8. John Bedini designed a pulsed flywheel motor/generator system which ran self-powered for years. Jim Watson built a large version which had many kilowatts of excess power.

9. Dr Oleg Gritskevitch built a self-powered motionless toroidal generator which produced 1.5 megawatts for two years.

10. James Hardy has demonstrated how the jet of water from a powerful water-pump can spin a generator fast enough to self-power the pump and supply additional electrical power for other equipment.

11. Mikhail Dmitriev has produced a gravity-powered generator which uses a small electrical motor to deflect weights on a rotor and that system produces kilowatts of excess power drawn from the gravitational field.

12. Lawrence Tseung has shown how a magnet embedded in an iron frame produces a greater output than the input power when it is powered with DC pulses.

13. Lawrence Tseung has also demonstrated that a heavy rotor powered by electromagnet pulses can have a substantially greater output power than the power needed to drive it.

14. Veljko Milkovic has demonstrated how combining a pendulum with a lever produces a system which has far greater mechanical output power than the mechanical power needed to operate it.

15. Richard Willis has shown how pulsing a magnetic material can produce kilowatts of excess power.

16. James Kwok has shown that introducing air into the bottom of a tank of water can generate tens of kilowatts of excess power through buoyancy.

17. Dietmar Hohl has published his design where permanent magnets cause permanent rotation of a cylinder without the need for any external source of power.

18. Mummar Yildiz has demonstrated a 300 watt permanent magnet only motor and then taken the motor completely apart to prove that there is no other source of power.

19. Lawrence Tseung has produced a variation on the Joule Thief circuit which has greater output power than the input power (something which I personally have built and can confirm).

20. Floyd Sweet produced a system where a tiny amount of power is used to wobble the magnetic poles of a specially conditioned magnet, producing thousands of times greater output power than the input power needed to power the system.

There are many other proven systems, but the point which I want to stress here is that while Nuclear Magnetic Resonance may well be an excellent method of generating electrical power, it is by no means the only way of accessing excess power and none of the systems listed above use NMR. Bearing that in mind, here are the two papers from William McFreey:

"Overunity" Devices

by William J. McFreey - July 2013

By now, it is obvious to me that the so called "overunity" devices as demonstrated by Tariel Kapanadze, Floyd Sweet, Steven Mark, Don Smith, Alfred Hubbard and others, draw their energy from the nuclei located in material which forms a part of the device. They are, in effect, conversion devices, converting excess energy of the nuclei to electricity and/or heat. In these devices, the fuel materials tend to be selected such as to have a non-zero spin, typically: copper, brass, aluminium and the like. Therefore it has been speculated that Nuclear Magnetic Resonance (NMR) may play a significant role in the process of energy extraction from these materials through magnetic manipulation of their nuclei. In time, after many experiments, the conclusion was that the magnetic resonance alone, *i.e.* flipping of nuclei (transitions between Zeeman states) with radio frequency, may only influence extremely unstable nuclei and make them beta decay (beta NMR). This phenomenon may be useful in some methods of energy generation, but the NMR method, in the case of power extraction from metals, suffers from some fundamental problems. In metals, the depth of penetration of RF energy is very limited due to eddy currents. This, in principle, limits the amount of volume of the material that experiences transitions between Zeeman states. In general, it is accepted that only the spins of nuclei located in the skin layer of thickness δ take part in the resonance absorption of energy of the varying magnetic field. That is:

$$\delta = \sqrt{\frac{2\rho}{(2\pi f)(\mu_0 \mu_r)}} \approx 503\sqrt{\frac{\rho}{\mu_r f}}$$

where

$\delta =$ the skin depth in metres,
$\mu_0 =$ the permeability of vacuum ($4\pi \times 10^{-7}$ H/m),
$\mu_r =$ the relative permeability of the medium
$\rho =$ the resistivity of the medium in Ω·m,
$f =$ the frequency of the current in Hz

The bulk of the material acts only as ballast although coupling of the Radio Frequency field in metals is normally enhanced by the generation of helicon waves (http://en.wikipedia.org/wiki/Helicon_(physics)).

