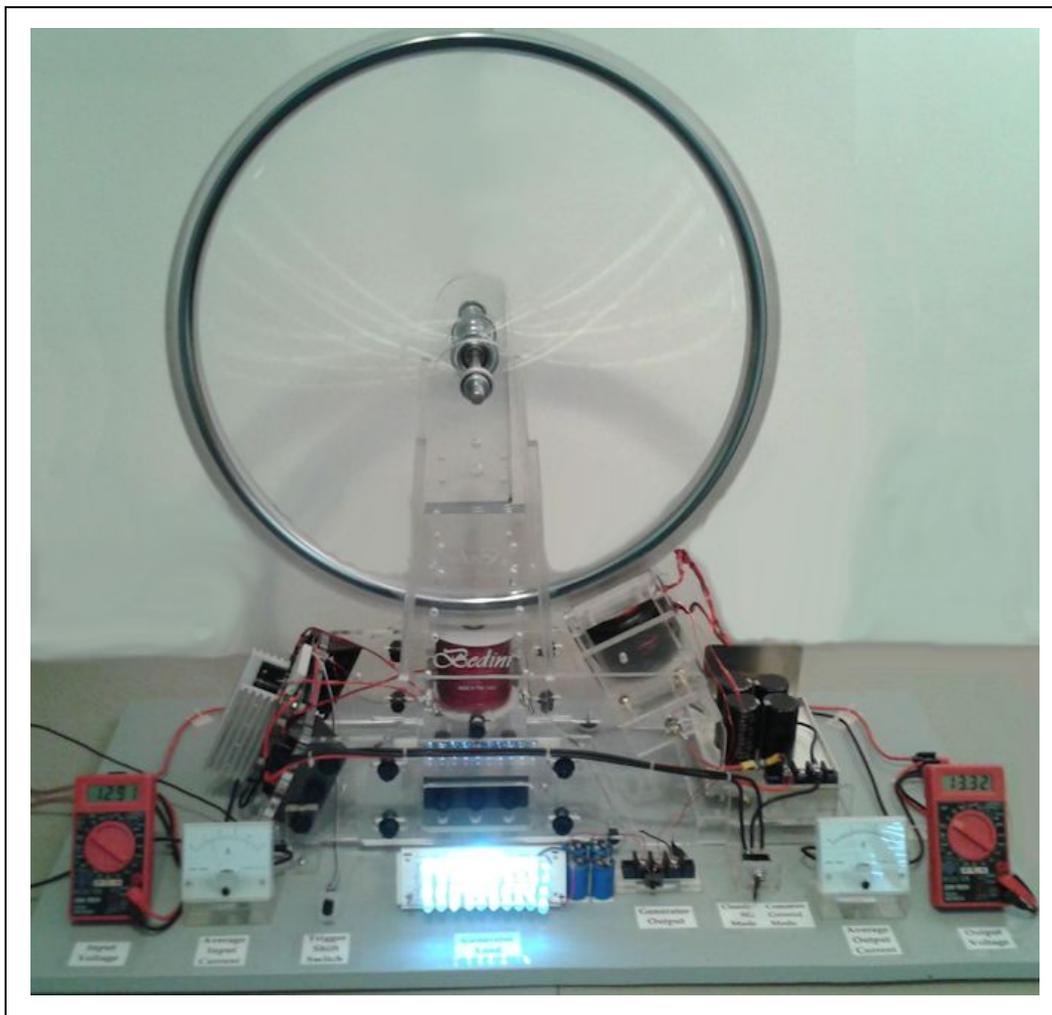


Bedini SG

The Complete Advanced Handbook

Optimizing Mechanical Recovery with a "Low-Drag" Generator



Written by
Peter Lindemann, D.Sc.

