Chapter 3: Motionless Pulsed Systems

The pulsed devices mentioned so far have had moving parts. This does not have to be the case if rotating or fluctuating magnetic fields can be created without moving parts. This can indeed be done, and an example of this is **Graham Gunderson's Solid-State Electric Generator** shown in US Patent Application 2006/0163971 A1 of 27th July 2006. The details are as follows:

Abstract
A solid-state electrical generator including at least one permanent magnet, magnetically coupled to a ferromagnetic core provided with at least one hole penetrating its volume; the hole(s) and magnet(s) being placed so that the hole(s) intercept flux from the permanent magnet(s) coupled into the ferromagnetic core. A first wire coil is wound around the ferromagnetic core for the purpose of moving the coupled permanent magnet flux within the ferromagnetic core. A second wire is routed through the hole(s) penetrating the volume of the ferromagnetic core, for the purpose of intercepting this moving magnetic flux, thereby inducing an output electromotive force. A changing voltage applied to the first wire coil causes coupled permanent magnet flux to move within the core relative to the hole(s) penetrating the core volume, thus inducing electromotive force along wire(s) passing through the hole(s) in the ferromagnetic core. The mechanical action of an electrical generator is therefore synthesised without the use of moving parts.

Background
This invention relates to a method and device for generating electrical power using solid state means.

It has long been known that moving a magnetic field across a wire will generate an electromotive force (EMF), or voltage, along the wire. When this wire is connected in a closed electrical circuit, an electric current, capable of performing work, is driven through this closed circuit by the induced electromotive force.

It has also long been known that this resulting electric current causes the closed circuit to become encircled with a secondary, induced magnetic field, whose polarity opposes the primary magnetic field which first induced the EMF. This magnetic opposition creates mutual repulsion as a moving magnet approaches such a closed circuit, and a mutual attraction as that moving magnet moves away from the closed circuit. Both these actions tend to slow or cause "drag" on the progress of the moving magnet, causing the electric generator to act as a magnetic brake, whose effect is in direct proportion to the amount of electric current produced.

Historically, gas engines, hydroelectric dams and steam-fed turbines have been used to overcome this magnetic braking action which occurs within mechanical generators. A large amount of mechanical power is required to produce a large amount of electrical power, since the magnetic braking is generally proportional to the amount of electrical power being generated.

There has long been felt the need for a generator which reduces or eliminates the well-known magnetic braking interaction, while nevertheless generating useful electric power. The need for convenient, economical and powerful sources of renewable energy remains urgent. When the magnetic fields within a generator are caused to move and interact by means other than applied mechanical force, electric power can be supplied without the necessity of consuming limited natural resources, thus with far greater economy.

Summary of the Invention
It has long been known that the source of the magnetism within a permanent magnet is a spinning electric current within ferromagnetic atoms of certain elements, persisting indefinitely in accord with well-defined quantum rules. This atomic current encircles every atom, thereby causing each atom to emit a magnetic field, as a miniature electromagnet.

This atomic current does not exist in magnets alone. It also exists in ordinary metallic iron, and in any element or metallic alloy which can be "magnetised", that is, any material which exhibits ferromagnetism. All ferromagnetic atoms and "magnetic metals" contain such quantum atomic electromagnets.

In specific ferromagnetic materials, the orientation axis of each atomic electromagnet is flexible. The orientation of magnetic flux both internal and external to the material, pivots easily. Such materials are referred to as magnetically "soft", due to this magnetic flexibility.

Permanent magnet materials are magnetically "hard". The orientation axis of each is fixed in place within a rigid crystal structure. The total magnetic field produced by these atoms cannot easily move. This constraint aligns the field of ordinary magnets permanently, hence the name "permanent".

The axis of circular current flow in one ferromagnetic atom can direct the axis of magnetism within another ferromagnetic atom, through a process known as “spin exchange”. This gives a soft magnetic material, like raw iron, the useful ability to aim, focus and redirect the magnetic field emitted from a magnetically hard permanent magnet.

In the present invention, a permanent magnet’s rigid field is sent into a magnetically flexible “soft” magnetic material. the permanent magnet’s apparent location, observed from points within the magnetically soft material, will effectively move, vibrate, and appear to shift position when the magnetisation of the soft magnetic material is modulated by ancillary means (much like the sun, viewed while underwater, appears to move when the water is agitated). By this mechanism, the motion required for generation of electricity can be synthesised within a soft magnetic material, without requiring physical movement or an applied mechanical force.

The present invention synthesises the virtual motion of magnets and their magnetic fields, without the need for mechanical action or moving parts, to produce the electrical generator described here. The present invention describes an electrical generator where magnetic braking known as expressions of Lenz’s Law, do not oppose the means by which the magnetic field energy is caused to move. The synthesised magnetic motion is produced without either mechanical or electrical resistance. This synthesised magnetic motion is aided by forces generated in accordance with Lenz’s Law, in order to produce acceleration of the synthesised magnetic motion, instead of physical “magnetic braking” common to mechanically-actuated electrical generators. Because of this novel magnetic interaction, the solid-state static generator of the present invention is a robust generator, requiring only a small electric force of operate.

Brief Description of the Drawings

The appended drawings illustrate only typical embodiments of this invention and are therefore not to be considered limiting of its scope, as the invention encompasses other equally effective embodiments.

FIG.1

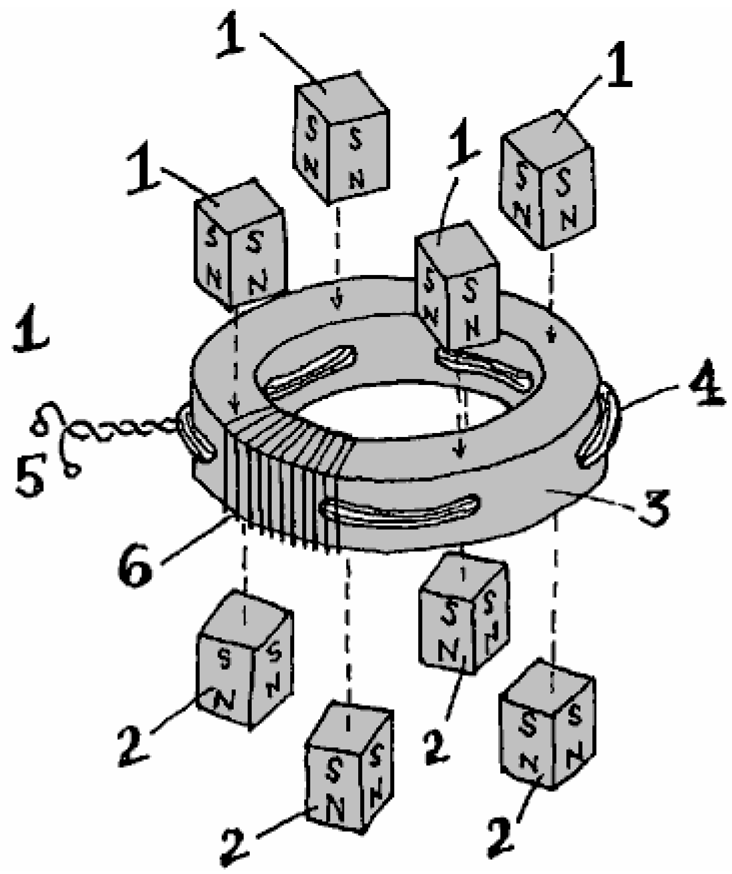


Fig.1 is an exploded view of the generator of this invention.

FIG.2

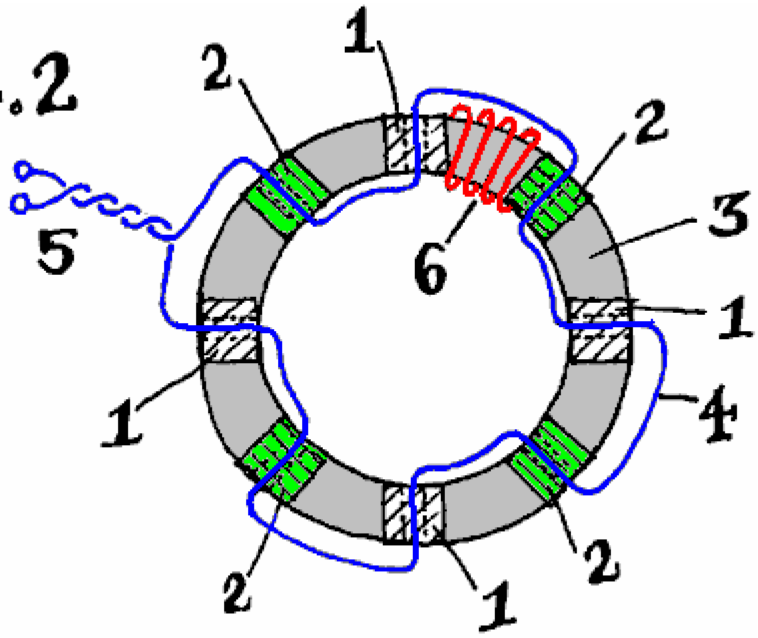


Fig.2 is a cross-sectional elevation of the generator of this invention.

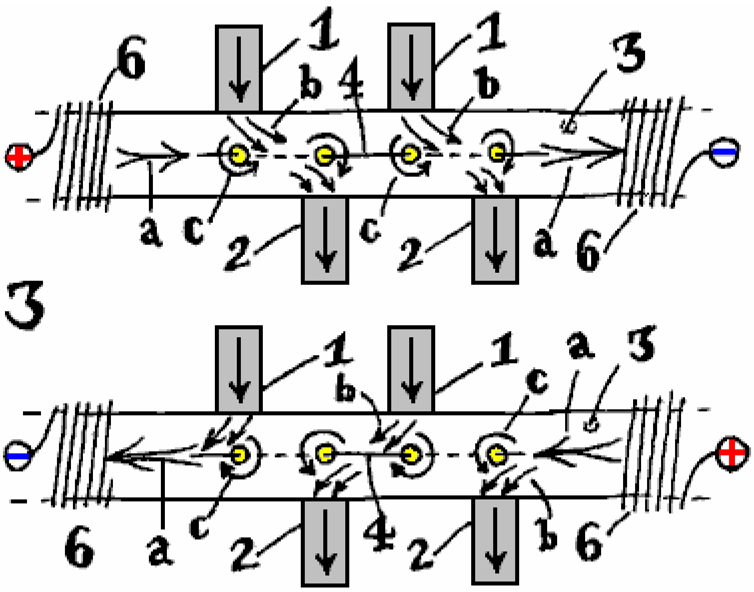


FIG.3

Fig.3 is a schematic diagram of the magnetic action occurring within the generator of **Fig.1** and **Fig.2**.

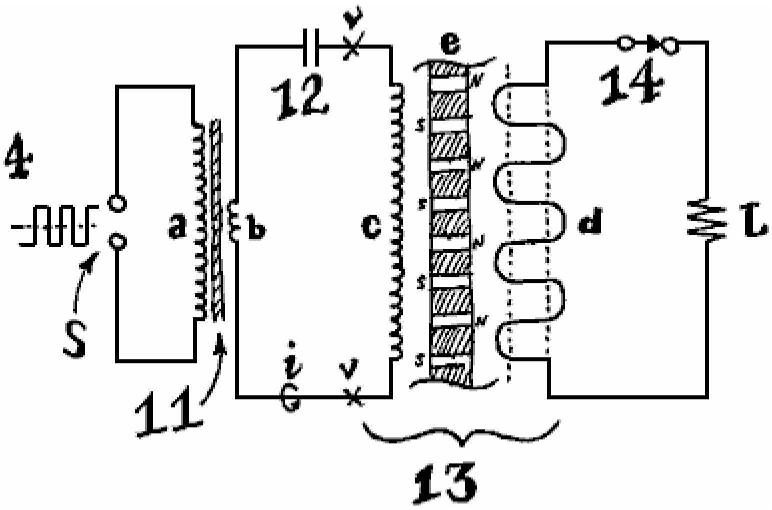
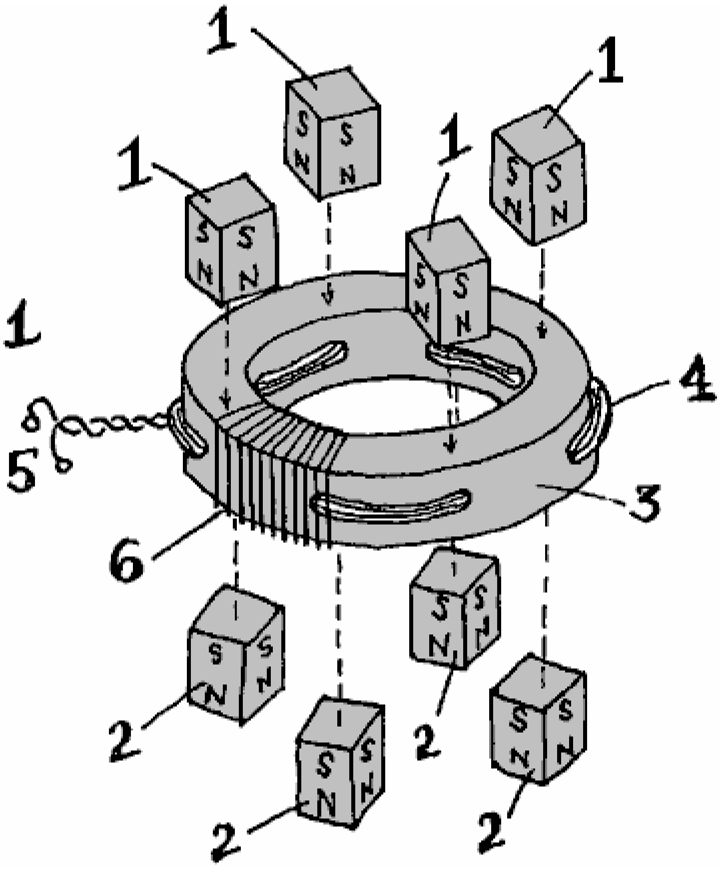


Fig.4 is a circuit diagram, illustrating one method of operating the electrical generator of this invention.

Detailed Description of the Invention

Fig.1 depicts a partially exploded view of an embodiment of an electrical generator of this invention. The part numbers also apply in **Fig.2** and **Fig.3**.



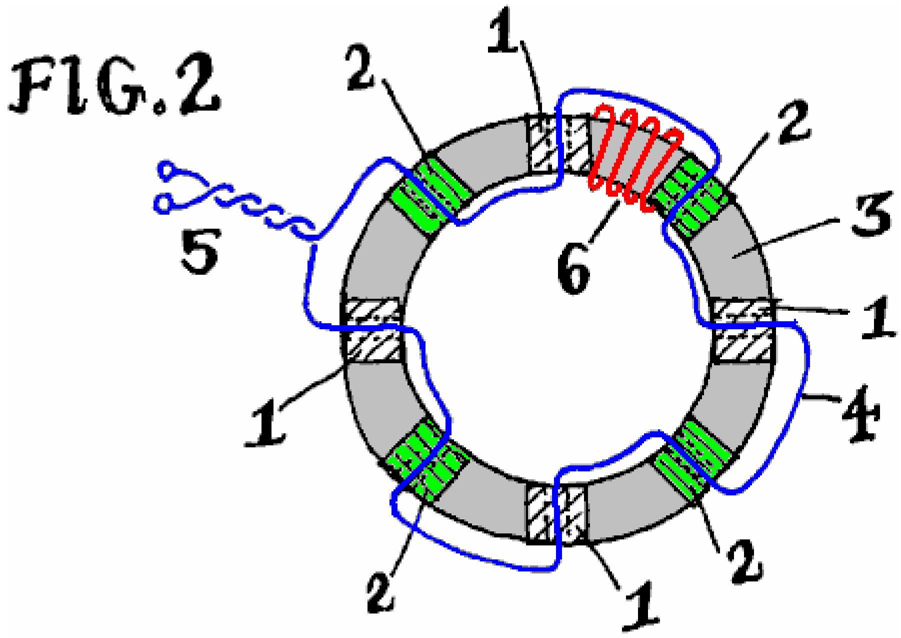
Numeral **1** represents a permanent magnet with it's North pole pointing inward towards the soft ferromagnetic core of the device. Similarly, numeral **2** indicates permanent magnets (preferably of the same size, shape and composition), with their South poles aimed inward towards the opposite side, or opposite surface of the device. The letters “**S**” and “**N**” denote these magnetic poles in the drawings. Other magnetic polarities and configurations may be used with success; the pattern shown merely illustrates one efficient method of adding magnets to the core.

The magnets may be formed of any polarised magnetic material. In order of descending effectiveness, the most desirable permanent magnet materials are Neodymium-Iron-Boron (“NIB”), Samarium Cobalt, AlNiCo alloy, or “ceramic” Strontium-Barium or Lead-Ferrite. A primary factor determining permanent magnet material composition is the magnetic flux strength of the particular material type. In an embodiment of the invention, these magnets may also be substituted with one or more electromagnets producing the required magnetic flux. In another embodiment of the invention, a superimposed DC current bias can be applied to the output wire to generate the required magnetic flux, replacing or augmenting the permanent magnets.

Numeral **3** indicates the magnetic core. This core is a critical component of the generator. The core determines the output power capacity, the optimum magnet type, the electrical impedance and the operating frequency range. The core may be any shape, composed of any ferromagnetic material, formed by any process (sintering, casting, adhesive bonding, tape-winding, etc.). A wide range of shapes, materials and processes is known in the art of making magnetic cores. Effective common materials include amorphous metal alloys (such as sold under the “Metglas” trademark by Metglas Inc., Conway, S.C.), nanocrystalline alloys, manganese and zinc ferrites as well as ferrites of any suitable element including any combination of magnetically “hard” and “soft” ferrites, powdered metals and ferromagnetic alloys, laminations of cobalt and/or iron and silicon-iron “electrical steel”. This invention successfully utilises any ferromagnetic material, while functioning as claimed. In an embodiment of the invention, and for the purpose of illustration, a circular “toroid” core is illustrated. In an embodiment of the invention, the composition may be bonded iron powder, commonly available from many manufacturers.

Regardless of core type, the core is prepared with holes, through which, wires may pass. the holes are drilled or formed to penetrate the core’s ferromagnetic volume. The toroidal core **3** shown, includes radial holes pointing towards a common centre. If, for example, stiff wire rods were to be inserted through each of these holes, these rods would meet at the centre point of the core, producing an appearance similar to a spoked wheel. If a square or rectangular core (not illustrated) is used, then these holes are preferably oriented parallel to the core’s flat sides, causing stiff rods passed through the holes to form a square grid pattern, as the rods cross each other in the interior “window” area framed by the core. While in other embodiments of the invention, these holes may take any possible orientation or patterns of orientation, a simple row of radial holes is illustrated as one example.

Numeral **4** depicts a wire, or bundle of wires which pick up and carry the output power of the generator. Typically, this wire is composed of insulated copper, though other materials such as aluminium, iron, dielectric material, polymers and semiconducting materials may be substituted. It may be seen in **Fig.1** and **Fig.2**, that wire **4** passes alternately through neighbouring holes formed in core **3**. The path taken by wire **4** undulates as it passes in opposite direction through each adjacent hole. If an even number of holes is used, the wire will emerge on the same side of the core on which it first entered. Once all the holes are filled, the resulting pair of trailing leads may be twisted together or similarly terminated, forming the output terminals of the generator shown at numeral **5**. Output wire **4**, may also make multiple passes through each hole in the core. Though the winding pattern is not necessarily undulatory, this basic form is shown as an example. Many effective connection styles exist. This illustration shows the most simple.



Numeral **6** in **Fig.1**, **Fig.2** and **Fig.3**, points to a partial illustration of the input winding, or inductive coil used to shift the fields of the permanent magnets, within the core. Typically, this wire coil encircles the core, wrapping around it. For the toroidal core shown, input coil **6** resembles the outer windings of a typical toroidal inductor - a common electrical component. For the sake of clarity, only a few turns of coil **6** are shown in each of **Fig.1**, **Fig.2** and **Fig.3**. In practice, this coil may cover the entire core, or specific sections of the core, including, or not including the magnets.

Fig.2 shows the same electrical generator of **Fig.1**, looking transparently "down" through it from above, so that the relative positions of the core holes (shown as dotted lines), the path of the output wire **4**, and the position of the magnets (white hatched areas for magnets under the core and green hatched areas for magnets above the core) are made clear. The few representative turns of the input coil **6** are shown in red in **Fig.2**.

The generator illustrated, uses a core with 8 radially drilled holes. The spacing between these holes is equal. As shown, each hole is displaced by 45 degrees from each of it's adjoining holes. The centres of all of the holes lie on a common plane lying half-way down the vertical thickness of the core. Cores of any shape or size may have as few as two or as many as hundreds of holes and a similar number of magnets. Other variations exist, such as generators with multiple rows of holes, zigzag and diagonal patterns, or output wire **4** moulded directly into the core material. In any case, the basic magnetic interaction shown in **Fig.3** occurs for each hole in the core as described below.

FIG.3

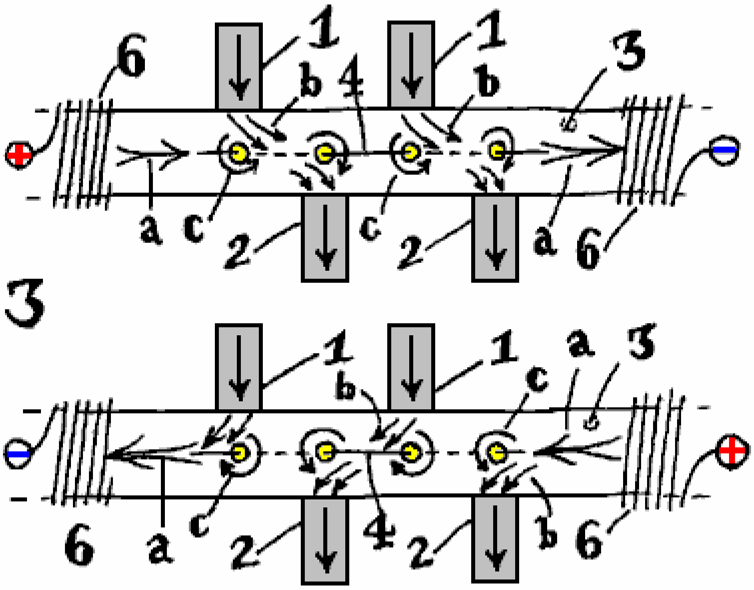


Fig.3 shows the same design, viewed from the side. The curvature of the core is shown flattened on the page for the purpose of illustration. The magnets are represented schematically, protruding from the top and bottom of the core, and including arrows indicating the direction of magnetic flux (the arrow heads point to the magnet's North pole).

In practice, the free, unattached polar ends of the generator's magnets may be left "as-is" in open air, or they may be provided with a common ferromagnetic path linking the unattached North and South poles together as a magnetic "ground". The common return path is typically made of steel, iron or similar material, taking the form of a ferrous enclosure housing the device. It may serve the additional purpose of a protecting chassis. The magnetic return may also be another ferromagnetic core of a similar electric generator stacked on top of the illustrated generator. There can be a stack of generators, sharing common magnets between the generator cores. Any such additions are without direct bearing on the functional principle of the generator itself, and have therefore been omitted from these illustrations.

Two example flux diagrams are shown in **Fig.3**. Each example is shown in a space between schematically depicted partial input coils **6**. A positive or negative polarity marker indicates the direction of input current, applied through the input coil. This applied current produces "modulating" magnetic flux, which is used to synthesise apparent motion of the permanent magnets, and is shown as a double-tailed horizontal arrow (**a**) along the core **3**. Each example shows this double-tailed arrow (**a**) pointing to the right or to the left, depending on the polarity of the applied current.

In either case, vertical flux entering the core (**b,3**) from the external permanent magnets (**1,2**) is swept along within the core, in the direction of the double-tailed arrow (**a**), representing the magnetic flux of the input coil. These curved arrows (**b**) in the space between the magnets and the holes, can be seen to shift or bend (**a** --> **b**), as if they were streams or jets of air subject to a changing wind.

The resulting sweeping motion of the fields of the permanent magnets, causes their flux (**b**) to brush back and forth over the holes and wire **4** which passes through these holes. Just as in a mechanical generator, when the magnetic flux brushes or "cuts" sideways across a conductor in this way, voltage is induced in the conductor. If an electrical load is connected across the ends of this wire conductor (numeral **5** in **Fig.1** and **Fig.2**), a current flows through the load via this closed circuit, delivering electrical power able to perform work. Input of an alternating current across the input coil **6**, generates an alternating magnetic field (**a**) causing the fields of permanent magnets **1** and **2** to shift (**b**) within the core **3**, inducing electrical power through a load (attached to terminals **5**), as if the fixed magnets (**1**,**2**) themselves were physically moving. However, no mechanical motion is present.

In a mechanical generator, induced current powering an electrical load, returns through output wire **4**, creating a secondary induced magnetic field, exerting forces which substantially oppose the original magnetic field inducing the original EMF. Since load currents induce their own, secondary magnetic fields opposing the original act of induction in this way, the source of the original induction requires additional energy to restore itself and continue generating electricity. In mechanical generators, the energy-inducing motion of the generator's magnetic fields is being physically actuated, requiring a strong prime mover (such as a steam turbine) to restore the EMF-generating magnetic fields' motion against the braking effect of the output-induced magnetic fields (the induced field **c** and the inducing field **b**), destructively in mutual opposition, which must ultimately be overcome by physical force, which is commonly produced by the consumption of other energy resources.

The electrical generator of the present invention is not actuated by mechanical force. It makes use of the induced secondary magnetic field in such a way as to not cause opposition, but instead, addition and resulting acceleration of magnetic field motion. Because the present invention is not mechanically actuated, and because the magnetic fields do not act to destroy one another in mutual opposition, the present invention does not require the consumption of natural resources in order to generate electricity.

The present generator's induced magnetic field, resulting from electrical current flowing through the load and returning through output wire **4**, is that of a closed loop encircling each hole in the core. The induced magnetic fields create magnetic flux in the form of closed loops within the ferromagnetic core. The magnetic field "encircles" each hole in the core which carries output wire **4**. This is similar to the threads of a screw "encircling" the shaft of the screw.