Fortunately, Radio Frequency is not the only method of inducing resonant nuclear transitions and Nuclear Magnetic Resonance can also be induced acoustically. In the presence of a constant magnetic field, as in the case of NMR, the Radio Frequency varying magnetic field also generates sound in conductive materials through eddy currents. The excited acoustic wave can in turn, interact with nuclear spins and acoustic NMR can be observed. The phenomenon is often called Nuclear Acoustic Resonance, usually abbreviated to "NAR". The book "Nuclear Acoustic Resonance" by Bolef and Sundfors, describes both the theoretical and experimental aspects of this: (http://books.google.ca/books/about/Nuclear_Acoustic_Resonance.html?id=izYbAQAAIAAJ&redir_esc=y).

Nuclear Acoustic Resonance is nothing more than an alternative means of inducing transitions between precession energy levels in nuclei with spin. The energy of mechanical vibrations (usually within the ultrasonic frequency range) is absorbed by the nuclei. At low amplitudes, Nuclear Acoustic Resonance is just another way of initiating magnetic resonance.

The most effective technique is to create conditions for appropriate acoustic (mechanical) resonance of the energy gain material itself, where the amplitude of atomic vibration is significant. The vibration spectrum of the material has a characteristic standing-wave pattern, with individual graph lines corresponding to different mechanical resonant frequencies. If that is implemented, then, the value of the external magnetic field, in which the sample is immersed, has to be adjusted for acoustically driven transitions to occur. The higher the strain induced in the material, the higher the probability of transitions occurring.

This paper clarifies the fact that nuclear magnetic resonance "NMR", which is understood to be resonant energy absorption by precessing nuclei, from either electromagnetic or acoustic sources, is not a necessary ingredient in the task of energy extraction from matter. Resonantly vibrating material can be viewed as a lattice of nuclei embedded in the shell and conduction electrons as shown in Fig. 2a. As the nuclei are much heavier than the electrons, the vibrating body will experience distortion of the electronic shell and displacement of the nucleus location within that shell due to periodic acceleration, as shown in Fig. 2b. If the resonantly vibrating material is immersed in a magnetic field, then, under certain conditions, a large number of it's nuclei will be in precession. Under these conditions, an enhanced interaction between the precessing nuclei and the shell electrons may take place. It has to be born in mind that vigorous precession may also influence the shape of the nuclei.

The frequency of the precession of the nuclei immersed in a magnetic field B is directly proportional to the value of the field as shown here:

$$f_0 = \gamma B/(2\pi)$$

where:

Υ is the gyromagnetic ratio of an isotope in the disc material, and
B is the local magnetic induction
(http://en.wikipedia.org/wiki/Larmor_precession).

This is illustrated in Fig.1. Thus, to achieve sufficiently high frequency of precession, the value of B has to be sufficiently high.

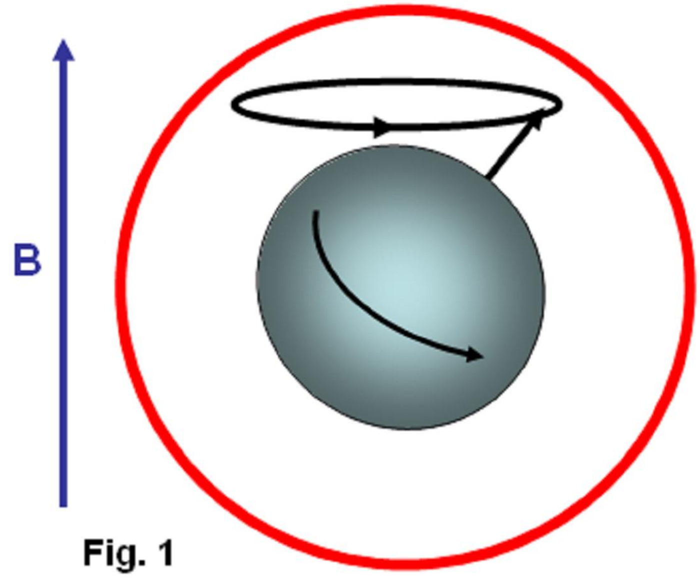

Fig. 1

Fig.1 shows the precession of a nucleus with non-zero spin immersed in a magnetic field B (not to scale). The red circle represents the shell of electrons.