Bedini SG

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Foreword

This book is the third and final book in the series of Bedini SG Handbooks. The full instructions on how to build the Bedini SG Energizer are in the first book titled **Bedini SG, the Complete Beginner's Handbook**. The full instructions on all of the fine-tuning methods and energy gain tricks are in the second book titled **Bedini SG, the Completer Intermediate Handbook**. If you are not familiar with these two previous books, then make sure to get them here so you can start from the beginning: <http://bedinisg.com>

This book reviews the fine tuning methods discussed in the Intermediate Handbook, and shows the operations of a working model where all of these features are optimized. It then goes on to discuss, in detail, the best ways to harness the mechanical energy available at the wheel, using "low-drag" generator methods. It also includes a complete analysis of the "Jim Watson" machine, putting the complete design, schematic, and operational details in print for the very first time.

This book picks up where the Intermediate Handbook leaves off and covers all of the major details and spin-offs from John Bedini's life-time search for the best design of a self-running, electro-mechanical machine.

After learning this material, you should understand enough of the science and method that John has shown to start experimenting with larger scale models which should lead to both self-running behavior and the production of enough extra energy to operate external loads.

The future is yours!

Peter Lindemann (August 2014)

Introduction

The purpose of this book is to demonstrate how the mechanical energy produced by a Bedini SG Energizer can be maximized, and how that mechanical energy can be converted back into the maximum quantity of electrical energy, so that a clear and unambiguous "energy gain" may be achieved.

This process involves:

1. using the "fine tuning" methods discussed in the Intermediate Handbook to produce the highest speed rotation of the rotor for the lowest electrical input from the run battery
2. as well as introducing a "low-drag" generator system to the wheel to take the highest possible advantage of that mechanical energy for the production of new electricity that did not come from the run battery in the first place

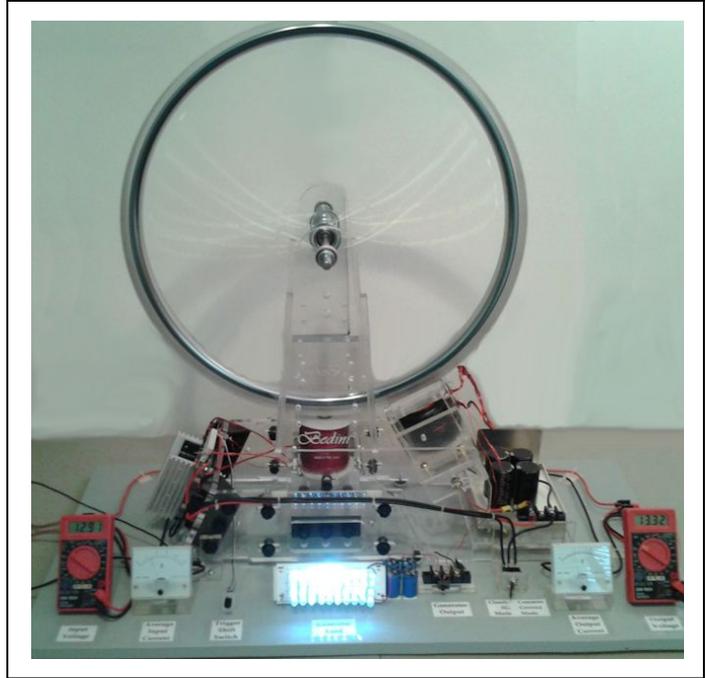
While John Bedini has demonstrated these methods repeatedly and published all of the basic schematics on how to accomplish this on his website since 1996, people still seem confused by this process. He believed that people needed to learn the process by actually building the equipment and therefore has never felt the need to fully explain it in words.

Since the demonstration of the "Ferris Wheel" machine in 2010, and the two previous **Bedini SG Handbooks** in 2012 and 2013, it seems possible that the release of this information will be tolerated by the forces in the economy that have resisted these things in the past. Therefore, everything is going to be explained clearly so that serious researchers may move their experiments forward.



A machine was demonstrated at the **2014 Energy Science and Technology Conference** that has all of the features you need to understand to build yourself a supplemental power plant for your off-grid home. This includes a "low-drag" generator whose features will be fully disclosed in Chapter 6.

This last installment of the **Bedini SG Handbook** series is the final unraveling of the mysteries of John's self-running machines, which have been "hidden in plain sight" for over 30 years.



Peter Lindemann, D.Sc.