Within this generator, the magnetic field from output wire **4** immediately encircles each hole formed in the core (**c**). Since wire **4** may take an opposing direction through each neighbouring hole, the direction of the resulting magnetic field will likewise be opposite. The direction of arrows (**b**) and (**c**) are, at each hole, opposing, headed in opposite directions, since (**b**) is the inducing flux and (**c**) is the induced flux, each opposing one another while generating electricity.

However, this magnetic opposition is effectively directed against the permanent magnets which are injecting their flux into the core, but not the source of the alternating magnetic input field **6**. In the present solid-state generator, induced output flux (**4**,**c**) is directed to oppose the permanent magnets (**1**,**2**) not the input flux source (**6**, **a**) which is synthesising the virtual motion of those magnets (**1**,**2**) by it's magnetising action on core **3**.

The present generator employs magnets as the source of motive pressure driving the generator, since they are the entity being opposed or "pushed against" by the opposing reaction induced by output current which is powering a load. Experiments show that high-quality permanent magnets can be magnetically "pushed against" in this way for very long periods of time, before becoming demagnetised or "spent".

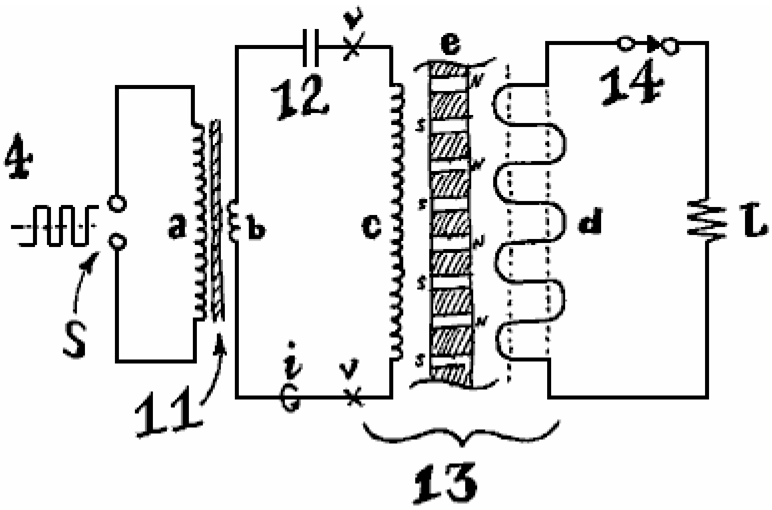
Fig.3 illustrates inducing representative flux arrows (**b**) directed oppositely against induced representative flux (**c**). In materials typically used to form core **3**, fields flowing in mutually opposite directions tend to cancel each other, just as positive and negative numbers of equal magnitude sum to zero.

On the remaining side of each hole, opposite the permanent magnet, no mutual opposition takes place. Induced flux (**c**) caused by the generator load current remains present; however, inducing flux from the permanent magnets (**b**) is not present since no magnet is present, on this side, to provide the necessary flux. This leaves the induced flux (**c**) encircling the hole, as well as input flux (**a**) from the input coils **6**, continuing its path along the core, on either side of each hole.

On the side of each hole in the core where a magnet is present, action (**b**) and reaction (**c**) magnetic flux substantially cancel each other, being directed in opposite directions within the core. On the other side of each hole, where no magnet is present, input flux (**a**) and reaction flux (**c**) share a common direction. Magnetic flux adds together in these zones, where induced magnetic flux (**c**) aids the input flux (**a**). This is the reverse of typical generator action, where induced flux (**c**) is typically opposing the "input" flux originating the induction.

Since the magnetic interaction is a combination of magnetic flux opposition and magnetic flux acceleration, there is no longer an overall magnetic braking or total opposition effect. The braking and opposition is counterbalanced by a simultaneous magnetic acceleration within the core. Since mechanical motion is absent, the equivalent electrical effect ranges from idling, or absence of opposition, to a strengthening and overall acceleration of the electrical input signal (within coils **6**). proper selection of the permanent magnet (**1**,**2**) material and flux density, core **3** material magnetic characteristics, core hole pattern and spacing, and output medium connection technique, create embodiments where the present generator will display an absence of electrical loading at the input and/or an overall amplification of the input signal. This ultimately causes less input energy to be required in order to work the generator. Therefore, as increasing amounts of energy are withdrawn from the generator as output power performing useful work, decreasing amounts of energy are generally required to operate it. This process continues, working against the permanent magnets (**1**,**2**) until they are demagnetised.

FIG.4



In an embodiment of this invention, **Fig.4** illustrates a typical operating circuit employing the generator of this invention. A square-wave input signal from a transistor switching circuit, is applied at the input terminals (**S**), to the primary (**a**) of a step-down transformer **11**. The secondary winding (**b**) of the input transformer may be a single turn, in series with a capacitor **12** and the generator **13** input coil (**c**), forming a series resonant circuit. The frequency of the applied square wave (S) must either match, or be an integral sub-harmonic of the resonant frequency of this 3-element transformer-capacitor-inductor input circuit.

Generator **13** output winding (**d**) is connected to resistive load **L** through switch **14**. When switch **14** is closed, generated power is dissipated at **L**, which is any resistive load, for example, and incandescent lamp or resistive heater.

Once input resonance is achieved, and the square-wave frequency applied at **S** is such that the combined reactive impedance of total inductance (**b** + **c**) is equal in magnitude to the opposing reactive impedance of capacitance **12**, the electrical phases of current through, and voltage across, generator **13** input coil (**c**) will flow 90 degrees apart in resonant quadrature. Power drawn from the square-wave input energy source applied to **S** will now be at a minimum.

In this condition, the resonant energy present at the generator input may be measured by connecting a voltage probe across the test points (**v**), situated across the generator input coil, together with a current probe around point (**I**), situated in series with the generator input coil (**c**). The instantaneous vector product of these two measurements indicates the energy circulating at the generator's input, ultimately shifting the permanent magnets' fields in order to create useful induction. This situation persists until the magnets are no longer magnetised.

It will be apparent to those skilled in the art that a square (or other) wave may be applied directly to the generator input terminals (**c**) without the use of other components. While this remains effective, advantageous re-generating effects may not be realised to their fullest extent with such direct excitation. Use of a resonant circuit, particularly with inclusion of a capacitor **12** as suggested, facilitates recirculation of energy within the input circuit, generally producing efficient excitation and a reduction of the required input power as loads are applied.

In an embodiment of this invention, **Fig.4** illustrates a typical operating circuit employing the generator of this invention. A square-wave input signal from a transistor switching circuit, is applied at the input terminals (**S**), to the primary (**a**) of a step-down transformer **11**. The secondary winding (**b**) of the input transformer may be a single turn, in series with a capacitor **12** and the generator **13** input coil (**c**), forming a series resonant circuit. The frequency of the applied square wave (S) must either match, or be an integral sub-harmonic of the resonant frequency of this 3-element transformer-capacitor-inductor input circuit.

Generator **13** output winding (**d**) is connected to resistive load **L** through switch **14**. When switch **14** is closed, generated power is dissipated at **L**, which is any resistive load, for example, and incandescent lamp or resistive heater.

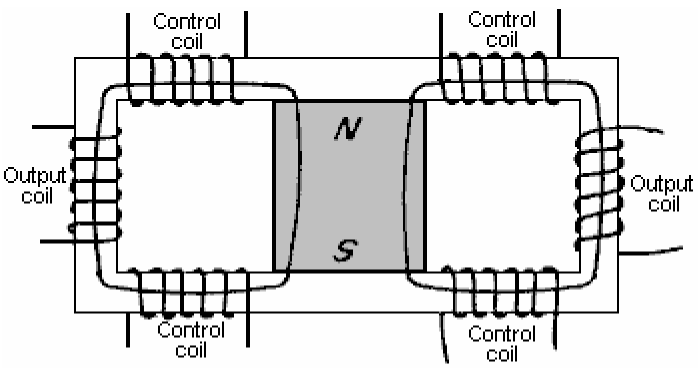
Once input resonance is achieved, and the square-wave frequency applied at **S** is such that the combined reactive impedance of total inductance (**b** + **c**) is equal in magnitude to the opposing reactive impedance of capacitance **12**, the electrical phases of current through, and voltage across, generator **13** input coil (**c**) will flow 90 degrees apart in resonant quadrature. Power drawn from the square-wave input energy source applied to **S** will now be at a minimum.

In this condition, the resonant energy present at the generator input may be measured by connecting a voltage probe across the test points (**v**), situated across the generator input coil, together with a current probe around point (**I**), situated in series with the generator input coil (**c**). The instantaneous vector product of these two measurements indicates the energy circulating at the generator's input, ultimately shifting the permanent magnets' fields in order to create useful induction. This situation persists until the magnets are no longer magnetised.

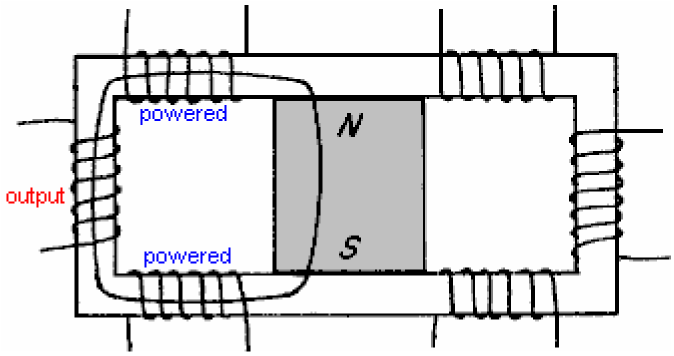
It will be apparent to those skilled in the art that a square (or other) wave may be applied directly to the generator input terminals (**c**) without the use of other components. While this remains effective, advantageous re-generating effects may not be realised to their fullest extent with such direct excitation. Use of a resonant circuit, particularly with inclusion of a capacitor **12** as suggested, facilitates recirculation of energy within the input circuit, generally producing efficient excitation and a reduction of the required input power as loads are applied.

Another device of this type comes from **Charles Flynn**. The technique of applying magnetic variations to the magnetic flux produced by a permanent magnet is covered in detail in the patents of Charles Flynn which are included in the Appendix. In his patent he shows techniques for producing linear motion, reciprocal motion, circular motion and power conversion, and he gives a considerable amount of description and explanation on each, his main patent containing a hundred illustrations. Taking one application at random:

He states that a substantial enhancement of magnetic flux can be obtained from the use of an arrangement like this:

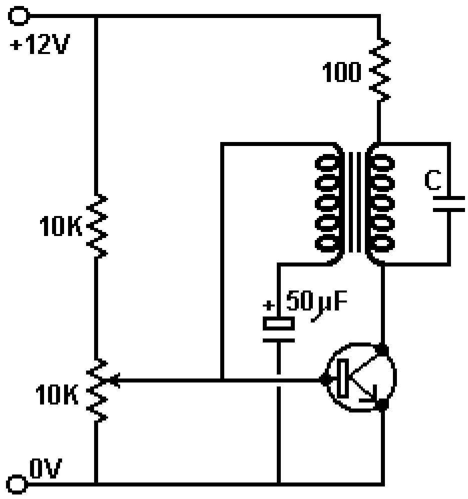


Here, a laminated soft iron frame has a powerful permanent magnet positioned in it's centre and six coils are wound in the positions shown. The magnetic flux from the permanent magnet flows around both sides of the frame.

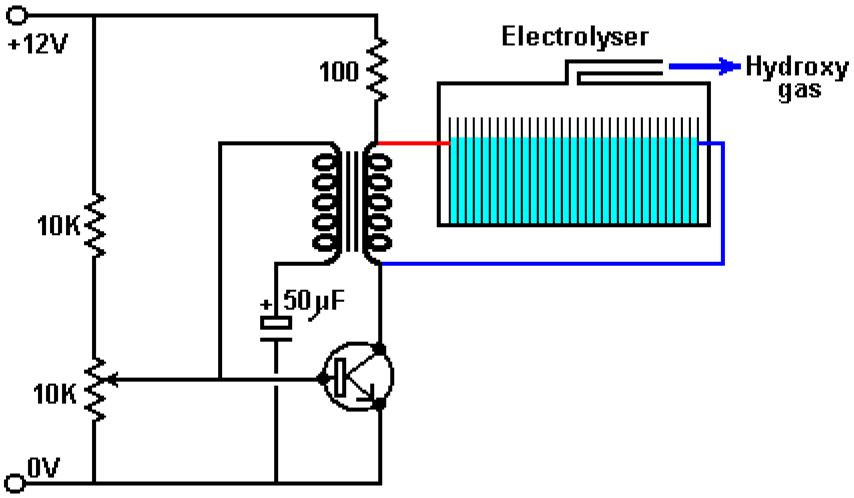


The full patent details of this system from Charles Flynn are in the Appendix, starting at page 336.

There is an interesting video posted on YouTube at http://www.youtube.com/watch?v=NCY7tYDjXhI where a contributor whose ID is "TheGuru2You" posts some really interesting information. He starts with a circuit produced by Alexander Meissner in 1913 and shown here:

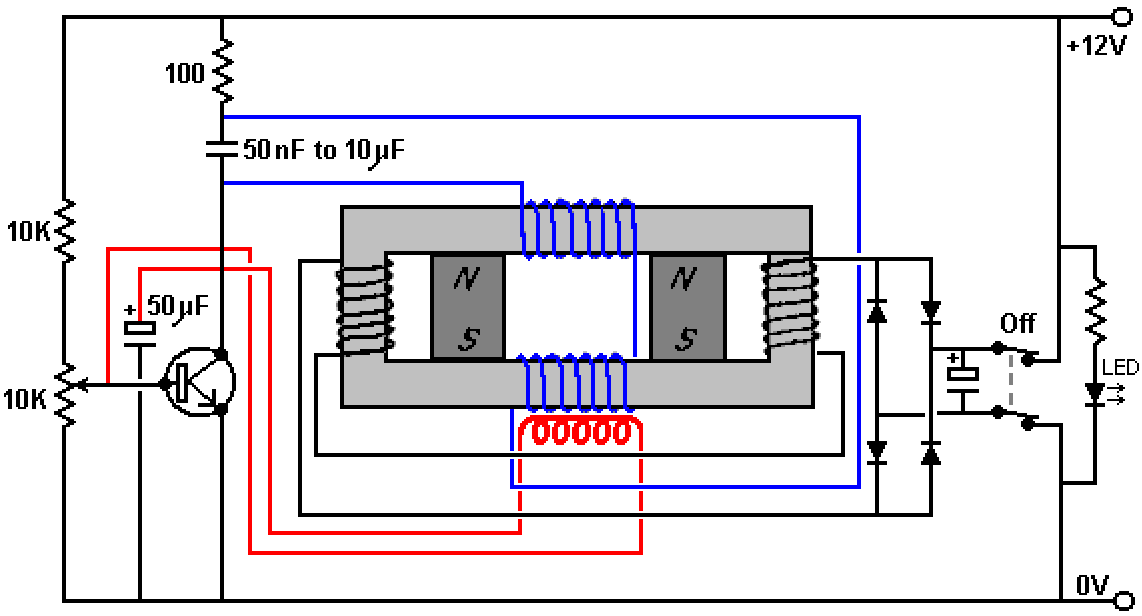


TheGuru2You states that he has built this circuit and can confirm that it is self-powering, something which conventional science says is impossible (unless perhaps, if the circuit is picking up radiated power through the wiring of the circuit). Once a twelve volt supply is connected briefly to input terminals, the transistor switches on powering the transformer which feeds repeating pulses to the base of the transistor, sustaining the oscillations even when the twelve volt supply is removed. The rate of oscillation is governed by the capacitor marked "**C**" in the diagram.



Interestingly, if that capacitor is replaced by an electrolyser (which is effectively a capacitor with the water forming the dielectric between the plates of the capacitor), then the frequency of the circuit automatically adjusts to the resonant frequency of the electrolyser and it is suggested that this system should be able to perform electrolysis of water without requiring a power source and automatically slaving to the varying resonant frequency of the electrolyser. As far as I am aware, this has not been confirmed, however, the voltage pulsers designed by John Bedini do slave themselves automatically to their load, whether it is a battery being charged, or an electrolyser performing electrolysis.

TheGuru2You then progresses considerably further by combining Alexander Meissner's circuit with Charles Flynn's magnetic amplification circuit. Here the transformer is switched to become the Charles Flynn oscillator winding plus a second winding placed alongside for magnetic coupling as shown here:



The transistor stage is self-oscillating as before, the transformer now being comprised of the red and blue coil windings. This oscillation also oscillates the Flynn magnetic frame, producing an electrical output via the black coils at each end of the magnetic frame. This is, of course, an oscillating, or AC output, so the four diodes produce a full-wave rectified (pulsating) DC current which is smoothed by the capacitor connected to the diodes.

This circuit can be started by touching a 12 volt source very briefly to the output terminals on the right. An alternative is to wave a permanent magnet close to the red and blue coils as that generates a voltage in the coils, quite sufficient to start the system oscillating and so, becoming self-sustaining. TheGuru2You suggests using the piezo crystal from a lighter and connecting it to an extra coil to produce the necessary voltage spike when the coils is held close to the red transistor coil and the lighter mechanism clicked.

A surprising problem is how to switch the device off since it runs itself. To manage this, TheGuru2You uses a two-pole On/Off switch to disconnect the output and prevent it supplying the input section of the circuit. To show whether or not the circuit is running, a Light-Emitting Diode ("LED") is connected across the output and the current flowing through it limited by a resistor of about 820 ohms.

In the video, this circuit is shown as powering a standard off-the-shelf inverter which has a 12 volt DC input and an AC mains output. This indicates that a circuit of this type is capable of providing substantial output current. In the video diagram, the input current is shown as being about 0.2 amps. Anyone wanting to try replicating this device will need to experiment with the number of turns in each coil and the wire diameter needed to carry the desired current. The first page of the Appendix shows the current carrying capacity for each of the standard wire diameters. As this is a newly released circuit, I am not aware of any replications of it at this time.

Floyd Sweet's VTA. Another device in the same category of permanent magnets with energised coils round it (and very limited practical information available) was produced by Floyd Sweet. The device was dubbed "Vacuum Triode Amplifier" or "VTA" by Tom Bearden and the name has stuck, although it does not appear to be a particularly accurate description.

The device was capable of producing more than 1 kW of output power at 120 Volts, 60 Hz and is self-powered. The output is energy which resembles electricity in that it powers motors, lamps, etc. but as the power increases through any load there is a temperature drop instead of the expected temperature rise.

When it became known that he had produced the device he became the target of serious threats, some of which were delivered face-to-face in broad daylight. It is quite possible that the concern was due to the device tapping zero-point energy, which when done at high currents opens a whole new can of worms. One of the observed characteristics of the device was that when the current was increased, the measured weight of the apparatus reduced by about a pound. While this is hardly new, it suggests that space/time was being warped. The German scientists at the end of WWII had been experimenting with this (and killing off the unfortunate people who were used to test the system) - if you have considerable perseverance, you can read up on this in Nick Cook's inexpensive book "The Hunt for Zero-Point" ISBN 0099414988.

Floyd found that the weight of his device reduced in proportion to the amount of energy being produced. But he found that if the load was increased enough, a point was suddenly reached where a loud sound like a whirlwind was produced, although there was no movement of the air. The sound was heard by his wife Rose who was in another room of their apartment and by others outside the apartment. Floyd did not increase the load further (which is just as well as he would probably have received a fatal dose of radiation if he had) and did not repeat the test. In my opinion, this is a dangerous device and I personally, would not recommend anyone attempting to build one. It should be noted that a highly lethal 20,000 volts is used to 'condition' the magnets and the principles of operation are not understood at this time. Also, there is insufficient information to hand to provide realistic advice on practical construction details.

On one occasion, Floyd accidentally short-circuited the output wires. There was a bright flash and the wires became covered with frost. It was noted that when the output load was over 1 kW, the magnets and coils powering the device became colder, reaching a temperature of 20 degrees Fahrenheit below room temperature. On one occasion, Floyd received a shock from the apparatus with the current flowing between the thumb and the small finger of one hand. The result was an injury akin to frostbite, causing him considerable pain for at least two weeks.

Observed characteristics of the device include:

1. The output voltage does not change when the output power is increased from 100W to 1 kW.
2. The device needs a continuous load of at least 25W.
3. The output falls in the early hours of the morning but recovers later on without any intervention.
4. A local earthquake can stop the device operating.
5. The device can be started in self-powered mode by briefly applying 9 Volts to the drive coils.
6. The device can be stopped by momentary interruption of the power to the power coils.
7. Conventional instruments operate normally up to an output of 1 kW but stop working above that output level, with their readings showing zero or some other spurious reading.

Information is limited, but it appears that Floyd's device was comprised of one or two large ferrite permanent magnets (grade 8, size 150 mm x 100 mm x 25 mm) with coils wound in three planes mutually at right angles to each other (i.e. in the x, y and z axes). The magnetisation of the ferrite magnets is modified by suddenly applying 20,000 Volts from a bank of capacitors (510 Joules) or more to plates on each side of it while simultaneously driving a 1 Amp 60 Hz (or 50 Hz) alternating current through the energising coil. The alternating current should be at the frequency required for the output. The voltage pulse to the plates should be applied at the instant when the 'A' coil voltage reaches a peak. This needs to be initiated electronically.

It is said that the powering of the plates causes the magnetic material to resonate for a period of about fifteen minutes, and that the applied voltage in the energising coil modifies the positioning of the newly formed poles of the magnet so that it will in future, resonate at that frequency and voltage. It is important that the voltage applied to the energising coil in this 'conditioning' process be a perfect sinewave. Shock, or outside influence can destroy the 'conditioning' but it can be reinstated by repeating the conditioning process. It should be noted that the conditioning process may not be successful at the first attempt but repeating the process on the same magnet is usually successful. Once conditioning is completed, the capacitors are no longer needed. The device then only needs a few milliwatts of 60 Hz applied to the input coil to give up to 1.5 kW at 60 Hz at the output coil. The output coil can then supply the input coil indefinitely.

The conditioning process modifies the magnetisation of the ferrite slab. Before the process the North pole is on one face of the magnet and the South pole on the opposite face. After conditioning, the South pole does not stop at the mid point but extends to the outer edges of the North pole face, extending inwards from the edge by about 6 mm. Also, there is a magnetic 'bubble' created in the middle of the North pole face and the position of this 'bubble' moves when another magnet is brought near it.

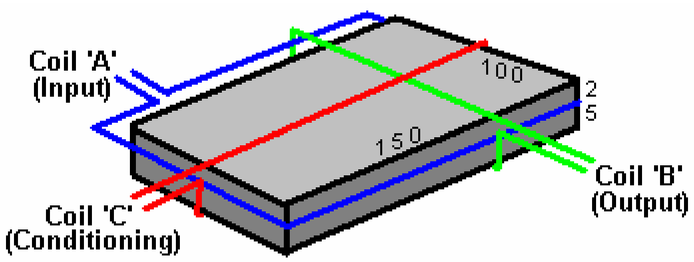
The conditioned slab has three coil windings:

1. The 'A' coil is wound first around the outer perimeter, each turn being 150 + 100 + 150 + 100 = 500 mm long (plus a small amount caused by the thickness of the coil former material). It has about 600 turns of 28 AWG (0.3 mm) wire.

2. The 'B' coil is wound across the 100 mm faces, so one turn is about 100 + 25 + 100 + 25 = 250 mm (plus a small amount for the former thickness and clearing coil 'A'). It has between 200 and 500 turns of 20 AWG (1 mm) wire.

3. The 'C' coil is wound along the 150 mm face, so one turn is 150 + 25 + 150 + 25 = 350 mm (plus the former thickness, plus clearance for coil 'A' and coil 'B'). It has between 200 and 500 turns of 20 AWG (1 mm) wire and should match the resistance of coil 'B' as closely as possible.

Coil 'A' is the input coil. Coil 'B' is the output coil. Coil 'C' is used for the conditioning and for the production of gravitational effects.



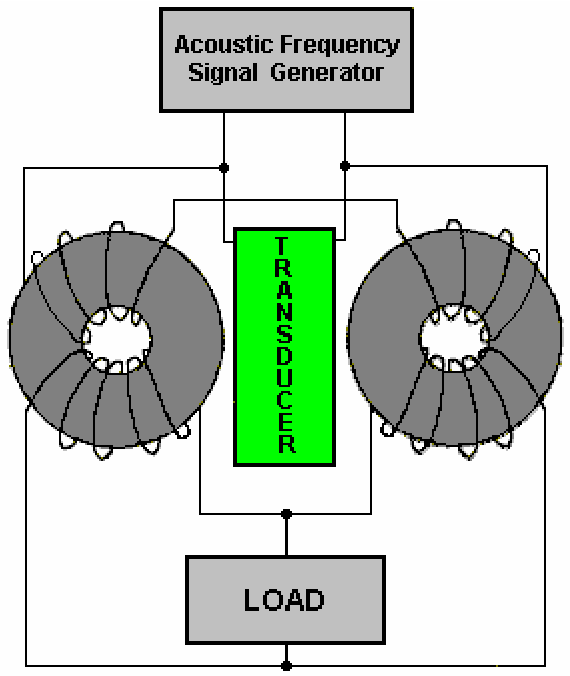
Much of this information and photographs of the original device can be found on the website:
http://www.intalek.com/Index/Index.htm where a paper by Michael Watson gives much practical information. For example, he states that an experimental set up which he made, had the 'A' coil with a resistance of 70 ohms and an inductance of 63 mH, the 'B' coil, wound with 23 AWG wire with a resistance of 4.95 ohms and an inductance of 1.735 mH, and the 'C' coil, also wound with 23 AWG wire, with a resistance of 5.05 ohms and an inductance of 1.78 mH.

In passing, if the gravity thrust aspect of this information interests you, let me mention a television documentary programme which you may not have seen. In it, Boyd Bushman demonstrated what might just have been a simplistic gravity thrust device. Boyd is a US weapons designer of 35 years experience. He designed the prototype for the 'Stinger' missile. He moved to Lockheed as a designer. There he experimented with various things including the model he demonstrated.

It consisted of 250 turns of 30 AWG enamelled wire wound in a circular bundle about 200 mm in diameter. The winding was circular in cross section and air cored. The turns were secured by masking tape, some of which was used to tether the ring to a table top. He then plugged the coil directly in to the 110V 60 Hz mains supply. The ring immediately lifted off the table.