This enhanced interaction between the precessing nuclei and shell electrons under mechanical acceleration often results in transmutation of the nucleus and emission of fast sub-atomic particles (induced nuclear decay) in the plane perpendicular to B. The instantaneous proximity of the precessing nucleus to the electronic shell may be viewed as a collision of the nucleus and an electron (interaction between waves of matter). The phenomenon could be called the "intra-atomic grinding effect".

It is interesting to note that the effect does not require large displacements of the nuclei from their equilibrium positions. A small displacement, being a small fraction of the atomic radius is capable of producing the effect. The displacement can be parallel, Fig.2b, as well as perpendicular to the magnetic field.

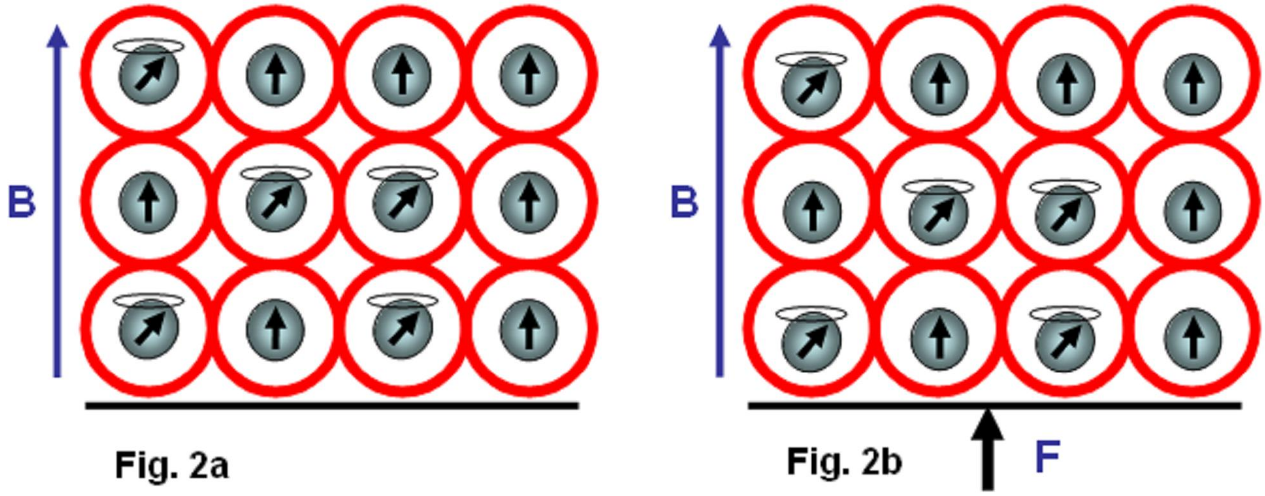

Fig. 2a Fig. 2b

Fig.2 shows that as the nuclei are much heavier than the electrons, any acceleration of the material causes the nuclei to lag behind, thus changing their position relative to the shell electrons. The arrows shown on the nuclei in Fig.2, represents their spin schematically, and the magnetic moment of the nuclei at that instant of time. The ellipsis above the nucleus represent nuclear precession.

It is also worth noting that the magnetic field B, penetrating the energy-gain material, cannot be static. In a static magnetic field, the precession of nuclei ceases after a time period known as the spin-lattice relaxation time. After this time, most of the nuclei will align their magnetic moments parallel to the magnetic field (*e.g.* for s = 3 / 2). To refresh the precession of nuclei, the field has to be brought to zero and then steadily, but quickly enough, increased to the desired value, such that the precession of a large population of the nuclei is maintained.