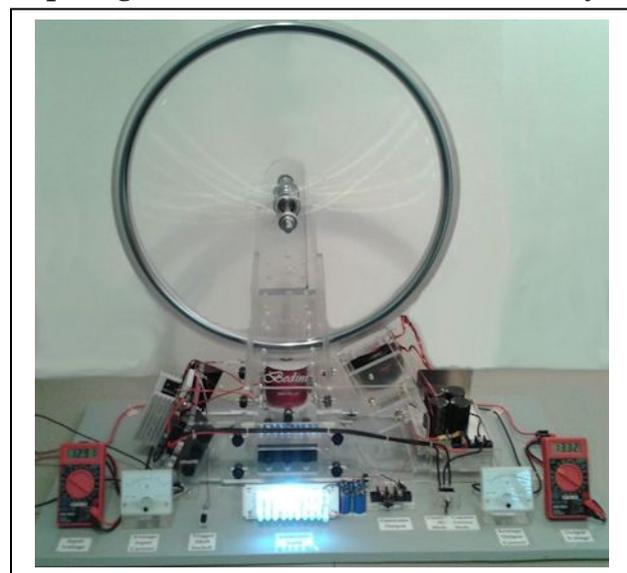
Intermediate SG Energizer Demo Review

The **Bedini SG, The Complete Intermediate Handbook** introduced and explained the benefits of many of John's "tricks." These tricks are really a series of very clever engineering procedures that allow a person "skilled in the art" to optimize the functions of the circuitry so that the machine may take advantage of a number of "windows of opportunity" to minimize energy losses and introduce some compensatory energy gains. The net result of these refinements increases the efficiency of the machine and unambiguously introduces the reader to the conditions necessary for "self-running" operation.

These refinements include the various methods to "fine tune" the operation of the Energizer, a complete historical review of all of the methods for providing a capacitor charge and discharge feature, and the advanced theory explaining why this produces a benefit based on Nikola Tesla's discovery of his "Method of Conversion" process.

As this book was being outlined in the Spring of 2014, it became necessary to build a working model of the optimized "Intermediate" energizer, so that the additional "low-drag" generator methods could be built and tested. This also made it possible to demonstrate this working model at the **2014 Energy Science and Technology Conference** at the end of June.

Here is a picture of that machine.