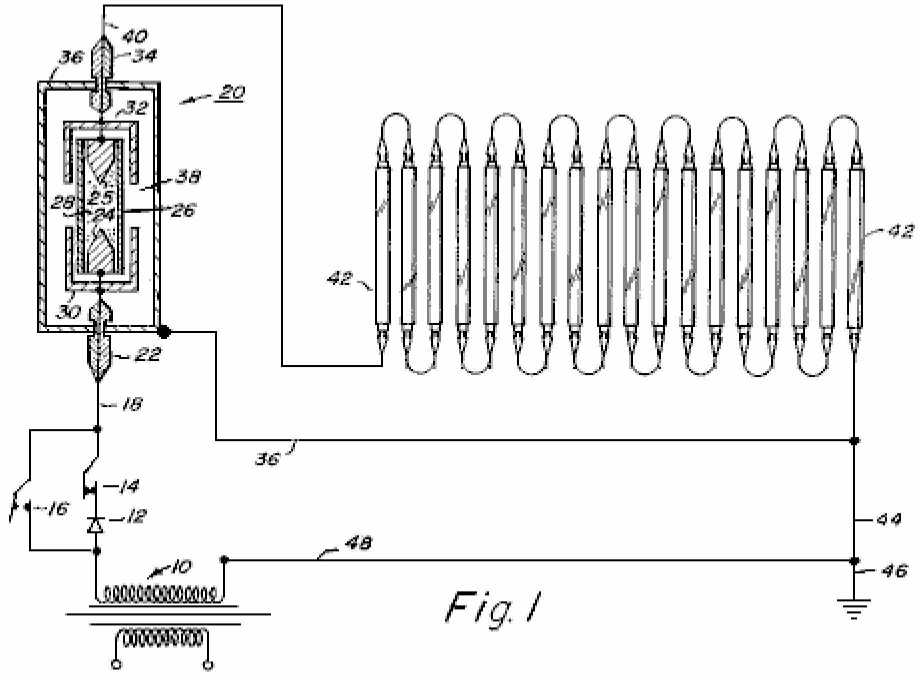
Boyd described the device as dangerous as it becomes very hot in just a few seconds. He stated that in his opinion, fed with different voltage and frequency, the ring could be made able to provide thrust for a full-scale flying vehicle.

Dan Davidson. Dan has produced a system rather similar to the 'MEG' described above. His system is different in that he uses an acoustic device to vibrate a magnet which forms the core of a transformer. This is said to increase the output by a substantial amount. His arrangement looks like this:



Dan's patent forms part of this set of documents and it gives details of the types of acoustic transducers which are suitable for this generator design.

Pavel Imris. Pavel was awarded a US patent in the 1970's. The patent is most interesting in that it describes a device which can have an output power which is more than nine times greater than the input power. He achieves this with a device which has two pointed electrodes enclosed in a quartz glass envelope which contains xenon gas under pressure (the higher the pressure, the greater the gain of the device) and a dielectric material.



Here, the power supply to one or more standard fluorescent lamps is passed through the device. This produces a power gain which can be spectacular when the gas pressure in the area marked '24' and '25' in the above diagram is high. The patent is included in this set of documents and it contains the following table of experimental measurements:

Table 1 shows the data to be obtained relating to the optical electrostatic generator. **Table 2** shows the lamp performance and efficiency for each of the tests shown in **Table 1**. The following is a description of the data in each of the columns of **Tables 1 and 2**.

Column	Description
B	**Gas used in discharge tube**
C	**Gas pressure in tube** (in torrs)
D	**Field strength across the tube** (measured in volts per cm. of length between the electrodes)
E	**Current density** (measured in microamps per sq. mm. of tube cross-sectional area)
F	**Current** (measured in amps)
G	**Power across the tube** (calculated in watts per cm. of length between the electrodes)
H	**Voltage per lamp** (measured in volts)
K	**Current** (measured in amps)
L	**Resistance** (calculated in ohms)
M	**Input power per lamp** (calculated in watts)
N	**Light output** (measured in lumens)

Table 1

		Optical	Generator	Section		
A	**B**	**C**	**D**	**E**	**F**	**G**
Test No.	**Type of discharge lamp**	**Pressure of Xenon**	**Field strength across lamp**	**Current density**	**Current**	**Power str. across lamp**
		(Torr)	**(V/cm)**	**(A/sq.mm)**	**(A)**	**(W/cm.)**
1	Mo elec	-	-	-	-	-
2	Xe	0.01	11.8	353	0.1818	2.14
3	Xe	0.10	19.6	353	0.1818	3.57
4	Xe	1.00	31.4	353	0.1818	5.72
5	Xe	10.00	47.2	353	0.1818	8.58
6	Xe	20.00	55.1	353	0.1818	10.02
7	Xe	30.00	62.9	353	0.1818	11.45
8	Xe	40.00	66.9	353	0.1818	12.16
9	Xe	60.00	70.8	353	0.1818	12.88
10	Xe	80.00	76.7	353	0.1818	13.95
11	Xe	100.00	78.7	353	0.1818	14.31
12	Xe	200.00	90.5	353	0.1818	16.46
13	Xe	300.00	100.4	353	0.1818	18.25
14	Xe	400.00	106.3	353	0.1818	19.32
15	Xe	500.00	110.2	353	0.1818	20.04
16	Xe	600.00	118.1	353	0.1818	21.47
17	Xe	700.00	120.0	353	0.1818	21.83
18	Xe	800.00	122.8	353	0.1818	22.33
19	Xe	900.00	125.9	353	0.1818	22.90
20	Xe	1,000.00	127.9	353	0.1818	23.26
21	Xe	2,000.00	149.6	353	0.1818	27.19
22	Xe	3,000.00	161.4	353	0.1818	29.35
23	Xe	4,000.00	173.2	353	0.1818	31.49
24	Xe	5,000.00	179.1	353	0.1818	32.56

Table 2

		Fluorescent	Lamp	Section	
A	**H**	**K**	**L**	**M**	**N**
Test No.	**Voltage**	**Current**	**Resistance**	**Input Energy**	**Light Output**
	(Volts)	**(Amps)**	**(Ohms)**	**(Watts)**	**(Lumen)**
1	220	0.1818	1,210	40.00	3,200
2	218	0.1818	1,199	39.63	3,200
3	215	0.1818	1,182	39.08	3,200
4	210	0.1818	1,155	38.17	3,200
5	200	0.1818	1,100	36.36	3,200
6	195	0.1818	1,072	35.45	3,200
7	190	0.1818	1,045	34.54	3,200
8	182	0.1818	1,001	33.08	3,200
9	175	0.1818	962	31.81	3,200
10	162	0.1818	891	29.45	3,200
11	155	0.1818	852	28.17	3,200
12	130	0.1818	715	23.63	3,200
13	112	0.1818	616	20.36	3,200
14	100	0.1818	550	18.18	3,200
15	85	0.1818	467	15.45	3,200
16	75	0.1818	412	13.63	3,200
17	67	0.1818	368	12.18	3,200
18	60	0.1818	330	10.90	3,200
19	53	0.1818	291	9.63	3,200
20	50	0.1818	275	9.09	3,200
21	23	0.1818	126	4.18	3,200
22	13	0.1818	71	2.35	3,200
23	8	0.1818	44	1.45	3,200
24	5	0.1818	27	0.90	3,200

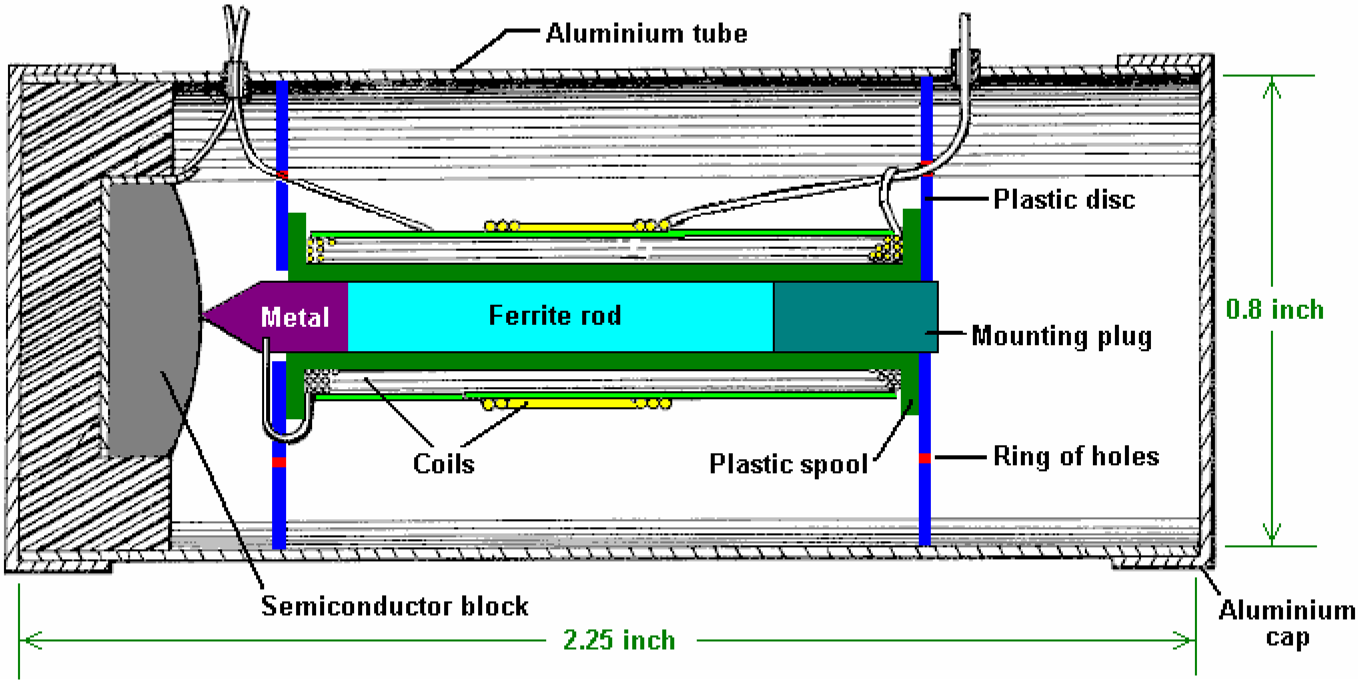
The results from Test No. 24 where the gas pressure is a very high 5,000 Torr, show that the input power for each 40-watt standard fluorescent tubes is 0.9 watts for full lamp output. In other words, each lamp is working to its full specification on less than one fortieth of its rated input power. However, the power taken by the device in that test was 333.4 watts which with the 90 watts needed to run the 100 lamps, gives a total input electrical power of 423.4 watts instead of the 4,000 watts which would have been needed without the device. That is an output power of more than nine times the input power.

From the point of view of any individual lamp, without using this device, it requires 40 watts of electrical input power to give 8.8 watts of light output which is an efficiency of about 22% (the rest of the input power being converted to heat). In test 24, the input power per lamp is 0.9 watts for the 8.8 watts of light produced, which is a lamp efficiency of more than 900%. The lamp used to need 40 watts of input power to perform correctly. With this device in the circuit, each lamp only needs 0.9 watts of input power which is only 2.25% of the original power. Quite an impressive performance for so simple a device!

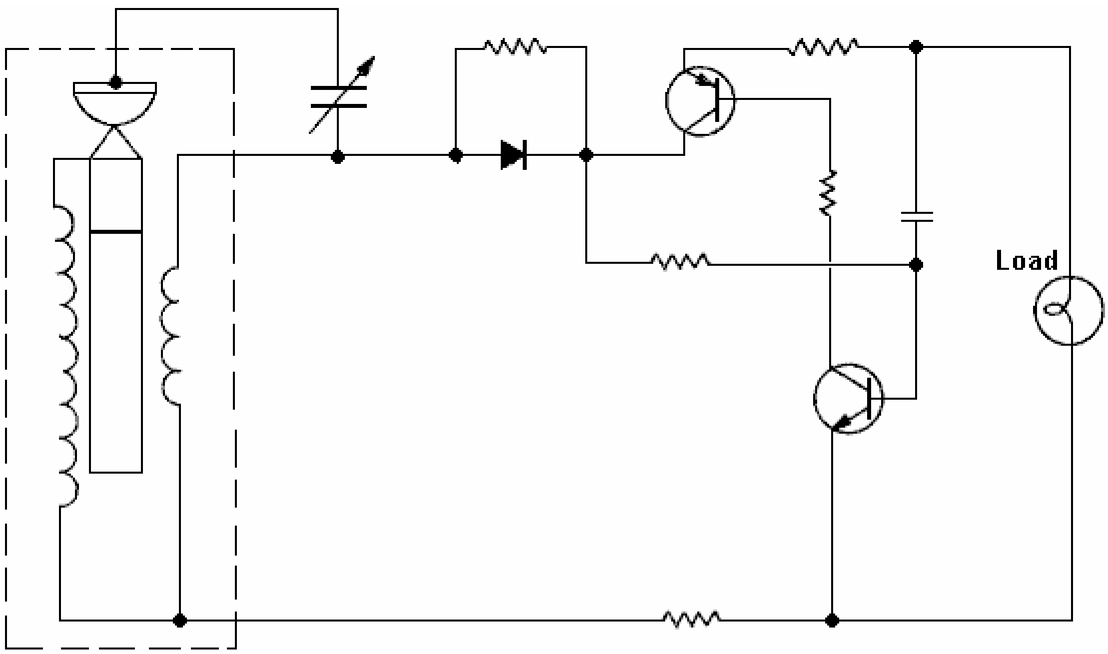
Michael Ognyanov's Self-powered Power Pack. A patent application US 3,766,094 (shown in detail in an accompanying document) gives the details of an interesting device. While it is only an application and not a full patent, the information implies strongly that Michael built and tested many of these devices.

While the power output is low, the design is of considerable interest. It is possible that the device works from picking up the output from many radio stations, although it does not have anything which is intended to be an aerial. It would be interesting to test the device, first, with a telescopic aerial added to it, and second, placed in an earthed metal box.

The device is constructed by casting a small block of a mixture of semiconductor materials such as Selenium with, from 4.85% to 5.5% Tellurium, from 3.95% to 4.2% Germanium, from 2.85% to 3.2% Neodymium, and from 2.0% to 2.5% Gallium. The resulting block is shaped with a dome on one face which is contacted by a short, pointed metal probe. When this arrangement is fed briefly with an oscillating signal, typically in the frequency range of 5.8 to 18 Mhz, it becomes self-powered and can supply electric current to external equipment. The construction is as shown here:



The circuit used with this component is shown as:



Presumably the output power would be increased by using full-wave rectification of the oscillations rather than the half-wave rectification shown. Michael says that increasing the dimensions of the unit increases the output power. The small unit shown in this example of his, has been shown to be able to provide flashing power for an incandescent lamp of up to 250 mA current requirement. While this is not a large power output, it is interesting that the output is obtained without any apparent input. Michael speculates that the very short connecting wires may act as radio reception aerials. If that is the case, then the output is impressive for such tiny aerials.

The Michael Meyer and Yves Mace Isotopic Generator. There is a French patent application number FR2680613 dated 19th August 1991 entitled “Activateur pour Mutation Isotopique” which provides some very interesting information. The system described is a self-contained solid-state energy converter which abstracts large amounts of energy from an ordinary iron bar.

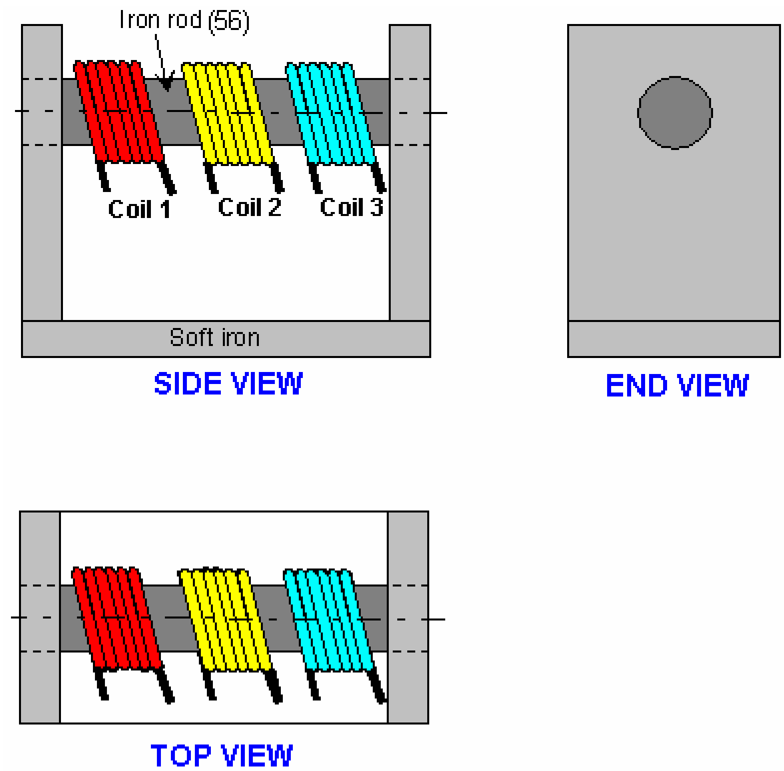
The inventors describes the technique as an “isotopic mutation effect” as it converts ordinary iron (isotope 56) to isotope 54 iron, releasing large amounts of electrical energy in the process. This excess energy can, they say, be used to drive inverters, motors or generators.

The description of the mechanism which is being used by the device is: “the present invention uses a physical phenomenon to which we draw attention and which we will call ‘Isotopic Change’. The physical principle applies to isotope 56 iron which contains 26 protons, 26 electrons and 30 neutrons, giving a total mass of 56.52 Mev, although its actual mass is 55.80 Mev. The difference between the total mass and the actual mass is therefore 0.72 Mev this which corresponds to an energy of cohesion per nucleon of 0.012857 Mev.

So, If one introduces an additional 105 ev of energy to the iron core isotope 56, that core isotope will have a cohesion energy level of 0.012962 Mev per nucleon corresponding to iron isotope 54. The instability created by this contribution of energy will transfer the isotope 56 iron to isotope 54 causing a release of 2 neutrons.

This process generates an excess energy of 20,000 ev since the iron isotope 54 is only 0.70 Mev while isotope 56 has 0.72 Mev. To bring about this iron isotope 56 conversion, we use the principle of Nuclear Magnetic Resonance.”

The practical method for doing this is by using three coils of wire and a magnetic-path-closing support frame of iron as shown in this diagram:



In this arrangement,

Coil 1: Produces 0.5 Tesla when fed with DC, converting the iron bar into an electromagnet
Coil 2: Produces 10 milli-Tesla when fed with a 21 MHz AC sinewave signal
Coil 3: Is the output coil, providing 110, 220 or 380 volts AC at about 400 Hz depending on the number of turns in the coil

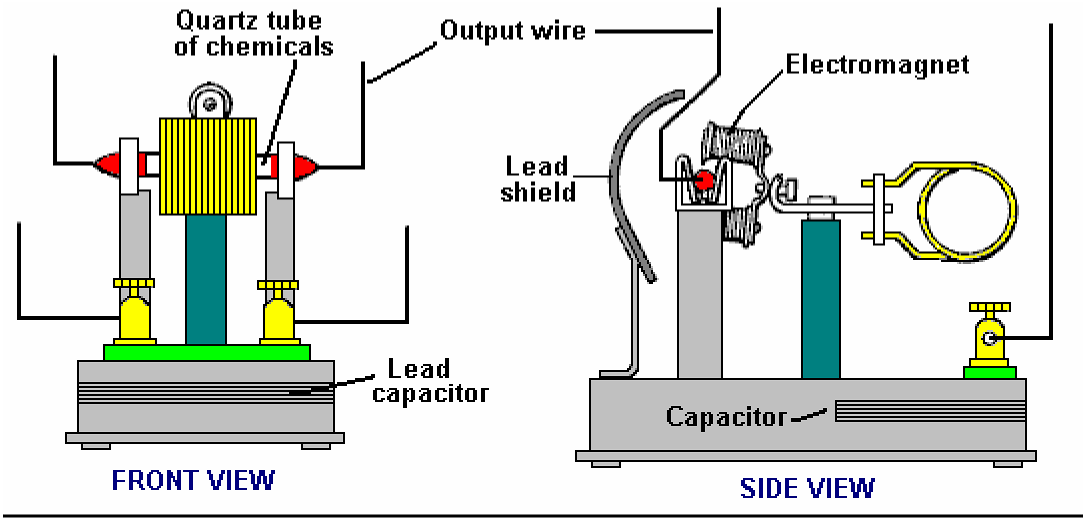
This simple and cheap system has the potential for producing substantial energy output for a very long time. The inventors claim that this device can be wired to be self-powered, while still powering external devices. Coil 1 turns the iron rod into an electromagnet with it’s flux channelled in a loop by the iron yoke. Coil 2 then oscillates that magnetic field in resonance with the isotope 56 iron atoms in the rod, and this produces the isotope conversion and release of excess energy. Coil 3 is wound to produce a convenient output voltage.

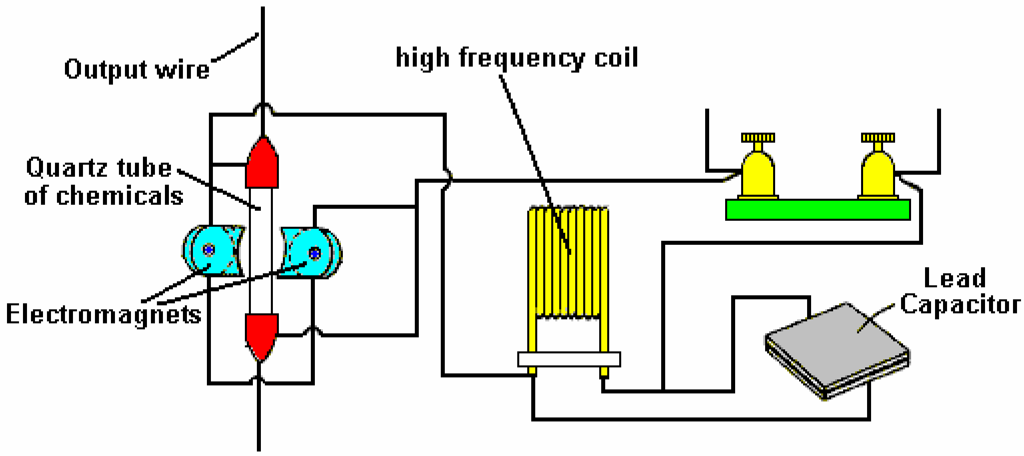
The Colman / Seddon-Gilliespie Generator. This device, patented by Harold Colman and Ronald Seddon-Gillespie on 5th December 1956, is quite remarkable. It is a tiny lightweight device which can produce electricity using a self-powered electromagnet and chemical salts. The working life of the device before needing refurbishment is estimated at some seventy years with an output of about one kilowatt.

The operation is controlled by a transmitter which bombards the chemical sample with 300 MHz radio waves. This produces radioactive emissions from the chemical mixture for a period of one hour maximum, so the transmitter needs to be run for fifteen to thirty seconds once every hour. The chemical mixture is shielded by a lead screen to prevent harmful radiation reaching the user. The patent, GB 763,062 is included in the Appendix.

This generator unit includes a magnet, a tube containg a chemical mixture of elements whose nuclei becomes unstable as a result of bombardment by short waves so that the elements become radio-active and release electrical energy, the mixture being mounted between, and in contact with, a pair of different metals such as copper and zinc, and a capacitor mounted between those metals.

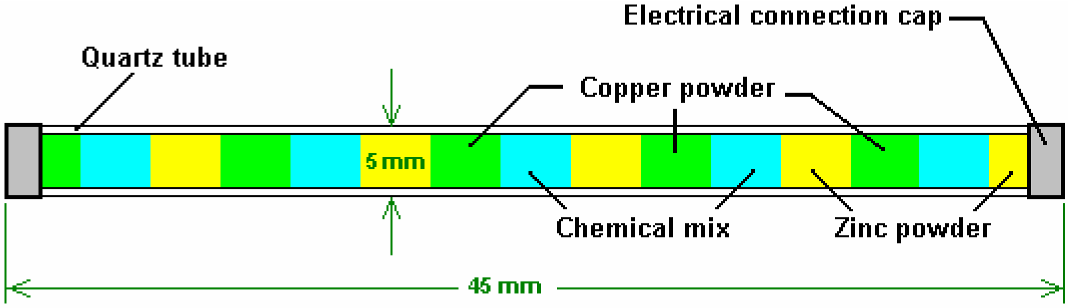
The mixture is preferably composed of the elements Cadmium, Phosphorus and Cobalt having Atomic Weights of 112, 31 and 59 respectively. The mixture, which may be of powdered form, is mounted in a tube of non-conducting, high heat resistivity material and is compressed between granulated zinc at one end of the tube and granulated copper at the other end, the ends of the tube being closed by brass caps and the tube being carried in a suitable cradle so that it is located between the poles of the magnet. The magnet is preferably an electro-magnet and is energised by the current produced by the unit. The transmitter unit which is used for activating the generator unit may be of any conventional type operating on ultra-shortwave and is preferably crystal controlled at the desired frequency.





SCHEMATIC LAYOUT

The transmitter unit is of any suitable conventional type for producing ultra shortwaves and may be crystal controlled to ensure that it operates at the desired frequency with the necessity of tuning. The quartz tube containing the chemical mixture, works best if made up of a number of small cells in series. In other words, considering the cartridge from one end to the other, at one end and in contact with the brass cap, there would be a layer of powdered copper, then a layer of the chemical mixture, then a layer of powdered zinc, a layer of powdered copper, etc. with a layer of powdered zinc in contact with the brass cap at the other end of the cartridge. With a cartridge some forty five millimetres long and five millimetres diameter, some fourteen cells may be included.



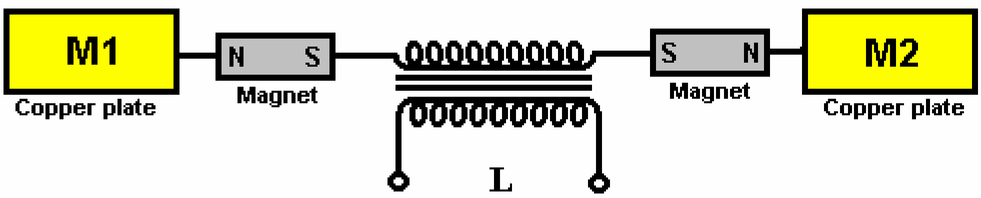
Hans Coler. Hans Coler developed a device which he named the "Stromerzeuger" which consisted of an arrangement of magnets, flat coils and copper plates with a primary circuit powered by a small battery. The output from the secondary circuit was used to light a bank of lamps and it was claimed that the output power was many times the input power and to continue indefinitely.