The vibrating, spinning and precessing nuclei interacting with shell electrons invoke forced transmutation of the nuclei, releasing fast charged sub-atomic particles. The biggest advantage of this approach is that the shell electrons are already in close proximity to the nucleus and do not have to overcome the potential barrier created by the shell electrons as unlike the situation for external electrons.

Since the vibrating body is permeated by the magnetic field, the released fast, charged, sub-atomic particles will be deflected by the Lorenz force, F_B=evB, forming a circular current in the energy-gain material. This current may resemble eddy currents, but contrary to the latter, it is constituted by fast moving charged particles, rather than slow electrons. This current arises very quickly and dies down quickly, as the electrons (or other charged sub-atomic particles) are either absorbed or radiated. The trajectories of these particles form short arcs rather than full circles. The rise and fall of the current in the energy-gain material produces a magnetic pulse which can be coupled inductively to a coil and used to do useful work.

This specific vibration method of generating electricity from materials was ascertained by Michel Meyer in the *Science et Vie* 1976 article. In the caption of one of the figures in this article we read:
"To **shake the atoms** and make them release the energy which they contain, you need to send a wave, with a high frequency oscillator (of the order of 172 kHz), **that resonates with the vibration of the copper electrodes**. This (is achieved) by an intermediary magnetic field that oscillates due to a coil surrounding the copper and connected to the oscillator". (translation by William McFreey).

Moreover, Steven Mark in the presentation of his first "spool" device says "it vibrates ever so slightly". In another video, a co-worker of Mark, given the energised device remarks: "buzzing, vibration". It is also interesting to notice that Tariel Kapanadze's devices produce screeching or humming sounds. This is particularly noticeable in the video where the spool motor is demonstrated. In the 2004 device presentation humming and buzzing can be heard. Thus, shaking the atoms is quite common in the field of interest. Also, according to the above, NMR or NAR are not necessary in the process of energy extraction. What is needed, is a vibrating "energy-gain" material placed in an alternating magnetic field, or in more general terms, spinning and precessing nuclei periodically displaced from their equilibrium positions and immersed in a magnetic field.

There are many possible implementations of the principle described here. Physical shape and the appropriate frequencies of oscillation in these implementations will depend on the form and size of the "energy-gain" material.

The simplest, intuitive implementation of this idea is shown in Fig.3 which shows the concept of an electromechanical transmutation device (symbol **F** denotes a fuse):

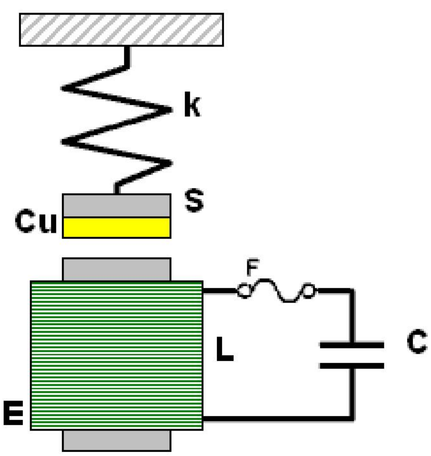

Fig. 3

Here, a disc of copper, Cu, laminated to the magnetic steel disc **S**, and attached to a spring **k**, is fixed above an electromagnet **E** of inductance **L** which forms an L-C circuit in conjunction with the capacitor **C**. The steel part of the laminated disc **S** is magnetised by the core of the electromagnet **E**. At the same time the magnetic field between the steel disc and the electromagnet core permeates the copper disc. The higher the current through the electromagnet, the stronger the field in the copper disc becomes and the greater the attractive force between disc **S** and the core **E**.

Since the attraction force between S and electromagnet core is independent of the core magnetic polarity, therefore, the frequency of mechanical force on the plate S will be twice that of the frequency of current maxima through the electromagnet. Thus for the system in Fig.3 to oscillate in an electromechanical resonance, the frequency of electrical oscillations of the LC circuit should be tuned to half the frequency of the mechanical oscillations of the composite disc.