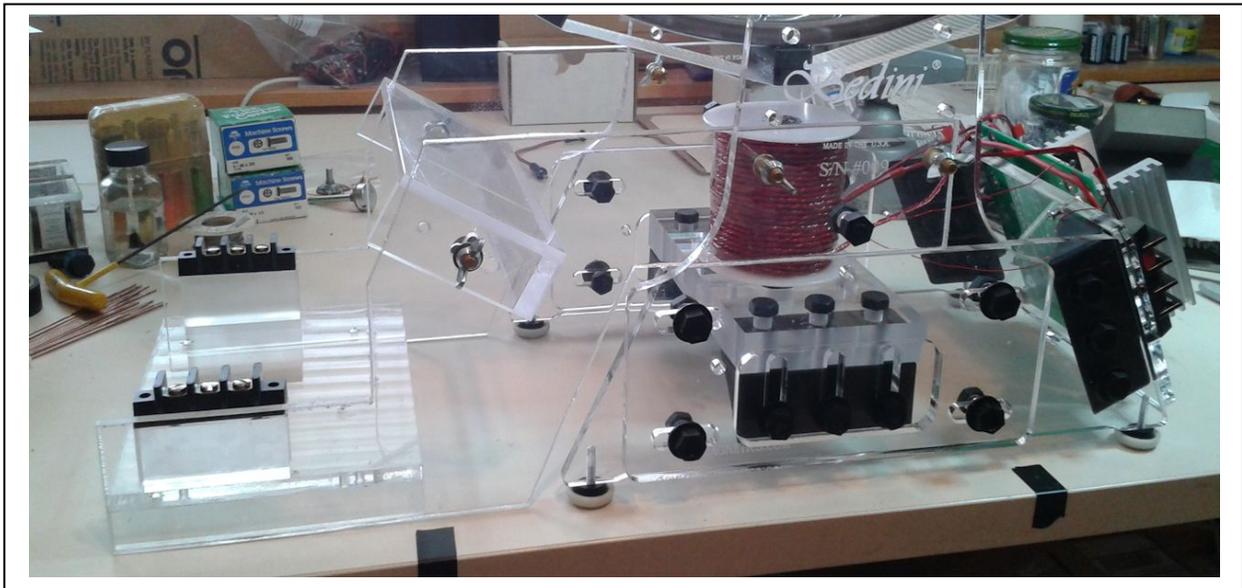


The Conference Demonstration Model

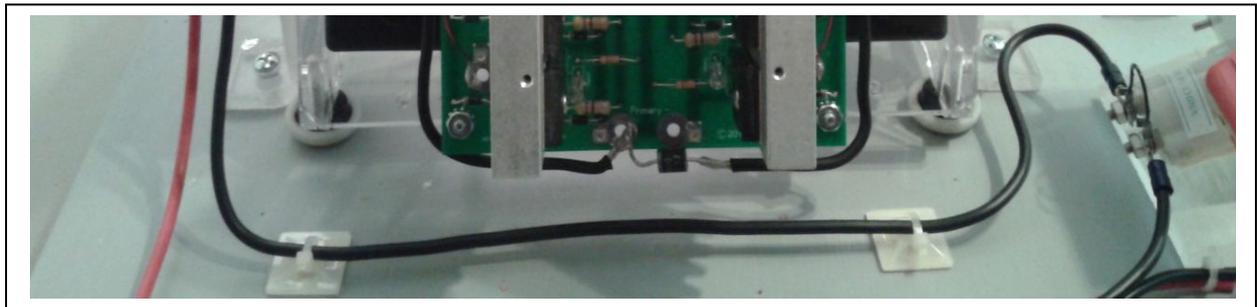
This machine had a number of features that you may not want to include in your replication. They include:

1. a frame built from clear acrylic
2. wiring suspended in the air
3. dedicated meters
4. labeled instrumentation

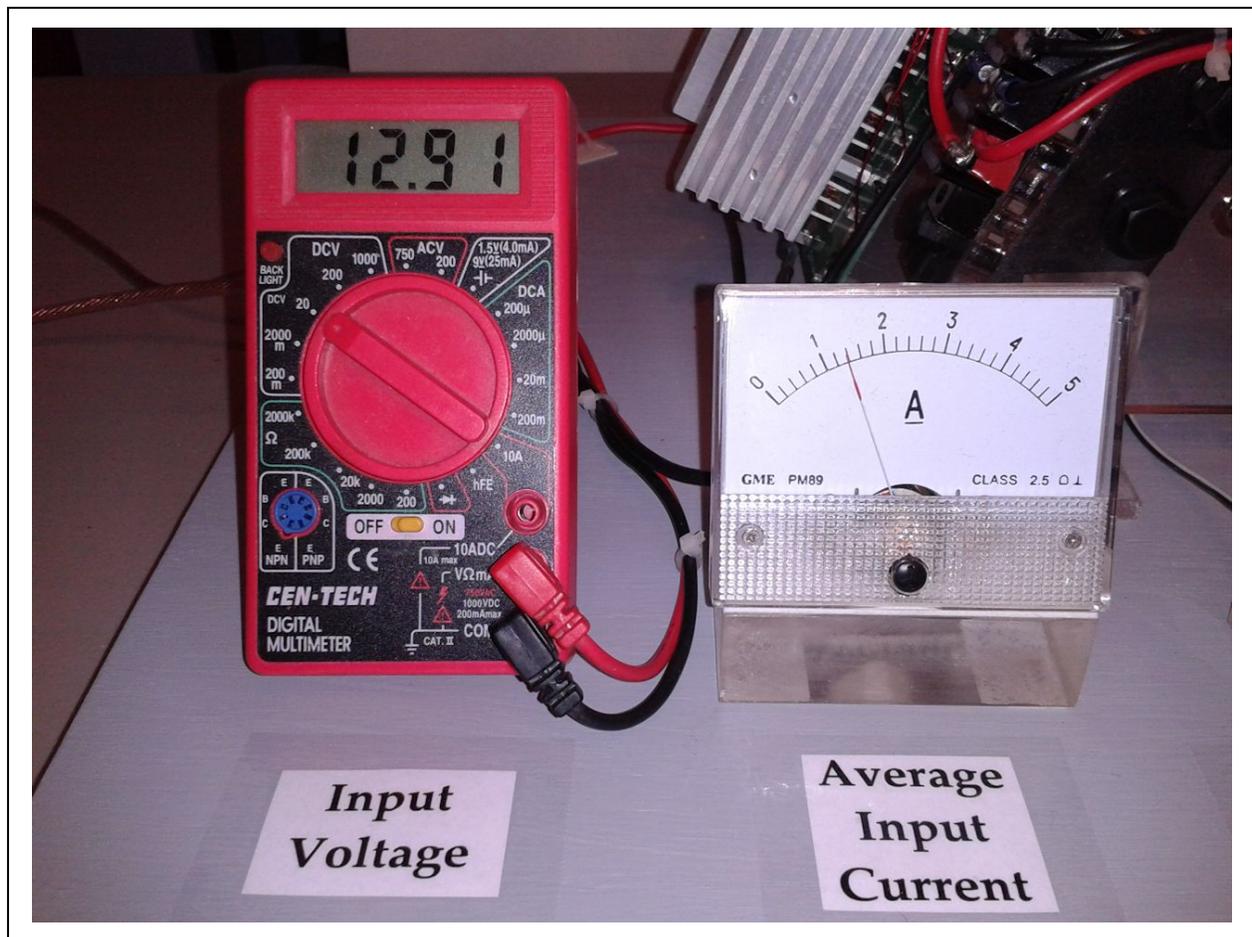
The clear acrylic frame was left over from the original SG Kit models that we sold for a short time in 2012. As a demonstration, it looked professional and it eliminated the arguments about whether anything was "hidden."



