Successful Brushless A.C. Power Extraction From The Faraday Acyclic Generator

by

July 11, 2010 Jerry E. Bayles

The A vector circulates around the B vector in the manner of the flux circulation around a current carrying wire in the standard definition for the right hand rule. I. E., If the right hand thumb points in the direction of magnetic flux, then the A vector rotates or circulates in the direction of the curled fingers of the right hand. The right hand rule for the direction of magnetic flux is established as being in the direction of the curled fingers of the right hand when the current flow is in the direction of the thumb. This is for the conventional current flow theory where positive charges flow from a positive terminal to a negative potential terminal. This is the prerequisite for the following two force generations.

The next order of action is to establish the right hand three vector generator rule where the thumb is force of rotation action F, the index finger is the direction of magnetic flux B and finally the current I is the middle finger where all three vectors or fingers are 90 degrees to each other.

The last order of action is the right hand rule for the generation of axial force that utilizes the thumb in the direction of the A vector, the index finger in the direction of force, and finally, the middle finger in the direction of the same current as for the magnetic rotational force above.

The Faraday equation for the acyclic generator is presented below as equation 1.

Let: $B := 5150 \cdot \text{gauss}$ $\quad B = 0.515\,\text{tesla}$ $\quad R1 := .125 \cdot \text{in}$ $\quad R2 := 1.00 \cdot \text{in}$ $\quad \Delta r := R2 - R1$

$RPM := 1200$ $\quad f := RPM \cdot 60^{-1} \cdot \text{sec}^{-1}$ $\quad f = 20\,\text{Hz}$ $\quad \omega := 2 \cdot \pi \cdot f$

Total resistance of the current path is measured to be : $R_t := 1.333333 \cdot 10^{-02} \cdot \text{ohm}$

Then: $$\boxed{Volt := \omega \cdot \int_{R1}^{R2} B \cdot r\,dr} \qquad Volt = 0.0205501552\,\text{volt} \qquad 1)$$

If we now consider that the voltage is capable of producing current if the rim of the disk is connected to the axis through a suitable load resistance, then current is also a direct function of the rate of rotation, ω.

$$I := \frac{Volt}{R_t} \qquad I = 1.5412620253\,\text{amp}$$

Note: Another way of looking at the generated current is to consider that the current flows whether a load is connected or not. This by reason that the near space to the surface of the conductive magnetic disk has a current flow from energy space.

$$A := \int_{R1}^{R2} B\,dr \qquad A = 0.011445875\,\frac{(\text{volt} \cdot \text{sec})}{\text{m}} \qquad 2)$$

Note that A is not dependent on the rotation rate.

In: $\begin{pmatrix} X \\ Y \\ Z \end{pmatrix}$ X and Y are in the plane of magnetic disk rotation. B field is along the axis of rotation, Z.

Note: $$\int \underbrace{\frac{\text{volt} \cdot \text{sec}}{r^2}}_{B}\,dr \rightarrow \underbrace{-\text{volt} \cdot \frac{\text{sec}}{r}}_{A} \qquad 3)$$

Zero frequency results in zero current as current depends on the circuit path having a source voltage which will be zero at zero Hz.

Superconducting magnet surfaces may yield very large current capability which could allow for significant force to be developed without overheating the magnet surfaces.

In figure 1 below, the standard generator force vector notation for the right-hand rule (thumb, index finger and middle finger respectively) of F, B, and I for force F, magnetic flux density B, and current I respectively is used. This is for a two disk system.