Whenever the field in Cu, the gain material, crosses zero, the magnetic moments of the nuclei take random orientation. When the field starts to rise, the magnetic moments try to orient themselves along the field. However, because the nuclei also have spin, the torque on the magnetic moments will cause the nuclei to precess. This precession will be fastest at the peak of the magnetic field. At this point. the acceleration of the Cu disc will also be greatest. This will shift the precessing nuclei position, to interact strongly with shell electrons, and forced transmutation will occur. The ejected electrons will then form a strong current pulse, as discussed above, which will be coupled by electromagnet coil L and pulse charge the capacitor C.

This will increase the current flowing in the electromagnet in the next cycle of the electrical oscillation, which in turn, will increase the amplitude of mechanical oscillation. This process will repeat itself to the point of the system destruction at the expense of the energy from Cu transmutation. To prevent the self destruction, it is advisable to connect the spark-gap across the LC circuit to discharge (waist) the excess energy thus maintaining the electromechanical oscillations at the safe level. Excess energy can also be coupled by few turns of winding wrapped around the electromagnet and utilised.

It should be understood that the amplitude and frequency of mechanical oscillations of the composite disc have to be sufficiently large to provide large enough acceleration of the nuclei. Since in harmonic motion of a mass m attached to a spring of modulus k is $a=-A\omega^2$ (A-amplitude of oscillations, ω-angular frequency), sufficiently high values of acceleration can be achieved either by increasing the amplitude or the frequency of mechanical oscillations. It is immediately noticeable that increasing the frequency is more effective in this case. This requires a spring with relatively high value of k and low values of m: $\omega^2=k/m$.

A more practical and improved implementation of the same idea is presented in Fig.4:

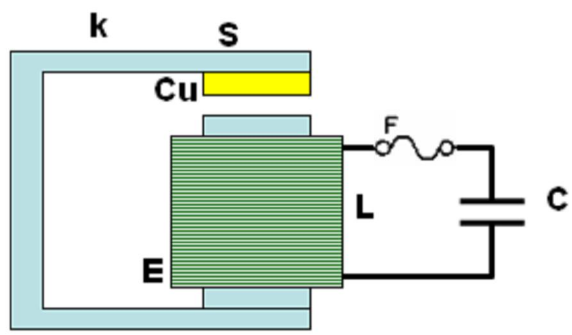

Fig. 4

Here the spring is made of magnetic steel in the form of a U-shape. This U-shape also works as a magnetic guide.

Yet another possible implementation of the above idea is even more intuitive. It consists in placing one of the turns of a coil inside the coil. In this arrangement, the coil **L** also forms an L-C circuit in conjunction with the capacitor **C**, as shown in Fig.5a where a single turn of a coil winding is placed within the coil:

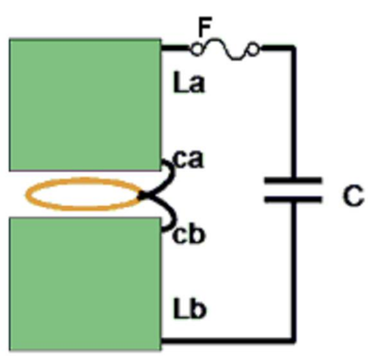

Fig. 5a

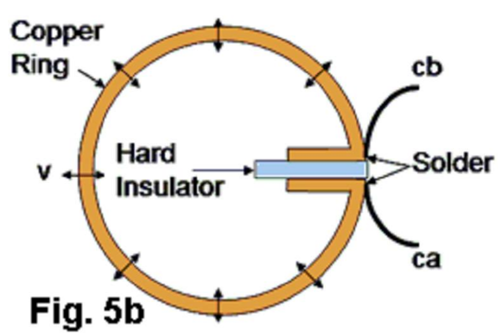

Fig. 5b

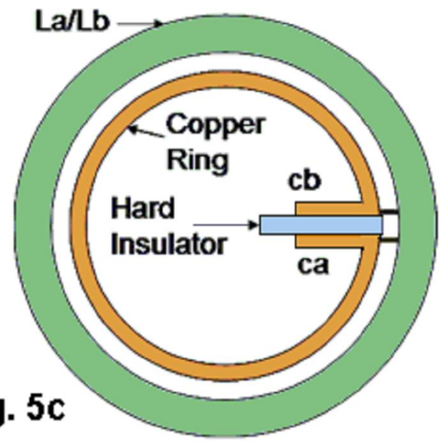

Fig. 5c

Here, the schematic layout is shown in Fig.5a. The single-turn ring resonator is shown in Fig.5b, and the top view of the arrangement is shown in Fig.5c. The connecting wires to the ring resonator are marked as **ca** and **cb** respectively. The hard insulator also supports the ring mechanically. Vibration of the ring is marked by double sided arrows **V** shown in Fig.5b. The gap between coils **La** and **Lb** is only shown to help with visualising the way that the coils sandwich the ring. In reality, the coils touch one another and the ring is placed inside, not actually touching the coils. Alternatively, coils **La** and **Lb** can be fitted with cores and the ring may than be placed in the gap between those cores, but not actually touching the cores.

If this single turn (in general, it can be more than one turn), is made of brass or copper and is prepared so as to form a ring, (as indicated in Fig.5b), then the turn will form a mechanical ring resonator. The direction of vibrations in this ring is marked by double sided arrows (one of them marked **V**). Since the ring is part of the coil winding, the current oscillating in the L-C circuit will, of course, also flow through the ring. Owing to the fact that the ring is immersed in the magnetic field of the coil, the mechanical vibration of this resonator will be excited by the Lorenz force which will try to expand or shrink the ring radially. The frequency of this force will be twice the frequency of the oscillations of the L-C circuit. This is because when the current flowing through the ring changes direction, the magnetic field in the coil also changes direction. The ring's fundamental resonant frequency corresponds to the mode in which all the points of the ring move radially outward together and then radially inward together. This is analogous to the fundamental longitudinal oscillation mode of the rod. Thus, the resonant frequency f_r of ring vibrations is: $f_r = v_L / \pi d$, where $\mathbf{v_L}$ is the longitudinal speed of the sound wave in the material of the ring (*e.g.* copper) and **d** is the diameter of the ring.

The speed of the longitudinal sound wave in copper is approximately 4 km/s. So, for a copper ring 10 cm in diameter, the mechanical resonant frequency of the ring will be around 12,730 Hz. The L-C circuit will then have to be tuned to 6,365 Hz for electromechanical resonance to be established. When the electromechanical resonance is established, and the amplitude of oscillations is high enough, pulses of fast electrons are generated in the ring, which in turn generate magnetic pulses, as described above. These pulses are coupled by the coil itself, recharging the capacitor **C**. This way, once started, the oscillations will gather strength until the circuit self destructs. To prevent self destruction, the circuit has to be fitted with a dissipative mechanism such as a spark-gap (a fuse may also be useful) or an automatic detuning mechanism that leads to the condition where the L-C circuit oscillates on a frequency slightly different to f_r / 2. The latter mechanism has been described by Mandelstam and Papalexi (see Mandelstam, Papalexi, 1935). In their original method, detuning the electrical oscillation frequency from that of the mechanical oscillations was found to utilise the magnetic saturation effect in iron, but nowadays ferrite can also be used in this application.
In the electromechanically resonant system shown in Fig.6, an inductor **Lc**, wound on two ferrite toroidal cores, is connected in series with coils **La** and **Lb**. Coil **Ld**, is wound on each core in opposite directions to minimise coupling from **Lc** to **Ld**, forming a magnetic biasing coil. In this way, the L-C circuit, consisting of components **La**, **Lb**, **Lc**, and **C**, can be tuned by passing current through Ld. The automatic detuning loop starts with coil **L2** which is magnetically coupled to **La/Lb**, which feeds the bridge rectifier. The rectified signal, after filtration by **C1**, supplies the biasing current to **Ld**. Thus, the higher the amplitude of oscillations of the L-C circuit, the higher the current in **Ld** and therefore the higher the magnetic saturation of the toroidal cores. Magnetic saturation of the toroidal cores reduces the inductance of **Lc** and detunes the oscillation frequency of the L-C circuit. This, in turn, reduces the amplitude of ring vibration and the conversion rate (the rate of transmutation) in the ring. Coils **L3** form a filter, preventing spuriously coupled RF by **Ld** from overloading the system.