The wiring suspended in the air also negated the arguments about whether there may have been "secret connections" to otherwise unseen circuitry.



The dedicated meters were mounted on pieces of clear acrylic, again to reduce the skeptic's ability to "explain away" the meter readings. Also, the labeled meters, switches, and connections made the demonstration easy for the Conference attendees to understand what they were looking at.



All of these features, produced at extra cost and time, created the intended effect. No one questioned the explanations of the operation of the machine at the Conference.

Significant Mechanical Up-grades

The SG Kits came with a bicycle wheel and shaft extensions that when combined, were never able to produce a wheel that ran true. This required major surgery. The frame bearings and internal wheel bearings and shaft were all abandoned and replaced with a new, larger diameter solid shaft

and new bearings and sleeve guides to hold everything in place. With these materials installed, the hub of the wheel ran true.



The next problem was the rim. With the hub running true, it was obvious how "out of round" the rim was. This required a laborious process of loosening and tightening the wheel spokes until all of the eccentricities were compensated. This took over an hour but was absolutely necessary.



Obviously, this step would not have needed to be done if a molded, plastic wheel had been used to begin with. Other model builders have used molded plastic wheels this size from wheel chairs or more modern bicycles.

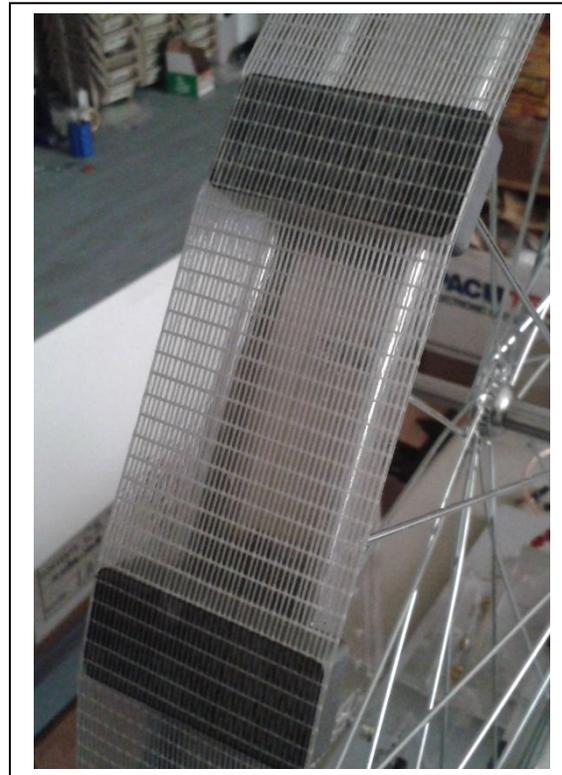
Once both the hub and the rim were running true, the wheel was balanced and able to run at high speed without vibration. It could also run in a narrow slot between the frame pieces holding the generator coil in place.