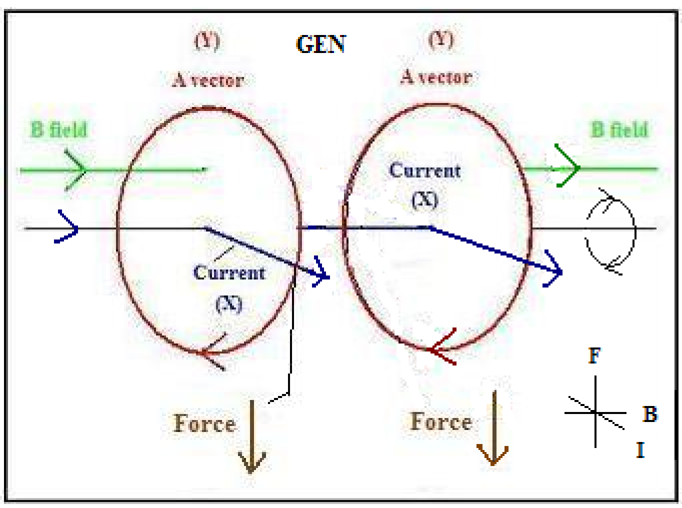
Case 1: $$F_{B1} := \begin{pmatrix} 0 \\ 0 \\ B \end{pmatrix} \times \begin{bmatrix} I \cdot (\Delta r) \\ 0 \\ 0 \end{bmatrix} \qquad F_{B1} = \begin{pmatrix} 0 \\ 0.0176410925 \\ 0 \end{pmatrix} \text{newton} \tag{4A)}$$

Case 2: $$F_{B2} := \begin{pmatrix} 0 \\ 0 \\ B \end{pmatrix} \times \begin{bmatrix} I \cdot (\Delta r) \\ 0 \\ 0 \end{bmatrix} \qquad F_{B2} = \begin{pmatrix} 0 \\ 0.0176410925 \\ 0 \end{pmatrix} \text{newton} \tag{4B)}$$

The force of action is along the Y direction as referenced to figure 1 below.

Fig. 1

Case 1 Case 2



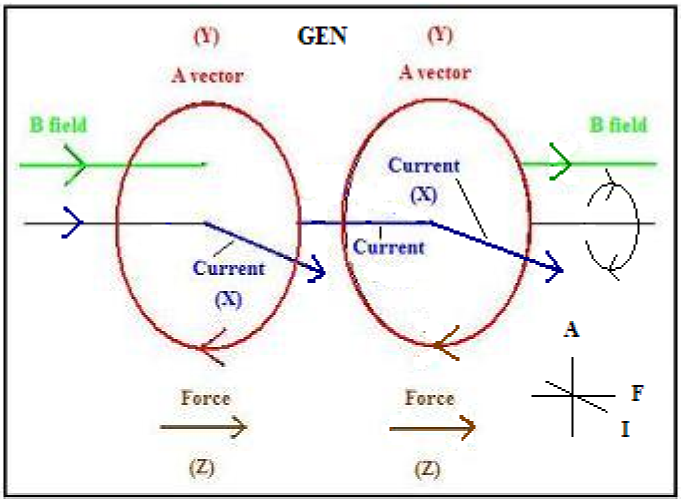
For the A vector, the thumb points in the direction of the magnetic flux and the fingers curl in the direction of the circulation of the A vector. The direction of the B flux is fixed regardless of the rotation of the disks since the disks are permanent magnets.

A force may exist as shown immediately below where the cross product of the radial current **I** and the **A** vectors produce an axial force **F**. The generator mode is shown with a short circuit load.

Case 1: $$F_{A1} := \begin{pmatrix} I \\ 0 \\ 0 \end{pmatrix} \times \begin{pmatrix} 0 \\ A \\ 0 \end{pmatrix} \qquad F_{A1} = \begin{pmatrix} 0 \\ 0 \\ 0.0176410925 \end{pmatrix} \text{newton} \tag{5A)}$$

Case 2: $$F_{A2} := \begin{pmatrix} I \\ 0 \\ 0 \end{pmatrix} \times \begin{pmatrix} 0 \\ A \\ 0 \end{pmatrix} \qquad F_{A2} = \begin{pmatrix} 0 \\ 0 \\ 0.0176410925 \end{pmatrix} \text{newton} \tag{5B)}$$

Fig. #2 Case 1 Case 2



+A means clockwise as viewed from the left to the right along the Z axis of rotation. The net vector force along the Z axis adds. Force in the AFI pictorial is action force. This is 90 degrees to the action force involving the generator terms FBI shown in Fig. 1 above. The AFI terms are derived from the FBI action vectors which must occur first. It is obvious that having both magnetic disks aiding in their B fields will cause a net force to the right. The A vector follows the rotation direction for this case.