The apparatus principally consists of two parallel connected spools which being bi-filarly wound in a special way, are magnetically linked together. One of these spools is composed of copper sheets (the spool is called the 'plate spool'). The other one is made of a number of thin parallel connected isolated wires (called 'spool winding'), running parallel to the plates, at small intervals. Both spools can be fed by separate batteries (6 Volt, 6.5 AHr were used). At least two batteries are needed to get the apparatus operating, but subsequently, one battery can be removed.

The spools are arranged in two halves each by the bi-filar windings. The plate spool also contains iron rods with silver wire connections. These rods are magnetised by a special battery through exciter windings. Electrically, the exciter winding is completely isolated from the other windings. Hans said that the production of energy takes place principally in these iron rods and the winding of the spools plays an essential part in the process.

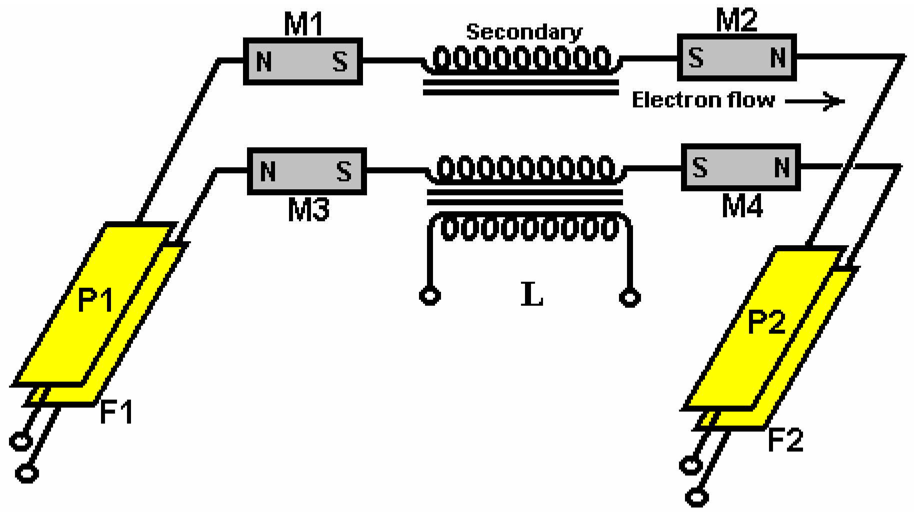
It should be mentioned that the spool circuit is powered up first. Initially, it took a current of 104 mA. The plates and exciter circuits are then switched on simultaneously. When this is done, the current in the spool circuit dropped from 104 mA to about 27 mA.

It is suggested that an electron be not only regarded as a negatively charged particle but also as a South magnetic pole. The basic Stromerzeuger element is that of an open secondary circuit, capacity loaded, inductively coupled to a primary circuit. The novel feature is that the capacities are connected to the secondary core through permanent magnets as shown here:



It is claimed that on switching on the primary circuit, "separation of charges" takes place with M1 becoming positively charged and M2 becoming negatively charged and that these charges are "magnetically polarised" when they formed, owing to the presence of the magnets. When the primary circuit is switched off, a "reversing current" flows in the secondary but the magnets "do not exert a polarising effect on this reversal".

Two of the basic elements shown above are placed together making a double stage arrangement with the copper plates close together (presumably as capacitor plates):



The secondary windings are both exactly equal and wound in a direction such that, on switching the primary coil on, the electrons in the secondary coil flow from P1 to P2 and from F1 to F2. This is the basic working arrangement. More of these double stages can be added to provide higher outputs.

Don Smith. One of most impressive developers of free-energy devices is Don Smith who has produced many spectacular things, generally with major power output. These are a result of his in-depth knowledge and understanding of the way that the environment works. Don says that his understanding comes from the work of Nikola Tesla as recorded in Thomas C. Martin's book "The Inventions, Researches, and Writings of Nikola Tesla" ISBN 0-7873-0582-0 available from http://www.healthresearchbooks.com and various other book companies. Much of the content of the book, such as Tesla's lectures, can be downloaded free from http://www.free-energy-info.com.

Don states that he repeated each of the experiments found in the book and that gave him his understanding of what he prefers to describe as the 'ambient background energy' which is called the 'zero-point energy field' elsewhere in this eBook. Don remarks that he has now advanced further than Tesla in this field, partly because of the devices now available to him and which were not available when Tesla was alive.

Don stresses two key points. Firstly, a dipole can cause a disturbance in the magnetic component of the 'ambient background' and that imbalance allows you to collect large amounts of electrical power, using capacitors and inductors (coils). Secondly, you can pick up as many powerful electrical outputs as you want from that one magnetic disturbance, without depleting the magnetic disturbance in any way. This allows massively more power output than the small power needed to create the magnetic disturbance in the first place. This is what produces a COP>1 device and Don has created nearly fifty different devices based on that understanding.

Although they get removed quite frequently, there is one video which is definitely worth watching if it is still there. It is located at http://www.metacafe.com/watch/2820531/don_smith_free_energy/ and was recorded in 2006. It covers a good deal of what Don has done. In the video, reference is made to Don's website but you will find that it has been taken over by Big Oil who have filled it with innocuous similar-sounding things of no consequence, apparently intended to confuse newcomers. A website which I understand is run by Don's son is http://www.28an.com/altenergypro/index.htm and it has brief details of his prototypes and theory. You will find the only document of his which I could locate, presented as a downloadable .pdf document here http://www.free-energy-info.com/Smith.pdf and it contains the following patent on a most interesting device which appears to have no particular limit on the output power. This is a slightly re-worded copy of that patent.

Patent NL 02000035 A 20th May 2004 Inventor: Donald Lee Smith

TRANSFORMER GENERATOR MAGNETIC RESONANCE INTO ELECTRIC ENERGY

ABSTRACT
The present invention refers to an Electromagnetic Dipole Device and Method, where wasted radiated energy is transformed into useful energy. A Dipole as seen in Antenna Systems is adapted for use with capacitor plates in such a way that the Heaviside Current Component becomes a useful source of electrical energy.

DESCRIPTION

Technical Field:
This invention relates to loaded Dipole Antenna Systems and their Electromagnetic radiation. When used as a transformer with an appropriate energy collector system, it becomes a transformer/generator. The invention collects and converts energy which is radiated and wasted by conventional devices.

Background Art:
A search of the International Patent Database for closely related methods did not reveal any prior art with an interest in conserving radiated and wasted magnetic waves as useful energy.

DISCLOSURE OF THE INVENTION
The invention is a new and useful departure from transformer generator construction, such that radiated and wasted magnetic energy changes into useful electrical energy. Gauss meters show that much energy from conventional electromagnetic devices is radiated into the ambient background and wasted. In the case of conventional transformer generators, a radical change in the physical construction allows better access to the energy available. It is found that creating a dipole and inserting capacitor plates at right angles to the current flow, allows magnetic waves to change back into useful electrical (coulombs) energy. Magnetic waves passing through the capacitor plates do not degrade and the full impact of the available energy is accessed. One, or as many sets of capacitor plates as is desired, may be used. Each set makes an exact copy of the full force and effect of the energy present in the magnetic waves. The originating source is not depleted of degraded as is common in conventional transformers.

BRIEF DESCRIPTION OF THE DRAWINGS
The Dipole at right angles, allows the magnetic flux surrounding it to intercept the capacitor plate, or plates, at right angles. The electrons present are spun such that the electrical component of each electron is collected by the capacitor plates. Essential parts are the South and North component of an active Dipole. Examples presented here exist as fully functional prototypes and were engineer constructed and fully tested in use by the Inventor. In each of the three examples shown in the drawings, corresponding parts are used.

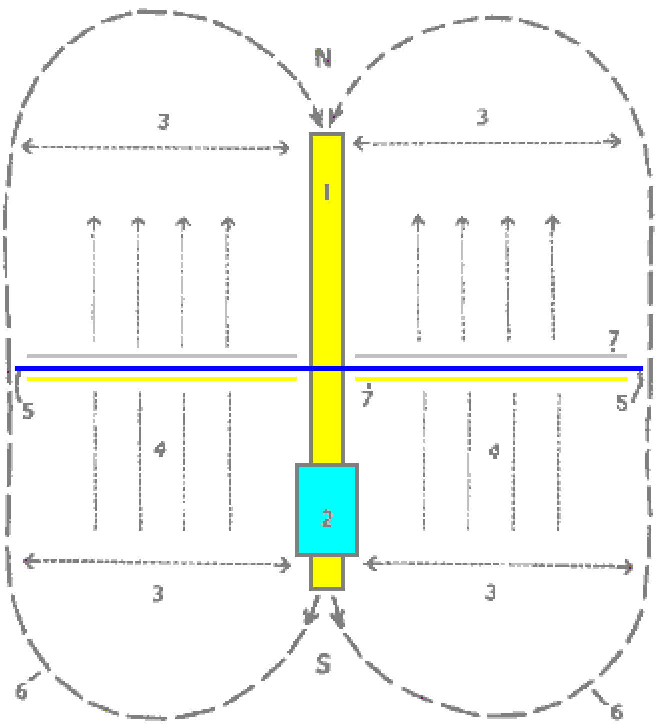


Fig.1 is a View of the Method, where **N** is the North and **S** is the South component of the Dipole.

Here, **1** marks the Dipole with its North and South components. **2** is a resonant high-voltage induction coil. **3** indicates the position of the electromagnetic wave emission from the Dipole. **4** indicates the position and flow direction of the corresponding Heaviside current component of the energy flow caused by the induction coil **2**. **5** is the dielectric separator for the capacitor plates **7**. **6** for the purposes of this drawing, indicates a virtual limit for the scope of the electromagnetic wave energy.

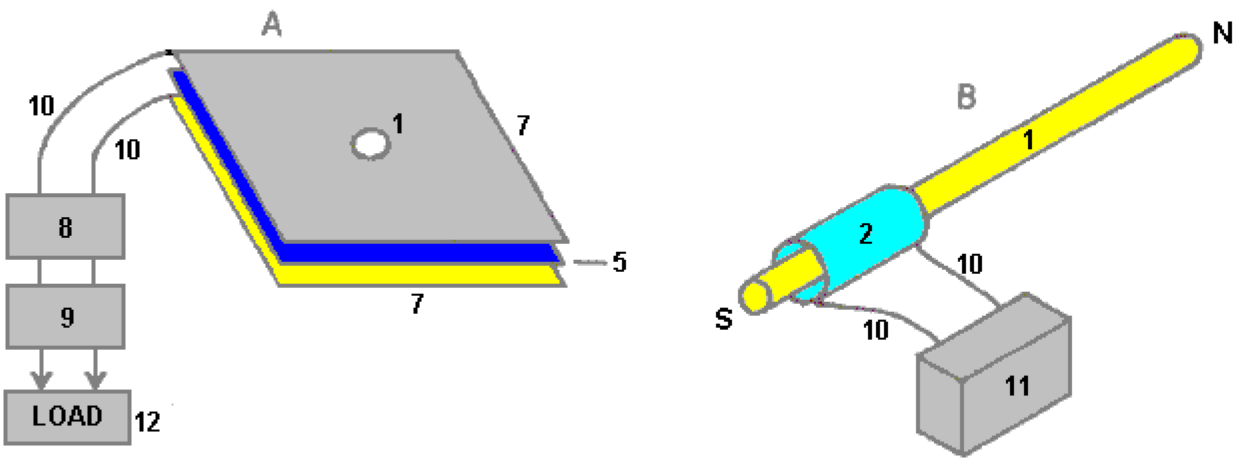


Fig.2 has two parts **A** and **B**.

In **Fig.2A 1** is the hole in the capacitor plates through which the Dipole is inserted and in **Fig.2B** it is the Dipole with its North and South poles shown. **2** is the resonant high-voltage induction coil surrounding part of the Dipole **1**. The dielectric separator **5**, is a thin sheet of plastic placed between the two capacitor plates **7**, the upper plate being made of aluminium and the lower plate made of copper. Unit **8** is a deep-cycle battery system powering a DC inverter **9** which produces 120 volts at 60 Hz (the US mains supply voltage and frequency, obviously, a 240 volt 50 Hz inverter could be used here just as easily) which is used to power whatever equipment is to be driven by the device. The reference number **10** just indicates connecting wires. Unit **11** is a high-voltage generating device such as a neon transformer with its oscillating power supply.

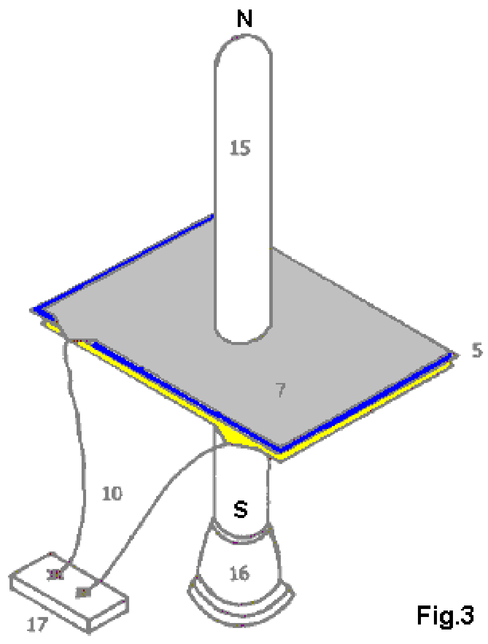


Fig.3

Fig.3 is a Proof Of Principal Device using a Plasma Tube as an active Dipole. In this drawing, **5** is the plastic sheet dielectric separator of the two plates **7** of the capacitor, the upper plate being aluminium and the lower plate copper. The connecting wires are marked **10** and the plasma tube is designated **15**. The plasma tube is four feet long (1.22 m) and six inches (100 mm) in diameter. The high-voltage energy source for the active plasma dipole is marked **16** and there is a connector box **17** shown as that is a convenient method of connecting to the capacitor plates when running tests on the device.

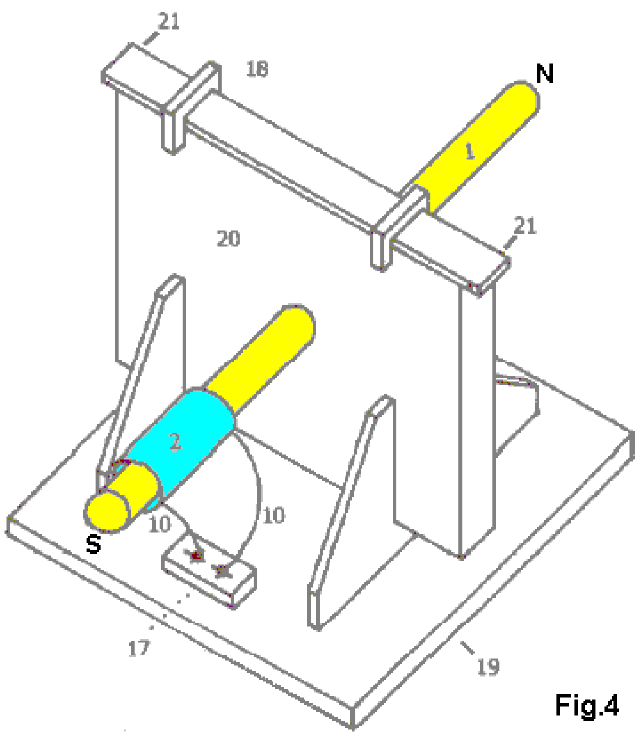


Fig.4

Fig.4 shows a Manufacturer's Prototype, constructed and fully tested. **1** is a metal Dipole rod and **2** the resonant high-voltage induction coil, connected through wires **10** to connector block **17** which facilitates the connection of it's high-voltage power supply. Clamps **18** hold the upper edge of the capacitor packet in place and **19** is the base plate with it's supporting brackets which hold the whole device in place. **20** is a housing which contains the capacitor plates and **21** is the point at which the power output from the capacitor plates is drawn off and fed to the DC inverter.

BEST METHOD OF CARRYING OUT THE INVENTION

The invention is applicable to any and all electrical energy requirements. The small size and it's high efficiency make it an attractive option, especially for remote areas, homes, office buildings, factories, shopping centres, public places, transportation, water systems, electric trains, boats, ships and 'all things great and small'. The construction materials are commonly available and only moderate skill levels are needed to make the device.

CLAIMS

1. Radiated magnetic flux from the Dipole, when intercepted by capacitor plates at right angles, changes into useful electrical energy.

2. A Device and Method for converting for use, normally wasted electromagnetic energy.

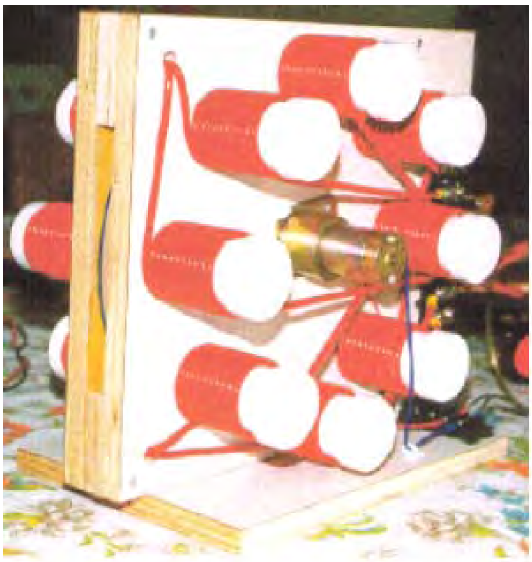
3. The Dipole of the Invention is any resonating substance such as Metal Rods, Coils and Plasma Tubes which have interacting Positive and Negative components.

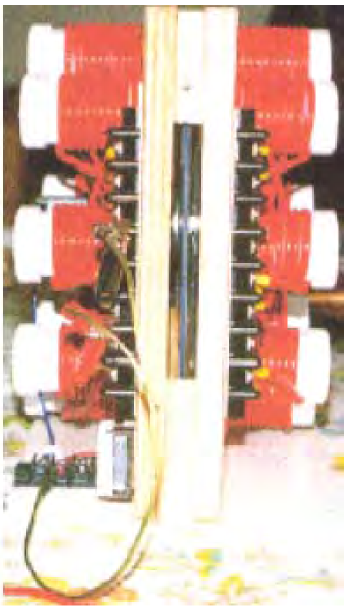
4. The resulting Heaviside current component is changed to useful electrical energy.

****

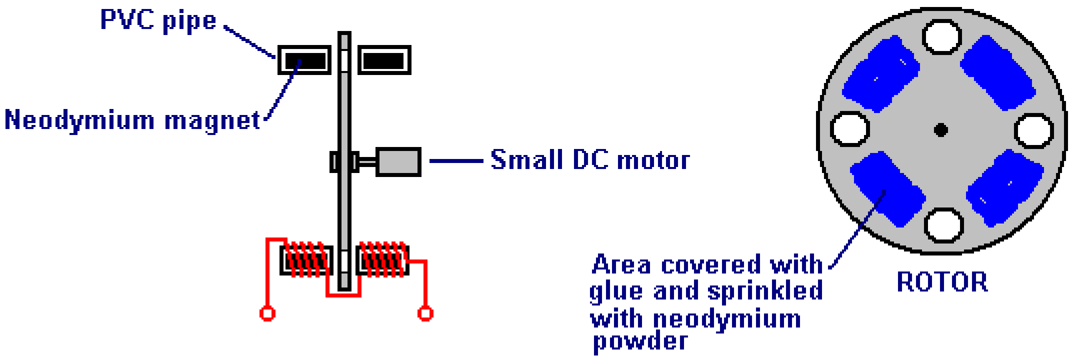
This patent does not make it clear that the device needs to be tuned and that the tuning is related to its physical location. The tuning will be accomplished by applying a variable-frequency input signal to the neon transformer and adjusting that input frequency to give the maximum output.

Don Smith has produced some forty eight different devices, and because he understands that the real power in the universe is magnetic and not electric, these devices have performances which appear staggering to people trained to think that electrical power is the only source of power. One device which is commercially produced in Russia, is shown here:



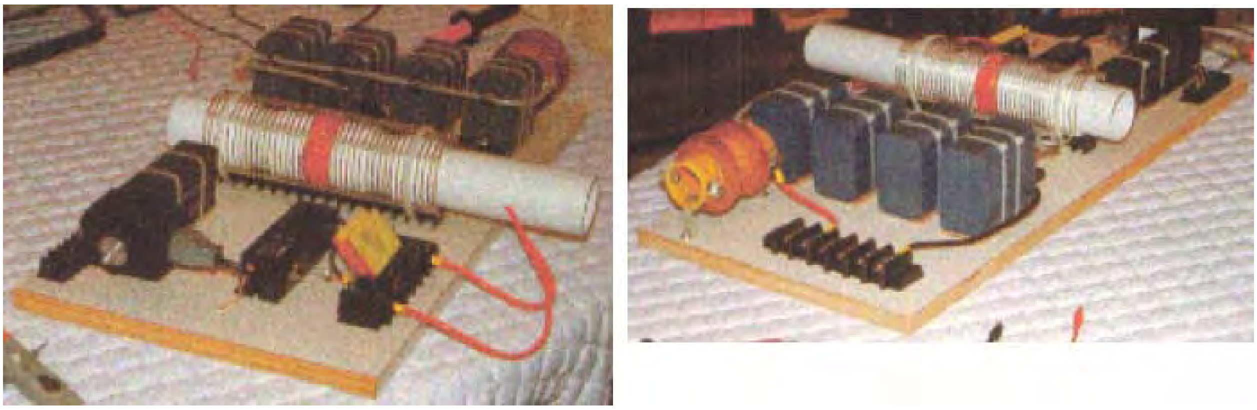


This is a small table-top device which looks like it is an experiment by a beginner, and something which would be wholly ineffective. Nothing could be further from the truth. Each of the eight coils pairs (one each side of the rotating disc) produces 1,000 volts at 50 amps (fifty kilowatts) of output power, giving a total power output of 400 kilowatts. It's overall size is 16" x 14.5" x 10" (400 x 370 x 255 mm). In spite of the extremely high power output, the general construction is very simple:



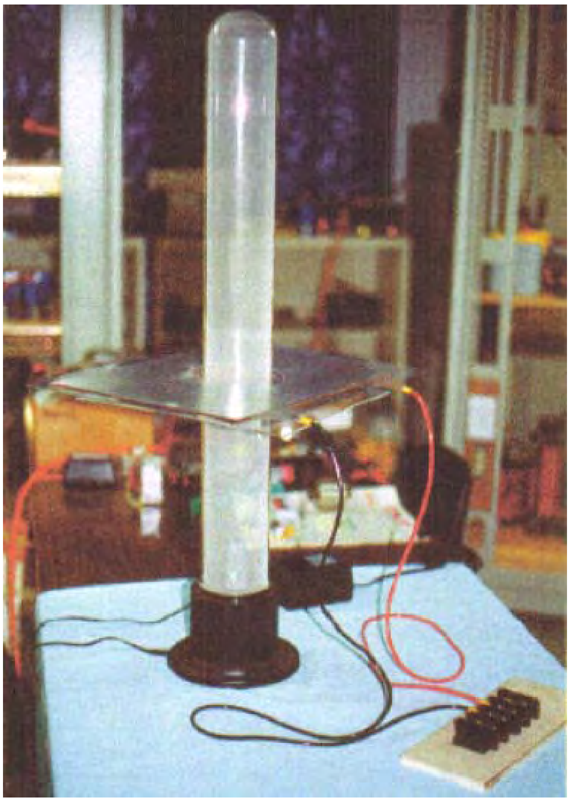
The device operates on a fluctuating magnetic field which is produced by a small low-power DC motor spinning a plastic disc. In the prototype shown above, the disc is an old vinyl record which has had holes cut in it. Between the holes is an area which was covered with glue and then sprinkled with powdered neodymium magnet material. It takes very little power to spin the disc, but it acts in a way which is very much like the Ecklin-Brown generator, repeatedly disrupting the magnetic field. The magnetic field is created by a neodymium magnet in each of the sixteen plastic pipes. It is important that the change in the magnetic flux between the matching magnets on each side of the disc is as large as possible. The ideal rotor material for this is "Terfenol-D" (tungsten zirconate) with slots cut in it but it is so expensive that materials like stainless steel are likely to be used instead.

For Don Smith, this is not an exceptional device. The one shown below is also physically quite small and yet it has an output of 160 kilowatts (8000 volts at 20 amps) from an input of 12 volts 1 amp (COP = 13,333):



Again, this is a device which can be placed on top of a table and is not a complicated form of construction, having a very open and simplistic layout.

Another of Don's devices is shown here:



This is a larger device which uses a plasma tube four feet (1.22 m) long and 6 inches (100 mm) in diameter. The output is a massive 100 kilowatts. This is the design shown as one of the options in Don's patent. Being an Electrical Engineer, none of Don's prototypes are in the "toy" category. If nothing else is taken from Don's work, we should realise that high power outputs can be had from very simple devices.

There is one other brief document "Resonate Electrical Power System" from Don Smith which says:

Potential Energy us everywhere at all times, becoming useful when converted into a more practical form. There is no energy shortage, only grey matter. This energy potential is observed indirectly through the manifestation of electromagnetic phenomenon, when intercepted and converted, becomes useful. In nonlinear systems, interaction of magnetic waves amplify (conjugate) energy, providing greater output than input. In simple form, in the piano where three strings are struck by the hammer, the centre one is impacted and resonance activates the side strings. Resonance between the three strings provides a sound level greater than the input energy. Sound is part of the electromagnetic spectrum and is subject to all that is applicable to it.

"Useful Energy" is defined as "that which is other than Ambient". "Electric Potential" relates to mass and it's acceleration. Therefore, the Earth's Mass and Speed through space, gives it an enormous electrical potential. Humans are like the bird sitting unaware on a high voltage line. in nature, turbulence upsets ambient and we see electrical displays. Tampering with ambient, allows humans to convert magnetic waves into useful electricity.