The above picture also shows the magnet spacing chosen for this model. The wheel had 36 spokes, so by placing a magnet next to every other spoke, the number of magnets came out to be 18. This made magnet placement

relatively easy and produced a run speed slightly higher than the 21 magnet arrangement used in the **SG Beginner's Handbook**.

Once the magnets were positioned on the metal rim and glued in place using a "super-glue" cyanoacrylate adhesive, it was time to secure them to the wheel for high speed operation.

For this, two layers of a reinforced packing tape was used, wrapped firmly around the wheel twice. This type of tape is sometimes called "strapping tape" because of the imbedded fiber-glass netting. This feature makes the tape very resistant to either stretching or tearing under stress.



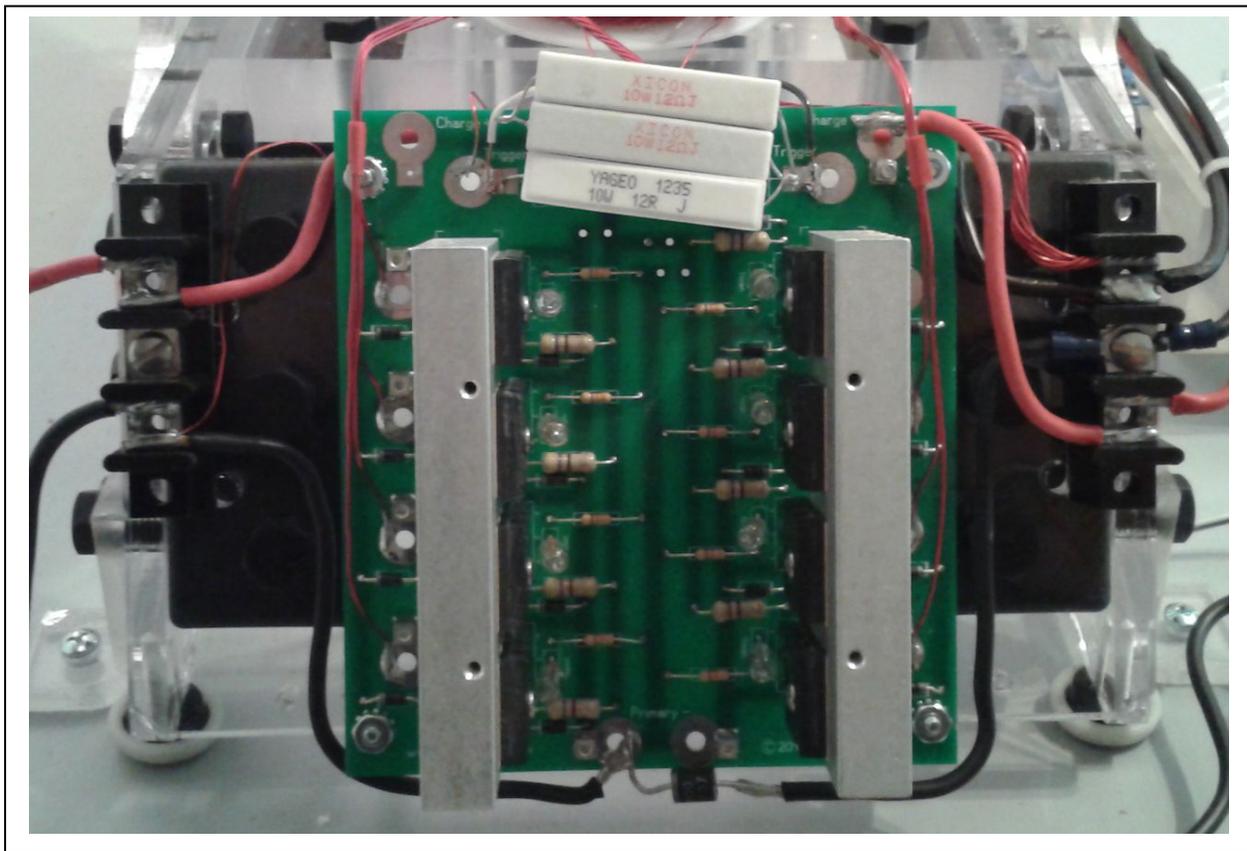
Cyanoacrylate adhesives are quite brittle after curing, and since this motor operates on an "attraction" mode, the magnetic field from the coil is trying to pull the magnets off of the wheel as they approach. With the reinforced tape in place, if the glue fails, a magnet will NOT fly across the room at 40 feet per second! Instead, you will just hear a "clicking" sound on the wheel as the magnet is pulled off of the rim slightly as it passes over the coil.