Equation 5, case 1 and 2 is shown in fig. 2 above pictorially. Using the right-hand generator rule, a new sequence is generated by using A, F, and I as thumb, index and middle finger respectively. The force (F) nexus occurs at the intersection of the (A) vector and the current (I) vector and is 90 degrees to to both since all of the vectors are 90 degrees to each other.

The voltage appears evenly around the rim of the disk and is measured from R2 to R1. It is obvious that the voltage increases in direct proportion to the rate of rotation ω. B and A magnitudes are independent of the rate or direction of rotation of the magnetic disk.

$$vel1 := \int_{R1}^{R2} \omega \, dr \qquad vel1 = 2.792875869\,m\,sec^{-1} \qquad \text{Also:} \quad \omega \cdot \Delta r = 2.792875869\,m\,sec^{-1}$$ 6)

$$W_{B1} := F_{B1} \cdot (\omega \cdot \Delta r) \qquad W_{B1} = \begin{pmatrix} 0 \\ 0.0492693815 \\ 0 \end{pmatrix} watt \qquad \lambda 1 := \frac{vel1}{f} \qquad \lambda 1 = 0.1396437935\,m$$ 7)

Wavelength remains constant with a change of rotation frequency.

$$S_{B1} := \frac{W_{B1}}{\lambda 1^2} \qquad S_{B1} = \begin{pmatrix} 0 \\ 2.5265845402 \\ 0 \end{pmatrix} \frac{watt}{m^2}$$ 8)

$$P_B := \frac{W_{B1}}{\lambda 1^2 \cdot vel1} \qquad P_B = \begin{pmatrix} 0 \\ 0.9046533604 \\ 0 \end{pmatrix} \frac{newton}{m^2}$$ 9)

The Poynting vector power S_{B1} as well as the regular power P_B are radiated radially from the axis of rotation of the magnets as will be explained below. This is related to the B field force above.

$$\boxed{E := vel1 \cdot B} \qquad E = 1.4383310726\,\frac{volt}{m}$$ E increases in direct proportion to the disk frequency. 10)

The above system is based on a variable permeability space-time if it is compared to free space. The above system is not in our ordinary space-time as a result. An increase of rotation frequency induces greater energy and thus power from energy space. The result is propulsion which can be used in deep space and therefore releases us from the gravitational chains of our Earth.

Electromagnetic Poynting vector equations for free space radiation power per meter squared is shown below and yields results that are much greater than the above calculation S_{B1}.

$$c := 2.9979924580 \cdot 10^{8} \cdot \frac{m}{sec} \qquad \mu_o := 4 \cdot \pi \cdot 1 \cdot 10^{-07} \cdot \frac{henry}{m}$$

$$S_{rad} := \frac{E \cdot B}{2 \cdot \mu_o} \qquad S_{rad} = 2.9473128125 \times 10^{5}\, watt \cdot m^{-2} \tag{11}$$

$$P_c := S_{rad} \cdot c^{-1} \qquad P_c = 9.8309547265 \times 10^{-4} \frac{newton}{m^2} \tag{12}$$

Note: E is in the X and Y plane and points radially from the Z axis. B points along the Z axis. Any vector chosen arbitrarily in the X-Y, (E vector plane), taken as a cross- product of the B vector will produce a pressure vector outwards 90 degrees from the Z axis and 90 degrees to the E and B vectors.

The above suggests that a relative permeability may be solved for to reconcile the velocity of free space c to the vel parameter of the two disk magnetic system of figures 1 and 2 above.