Putting this in focus, requires a look at the Earth in general. Each minute of each day (1,440 minutes), more than 4,000 displays of lightning occur. Each display yields more than 10,000,000 volts at more than 200,000 amperes in equivalent electromagnetic flux. This is more than 57,600,000,000,000 volts and 1,152,000,000,000 amperes of electromagnetic flux during each 24 hour period. This has been going on for more than 4 billion years. The USPTO insist that the Earth's electrical field is insignificant and useless, and that converting this energy violates the laws of nature. At the same time, they issue patents in which, electromagnetic flux coming in from the Sun is converted by solar cells into DC energy. Aeromagnetic flux (in gammas) Maps World-Wide, includes those provided by the US Department of Interior-Geological Survey, and these show clearly that there is present, a spread of 1,900 gamma above Ambient, from reading instruments flown 1,000 feet above the (surface) source. Coulomb's Law requires the squaring of the distance of the remote reading, multiplied by the recorded reading. Therefore, that reading of 1,900 gamma has a corrected value of 1,900 x 1,000 x 1,000 = 1,900,000,000 gamma.

There is a tendency to confuse "gamma ray" with "gamma". "Gamma" is ordinary, everyday magnetic flux, while "gamma ray" is high-impact energy and not flux. One gamma of magnetic flux is equal to that of 100 volts RMS. To see this, take a Plasma Globe emitting 40,000 volts. When properly used, a gamma meter placed nearby, will read 400 gammas. The 1,900,000,000 gamma just mentioned, is the magnetic ambient equivalent of 190,000,000 volts of electricity. This is on a "Solar Quiet" day. On "Solar Active" days it may exceed five times that amount. The Establishment's idea that the Earth's electrical field is insignificant, goes the way of their other great ideas.

There are two kinds of electricity: "potential" and "useful". All electricity is "potential" until it is converted. The resonant-fluxing of electrons, activates the electrical potential which is present everywhere. The Intensity/CPS of the resonant-frequency-flux rate, sets the available energy. This must then be converted into the required physical dimensions of the equipment being used. For example, energy arriving from the Sun is magnetic flux, which solar cells convert to DC electricity, which is then converted further to suit the equipment being powered by it. Only the magnetic flux moves from point "A" (the Sun) to point "B" (the Earth). All electrical power systems work in exactly the same way. Movement of Coils and Magnets at point "A" (the generator) fluxes electrons, which in turn, excite electrons at point "B" (your house). **None of the electrons at point "A" are ever transmitted to point "B"**. In both cases, the electrons remain forever intact and available for further fluxing. This is not allowed by Newtonian Physics (electrodynamics and the laws of conservation). Clearly, these laws are all screwed up and inadequate.

In modern physics, USPTO style, all of the above cannot exist because it opens a door to overunity. The good news is that the PTO has already issued hundreds of Patents related to Light Amplification, all of which are overunity. The Dynode used to adjust the self-powered shutter in your camera, receives magnetic flux from light which dislodges electrons from the cathode, reflecting electrons through the dynode bridge to the anode, resulting in billions of more electrons out than in. There are currently, 297 direct patents issued for this system, and thousands of peripheral patents, all of which support overunity. More than a thousand other Patents which have been issued, can be seen by the discerning eye to be overunity devices. What does this indicate about Intellectual Honesty?

Any coil system, when fluxed, causes electrons to spin and produce useful energy, once it is converted to the style required by its use. Now that we have described the method which is required, let us now see how this concerns us.

The entire System already exists and all that we need to do is to hook it up in a way which is useful to our required manner of use. Let us examine this backwards and start with a conventional output transformer. Consider one which has the required voltage and current handling characteristics and which acts as an isolation transformer. Only the magnetic flux passes from the input winding to the output winding. No electrons pass through from the input side to the output side. Therefore, we only need to flux the output side of the transformer to have an electrical output. Bad design by the establishment, allowing hysteresis of the metal plates, limits the load which can be driven. Up to this point, only potential is a consideration. Heat (which is energy loss) limits the output amperage. Correctly designed composite cores run cool, not hot.

A power correction factor system, being a capacitor bank, maintains an even flow of flux. These same capacitors, when used with a coil system (a transformer) become a frequency-timing system. Therefore, the inductance of the input side of the transformer, when combined with the capacitor bank, provides the required fluxing to produce the required electrical energy (cycles per second).

With the downstream system in place, all that is needed now is a potential system. Any flux system will be suitable. Any amplification over-unity output type is desirable. The input system is point "A" and the output system is point "B". Any input system where a lesser amount of electrons disturbs a greater amount of electrons - producing an output which is greater than the input - is desirable.

At this point, it is necessary to present updated information about electrons and the laws of physics. A large part of this, originates from me and so is likely to upset people who are rigidly set in the thought patterns of conventional science.

Non - Ionic Electrons

As a source of electrical energy, non-ionic electrons doublets exist in immense quantities throughout the universe. Their origin is from the emanation of Solar Plasma. When ambient electrons are disturbed by being spun or pushed apart, they yield both magnetic and electrical energy. The rate of disturbance (cycling) determines the energy level achieved. Practical methods of disturbing them include, moving coils past magnets or vice versa. A better way is the pulsing (resonant induction) with magnetic fields and waves near coils.

In coil systems, magnetic and amperage are one package. This suggests that electrons in their natural non-ionic state, exist as doublets. When pushed apart by agitation, one spins right (yielding Volts-potential electricity) and the other spins left (yielding Amperage-magnetic energy), one being more negative than the other. This further suggests that when they reunite, we have (Volts x Amps = Watts) useful electrical energy. Until now, this idea has been totally absent from the knowledge base. The previous definition of Amperage is therefore flawed.

Electron Related Energy

	Energy Available	Method of Storage	Common Unit	Units of Measure
	Electrical	Capacitor/Coulombs	Volts	Flux Units
	Spin / Gravity	Momentum	Torque	Ergs
	Magnetic	Coils/Amp. turns	Amperes	Flux Units Teslas, Gauss, Gammas, Oesteds
Electrons				
	Light	Laser	Lux ,	Photons/Gamma Rays
	Impact / resistance			
	Heat	Various	Fahrenheit/Celsius	Temp

Left hand spin of electrons results in Electrical Energy and right hand spin results in Magnetic Energy. Impacted electrons emit visible Light and heat.

Useful Circuits, Suggestions for Building an Operational Unit

1. Substitute a Plasma Globe such as Radio Shack's "Illumna-Storm" for the source-resonant induction system. It will have about 400 milligauss of magnetic induction. One milligauss is equal to 100 volts worth of magnetic induction.

2. Construct a coil using a 5-inch to 7-inch (125 to 180 mm) diameter piece of PVC for the coil former.

3. Get about 30 feet (10 m) of Jumbo-Speaker Cable and separate the two strands. This can be done by sticking a carpet knife into a piece of cardboard or wood, and then pulling the cable carefully past the blade to separate the two insulated cores from each other. (PJK Note: "Jumbo-Speaker Cable" is a vague term as that cable comes in many varieties, with anything from a few, to over 500 strands in each core. As Don points out that the output power increases with each turn of wire, it is distinctly possible that each of these strands acts the same as individual insulated turns which have been connected in parallel, so a 500-strand cable may well be far more effective than a cable with just a few strands).

4. Wind the coil with 10 to 15 turns of wire and leave about 3 feet (1 m) of cable spare at each end of the coil. Use a glue gun to hold the start and finish of the coil.

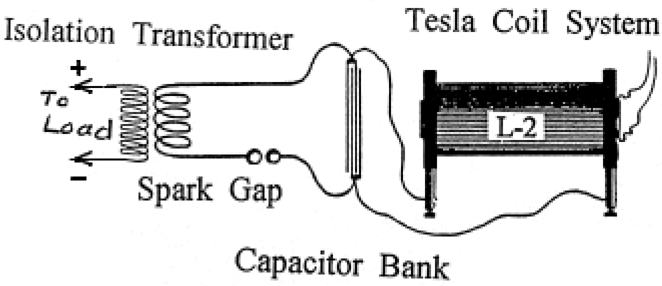
5. This will become the "L - 2" coil shown in the Circuits page.

6. When sitting on top of the Plasma Globe (like a crown) you have a first-class resonant air-core coil system.

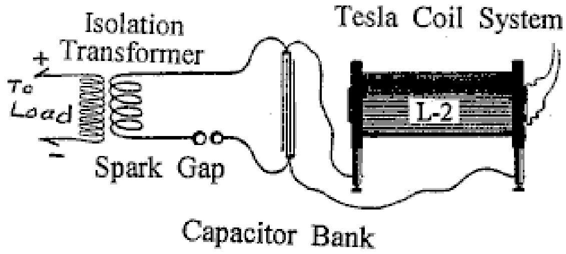
7. Now, substitute two or more capacitors (rated at 5,000 volts or more) for the capacitor bank shown on the Circuits page. I use more than two 34 microfarad capacitors.

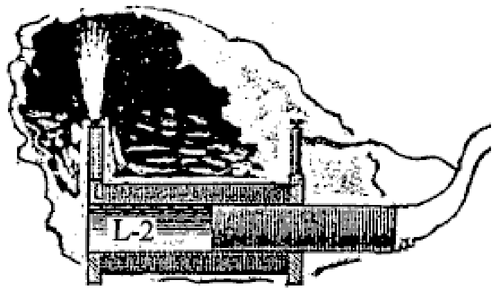
8. Finish out the circuit as shown. You are now in business !

9. Voltage - Amperage limiting resistors are required across the output side of the Load transformer. These are used to adjust the output level and the desired cycles per second.

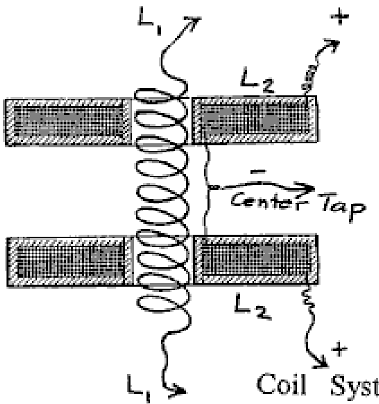


Useful Circuits from Nikola Tesla

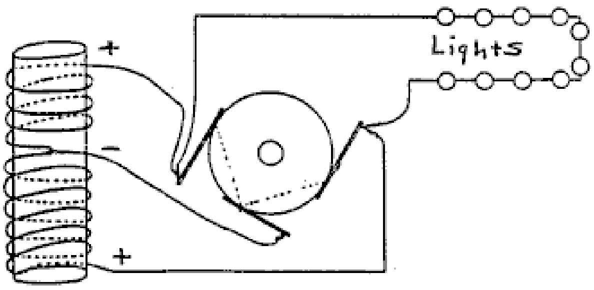




Tunable Coil System
Insertable Movable L-1



Coil System having desired Amperage Output



Armature (generator) taking place of the L - 1 yields desired Amperage

Don Smith's Suggestions: Get a copy of the "Handbook of Electronic Tables and Formulas", published by Sams, ISBN 0-672-22469-0, also an LCR meter is required. Chapter 1 in this book has important time constant (frequency) information and a set of reactance charts in nomograph style (*"nomograph": a graph, usually containing three parallel scales graduated for different variables so that when a straight line connects values of any two, the related value may be read directly from the third at the point intersected by the line*) which makes working, and approximating of the three variables (capacitance, inductance and resistance) much easier. If two of the variables are known, then the third one can be read from the nomograph.

For example, if the input side of the isolation transformer needs to operate at 60 Hz, that is 60 positive cycles and 60 negative cycles, being a total of 120 cycles. Read off the inductance in Henries using the LCR meter attached to the input side of the isolation transformer. Plot this value on the (nomographic) reactance chart. Plot the needed 120 Hz on the chart and connect these two points with a straight line. Where this line crosses the Farads line and the Ohms line, gives us two values. Choose one (resistor) and insert it between the two leads of the transformer input winding.

The Power Correction Factor Capacitor (or bank of more than one capacitor) now need adjusting. The following formula is helpful in finding this missing information. The capacitance is known, as is the desired potential to pulse the output transformer. One Farad of capacitance is one volt for one second (one Coulomb). Therefore, if we want to keep the bucket full with a certain amount, how many dippers full are needed? If the bucket needs 120 volts, then how many coulombs are required?

$$\frac{\text{Desired Voltage}}{\text{Capacitance in Microfarads}} = \text{Required frequency in Hz}$$

Now, go to the Reactance Chart mentioned above, and find the required resistor jumper to place between the poles of the Correction Factor Capacitor.

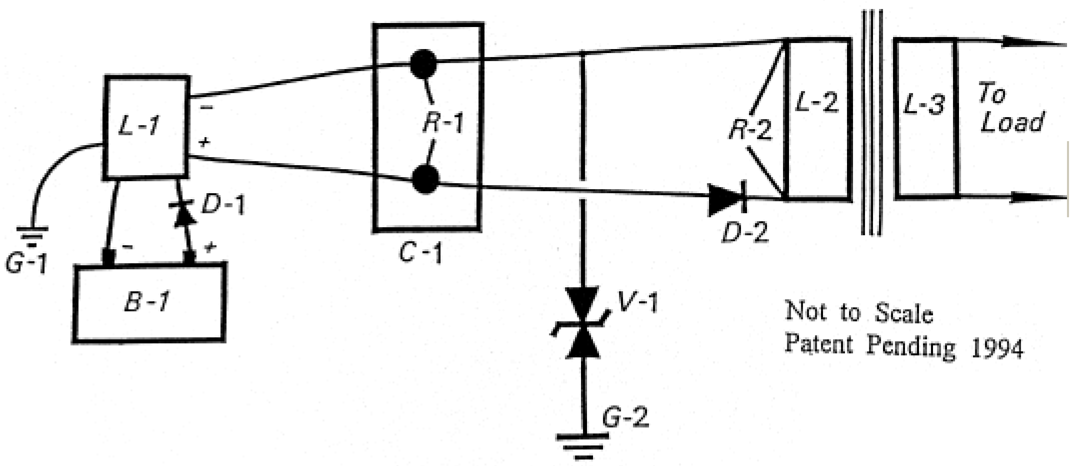
A earth grounding is desirable as a voltage-limiter and transient spike control. Two are necessary, one at the Power Factor Capacitor and one at the input side of the isolation transformer. Off-the-shelf surge arrestors / spark gaps and varistors having the desired voltage/potential and amperage control are commonly available. Siemans, Citel America and others, make a full range of surge arrestors, etc. Varistors look like coin-sized flat capacitors. Any of these voltage limiters are marked as "V - 1" in the following text.

It should be obvious that several separate closed circuits are present in the suggested configuration: The power input source, the high-voltage module, a power factor capacitor bank combined with the input side of the isolation transformer. Lastly, the output side of the isolation transformer and its load. None of the electrons active at the power source (battery) are passed through the system for use downstream. At any point, if the magnetic flux rate should happen to vary, then the number of active electrons also varies. Therefore, controlling the flux rate controls the electron (potential) activity. Electrons active at point "A" are not the same electrons active at point "B", or point "C", and so on. If the magnetic flux rate (frequency Hz) varies, then a different number of electrons will be disturbed. This does not violate any Natural Law and does produce more energy out than in should that be desirable.

A convenient high-voltage module is a 12 volt DC neon tube transformer. The Power Factor Correction Capacitors should be as many microfarads as possible as this allows a lower operating frequency. The 12-volt neon tube transformer oscillates at about 30,000 Hz. At the Power Correction Factor Capacitor bank we lower the frequency to match the input side of the isolation transformer.

Other convenient high-voltage sources are car ignition coils, television flyback transformers, laser printer modules, and various other devices. Always lower the frequency at the Power Factor Correction Capacitor and correct, if needed, at the input side of the isolation transformer. The isolation transformer comes alive when pulsed. Amperage becomes a part of the consideration only at the isolation transformer. Faulty design, resulting in hysteresis, creates heat which self-destructs the transformer if it is overloaded. Transformers which have a composite core instead of the more common cores made from many layers of thin sheets of soft iron, run cool and can tolerate much higher amperage.

RESONATE ELECTROMAGNETIC POWER SYSTEM



Power Source: B - 1 Gelcell, 12 Volt, 7 Amp Hour
D - 1 Kick back protection for L - 1
L - 1 Bertonee, NPS - 12D8, constant burn Neon Tube transformer, Bertonee, Boston, MS

Power Conditioner: C - 1, Capacitor or Capacitor Bank, 8,000 microfarads for 480 volts DC . R - 1, Resister used to set electron pump rate, frequency of the capacitor. Maintains the desired voltage level required to operate the system .

Voltage Control: V-1, Varistor, limits the voltage as required for the Output Transformer L -2. (480 V @ 60 Amps)

Output Transformer: Isolation Type, (L - 2 / L-3) with R - 2 (resistor) correcting the output frequency to 60 CPS, being 60 UP and 60 DN (120 total). (28.8 KVA)

Useful Timing Formulas:

T = frequency in cycles per second
C = capacitance in microfarads
L = Inductance in milliheneries
R = resistance in ohms

Therefore: $T = RC$ and $T = \frac{L}{R}$

The information shown above, relates to the small Suitcase Model demonstrated at the 1996 Tesla Convention, presented as Don Smiths' Workshop. This unit was a very primitive version and newer versions have atomic batteries and power output ranges of Gigawatts. The battery requirement is low level and is no more harmful than the radium on the dial of a clock. Commercial units of Boulder Dam size are currently being installed at several major locations throughout the world. For reasons of Don's personal security and contract obligations, the information which he has shared here, is incomplete.

Booker, H.G., " Energy in Electromagnetism ", Institute of Electrical Engineers, Peter Peregrinus, Ltd., 1982, I.S.B.N. 0-906048-59-1

Bleany and Bleany, " Electricity and Magnetism ", Oxford University Press, 1991, I.S.B.N. 0-19-851172-8

Chapman and Bartels, " Geomagnetism ", 3 vol., Oxford University Press, 1940

Hammond, P., " Energy Methods in Electromagnetism ", Oxford University Press, 1986, I.S.B.N. 0-19-859368-6

Matsushita and Campbell, " Physics of Geomagneic Phenomena ", several vols., National Center for Atmospheric Research, Boulder, Colorado, Academic press, 1967

Nashida, A., " Geomagnetic Diagnosis of the Magnetosphere ", University of Tokyo, Springer-Verlag, 1978, I.S.B.N. 0-387-08297-2

Rieger, Von Heinz., " Der Magnetisch Kreis ", Siemens A.G., Berlin and Munchen, Germany, I.S.B.N. 3-8009-4719-6

Rokityansky, I.I., " Geoelectrical investigation of the Earth's Crust and Mantel ", Institute of Geophysics, Kiev, U.S.S.R., Springer-Verlag, 1982, I.S.B.N. 3-540-10630-8

Vigoureux, P., " Units and Standards for Electromagnetics ", National Physical Laboratory, 1971, Springer-Verlag, I.S.B.N. 0-387-91077-8

Finnell, Woosley, " Solar Power Satellite Microwave Transmission and Receiver System. Energy Conversion Conference, Sept. 1981 pp 266-271

Glaser, " Satellite Solar Power Station " The Journal of Solar Energy and Technology, Vol. 12, No. 3., p. 353 .

Denmum et al, "A Microwave Power Transmission System for Space Satellite Power", Energy Conversion Conference Conference, Sept. 1977, pp 162-168

Nalos et al, "Microwave Power Beaming for long range energy transfer" "Proceedings of the 8 th European Microwave Conference" pp 573-578, 4 through 8 th. Sept., 1978

Angrist, S.W., " Direct Energy Conversion ", forth edition, Carnegie-Mellon University, Pub. Allyn and Bacon, Boston, London, Sidney and Toronto, ISBN 0-205-07758-7

Smith, D.L., " An Answer to Americas Energy Defict " , fifth edition, Pub. International Tesla Society, Colorado Springs, Co., 1996

Aspden, H. " The Law of Electrodynamics ", J. Franklin Inst., 287:179, 1969.

Sethian, J.D., " Anomalous Electron-Ion Energy Transfer ", Phys. Rev. Letters, vol. 40, No. 7, pp. 451-454 , 1978.

Westinghouse R. & D., "Electromagnetic Spectrum Chart"., Pub. The Exploratorium, San Francisco, CA 94123, Distributed by Edmond Scientific, Barrington, N.J. 06007 Order # 609-573-6250

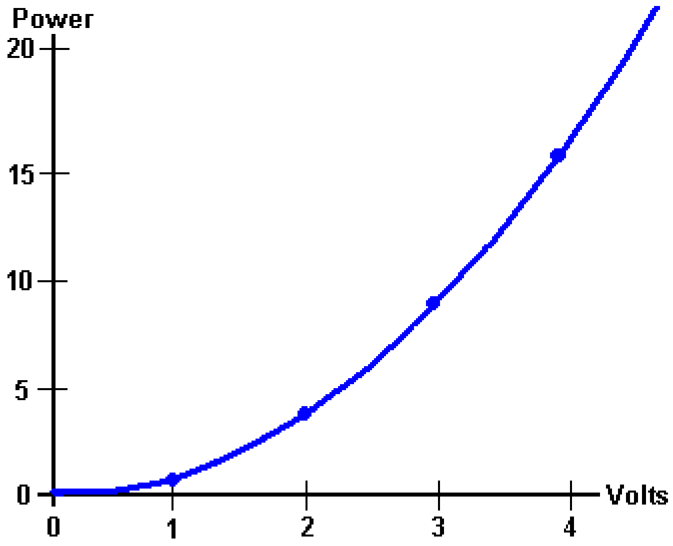
I am most definitely not an expert in this area. However, it is probably worth mentioning some of the main points which Don Smith appears to be making. There are some very important points being made here, and grasping these may make a considerable difference to our ability to tap into the excess energy available in our local environment. There are four points worth mentioning:

1. Voltage
2. Frequency
3. Magnetic / Electric relationship
4. Resonance

1. Voltage. We tend to view things with an 'intuitive' view, generally based on fairly simple concepts. For example, we automatically think that it is more difficult to pick up a heavy object than to pick up a light one. How much more difficult? Well, if it is twice as heavy, it would probably be about twice as much effort to pick it up. This view has developed from our experience of things which we have done in the past, rather than on any mathematical calculation or formula.

Well, how about pulsing an electronic system with a voltage? How would the output power of a system be affected by increasing the voltage? Our initial 'off-the cuff' reaction might be that the power output might be increased a bit, but then hold on… we've just remembered that Watts = Volts x Amps, so if you double the voltage, then you would double the power in watts. So we might settle for the notion that if we doubled the voltage then we could double the output power. If we thought that, then we would be wrong.

Don Smith points out that as capacitors and coils store energy, if they are involved in the circuit, then the output power is proportional to the **square** of the voltage used. Double the voltage, and the output power is four times greater. Use three times the voltage and the output power is nine times greater. Use ten times the voltage and the output power is one hundred times greater !



Don says that the energy stored, multiplied by the cycles per second, is the energy being pumped by the system. Capacitors and inductors (coils) temporarily store electrons, and their performance is given by:

Capacitor formula: $\mathbf{W = 0.5 \times C \times V^2 \times Hz}$ where:

W is the energy in Joules (Joules = Volts x Amps x seconds)
C is the capacitance in Farads
V is the voltage
Hz is the cycles per second

Inductor formula: $\mathbf{W = 0.5 \times L \times A^2 \times Hz}$ where:

W is the energy in Joules
L is the inductance in henrys
A is the current in amps
Hz is the frequency in cycles per second

You will notice that where inductors (coils) are involved, then the output power goes up with the square of the current. Double the voltage **and** double the current gives four times the power output due to the increased voltage and that increased output is increased by a further four times due to the increased current, giving sixteen times the output power.

2. Frequency. You will notice from the formulas above, that the output power is directly proportional to the frequency "Hz". The frequency is the number of cycles per second (or pulses per second) applied to the circuit. This is something which is not intuitive for most people. If you double the rate of pulsing, then you double the power output. When this sinks in, you suddenly see why Nikola Tesla tended to use millions of volts and millions of pulses per second.

However, Don Smith states that when a circuit is at it's point of resonance, resistance in the circuit drops to zero and the circuit becomes effectively, a superconductor. The energy for such a system which is in resonance is:

Resonant circuit: $\mathbf{W = 0.5 \times C \times V^2 \times (Hz)^2}$ where:

W is the energy in Joules
C is the capacitance in Farads
V is the voltage
Hz is the cycles per second

If this is correct, then raising the frequency in a resonating circuit has a massive effect on the power output of the device. The question then arises: why is the mains power in Europe just fifty cycles per second and in America just sixty cycles per second? If power goes up with frequency, then why not feed households at a million cycles per second? One major reason is that it is not easy to make electric motors which can be driven with power delivered at that frequency, so a more suitable frequency is chosen in order to suit the motors in vacuum cleaners, washing machines and other household equipment.

However, if we want to extract energy from the environment, then we should go for high voltage and high frequency. Then, when high power has been extracted, if we want a low frequency suited to electric motors, we can pulse the already captured power at that low frequency.

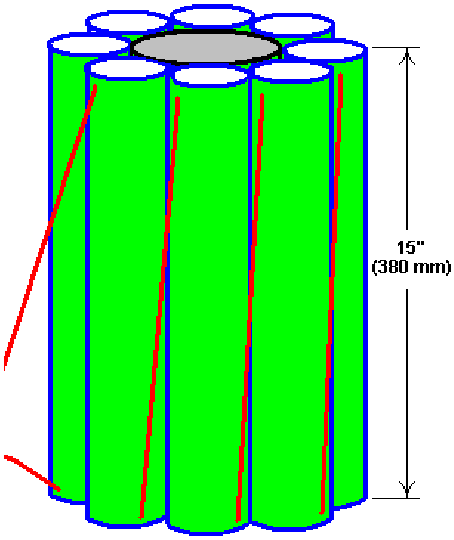
It might be speculated that if a device is being driven with sharp pulses which have a very sharply rising leading edge, that the effective frequency of the pulsing is actually determined by the speed of that rising edge, rather than the rate at which the pulses are actually generated. For example, if pulses are being generated at, say, 50 kHz but the pulses have a leading edge which would be suited to a 200 kHz pulse train, then the device might well see the signal as a 200 kHz signal with a 25% Mark/Space ratio, the very suddenness of the applied voltage having a magnetic shocking effect equivalent to a 200 kHz pulse train.

3. Magnetic / Electric relationship. Don states that the reason why our present power systems are so inefficient is because we concentrate on the electric component of electromagnetism. These systems are always COP<1 as electricity is the 'losses' of electromagnetic power. Instead, if you concentrate on the magnetic component, then there is no limit on the electric power which can be extracted from that magnetic component. Contrary to what you might expect, if you install a pick-up system which extracts electrical energy from the magnetic component, you can install any number of other identical pick-ups, each of which extract the same amount of electrical energy from the magnetic input, **without** loading the magnetic wave in any way. Unlimited electrical output for the 'cost' of creating a single magnetic effect.