Electrical Circuit Features

When this model was coming together, a number of people very generously donated parts. John Bedini provided the plastic frame, wheel, magnets, and a prototype circuit board built by Tom Childs at Teslagentx. Tom then donated one of their fully wound coils with seven 20 gauge power windings and a 23 gauge trigger winding. Finally, Aaron Murakami donated the capacitor discharge circuit he had purchased

earlier. Peter Lindemann took all of these parts and assembled and adjusted everything to produce the finished Demonstration Model.

For the electronic circuit, all of the "fine tuning" methods were employed. This included matched transistors and matched resistors and the circuit built on a clean circuit board. Anyone can build a circuit like this using the specifications in the **Bedini SG Intermediate Handbook**, or simply by purchasing a circuit like this from Teslagenx.

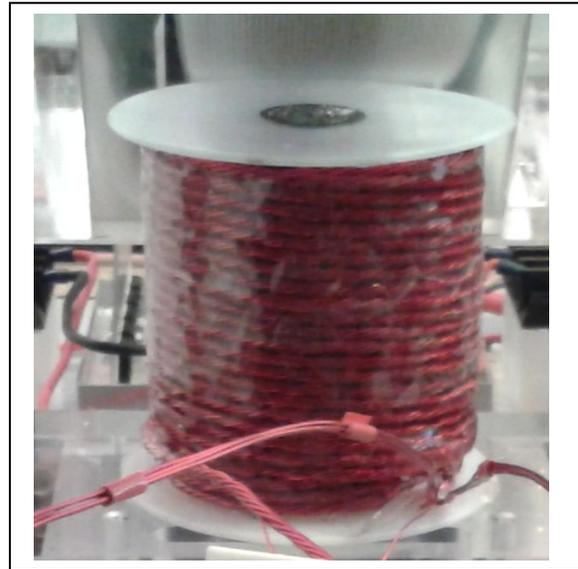


There are only two modifications made to this circuit board for this model. The first is that the single large 12 Ohm resistor (Yageo) at the top-center of the photo is joined by two more 12 Ohm resistors (Xicon) as part of the "fine tuning" of the trigger. This modification will be discussed in more detail shortly. The second modification is the large Diode at the bottom-center of the photo which is part of the "generator mode" circuitry which