Let: $S_{B1} = \frac{E \cdot B}{2 \cdot \mu_r \cdot \mu_o}$ Then: $\mu_r := \frac{E \cdot B}{\left|S_{B1}\right| \cdot 2 \cdot \mu_o}$ $\boxed{\mu_r = 1.1665205599 \times 10^{5}}$ 13)

$$S := \frac{E \cdot B}{2 \cdot \mu_r \cdot \mu_o} \qquad S = 2.5265845402 \frac{watt}{m^2} \qquad \text{Ck: (o.k.)} \tag{14}$$

Relative permeability decreases with an increase of rotation frequency. It can even be less than unity.

S above is now equal to the result in eq. 8 above for the two disk magnetic rotating system.

$$S_{B1} = \begin{pmatrix} 0 \\ 2.5265845402 \\ 0 \end{pmatrix} \frac{watt}{m^2} \tag{16}$$

For the radial pressure discussed above:

$$P_{rad} := \left[\begin{pmatrix} 0 \\ E \\ 0 \end{pmatrix} \times \begin{pmatrix} 0 \\ 0 \\ B \end{pmatrix}\right] \cdot \frac{1}{2\mu_r \cdot \mu_o \cdot vel1} \qquad P_{rad} = \begin{pmatrix} 0.9046533604 \\ 0 \\ 0 \end{pmatrix} \frac{newton}{m^2} \tag{17}$$

Note that the outwards pressure is 90 degrees to the axis of rotation. It is in the XY plane of the magnetic disk rotation

The following interesting relationships exists:

$$F_{fund} := \frac{(\mu_r)\cdot\mu_o\cdot I^2}{2\cdot\pi^2} \qquad F_{fund} = 0.0176410925\,\text{newton} \qquad \text{finally,} \quad \boxed{\frac{F_{fund}}{|F_{B1}|} = 1} \tag{18}$$

The permeability of space times current equals the A vector and the A vector times current again is force.

$$\frac{(\mu_r)\cdot\mu_o\cdot I}{2\cdot\pi^2} = 0.011445875\,\frac{\text{volt}\cdot\text{sec}}{\text{m}} \qquad \frac{(\mu_r)\cdot\mu_o\cdot I^2}{2\cdot\pi^2} = 0.0176410925\,\text{newton} \tag{19}$$

The inductance and capacitance for resonance of the above system related to the disk circumference is:

$$L := (\mu_r)\cdot\mu_o\cdot 2\cdot\pi\cdot\Delta r \qquad L = 20.4702854921\,\text{mH} \qquad \text{(Millihenry)} \tag{20}$$

$$C := \frac{1}{4\cdot\pi^2\cdot f^2\cdot L} \qquad C = 3.0935445332\times 10^3\,\mu\text{F} \qquad \text{(Microfarad)} \tag{21}$$

Check: $$f_r := \frac{1}{2\cdot\pi\cdot\sqrt{L\cdot C}} \qquad f_r = 20\,\text{Hz} \qquad \text{(o.k.)} \tag{22}$$

The current derived from rotation times the permeability of free space yields an A vector much less than in equation 2 above.

Let: $\mu_o := 4\cdot\pi\cdot 1\cdot 10^{-07}\cdot\frac{\text{henry}}{\text{m}}$ Then:

$$A_{\mu o} := \mu_o\cdot I \qquad A_{\mu o} = 1.9368069823\times 10^{-6}\,\frac{\text{volt}\cdot\text{sec}}{\text{m}} \tag{23}$$

This minor A vector is inline with the current I in deference to the major A vector generated around the B vector. Further, both are 90 degrees to each other. Then there is not a cross product force associated with the minor A vector.