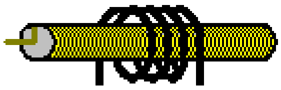
The magnetic effect which we want to create is a ripple in the zero-point energy field, and ideally, we want to create that effect while using very little power. Creating a dipole with a battery which has a Plus and a Minus terminal or a magnet which has North and South poles, is an easy way to do create an electromagnetic imbalance in the local environment. Pulsing a coil is probably an even better way as the magnetic field reverses rapidly if it is an air-core coil, such as a Tesla Coil. Using a ferromagnetic core to the coil can create a problem as iron can't reverse it's magnetic alignment very rapidly, and ideally, you want pulsing which is at least a thousand times faster than iron can handle.

Don draws attention to the "Transmitter / Receiver" educational kit "Resonant Circuits #10-416" supplied by The Science Source, Maine. This kit demonstrates the generation of resonant energy and it's collection with a receiver circuit. However, if several receiver circuits are used, then the energy collected is increased several times without any increase in the transmitted energy. This is similar to a radio transmitter where hundreds of thousands of radio receivers can receive the transmitted signal without loading the transmitter in any way.

This immediately makes the Hubbard device spring to mind. Hubbard has a central "electromagnetic transmitter" surrounded by a ring of "receivers" closely coupled magnetically to the transmitter, each of which will receive a copy of the energy sent by the transmitter:



Don points to an even more clearly demonstrated occurrence of this effect in the Tesla Coil. In a typical Tesla Coil, the primary coil is much larger diameter than the inner secondary coil:



If, for example, 8,000 volts is applied to the primary coil which has four turns, then each turn would have 2,000 volts of potential. Each turn of the primary coil transfers electromagnetic flux to every single turn of the secondary winding, and the secondary coil has a very large number of turns. Massively more power is produced in the secondary coil than was used to energise the primary coil. A common mistake is to believe that a Tesla Coil can't produce serious amperage. If the primary coil is positioned in the middle of the secondary coil as shown, then the amperage generated will be as large as the voltage generated. A low power input to the primary coil can produce kilowatts of usable electrical power as described in chapter 5.

4. Resonance. An important factor in circuits aimed at tapping external energy is resonance. It can be hard to see where this comes in when it is an electronic circuit which is being considered. However, everything has it's own resonant frequency, whether it is a coil or any other electronic component. When components are connected together to form a circuit, the circuit has an overall resonant frequency. As a simple example, consider a swing:

If the swing is pushed before it reaches the highest point on the mother's side, then the push actually detracts from the swinging action. The time of one full swing is the resonant frequency of the swing, and that is determined by the length of the supporting ropes holding the seat and not the weight of the child nor the power with which the child is pushed. Provided that the timing is exactly right, a very small push can get a swing moving in a substantial arc. The key factor is, matching the pulses applied to the swing, to the resonant frequency of the swing. Get it right and a large movement is produced. Get it wrong, and the swing doesn't get going at all (at which point, critics would say "see, see …swings just don't work - this proves it !!").

Establishing the exact pulsing rate needed for a resonant circuit is not particularly easy, because the circuit contains coils (which have inductance, capacitance and resistance), capacitors (which have capacitance and a small amount of resistance) and resistors and wires, both of which have resistance and some capacitance.

These kinds of circuit are called "LRC" circuits because "L" is the symbol used for inductance, "R" is the symbol used for resistance and "C" is the symbol used for capacitance.

Don Smith provides instructions for winding and using the type of air-core coils needed for a Tesla Coil. He says:

1. Decide a frequency and bear in mind, the economy of the size of construction selected. The factors are:

(a) Use radio frequency (above 20 kHz).
(b) Use natural frequency, i.e. match the coil wire length to the frequency - coils have both capacitance and inductance.
(c) Make the wire length either one quarter, one half or the full wavelength.
(d) Calculate the wire length in feet as follows:
If using one quarter wavelength, then divide 247 by the frequency in MHz.
If using one half wavelength, then divide 494 by the frequency in MHz.
If using the full wavelength, then divide 998 by the frequency in MHz.
For wire lengths in metres:
If using one quarter wavelength, then divide 75.29 by the frequency in MHz.
If using one half wavelength, then divide 150.57 by the frequency in MHz.
If using the full wavelength, then divide 304.19 by the frequency in MHz.

2. Choose the number of turns to be used in the coil when winding it using the wire length just calculated. The number of turns will be governed by the diameter of the tube on which the coil is to be wound. Remember that the ratio of the number of turns in the "L - 1" and "L - 2" coils, controls the overall output voltage. For example, if the voltage applied the large outer coil "L - 1" is 2,400 volts and L - 1 has ten turns, then each turn of L - 1 will have 240 volts dropped across it. This 240 volts of magnetic induction transfers 240 volts of electricity to every turn of wire in the inner "L - 2" coil. If the diameter of L - 2 is small enough to have 100 turns, then the voltage produced will be 24,000 volts. If the diameter of the L - 2 former allows 500 turns, then the output voltage will be 120,000 volts.

3. Choose the length and diameter of the coils. The larger the diameter of the coil, the fewer turns can be made with the wire length and so the coil length will be less, and the output voltage will be lower.

4. For example, if 24.7 MHz is the desired output frequency, then the length of wire, in feet, would be 247 divided by 24.7 which is 10 feet of wire (3,048 mm). The coil may be wound on a standard size of PVC pipe or alternatively, purchased from a supplier - typically, an amateur radio supply store.

If the voltage on each turn of L - 1 is arranged to be 24 volts and the desired output voltage 640 volts, then there needs to be 640 / 24 = 26.66 turns on L - 2, wound with the 10 feet of wire already calculated.

Note: At this point, Don's calculations go adrift and he suggests winding 30 turns on a 2-inch former. If you do that, then it will take about 16 feet of wire and the resonant point at 10-feet will be at about 19 turns, giving an output voltage of 458 volts instead of the required 640 volts, unless the number of turns on L - 1 is reduced to give more than 24 volts per turn. However, the actual required diameter of the coil former (plus one diameter of the wire) is 10 * 12 / (26.67 * 3.14159) = 1.43 inches. You can make this size of former up quite easily if you want to stay with ten turns on the L - 1 coil.

5. Connect to the start of the coil. To determine the exact resonant point on the coil, a measurement is made. Off-the-shelf multimeters are not responsive to high-frequency signals so a cheap neon is used instead. Holding one wire of the neon in one hand and running the other neon wire along the outside of the L - 2 winding, the point of brightest light is located. Then the neon is moved along that turn to find the brightest point along that turn, and when it is located, a connection is made to the winding at that exact point. L - 2 is now a resonant winding. It is possible to increase the ("Q") effectiveness of the coil by spreading the turns out a bit instead of positioning them so that each turn touches both of the adjacent turns.

6. The input power has been suggested as 2,400 volts. This can be constructed from a Jacob's ladder arrangement or any step-up voltage system. An off-the-shelf module as used with lasers is another option.

7. Construction of the L - 1 input coil has been suggested as having 10 turns. The length of the wire in this coil is not critical. If a 2-inch diameter PVC pipe was used for the L - 2 coil, then the next larger size of PVC pipe can be used for the L - 1 coil former. Cut a 10-turn length of the pipe (probably a 3-inch diameter pipe). The pipe length will depend on the diameter of the insulated wire used to make the winding. Use a good quality multimeter or a specialised LCR meter to measure the capacitance (in Farads) and the inductance (in henrys) of the L - 2 coil. Now, put a capacitor for matching L - 1 to L - 2 across the voltage input of L - 1, and a spark gap connected in parallel is required for the return voltage from L - 1. A trimmer capacitor for L - 1 is desirable.

8. The performance of L - 2 can be further enhanced by attaching an earth connection to the base of the coil. The maximum output voltage will be between the ends of coil L - 2 and lesser voltages can be taken off intermediate points along the coil if that is desirable.

There is a most interesting patent application from Kwang-jeek Lee in which Mr Lee shows clearly how arranging a resonant circuit which is placed between the power supply and the load which is being power by that power supply can have a spectacular effect. His patent application may be a little difficult for some to follow in detail, and if that is the case then please just pay attention to the overall effect as described by him here:

Patent Application US 2008/0297134 12th April 2008 Inventor: Kwang-jeek Lee

CIRCUIT FOR TRANSMITTING AMPLIFIED RESONANT POWER TO A LOAD

ABSTRACT

A circuit for transferring amplified resonant power to a load is disclosed. The circuit transfers amplified resonant power, which is generated in an inductor of a conventional transformer when serial or parallel resonance of a conventional power supply is formed. This amplified power is transferred to a load through the conventional transformer. The circuit comprises of: a power supply for producing and supplying voltage or current; a power amplifier for generating amplified resonant power using the voltage or current; and a power transferring unit for transferring the amplified resonant power to the load using a transformer

TECHNICAL FIELD

The present invention relates to a power amplifier circuit and its power transferring capabilities. More particularly, this invention relates to a circuit which can transfer amplified resonant power, to a load through a conventional transformer, the power being generated by an inductor of a conventional transformer when serial or parallel resonance of a conventional power supply is formed.

BACKGROUND ART

An electric power supply produces electric power and supplies that electric power to a load which is connected directly to it. An example of such an electric power supply is an electric generator. When such an electric generator produces electric power, a transformer is used to transform the electric power into a voltage or current suited to the resistance of the load and then supplies it to the load.

With a conventional power supply, a primary power supply provides electric power directly to a load. That is, the consumption power of the load is directly provided by the independent power supply. A method where electric power provided from an independent power supply is amplified and then supplied to a load has not been known. If this is done, then the electric power consumption can be reduced. That is, such an idea becomes a landmark in the industry.

DISCLOSURE OF THE INVENTION

Therefore, it is an object of the present invention to provide a circuit for transferring amplified resonant power to a load. A circuit which is capable of transferring Q times the original power as an amplified resonant power output. This power is generated at an inductor of a conventional transformer when serial or parallel resonance of a conventional power supply is formed. This power is then passed to a load through a conventional transformer, thereby providing a higher amount of power to the load than can be supplied by a conventional circuit.

In accordance with an aspect of the present invention, the above and other objects can be accomplished by the provision of a circuit for transferring amplified resonant power to a load, comprising:

1. A power supply for producing and supplying voltage or current;
2. A power amplifier for generating amplified resonant power using that voltage or current; and
3. A power-transferring unit for transferring the amplified resonant power to the load using a transformer.

Preferably, the power supply either supplies AC voltage, AC current, DC voltage or DC current. Ideally, the power amplifier should include:

1. A primary inductor of the transformer; and
2. A capacitor connected to the primary inductor in serial or in parallel.

Here, the amplified resonant power is stored in the primary inductor. Ideally, the reflective impedance at the primary side of the transformer has a relatively small value so that the power amplifier can maintain resonance.

BRIEF DESCRIPTION OF THE DRAWINGS

The above and other object, feature and other advantages of the present invention will be more clearly understood from the following detailed description taken in conjunction with the accompanying drawings, in which:

[Fig. 1]

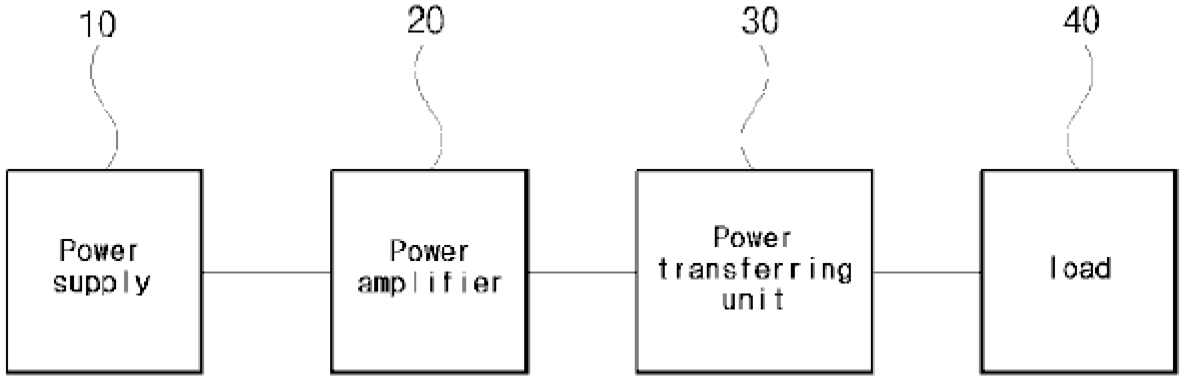


Fig.1 is a schematic circuit block diagram according to an embodiment of the present invention;

[Fig. 2]

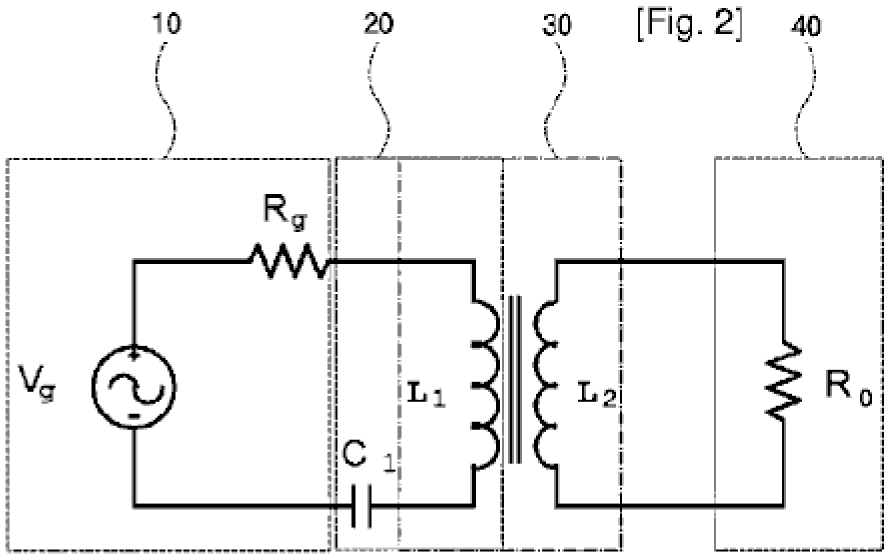


Fig.2 is a view illustrating a circuit that transfers amplified resonant power, generated in serial resonance, to a load, according to an embodiment of the present invention;

[Fig. 3]

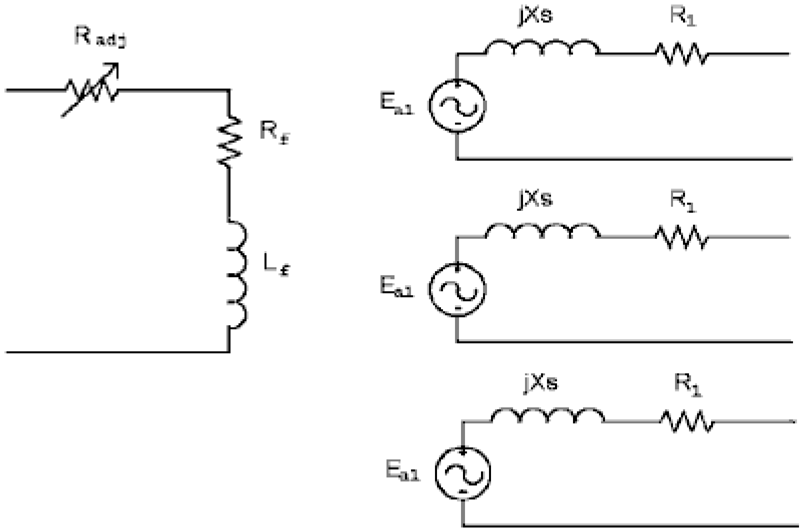


Fig.3 shows equivalent circuit diagrams of a three-phase synchronous electric generator according to an embodiment of the present invention;

[Fig. 4]

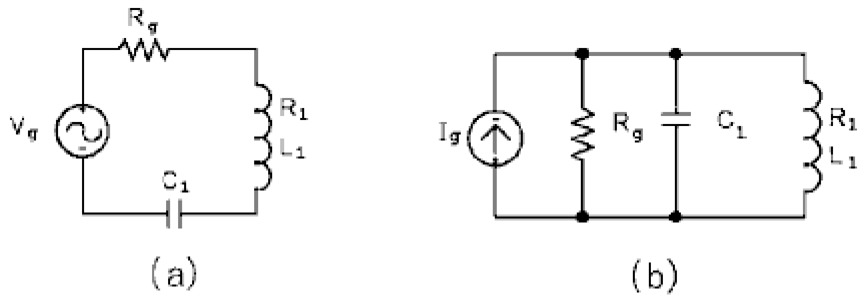


Fig.4A and **Fig.4B** are equivalent circuit diagrams of serial and parallel resonance circuits, respectively, according to an embodiment of the present invention;

[Fig. 5]

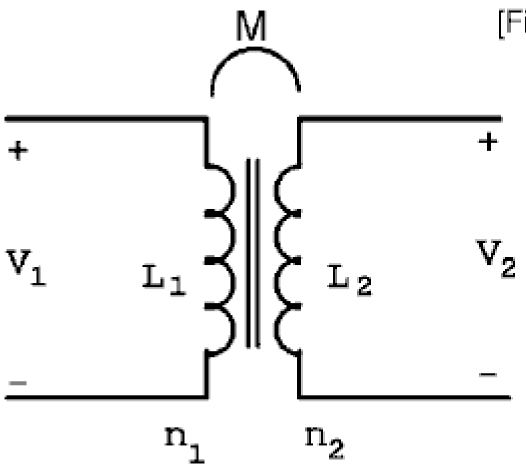


Fig.5 is an equivalent circuit diagram of a transformer according to an embodiment of the present invention;

[Fig. 6]

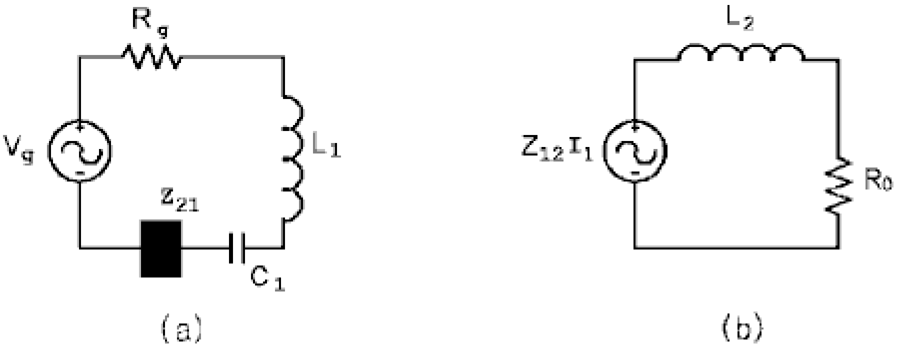


Fig.6A and **Fig.6B** are equivalent circuit diagrams when a transformer connected to a load is in serial resonance, according to an embodiment of the present invention;

[Fig. 7]

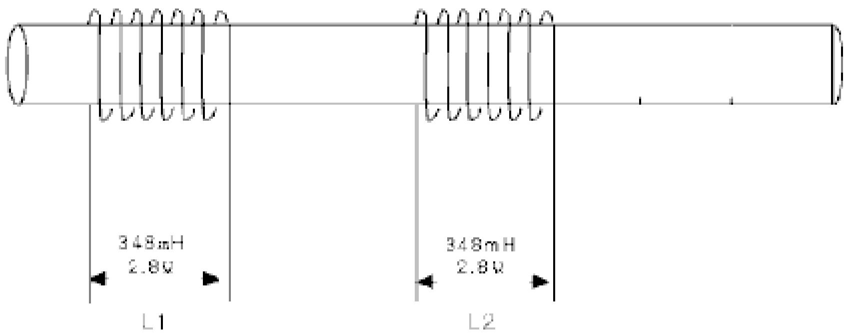


Fig.7 is an exemplary view illustrating a transformer used in an embodiment of the present invention;

[Fig. 8]

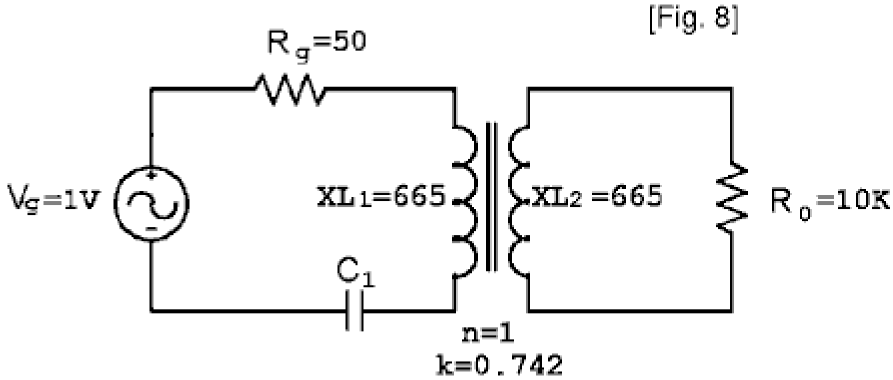


Fig.8 is an equivalent circuit diagram of an electric power amplification/transfer experiment circuit, according to an embodiment of the present invention;

[Fig. 9]

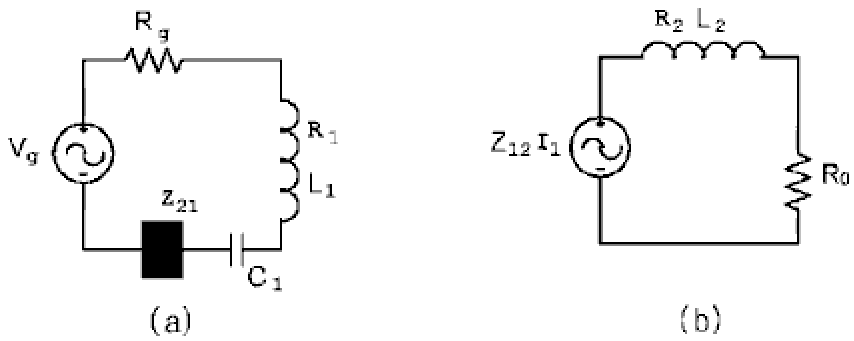


Fig.9 shows equivalent circuit diagrams of a circuit used in an experiment according to the present invention;

[Fig. 10]

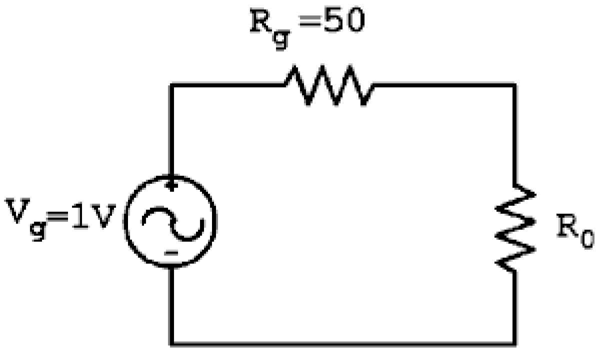


Fig.10 is a circuit diagram where a load is directly connected to a power supply according to an experiment of the present invention;

[Fig. 11]

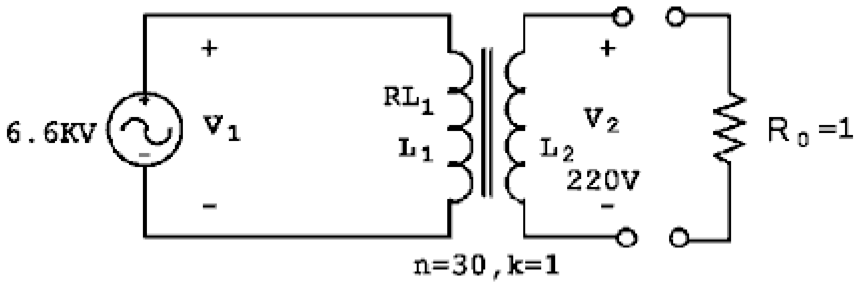


Fig.11 is an equivalent circuit diagram of a final transformer for electric power transfer according to an experiment of the present invention.