Diode **D1** increases the feedback threshold. In fact, **D1** may consist of several diodes connected in series or be simply a Zener diode.

Coil **L4**, is also magnetically coupled to **La/Lb**, and couples usable energy. This energy can be used directly, as shown in Fig.6, or after rectification, used as a DC source.

Drawing more power from the device, normally reduces the current flowing through **Ld** and diminishes the detuning between resonances, increasing the conversion rate. Instead of the ring one may use a section of tubing with a slit. In this case, however, coils **La/Lb** should not be wound directly on the tube as this would prevent mechanical vibration of the tube which is essential if transmutation is to occur.

The tuning procedure for this device consists mainly of determining the resonant frequency of the ring vibrations, f_r, and then adjusting the value of **C** so that the (**La,Lb,Lc**) - **C** combination resonates at the frequency $f_r/2$.

Fig. 6 shows a schematic layout of the "resonance-in-resonance" generator with feedback. The feedback detunes the frequency of electrical oscillations from that of the mechanical resonance. A single toroid tuning coil may also be used provided that it is wound properly.

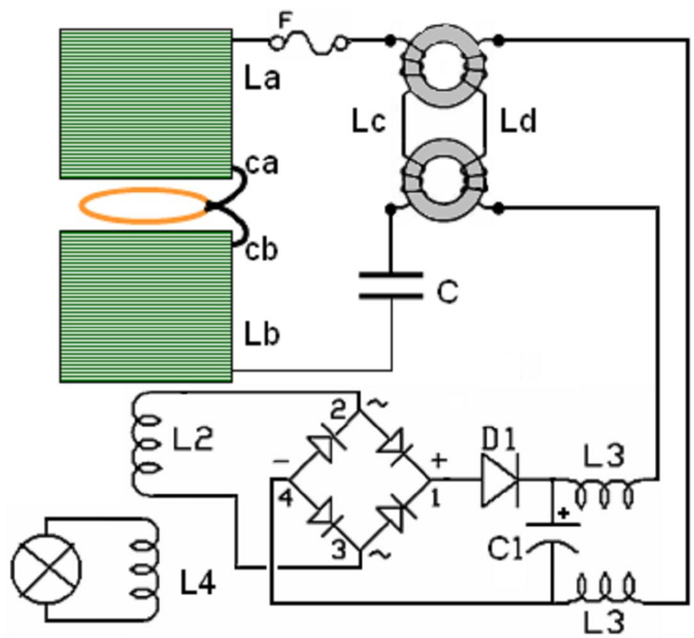

Fig. 6

The device concepts shown in Fig.4, Fig.5 and Fig.6 can be classified as "resonance in resonance" or electromechanical resonance devices where both mechanical and electrical oscillations are caused by just a single current flow. This current, being part of the electrical oscillations, also excites the mechanical vibrations. Part of the energy of electrical oscillations feeds the mechanical vibrations. Thus, this is a closed loop system. These kind of systems can easily be transformed into toroidal power units (TPUs) by choosing an appropriate diameter for the coils La/Lb and for the excess-energy ring. The system shown in Fig.6 can be started by disconnecting the load from **L4** and briefly connecting a frequency generator to **L4**. The other method of starting the device would be to momentarily charge the capacitor **C**, with the load disconnected.