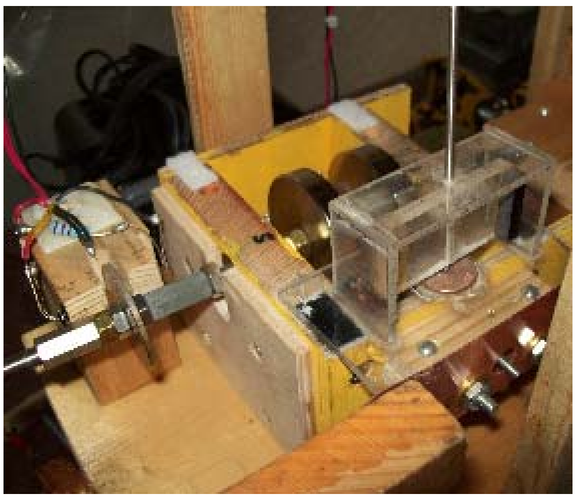
Relative permeability is:

$$\mu_{Ar} := \frac{A}{A_{\mu o}} \qquad \mu_{Ar} = 5.9096621938\times 10^3 \quad \text{Relative permeability increase due to I.} \tag{24}$$

Finally: $$\frac{\mu_r}{\mu_{Ar}\cdot 2\cdot\pi^2} = 1 \tag{25}$$

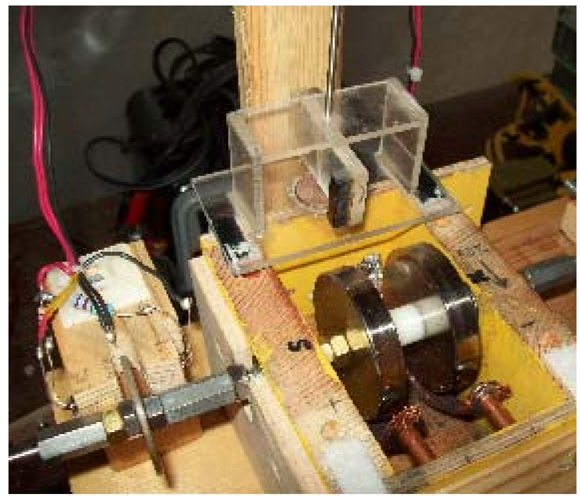
Tests show a resonance of an ammeter needle as well as a much more massive pair of permanent magnets mounted on a swivel arrangement as in the below pictures in figures 3 and 4. Both move vigorously at near the Schuman frequency and a definite force can be felt by the finger tips when attempting to stop the vibration of the swivel magnet arrangement. Since the main disk magnets are nearly uniform in the diameter and thus magnetic field, there would not be expected such a powerful oscillation under normal circumstances. Perhaps a field is being radiated that is free energy at near the Schumann frequency. With that in mind, the following mathematical analysis is presented.

Fig. 3



North Side Magnetic Balance

Fig. 4



South Side Magnetic Balance

In the above figures, the brush contacts are dropped below the disk magnets and are thus out of the measurement.

$f_{Schu} := 8 \cdot Hz$ Known empirically established Schumann frequency.

$\lambda 2 := 2 \cdot \pi \cdot R2$ $\quad \lambda 2 = 0.1595929068\,m$ (All λ's are constant.) 26)

$\Delta\lambda := \lambda 2 - \lambda 1$ $\quad \Delta\lambda = 0.0199491134\,m$ Note: $\frac{1}{\Delta\lambda} = 1.2732395447\,in^{-1}$ and $\frac{4}{\pi} = 1.2732395447$ 27)

$f_{Schu} \cdot (\Delta\lambda) = 0.1595929068\,m\,sec^{-1}$ **(= square root of the Golden Ratio.)**

$$\frac{f_{Schu} \cdot (\Delta\lambda)}{\lambda 2} = 1\,Hz$$

One (1) hertz is one 1/1second and therefore the expression at the left at 8 Hz is hidden in all frequencies. Any frequency other than 8 Hz will not yield the exact one hertz or second.

A resonance at 2π Hz and 8.00 Hz occurs during testing. At the 2π Hz resonance, the entire test bed vibrates and at 8.00 Hz, the balance magnets in figures 3 and 4 swing back and forth violently. The meter also vibrates and seems to follow the action of the balance magnets. Further, the static alignment of the balance magnets remain relatively still as shown if the disks are rotated slowly by hand. Due to the alignments being 90 degrees out from one side of the disks to the other, it is postulated that there is some sort of active standing quarter wave across the disks even when they are not being rotated. Further, it is locked into an geographical North-South alignment for this setup. The North-South alignment may not be more than coincidence but the standing wave is locked into the above alignment. When the disks are spun, the standing wave is force to degenerate and radiate. This radiated field power has been measured and the results are encouraging. This means that no contacts are needed on the Faraday disk to extract power under the above setup conditions.

