength from an AC voltage at a fixed frequency. A resonant standing wave will be formed, with a frequency which is double the frequency of the input AC voltage. which same result will apply, in a wire having any length which is an exact (integer) multiple (such as 1x, 2x, 3x, etc.) of the wavelength of the AC voltage being pushed (or forced, driven, pumped, etc.) into the wire segment.

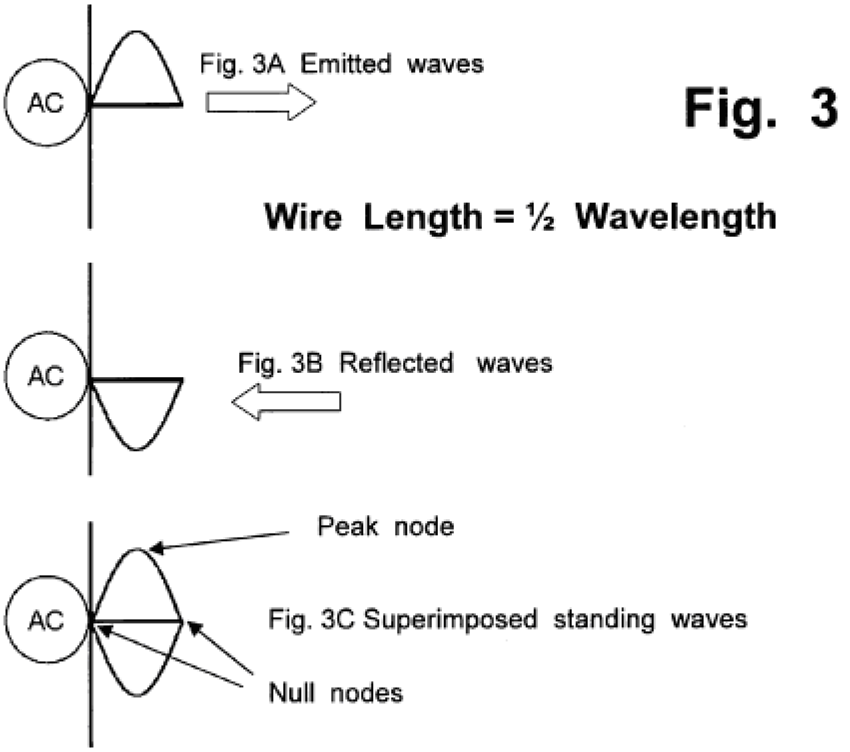


Fig. 3

Moving to still shorter wires, the same principle also applies to any wire with a length equal to one half of an AC voltage wavelength. As shown in Fig.3 (which includes Fig. 3A showing an emitted wave, Fig. 3B showing a reflected wave, and Fig. 3C showing the superimposed "bubbles"), if the wire length is one half of the wavelength, a natural and resonant standing wave will still form, with a frequency which is double the frequency of the input AC voltage.

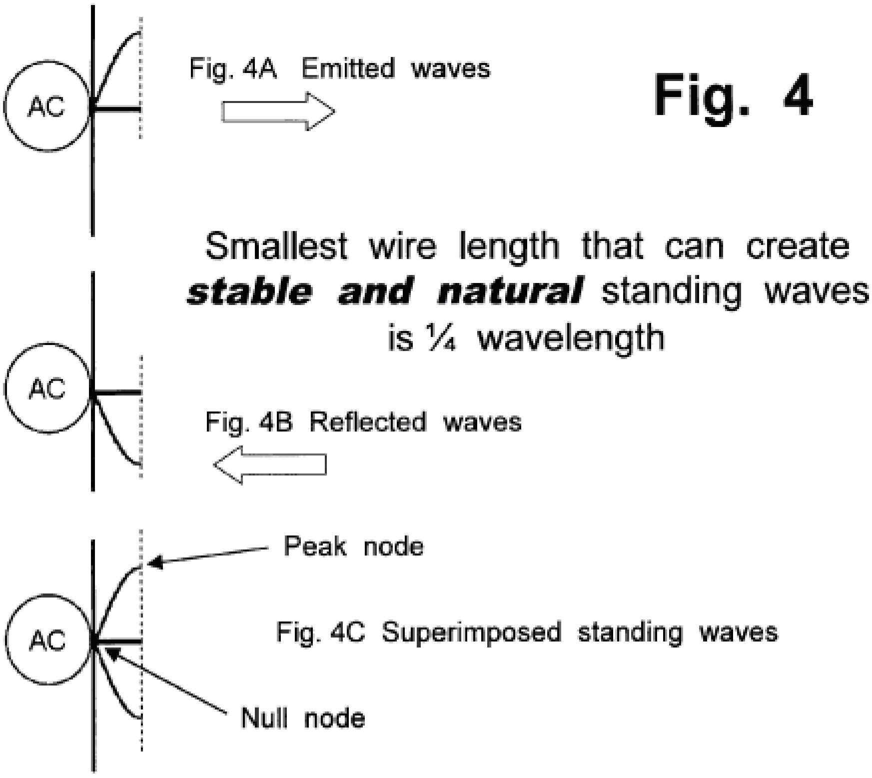


Fig. 4

Finally, moving to a still shorter wire, the same principle also applies to any wire which has a length equal to one quarter of an AC voltage wavelength, as shown in Fig.4A, Fig.4B, and Fig.4C Even though it does not stretch across or cover a complete "bubble", the standing wave shown in Fig.4C is nevertheless a stable, natural, and resonant "standing wave", with a frequency which is exactly twice the frequency of the input AC voltage.

It is possible to create partially stable and semi-resonant responses, using one eighth, one sixteenth, or shorter lengths of wire, by using additional devices which can remove electrical power from the system, or which can generate effects which are usually called "harmonics". However, those are not the types of natural and stable responses which can be created by a simple, basic system consisting of nothing more than: (i) a wire having a fixed length and a "reflective" tip; and (ii) an AC power source with a frequency which can be "tuned" until it creates a resonant response in any wire segment having a suitable length. Therefore, since quarter-wave wire lengths are the shortest lengths which can create natural and stable standing waves, the conventional term which is commonly used, to describe what happens when a wire creates a resonant standing-wave response, is a "quarter-wave" response.

In some devices, telescoping components (or other elements which can alter the effective length of a wire-type element) can be used to alter the ability of the element to respond to a fixed wavelength. Many types of antennas use this approach, if they need to process signals which are being transmitted on fixed and known frequencies. However, those examples are not relevant to spiral coil reactors, which will use an approach which involves tuning and adjusting the frequency of the voltage which is being supplied to a reactor, until a resonant response is observed in coils with fixed and unchanging lengths.

It should also be noted that certain types of "tuning" elements (such as capacitors, which can have either fixed or adjustable capacitance levels) can also be coupled electrically to a wire, in a manner which "emulates" adding more length to that wire. This approach can be used to alter (or increase the range of) the frequencies to which a wire circuit will respond resonantly.

So, if we have resonant standing-wave voltages in our L2 coil and some of that signal passes through the wire connecting one end of the coil to the earth, then what will happen? The best way to check it is to test the way which a prototype behaves, however, if I may express an opinion, I would suggest that the signal passing down the earth wire will be absorbed when it reaches the earth and that will prevent the signal being reflected back to the L2 coil to upset it's operation.

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