One can also envisage an open loop system which works on the same principle: vibrating body placed in an alternating magnetic field. Here, however, excitation of the gain medium vibration, and generation of the varying magnetic field are separated. An example of an open loop generator is shown in Fig.7 in which the gap shown between coils **La** and **Lb** is for clarity only, unless the coils are fitted with cores. Transformer **T** supplies low frequency (LF) alternating magnetisation current, (f = 50 to 400 Hz) to coils **La** and **Lb** through coil **L1** which is wound using heavy gauge wire:

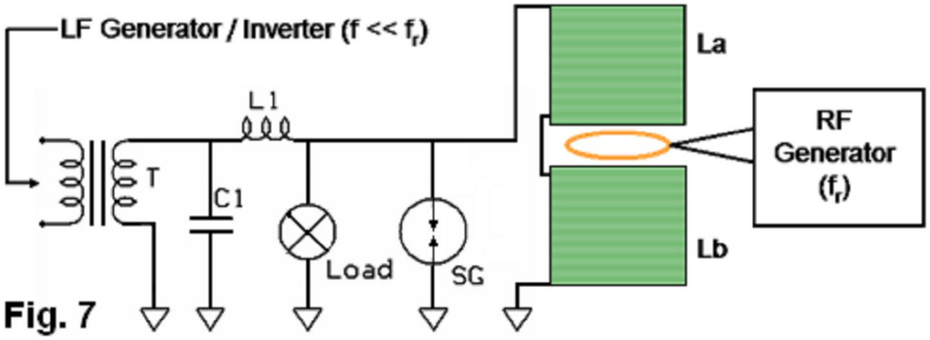

Fig. 7

The ring resonator placed within the magnetic field of **La/Lb** is resonantly vibrated by strong pulses of current from a Radio Frequency generator (f_r = 2 - 200 kHz). The frequency of these pulses should be equal to f_r and preferably be an integer multiple of the coil magnetisation frequency f (f_r = nf, usually n > 6). Since the field in **La/Lb** is modulated, the amplitude of ring vibration also varies, being smallest at field transitions through zero and highest at magnetic field maxima. Forced transmutation of nuclei in the ring material occurs near the field maxima and manifests itself as strong magnetic pulses, as described above. These magnetic pulses are coupled by **La/Lb** in the form of high voltage spikes across the coil. These spikes power the load, but are filtered out by **L1- C1**, preventing unwanted feedback to the LF generator.

Self powering in this open loop system is possible by drawing some power from the coil, transformation, rectification and filtration. The DC power thus obtained can be used to supply the LF and RF generators. The spark-gap **SG** limits the excess voltage on the coil, preventing damage to the load.

The process of tuning of this device is even simpler and consists of determining the resonant frequency of the ring vibrations f_r, and then adjusting the LF magnetisation current in coils **La/Lb** until the Load is powered. The frequency f_r which is the mechanical resonance frequency of the ring, has to be maintained during operation of the device.

As mentioned before, the range of resonance excitation frequencies depends strongly on the physical dimensions of the energy-gain material. Here, we considered energy-gain resonators whose size is of the order of centimetres. However, if the energy-gain material is in the form of a powder, as for instance in the Colman/Seddon-Gillespie tube shown earlier in this chapter and further detailed at the web site http://www.rexresearch.com/colman/GB763062A.pdf, these tiny multiple resonators are just micrometers in size, and so their resonant frequency of oscillation is very high, being of the order of hundreds of megahertz. Additionally, when in powder form, the skin effect does not pose a significant limitation.

The connection of the ideas and examples of devices described here to the devices presented by some inventors should be obvious to those familiar with the technology. It is quite possible that Nikola Tesla experimented with this technology a long time ago.

Please be fully aware that this analysis is for information purposes only and **must not** under any circumstances be considered to be a recommendation for the reader to build or experiment with any such device as lethal voltages are liable to be generated by the coils. Radioactive particles may be produced by this device. It may be necessary to mount any such device in an earthed box made of aluminium (or other suitable metal) in order to screen out any stray radioactive particles. The fuel ring or disc must be connected to ground because the voltage generated in the ring or disc can get very high and pose a danger of a fatal electric shock. The disc, ring or tube may overheat and might even explode. Thus it is entirely your own responsibility should you decide to experiment with this kind of device.