The hidden frequency constant above is comparable to the hidden force in my electrogravitational equation that is also a constant and since it is a constant it does not show up in the output force that is a variable. The electrogravitational equation is shown below and a full explanation is presented on my web site at http://www.electrogravity.com.

Fig. 5

Electrogravitational force

(A) variable volt*sec/meter	|--------constant newton--------| (amp)	(amp)	(A) variable volt*sec/meter

$$F_{EG} = \left(\frac{\mu_o \cdot i_{LM} \cdot \lambda_{LM}}{4 \cdot \pi \cdot \Delta r_x}\right) \cdot \left[\left(\frac{i_{LM} \cdot \lambda_{LM}}{l_q}\right) \cdot \mu_o \cdot \left(\frac{i_{LM} \cdot \lambda_{LM}}{l_q}\right)\right] \cdot \left(\frac{\mu_o \cdot i_{LM} \cdot \lambda_{LM}}{4 \cdot \pi \cdot \Delta r_x}\right)$$

Note: (A) = volt * sec / m = weber/m

A cylindrical outwards slow moving field of magnetic radiation at the Schuman frequency may be formed by the cross product of the magnetic Z axis B field and the velocity vel1 in the X and Y axis.

$$S_{Schu} := \begin{pmatrix} 0 \\ 0 \\ B \end{pmatrix} \times \begin{pmatrix} vel1 \\ -vel1 \\ 0 \end{pmatrix} \qquad S_{Schu} = \begin{pmatrix} 1.4383310726 \\ 1.4383310726 \\ 0 \end{pmatrix} m\,sec^{-1}\,tesla \tag{28}$$

Tesla times velocity indicates a magnetic field in linear motion. This resonates and induces free Schumann frequency energy at 8 Hz.

The units also can be expressed in volts/meter. I suggest that the two forms can alternate with distance in a longitudinal manner. In that case, the field can act not only on other magnetic fields but also electrically charged objects. Even neutral field mass may be acted on since another unit form is newton per coulomb which involves mass times acceleration over charge.

The two disks are aligned with fields aiding and nearly perfectly uniform in the radius of rotation. That being so, the fields can be expected to show little non-uniformity around the axis of rotation for a given radius to the circumference.

It is found by empirical tests however that when the disks are rotated, an electromagnetic field is radiated in proportion to speed. Thus equations 10 through 17 above are substantiated by actual measurement. The increase in current and voltage in the pickup coil(s) are close to equal regardless of whether the core is iron or air. Equation 10 above shows that the E field will increase as the disk rotation velocity increases and this is measured to be the case. This suggests that there is a current and potential in the radiated field and as a result the field changes in amplitude with distance and time but in a longitudinal fashion? Whence the variation in the field around the disks? Perhaps a standing wave between the disks exists and also around the disks when they are standing still.

Two identical small magnets mounted on a rotor free to move on a low friction point of balance is brought to the sides of the magnet disks and if placed on the near side, the balanced magnet indicator lines up parallel to the axis of the disks. If however the balanced indicator magnets are placed on the far opposite side, the balance magnets line up towards the axis and between the disks! Since the disks are uniformly magnetized and uniform radially from the axis, this is most unexpected. If the disks are slowly moved in rotation, the same results are obtained. Is there a standing wave fixed around the magnets?

Further tests reveal that free from any contacts, the near side balance test oscillates the test magnet balance the most at 8.3 Hz and the far side position oscillates at 6.28 Hz. Also, at 6.28 Hz, the entire support for the magnet disk rotors and drill motor is observed to shake vigorously with a sharp resonance point at 6.28 Hz. If we divide 8 Hz by $4/\pi$ we will arrive at 2π exactly. (See eq. 28 above for relevance.)