[Fig. 12]

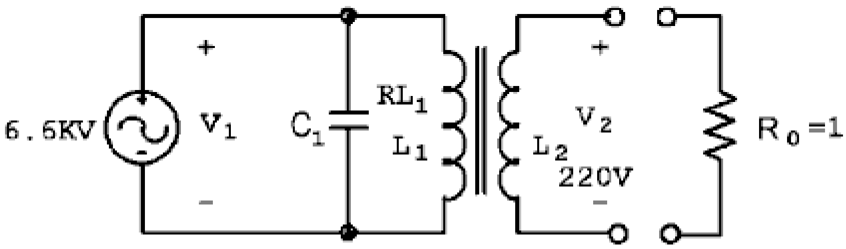


Fig.12 is an equivalent circuit diagram of an electric power transfer resonant voltage source according to an experiment of the present invention;

[Fig. 13]

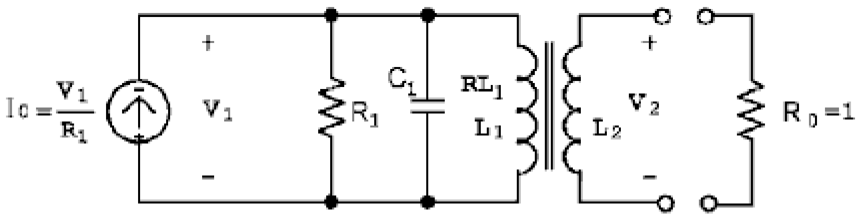


Fig.13 is an equivalent circuit diagram of an electric power transfer resonant current source according to an experiment of the present invention;

[Fig. 14]

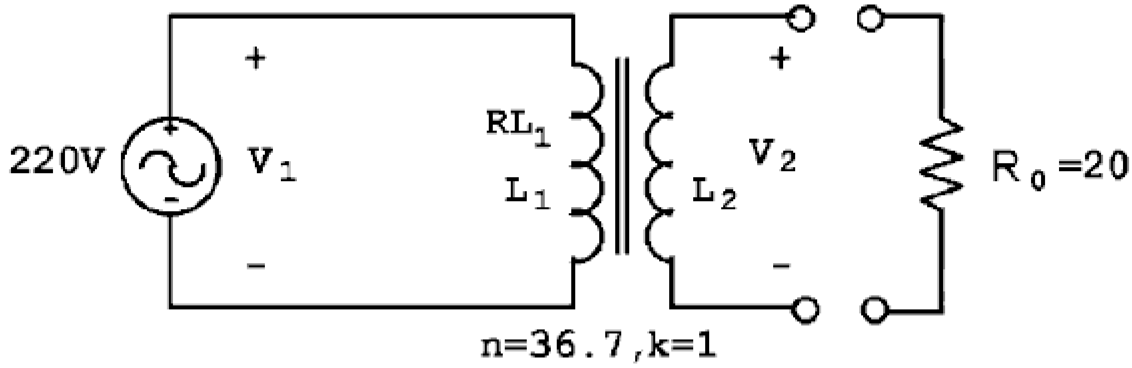


Fig.14 is an equivalent circuit diagram of an electric power transfer transformer of a home electrical appliance, according to an experiment of the present invention; and

[Fig. 15]

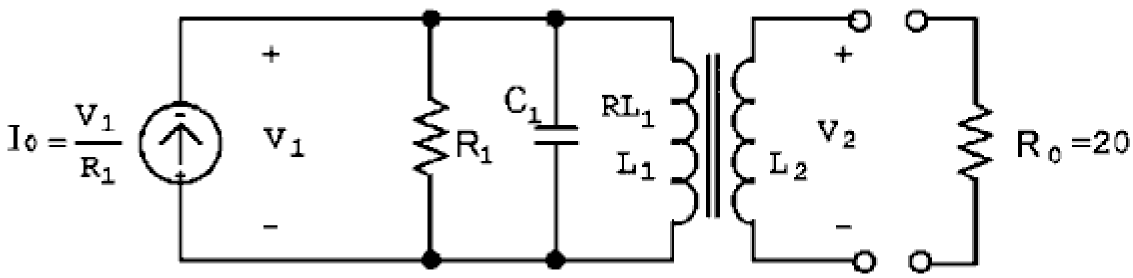
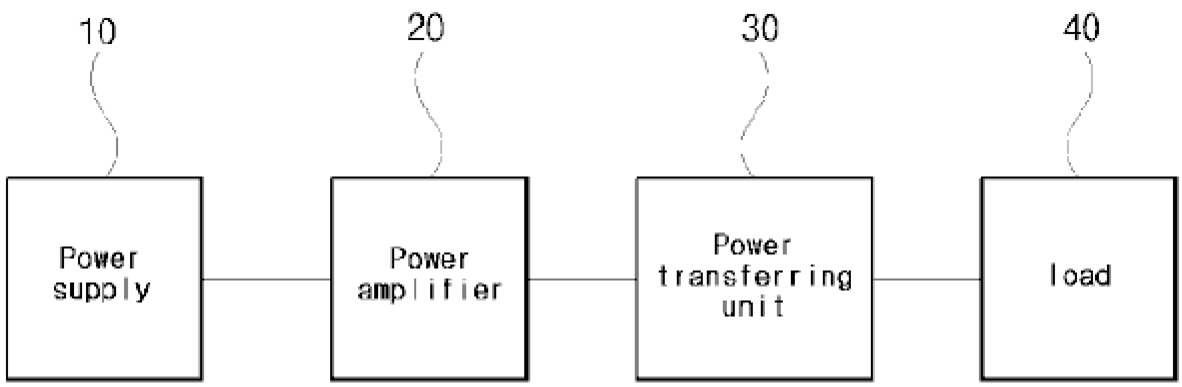


Fig.15 is an equivalent circuit diagram of an electric power transfer resonant current source of a home electrical appliance, for reducing consumption power of a load, according to an experiment of the present invention.

BEST MODE FOR CARRYING OUT THE INVENTION

Preferred embodiments of a circuit for transferring amplified resonant power, configured to include the above-described means, and their operations, will be described in detail with reference to the accompanying drawings.

[Fig. 1]



As shown in **Fig.1**, the circuit of the present invention is configured to include: a power supply **10** for producing and supplying electric power, a power amplifier **20** for resonating the electric power provided from the power supply **10** to generate amplified resonant power, and storing it; and a power-transferring unit **30** for transferring the amplified resonant power of the power amplifier **20** to a load **40**.

The power supply **10** means a general purpose, independent power source. This is used in such a way so that its output voltage is increased or decreased to a voltage necessary for the load transformer, and then transferred to the load. However, in the present invention, the power supply **10** only functions as an accessory circuit which supplies current or voltage to the power amplifier **20** so that the power amplifier **20** can amplify it. The power supply **10** does not provide its electric power directly to the load.

The independent power supply source functioning as the power supply **10** may be implemented with an AC source and a DC source. The AC source includes an AC voltage source and an AC current source. The DC source includes a DC voltage source and a DC current source. When the power supply is a DC source, the output of the DC source can be converted to AC power by using an inverter.

The power amplifier **20** produces amplified resonant power using the voltage and current coming from the power supply **10**. In an embodiment of the present invention, the amplified resonant power is transferred to a load through a transformer. More specifically, the power amplifier **20** produces the amplified resonant power using the primary inductor of the transformer, and that amplified power is then stored in the primary inductor.

Here, the power amplifier **20** is configured to include the primary inductor of the transformer and a capacitor connected to the primary inductor, either in serial or in parallel. The power amplifier **20** resonates and amplifies the power provided from the power supply **10** and then stores it in the inductor.

The power amplifier **20** contains an inductor (**L**) and capacitor (**C**), which are electrical parts which store energy, these are effectively connected to the power supply **10**, and this enables the inductor (**L**) and capacitor (**C**) to synchronise with the frequency of the power source and so to form serial or parallel resonance. Therefore, the source power is amplified Q times and then stored in the inductor (**L**) and the capacitor (**C**).

When serial resonance is formed at a source voltage of V_g , Q times the source voltage, i.e., Q x V_g volts, is applied to the inductor. Here, the serial resonant power P caused by the resonant current I_o flowing in the inductor is generated such that P_s =Q x V_g x I_o watts.

On the other hand, when parallel resonance is formed, Q times input current of I_g , i.e., Q x I_g amps, flows into the inductor. Here, parallel resonant power P_p by a voltage V_p between both leads of the inductor generates as P_p = Q x I_g x V_p watts.

As such, in using serial or parallel resonance, the inductor for resonance stores Q times the input power P in it. Here, the type of resonance can be chosen according to the object of the circuit design, and here, the power generated in the inductor is reactive power, and, for convenience, will be denoted by power **P**.

The amplified resonant power, generated by the power amplifier **20**, is transferred to the load **40** by the power transferring unit **30** which is a standard transformer. The power transferring unit **30** transfers the power, amplified Q times by the transformer in the power amplifier **20** , to the load. In order to transfer power in the most efficient manner, it is preferable that the coupling coefficient k be close to 1.

When serial resonance is formed, voltage V_2 at the secondary side of the transformer, which will now be referred to as the "secondary voltage V_2" , can be calculated by the following equation, based on the transformer principle. Here, the current I_2 at the secondary side, which will now be referred to as "secondary current I_2" , is assumed to be zero.

$$\mathbf{V_2 = k \times V_1 / n} \quad \text{so}$$
$$\mathbf{V_2 = k \times Q \times V_g / n} \quad \text{or}$$
$$\mathbf{V_2 = (Q / n) \times k \times V_g}$$

Where:

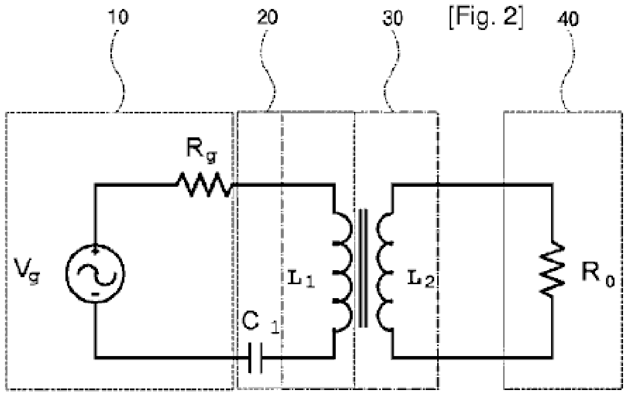
- **Q** is a quality factor of the circuit
- **n** is the turns ratio of the transformer
- **k** is the coupling coefficient
- $\mathbf{V_g}$ is the source voltage and
- $\mathbf{V_1}$ denotes a voltage between both leads of the inductor when it is in serial resonance.

When the transformer is operating, the secondary current I_2 flows in the secondary side of the transformer. Then, reflective impedance Z_{21} is reflected from the secondary side to the primary side, thereby suppressing resonance at the primary side.

Therefore, the reflective impedance at the primary side, which will now be referred to as the "primary reflective impedance", is designed to be relatively small in order to maintain resonance in the power amplifier **20**. In the present invention, an equation for voltage transfer to the secondary side and an equation for adjusting reflective impedance Z_{21} when resonance is formed, are derived and then applied to the circuit design. Therefore, based on the transformer principle, the present invention allows the amplified resonant power to be transferred to the load without loss.

The load **40** is a circuit which is provided with the power amplified Q times at the primary inductor of the transformer. When the secondary current I_2 is not zero, resonance of the primary side of the transformer is broken by the reflective impedance of the transformer. To prevent this, the reflective impedance Z_{21} must be adjusted and resistance R_0 of the load must be chosen to be the optimum value needed to maintain the resonance of the primary side of the transformer.

[Fig. 2]



An embodiment of the circuit for transferring amplified resonant power to the load, as configured above, according to the present invention, is illustrated in **Fig.2**. Here, the circuit includes: a power supply **10** having an AC voltage source (V_g) and an internal resister (R_g) a power amplifier **20** having a primary inductor (L_1) of a transformer and a capacitor (C_1) serially connected to the inductor (L_1) a power transferring unit **30** having the transformer and a load (R_0) inputting resonant power, amplified by the power transferring unit **30**.

[Fig. 3]

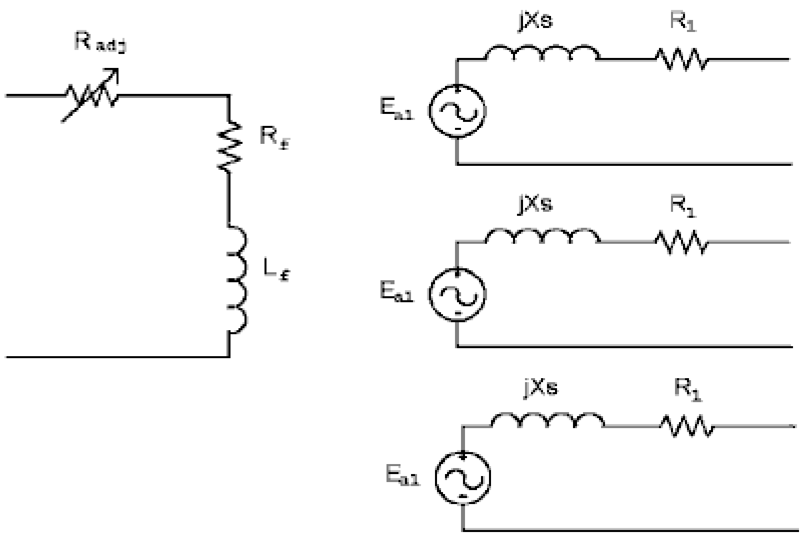
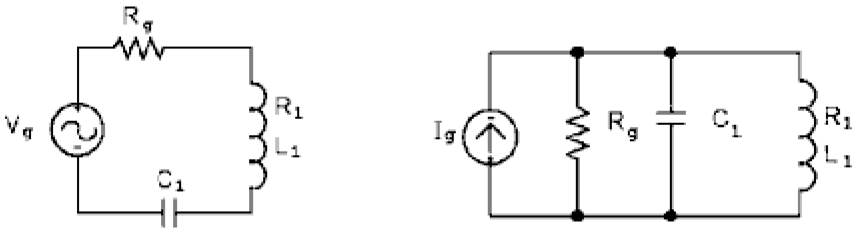


Fig.3 shows equivalent circuit diagrams of a three-phase synchronous electric generator according to an embodiment of the present invention. In such a circuit, $\mathbf{jX_s}$ denotes reactance of an electric generator and $\mathbf{R_1}$ denotes resistance of the inductor. The present invention transfers electric power to the load in such a way that: in order to apply an equivalent circuit for a single phase electric power generation to a circuit, a capacitor is added the circuit power is amplified by using resonance; and the amplified resonant power is provided directly to the load using the transformer principle. Therefore, the present invention transfers the amplified power to the load. On the other hand, the conventional power supply is connected directly to the load and transfers it's power to it.

[Fig. 4]



(a) (b)

Fig.4A and **Fig.4B** are diagrams illustrating a single-phase equivalent circuit of an electric generator to which serial or parallel resonance is applied to amplify the electric power. Such a circuit is arranged to include a power supply **10** and a power amplifier **20**.

As shown in **Fig.4A**, a circuit to which serial resonance is applied, if resistance $\mathbf{R_1}$ of a coil is neglected, the quality factor $\mathbf{Q_S}$ is expressed as

$$\mathbf{Q_S} = \boldsymbol{\omega} \times \mathbf{L_1} / \mathbf{R_g}$$

Where:

R_g is the internal resistance of the power supply, and

R_1 is the loss resistance of the coil.

Here, the factor Q_S of a circuit is generally greater than 10. Also, a voltage V_1 between both leads of an inductor (L_1) in serial resonance is expressed as $V_{1\ x}$ Q_S x V_g. Here, the power P_1 stored in the inductor (L_1) is expressed as follows:

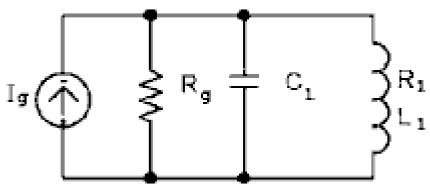
$$\mathbf{P_1 = V_1} \times \mathbf{I_o} \quad \text{or}$$
$$\mathbf{P_1 = Q_S} \times \mathbf{V_g} \times \mathbf{I_o} \quad \text{or}$$
$$\mathbf{P_1 = Q_S} \times \mathbf{V_g^2 / R_g}$$

Where: $\mathbf{I_o} = \mathbf{V_g} / \mathbf{R_g}$ (I_o being the resonance current)

As well, the source power P_g in serial resonance is expressed as:

$$\mathbf{P_g} = \mathbf{V_g} \times \mathbf{I_o} \quad \text{or}$$
$$\mathbf{P_g} = \mathbf{V_g^2 / R_g} \quad \text{therefore:}$$

$\mathbf{P_1} = \mathbf{Q_S} \times \mathbf{P_g}$ showing that the inductor (L_1) when in serial resonance, inputs Q_S times the input power.



[Fig. 4] (b)

As shown in **Fig.4B**, the circuit to which parallel resonance is applied, just like the serial resonant circuit, Q times the input power is applied to both leads of the inductor. Since such power amplification in the parallel resonant circuit is similar to that of the serial resonant circuit, which has already been described above, its description will be omitted.

[Fig. 5]

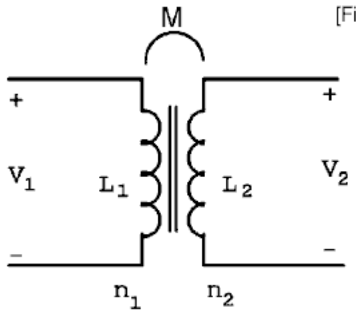


Fig.5 is an equivalent circuit diagram of a transformer used in the power-transferring unit **30** according to an embodiment of the present invention.

If the transformer of the power transferring unit **30** is assumed to be ideal, then the input power P_1 of the primary side can be transferred to the secondary side without loss. Therefore, the power P_2 at the secondary side becomes the input power P_1 , i.e., $P_1 = P_2$ However, when considering the coupling coefficient **k** and turns ratio **n**, the secondary side can be expressed, if coil resistance is neglected, as follows:

$$V_2 = k \times V_1 / n$$

$$I_2 = k \times n \times I_1$$

$$P_2 = V_2 \times I_2 \quad \text{or}$$
$$P_2 = k^2 \times P_1$$

On the other hand, when internal resistance R_g of the power supply exists and the secondary current I_2 is not zero, as a load having resistance R_o is connected to the secondary side, reflective impedance Z 21 is coupled to the primary side. Here, the reflective impedance Z_{21} can be expressed as:

$$Z_{21} = -(sM)^2 / Z_{22} \quad \text{or}$$
$$Z_{21} = R_{21} + jX_{21} \text{ ohms.}$$

[Fig. 6]

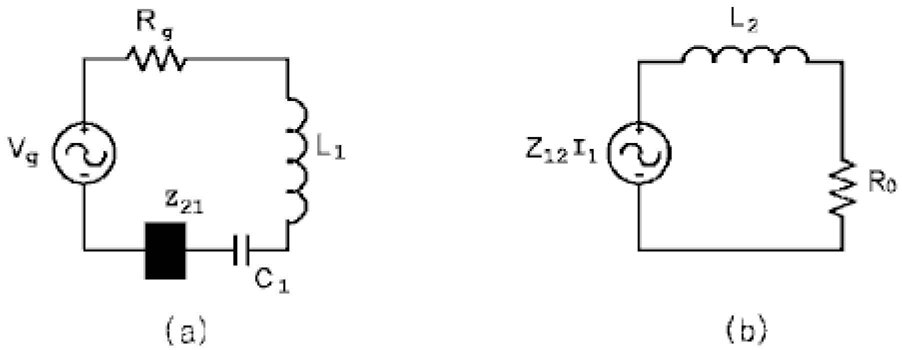
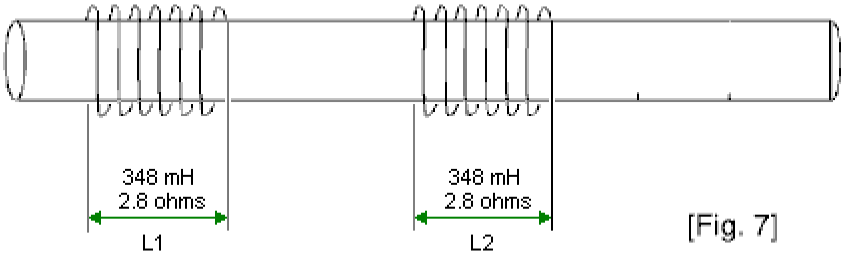


Fig.6A and **Fig.6B** are equivalent circuit diagrams of the primary and secondary sides of a transformer, respectively, when the resonant power amplified by the serial resonant circuit of **Fig.4A** is transferred to the secondary side of the transformer, based on the transformer principle, as shown in **Fig.5**.

As shown in **Fig.6B**, in the equivalent circuit diagram of the secondary side of the transformer, I_1 is the primary current and Z_{12} is the mutual inductance.

As shown in **Fig.6A**, when the power supply circuit at the primary side is configured to be a serial resonant circuit and a load is connected to the secondary side circuit, reflective impedance Z_{21} appears in the resonant circuit at the primary side. When the circuit is designed so that the reflective impedance Z_{21} hardly affects the resonant circuit at the primary side, the resonant circuit continues its resonance. Then, the power amplified by such resonance is transferred to the secondary side, based on the transformer principle, so that amplified power can be fed to the load.

The following is a detailed description of exemplary experiments to prove the above-described embodiments of the present invention.



[Fig. 7]

Fig.7 is a view illustrating a transformer used in a practical experiment for an embodiment of the present invention. The transformer is designed in such a way that coils are wound around a ferrite core to form primary and secondary sides whose inductances are each 348 mH and whose turns ratio is n:1. Also, the transformer is operated in serial resonance mode. Here, the DC resistance of the coil is 2.8 ohms and the coupling coefficient k is 0.742.

For this experiment, a Tektronix CFG 280 signal generator, whose internal impedance is 50 ohms, was used as an AC power source and a serial resonance frequency of 304 KHz was used. A Tektronix TDS 220 oscilloscope was used to measure the voltages.

[Fig. 8]

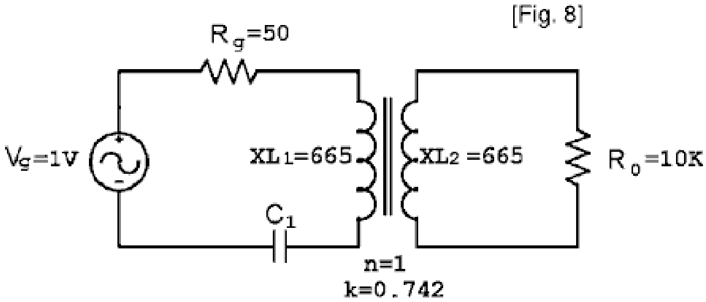


Fig.8 is an equivalent circuit diagram of an electric power amplification/transfer experimental circuit according to an embodiment of the present invention.

[Fig. 9]

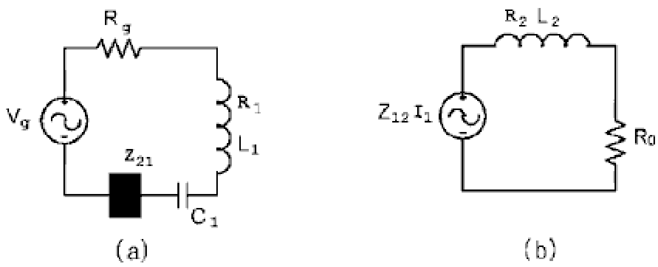


Fig.9A and **Fig.9B** are equivalent circuit diagrams of the primary and secondary sides in the equivalent circuit of **Fig.8**.

At the primary side of the equivalent circuit shown in **Fig.9A**, the equivalent resistance R_T can be expressed as $R_T = R_g + R_1 + R_{21}$ Here, when a load (R_0) is connected to the circuit, the quality factor Q_S can be expressed as $Q_S = XL_1 / R_T$ Thus, the smaller the reflective impedance R_{21}, the greater the power amplification.

Therefore, if the reflective impedance Z_{21} is minimised at the primary side to maintain resonance when the circuit is designed, the amplified resonant power is transferred to the secondary side without loss, based on the transformer principle, such that the voltage and current corresponding to the transferred power can appear at the secondary side. Accordingly, the voltage at the primary side, when amplified by serial resonance, becomes Q_S x V_g, and the voltage V_2 at the secondary side is expressed as $\mathbf{V_2}$ = ($\mathbf{Q_2}$ / **n**) x **k** x

$\mathbf{V_g}$. When the coupling coefficient k is 1 and the turns ratio n is 1, the secondary voltage V_2 is amplified to become Q times the source power V_g and then applied to the load connected to the secondary side.

Since the secondary current I_2 is k x n x I_1 , when n = 1 and k = 1, then $I_2 = I_1$. Here, I_1 is the resonant current of the primary side and is transferred to the secondary side without loss.

Therefore, the power P_2 transferred to the secondary side is expressed as the following equation:

$$\mathbf{P_2} = \mathbf{V_2} \times \mathbf{I_2} \quad \text{or}$$
$$\mathbf{P_2} = (\mathbf{Q_s} / \mathbf{n}) \times \mathbf{k} \times \mathbf{V_g} \times \mathbf{k} \times \mathbf{n} \times I_1 \quad \text{or}$$
$$\mathbf{P_2} = \mathbf{Q_s} \times \mathbf{k^2} \times \mathbf{V_g} \times \mathbf{I_1} \quad \text{or}$$
$$\mathbf{P_2} = \mathbf{Q_s} \times \mathbf{k^2} \times \mathbf{P_1}$$

The equation above shows that when resonance is achieved and k = 1, then the calculation for the output power P_2 , shows that Q_s times the input power is transferred to the secondary side. The load does not draw electric power from the power supply but instead, draws it's power from the resonant power amplified by the power amplifier, which is it's main power supply. Thus, the power supply functions as a trigger (an auxiliary circuit) allowing this resonance to be maintained.

In the experimental circuits shown in **Fig.9A** and **Fig.9B**, when the load resistance R_o is assumed to be 170K ohms, the reflective impedance Z_{21} is expressed as follows:

$$\mathbf{Z_{21}} = \mathbf{-(sM)^2} / \mathbf{Z_{22}} \quad \text{or}$$
$$\mathbf{Z_{21}} = \mathbf{1.43} - \mathbf{j5.6} \times \mathbf{10^{-3}} \text{ ohms} \quad \text{or}$$
$$\mathbf{Z_{21}} = \mathbf{R_{21}} + \mathbf{jX_{21}} \text{ ohms}$$

Assuming that:

Rg = 50 ohms,
R_o = 170K ohms,
XL_1 = 665 ohms,
XL_2 = 665 ohms,
k = 0.742, and
n = 1.

As described in the equation, since the reflective resistance R_{21} of 1.43 ohms, is substantially smaller than the internal resistance Rg which is 50 ohms, it hardly affects Q_s the overall performance factor of circuit. Also, since the reflective capacitive reactance X_{21}, which is 5.6 x 10^{-3} ohms, is substantially smaller than the inductive reactance of 665 ohms at the primary side, this resonance can be maintained continuously.

The following table, "Table 1", shows experimental measured data showing the available output power provided to a load (R_o) using a resonant circuit of the power supply whose internal resistance R_g is 50 ohms and whose voltage is 1 volt. Here, the data were obtained when the coupling coefficient k was 0.742. However, when the coupling coefficient k is 1, then, $V_2 = V_1$ and the power provided to the load is as described in **Table 1**. Here, XL_2 is neglected, because R_o is very much greater than XL_2 when the power provided to the load is calculated.

TABLE 1: Experimental measurement of power, related to load change, in the equivalent circuit of **Fig.8**

Load Resistance $\mathbf{R_o}$ Ohms	Primary Quality Factor $\mathbf{Q_s}$ Number	Primary Voltage $\mathbf{V_1}$ Volts	Secondary Voltage $\mathbf{V_2}$ (= 0.742 V_1) Volts	Available Load Power $\mathbf{P_o}$ (= V_2^2 / R_o) Microwatts	Reflective Resistance $\mathbf{R_{21}}$ Ohms
1M	8.97	8.97	6.65	42.9	0.24
170K	8.80	8.80	6.55	252.3	1.43
10K	6.56	6.56	4.92	2,420.6	24.34
1.2K	2.40	2.40	1.72	2,465.3	202.89
870	1.93	1.93	1.34	2,063.9	279.85

Where: V_g = 1 volt, k = 0.742, and n = 1.