It is interesting that 2π multiplied by the sexagesimal number 60 yields a number that in magnitude is extremely close to the free space resistance of 376.7303135 ohms. Divide this by 2 and then divide again by the fine structure constant α and we arrive at the quantum ohm. Then it is possible that the disks are acting as a quantum energy space to free space energy transformer using resonant standing waves?

Below is the pickup coil that was used to extract the field energy from the spinning quarter wave resonant Faraday disk generator as described above.

Fig. 5

Results are for bottom coil only @ 1200 RPM.

D.C. coil resistance: 6.7 ohm

Max. current: 68 mA a.c. @ .4 v pp

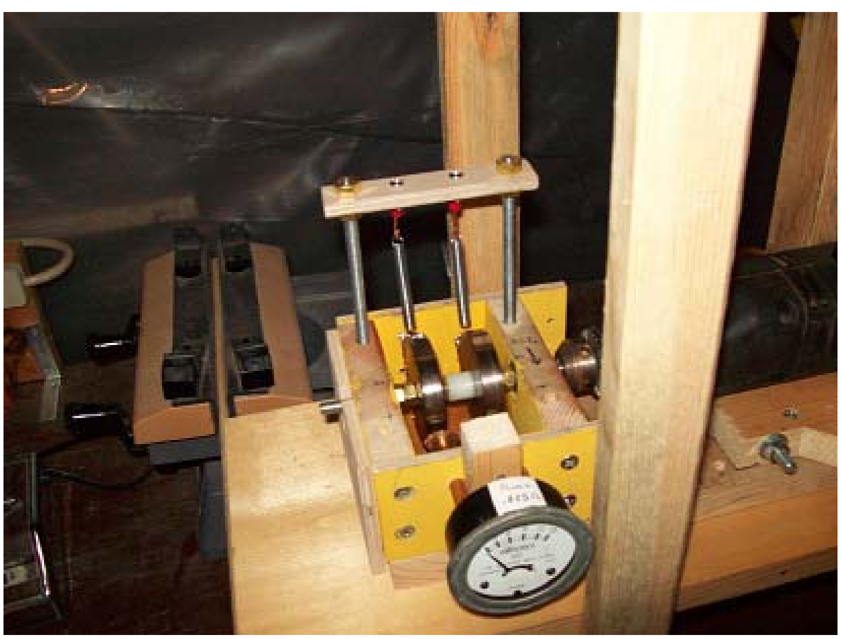
Open circuit voltage: 0.68 v rms, 2.0 v pp

With both lower and upper coils in series, the resistance was: 19.7 ohm. The current was 38 mA a.c. and the voltage was .812 v rms, 2.5 v pp.

It is obvious that a lower resistance aids in the current generation by almost doubling the current while the voltage drops to only 2/3 that of the double coil pickup arrangement. A superconducting pickup coil may deliver large quantities of current, especially if the magnet surfaces are also superconductors.

Below is a preliminary setup for determining the brush current utilizing copper braid. This is no longer needed!

Fig. 6



Disk magnets are shown with brushes attached. This is an early test where the disks are mounted with opposing fields to build the output voltage in series fashion. This was prior to discovery of the standing wave phenomena around the disks as described above. The output maximum was about 3 amps d.c. at 1200 RPM. The connecting shaft is common to both disks electrically and mechanically.

Conclusion:

It may be serendipitous that the dimensions of the magnets used develop a standing wave that yield the properties of being related to the golden ratio as shown in equations 26 and 27 on page 6 above.

The reader may be interested in duplicating the above simple test arrangement. If so, the magnets can be purchased from:

http://www.kjmagnetics.com/proddetail.asp?prod=RY046

These are very strong magnets and therefore great care should be exercised in the handling of them. Use wood and brass clamps, etc.

Help on the construction details of the above apparatus will be provided as needed or requested.

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