In **Table 1**, since the source voltage V_g is 1 volt, the value of the quality factor of the circuit Q_S is equal to the magnitude of the voltage V_1 applied to the inductor (L_1). Therefore, the voltage V_2, transferred to the secondary side, is k x V_1.

Also, when $I_2 = 0$, the quality factor Q_2 at the primary side is expressed as:

$\mathbf{Q_S} = \mathbf{XL_1} / (\mathbf{R_g} + \mathbf{R_1})$ or
$\mathbf{Q_S}$ = 665 ohms / 52.8 ohms and so
$\mathbf{Q_S}$ = 12.59 ohms.

Provided that R_g the internal resistance of the power supply is 50 ohms, and R_1 the DC resistance of the primary coil is 2.8 ohms.

Since the case where load resistance R_o is 1M ohms is similar to that where $I_2 = 0$, Q_S must be 12.59 like the theoretical value but, as described in **Table 1**, the experimental value is measured as 8.97. Such a result is estimated because the value of the factor Q_S is reduced by resistance caused by the high frequency of the coil as well as the DC resistance of the coil.

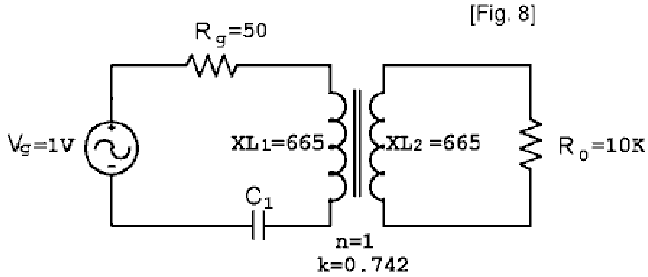
Therefore, based on such a result, effective resistance R_{eff} of the primary circuit can be calculated as:

$\mathbf{R_{eff}} = \mathbf{XL_1} / \mathbf{Q_S}$ that is,
$\mathbf{R_{eff}}$ = 667 / 8.97 = 74.1 ohms.

Thus, the experiment circuit is estimated as being operated in a state where the effective resistance R_{eff} is 74.1 ohms and the internal resistance R_g of the power source is 50 ohms. **Table 1** shows that the quality factor Q_S according to change of load resistance R_o is $XL_1 / (R_{eff} + R_{21})$, i.e., $Q_S = XL_1 / (R_{eff} + R_{21})$.

Table 1 shows that, when the load resistance R_o is 1.2K ohms, the reflective resistance R_{21} is 202.89 ohms and voltage amplification is approximately 2.4 times. Therefore, if a circuit designed to have such characteristics, is operated in this way, then, when the load resistance R_o is increased, the reflective resistance R_{21} and the reflective impedance Z_{21} are decreased but the quality factor Q_S is increased.

[Fig. 8]



The following **Table 2** describes value calculated by an equation when the coupling coefficient **k** set to that of the resonant equivalent circuit of **Fig.8**.

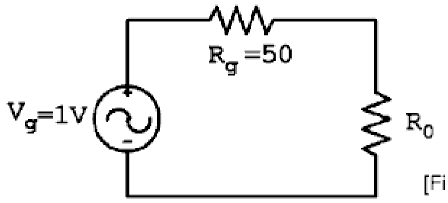
TABLE 2 Theoretical values, with k = 1, in the equivalent circuit of **Fig.8**

Load Resistance $\mathbf{R_o}$ Ohms	Primary Quality Factor $\mathbf{Q_S}$ Number	Primary Voltage $\mathbf{V_1}$ Volts	Secondary Voltage $\mathbf{V_2}$ (= 0.742 V_1) Volts	Available Load Power $\mathbf{P_o}$ (= V_2^2 / R_o) Microwatts	Reflective Resistance $\mathbf{R_{21}}$ Ohms
1M	8.93	8.93	8.93	79.7	0.44
170K	8.67	8.67	8.80	442	2.60
10K	5.62	5.62	5.62	3,158	44.21
1.2K	1.50	0.83	0.83	577	368.51
870	1.14	0.75	0.75	651	508.30

Where: V_g = 1 volt, k = 1, and n = 1.

In **Table 2**, since the reflective resistance R_{21} is changed according to a change in the load resistance R_o when k = 1, when each R_o in **Table 1** and **Table 2** is 1.2K ohms or 870 ohms, the available power provided to the load (R_o) is decreased more than it is in the case of k = 0.742. Such a result is because the parameters used for the reflective impedance Z_{21}, such as the coupling coefficient k, the load resistance R_o, the turns ratio n, and the reactance XL_1, are associated with the design of a circuit for the transfer of resonant power.

The following **Table 3** shows comparisons of magnitude of available power provided to a load (R_o) when the load (R_o) is connected directly to the source voltage, with that of available power provided to a load (R_o) when the load is connected to an experimental circuit for power amplification with a 1-volt voltage source, as shown in **Fig.8**.



[Fig. 10]

Fig.10 is a circuit diagram where a power supply is directly connected to a load to supply its power to the load. Here, since the value of R_o is very much greater than the value of R_g, the internal resistance R_g of the power supply is neglected.

TABLE 3 Comparison of the available load power between the direct connection manner and the source power amplification connection manner

Load Resistance R_o	Direct Connection Manner $P_o=V_g^2/R_o$	Source power connection **k** = 0.742 **P_o** (= V_g^2 / R_o)	amplification manner **k** = 1 **P_o** (= V_g^2 / R_o)	Ratio of available load Col.3/Col.2	Reflective Resistance Col.4/Col.2
Ohms	Microwatts	Microwatts	Microwatts	Ratio	Ratio
1M	1.0	42.9	79.7	42.90	79.70
170K	5.9	252.3	442	42.76	74.91
10K	100.0	2,420.6	3,158	24.20	31.58
1.2K	833.3	2,465.3	577	2.95	0.69
870	1,149.4	2,063.9	651	1.79	0.56

As described in **Table 1**, in the circuit where Q_S is maintained at 6.56 in serial resonance, the available power provided to the load having load resistance R_O of 10K ohms, as described in **Table 3**, is 24.2 times the power in the case of k = 0.742 and 31.58 times the power in the case of k = 1 than that of the case where the load is directly connected to the power supply. This means that the load is provided with amplified power, Q_S^2 times greater than that of the conventional power providing method.

The following is a detailed description of a circuit for amplifying and supplying source power using parallel resonance, based on the experiment results.

Home electric power is provided in such a way that 6,600 volts is transmitted to a transformer nearest to a home and a transformer then steps the voltage down to a single phase 220-volts to supply it to the home, so that home appliances can use it.

[Fig. 11]

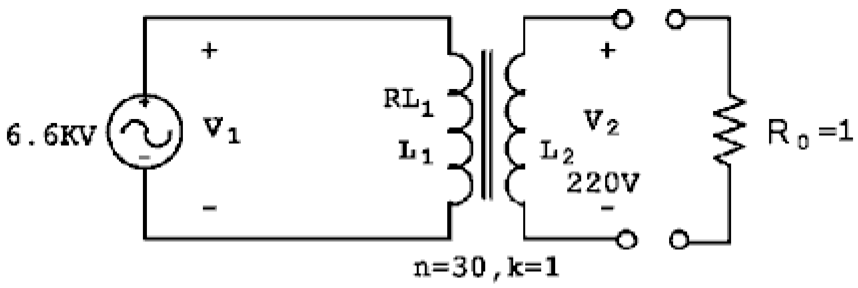
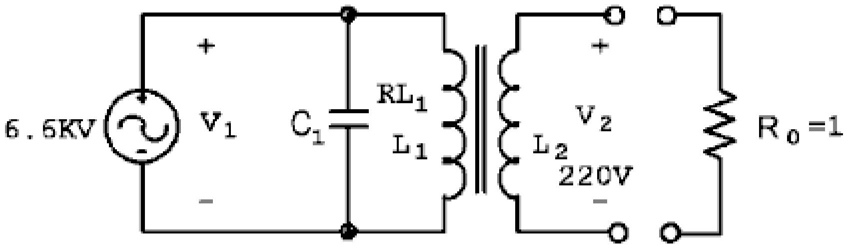


Fig.11 is an equivalent circuit diagram for transferring electric power to loads in a home. The circuit is designed in such a way that load resistance R_O is 1 ohm and a factor Q_p of a desired circuit is 8.58. Here, the internal resistance of the power supply is neglected.

Here, the primary voltage of the transformer is 6,600 volts and the secondary voltage is 220 volts. In addition, when the coupling coefficient k of the transformer is assumed to be 1, the turns ratio n is 30 (that is, V_1 / V_2 or 6,600 / 220). Also, the resistance of a load in the home is assumed to be 1 ohm.

Here, in order to apply 220 volts to the load, the reactance at the secondary side of transformer shown in **Fig.11** must be chosen in such a way to be 1% of the load resistance, i.e., 0.0105 ohms. Since the reactance X_1 at the primary side and the reactance X_2 at the secondary side are each proportional to the square of the turns ratio, $\mathbf{XL_1} = \mathbf{n^2} \times \mathbf{XL_2}$ which is $30^2 \times (0.0105)$ or 9.44 ohms. Here, since the reflective impedance $\mathbf{Z_{21}}$ is $\mathbf{-(sM)^2} / \mathbf{Z_{22}}$ or 0.1 - j0.01 ohms, and so it hardly affects the circuit at the primary side.

[Fig. 12]



Therefore, a parallel resonance circuit of the primary side, for amplifying power, is applied to the power amplification circuit using parallel resonance, as shown in **Fig.12**, thereby transferring the amplified resonant power to the secondary side.

Here, when the resistance RL_1 of the coil at the primary side is assumed to be 1 ohm, the performance factor of the circuit Q_p is 8.58 (that is, XL_1 / R_{eff} which is 9.44 ohms / 1.1 ohms). Provided that $R_{eff} = RL_1 + R_{21}$. Also, the resistance R_1 in the parallel resonance is 81 ohms ($R_{eff} \times Q_2$ or 1.1 ohms x $(8.58)^2$). Here, the internal resistance of the power supply is neglected.

[Fig. 13]

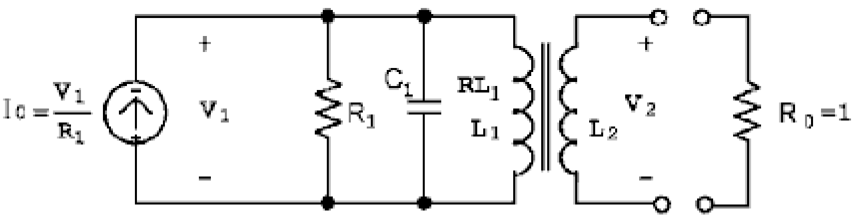


Fig.13 is an equivalent circuit diagram of a current source, which is modified from the circuit of **Fig.12** as the voltage source is replaced with the current source.

As shown in **Fig.13**, the resonant current I_o is 81.5 amps (as V_1 / R_1 is 6,600 volts / 81 ohms). The primary reactance X_1 allows a circulating current of 699 amps, which corresponds to I_o (81.5 amps) times Q_p , to be flowing in it. The 6,600 volts is applied to both leads of the primary reactance, therefore, under these conditions, the parallel resonant power P_{1R} is 4,613.4 kilowatts ($V_1 \times Q_p \times I_o$ which is 6,600 volts x 699 amps).

However, in the equivalent circuit of **Fig.11**, when the coil resistance RL_1 is neglected, the current I_1 flowing in the primary reactance XL_1 is 699 amps (V_1 / XL_1 = 6,600 volts / 9.44 ohms, therefore, the power P_1 applied to the primary reactance XL_1 is 4,613.4 kilowatts (as $V_1 \times I_1$ = 6,600 volts x 699 amps).

Therefore, the parallel resonant power P_{1R} of 4,613.4 kilowatts in parallel resonance is identical, in magnitude, to the power P_1 of 4,613.4 kilowatts, not in resonance, and transferred to the load through the transformer. From the point of view of the power supply, it must produce power P_1 of 4,613.4 kilowatts, not in resonance. However, since the source power P_g in parallel resonance, as shown in the equivalent circuit of **Fig.13**, is 0.54 kilowatts (as $V_1 \times I_o$ is 6,600 volts x 0.0815 amps), the power supply in resonance may produce P_1 times $1/Q_s$. Therefore, from the point of view of the electric generator, its output power seems to be increased. On the other hand, such an effect can be obtained in an identical fashion from a circuit which is in serial resonance.

The present invention can save more of a load's consumption power than the conventional method can.

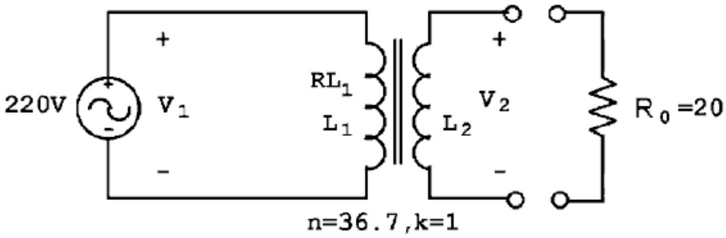
The following describes theoretical proposals for how the present invention can be applied to home appliances to save consumption power, based on the experiment results.

A typical home appliance steps the voltage down from 220 volts to a required voltage using a transformer and then leaves the stepped-down voltage as AC or converts it to DC to provide the necessary power to loads, for example, an apparatus might have requirement for power supplied at 6 volts and a current of 0.3 amps.

Here, the equivalent resistance R_o of the load is 20 ohms (V_2 / I_2 = 6 volts / 0.3 amps). In order to apply 99% of the voltage to the load (R_o), XL_2 is chosen to be 0.2 ohms. Here, the turns ratio n is 36.7 (V_1 /V_2 = 220 volts / 6 volts), and the primary reactance XL_1 is 269 ohms (n^2 x XL_2 = 36.72 x 0.2 ohms).

Also, when the reflective impedance Z_{21} and the resistance RL_1 of the primary coil (L_1) are chosen so that $Z_{21} = -(sM)^2 / Z_{22}$ = 2.7 - j0.027 ohms and RL_1 = 40 ohms, the reflective impedance Z_{21} hardly affects the primary circuit. Such an equivalent circuit of the transformer is illustrated in **Fig.14**, in which the internal resistance of the power supply is neglected.

[Fig. 14]



In **Fig.14**, in order to apply 6 volts to the load (R_o) of 20 ohms, the primary current I_1 needs approximately 818 milliamps (i.e., $I_1 = V_1 / XL_1$ = 220 volts / 269 ohms which is about 818 milliamps), assuming that the resistance RL_1 of the primary coil is neglected.

Therefore, the power actually consumed by the load (R_o) is determined by the primary voltage, 220 volts, and the current, 818 milliamps, of the primary side of the transformer shown in **Fig.14**.

[Fig. 15]

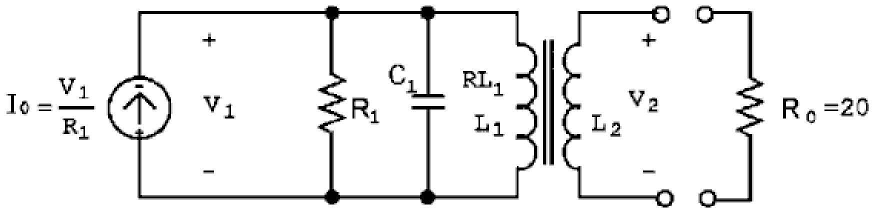


Fig.15 shows an equivalent circuit diagram modified from the circuit of **Fig.14** as the voltage source is replaced with a current source. The circuit of **Fig.15** is configured to be operated in parallel resonance.

In **Fig.15**, the internal resistance of the power supply is neglected. In the equivalent circuit using parallel resonance, the performance factor Q_p is obtained as $Q_p = XL_1 / (RL_1 + R_{21})$ = 269 ohms / (40 + 27) ohms which is about 6.3. As well, the primary circuit resistance R_1 is obtained as $R_1 = (RL_1 + R_{21}) \times Q_p^2$ which is 42.7 x 6.3 which is about 1,694.7 ohms.

Therefore, the primary current I_1 is identical to the resonant current I_o , and is given by $I_o = V_1 / R_1$ or 220 volts / 1,694.7 ohms which is about 129.8 milliamps. Thus, the current I_q, flowing in the primary reactance XL_1, is calculated as $I_q = Q_p \times I_o$ which is 6.3 x 129.8 milliamps or about 818 milliamps.

So, under the conditions where the coupling coefficient k is 1 and the turns ratio n is 36.7, the voltage V_2 and current I_2 , obtained as $V_2 = V_1 / n$ or 220 volts / 36.7 which is about 6 volts, and $I_2 = n \times I_Q$ or 36.7 x 818 milliamps which is about 30 amps, respectively, are transferred to the load at the secondary side of the transformer. Thus, the load can be operated by the voltage V_2 and current I_2 , used as the regular voltage and current of the load.

However, since the consumption power of the load is caused by the power induced at the primary side of the transformer, the load actually consumes power caused by voltage and current used at the primary side.

Therefore, when the resonance shown in the equivalent circuit of **Fig.14** is not used, the primary current I_1 is approximately 818 milliamps and the current I_0 , flowing in the primary side in parallel resonance shown in **Fig.15**, is approximately 129.8 milliamps. Since the circuit inputs the same 220 volts, it can reduce the power, provided to the load when in parallel resonance, by a factor of approximately 6.3 times than would otherwise be provided to the load when operating in a mode which is not in resonance. That is, the circuit can reduce the power consumption when operating in parallel resonance by Q_p times, compared to the non-resonance mode of operation.

INDUSTRIAL APPLICABILITY

As described above, the circuit according to the present invention can transfer amplified power to a load, compared to the conventional circuit where the electric power is simply transferred to the load using an electric generator and a transformer. To this end, the circuit of the present invention is configured in such a way that: resonance (serial or parallel resonance) is formed at the side of the power supply; and the transformer circuit, used for transferring power to the load, is designed so that its reflective impedance can be set with a value to maintain the resonance. Therefore, the amplified resonant power is transferred to the load. That is, the circuit according to the present invention does not transfer the power, produced by an electric generator as a main power source, to the load, but instead, transfers amplified resonant power to the load.

In the circuit according to the present invention, the power supply (an electric generator, etc.) is regarded as an auxiliary circuit to the production of resonant power. Power to be transferred to a load is amplified by a parallel or serial resonant circuit, thereby providing amplified resonant power to the load, compared to the conventional circuit where power produced by an electric generator is fed directly to the load. Therefore, the circuit of the present invention can appear to reduce the consumption power required to operate the load.

The present invention is operated to transfer resonant power to a load through a transformer, and may be set up as either a serial or parallel resonant circuit. Therefore, the present invention can be usefully applied to industrial power applications while satisfying energy conservation laws.

Although the preferred embodiments of the present invention have been disclosed for illustrative purposes, those skilled in the art will appreciate that various modifications, additions and substitutions are possible, without departing from the scope and spirit of the invention as disclosed in the accompanying claims.

Claims

1. A circuit for transferring amplified resonant power to a load, comprising: a power supply for producing and supplying voltage or current; a power amplifier for generating amplified resonant power using the voltage or current; and a power transferring unit for transferring the amplified resonant power to the load using a transformer.

2. The circuit according to claim 1, wherein the power supply is one of AC voltage source, AC current source, DC voltage source, and DC current source.

3. The circuit according to claim 1, wherein the power amplifier includes: a primary inductor of the transformer; and a capacitor connected to the primary inductor in serial or in parallel, wherein the amplified resonant power is stored in the primary inductor.

4. The circuit according to claim 1, wherein reflective impedance at the primary side of the transformer has a relatively small value such that the power amplifier can maintain resonance, wherein reflective resistance (R21)of the reflective impedance (Z_2) is less than equivalent inductive reactance (XL_1) of the primary side of the transformer transferring the resonant power, and reflective reactance (X_{21}) is less that 0.5 of the equivalent inductive reactance (XL_1) of the primary side of the transformer.

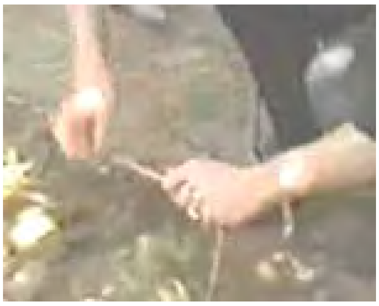
5. The circuit according to claim 1, wherein the circuit amplifies power by using parallel resonance, and transfers the amplified resonant power to the load, such that consumption power of the load can be reduced.

Tariel Kapaladze (or perhaps**,** Tariel Kapanadze), like Don Smith, appears to have based his work on that of Nikola Tesla. There has been a video on the web, of one of his devices in operation, but it appears that the video has been removed. The video commentary was not in English and so the information gathered from it is not as complete as it might be. However, in spite of that, a number of useful things can be learned from it.

The video shows a demonstration being staged in a back garden, I believe, in Turkey. Strong sunshine was casting dense shadows which made video detail less than perfect. Essentially, Tariel demonstrated one of his builds of a Tesla-style free-energy device, powering both itself and a row of five light bulbs.

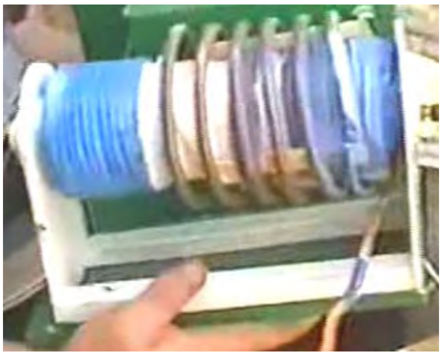
One of the most encouraging things about this video is that the construction and operation was of the most basic kind, with not the slightest suggestion of expensive laboratory work or anything high-precision. This is most definitely a backyard construction within the scope of any knowledgeable person.

Electrical connections were made by twisting bare wires together:



and where necessary, tightening the twist with a pair of pliers:

This shows clearly that a high-power and very useful free-energy device can be made with the most simple of construction methods - no expensive connectors here, just a zero-cost twisted connection.

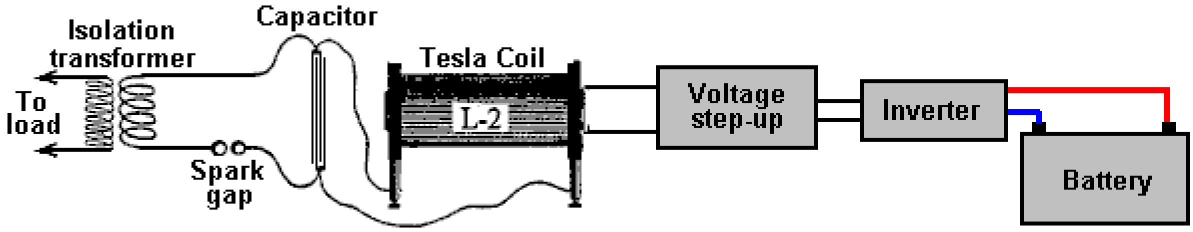


The device being displayed is a Tesla Coil powered, earth-connected system of the type already described. You will notice that the thick primary winding is not placed at one end of the central secondary winding but is much closer to the centre of the coil. Remember that Don Smith states that if the primary coil is placed centrally, then the amount of current which the coil can deliver is very large, in spite of the fact that most people think that a Tesla Coil can only produce trivial currents. Notice also that this Tesla Coil appears to be mounted on a cheap kitchen-roll holder. I have seen it said that Tariel makes a new device for each demonstration and takes it apart afterwards, so if that is correct, then it is likely that there is no great effort or expense involved in making one of these systems.

The main operational components are shown here, placed on one small table. There is a lead-acid battery (which is removed later in the demonstration), what appears to be an inverter to produce mains AC voltage from the battery, a high-voltage step-up system housed in a green box for safety reasons, a Tesla Coil, a spark gap mounted on the box and a fan-cooled component, probably a solid-state oscillator system driving the Tesla Coil. Not seen in this picture, is an item contained in a small box which might well be a high-voltage capacitor.

Two earth connections are organised. The first one is an old car radiator buried in the ground:

and the second is a bare wire wrapped around a garden tap's metal pipe and twisted tight as shown above. It is distinctly possible that the circuit is based on this circuit of Tesla's:



Perhaps, the battery powers the inverter which produces mains voltage, which is then stepped up to a high voltage level by the enclosed electronics. This then drives the Tesla Coil, producing both very high voltage and current with the capacitor storing the energy as a reservoir. The spark gap then pulses this energy, driving the primary winding of the isolation transformer which produces a lower voltage at substantial current (depending on the current-handling capacity of the transformer itself) powering the load, which in this case, is a row of light bulbs.

It is distinctly possible that the Tesla Coil is mounted inside the green box and the coils seen on the outside of the box are the isolation transformer, hand-wound with heavy-duty wire. The spark gap is mounted on a non-conducting bracket attached to the side of the box and is of very simple construction with a copper rod threaded into a vertical copper post and a screwdriver slot cut in it to allow exact adjustment of the width of the spark gap:

The load is a row of five light bulbs hung from a broom placed across the backs of two chairs:

As you can see, this is not exactly high-tech, high-cost construction here, with all of the materials being used for other things afterwards.

Initially, the battery is used to power the inverter and it is demonstrated that the current being drawn from the inverter is substantially less than the power entering the load. In conventional terms, this appears impossible, which is an indication that the conventional terms are out of date and need to be updated to include the observed facts from demonstrations such as this.

As the system is putting out a good deal more power than is required to drive it, might it not be possible to use part of the output power to provide the input power. This is often called "closing the loop" and it is demonstrated in this video as the next step.

First, the circuit is altered so that the input power connection to the inverter is taken from the output. Then the circuit is powered up using the battery as before. The battery is then disconnected and removed altogether, and the people helping with the demonstration pick up all of the active items and hold them up in the air so as to show that there are no hidden wires providing the extra power from some hidden source. The items on the table are not part of the circuit:

There is some additional information on Tariel including videos of some of his more powerful, newer designs at http://peswiki.com/index.php/Directory:Kapanadze_Free_Energy_Generator#Official_Website although it has to be said that there does not appear to be very much on him or his work available at this time.

One of the most important aspects of this video is the confirmation it gives for the work of Tesla and of Don Smith, in that it shows clearly, yet again, that large amounts of energy can be drawn from the local environment, without the need to burn a fuel.

Patrick Kelly
engpjk@yahoo.co.uk
http://www.free-energy-info.co.uk
http://www.free-energy-info.com