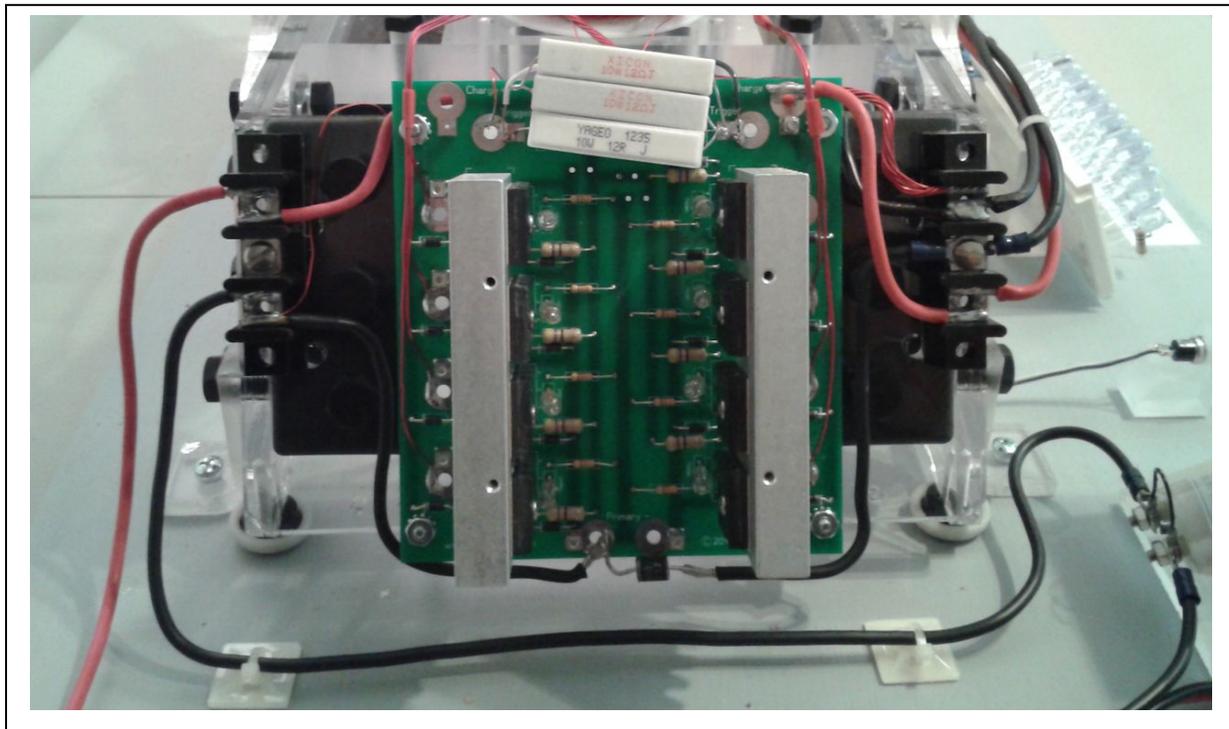
will be discussed later. Otherwise, this circuit board is exactly like the one you would get from Teslagenx.

The specifications for winding your own coil are in the **SG Beginner's Handbook**, but making the coil remains the most difficult task of building your own SG replication.

So don't feel bad if you want to just purchase this component. Here is a photo of the coil donated to this project and it represents proof that they work perfectly when incorporated into a really "fine tuned" model.



After the coil and the circuitry were in place, all of the temporary wiring was removed and replaced by 12 gauge wire, as shown here.



This is all of the larger **Red** and **Black** wires that connect between the batteries, meters, terminal blocks, and other sections of the circuit. When

this operation was completed, the behavior of the machine changed dramatically! In short, it started running much better.

In order to understand why this happened, you have to remember that the Bedini SG is a "high frequency" machine. The transistors are rated at 16 Mhz and can easily turn off within a few microseconds. With this kind of switching speeds, it means that "every length of wire is an inductor" and that everything you can do to "lower the impedance of the circuit" will improve its performance. Many model builders neglect this step, but the benefits are significant and well worth installing.

Adjusting the Trigger Circuit

The next step was to "fine tune" the triggering function of the circuit. As you probably remember from the **SG Beginner's Handbook**, the current circulating in the trigger circuit is actually generated in the trigger winding by the permanent magnets moving passed the coil. That means that the distance between the coil and the wheel is one of the variables that contributes to the strength of that current.

So the first thing to do is to move the coil up or down from its original position until you find a height that produces the highest speed. In the case of this demonstration model, that distance ended up being 0.375" or 9.52 mm. [The **SG Beginner's Handbook** specified 0.125" on page 56.]

With the coil height set, the 12 Ohm resistor was disconnected from the circuit board and temporarily replaced by a 25 watt variable resistor. The machine was then brought up to full speed and the variable resistor was turned up and down until the highest speed could be maintained with the lowest



current draw from the run battery, as shown on the Input Ammeter.

As it turned out, the value of the additional resistance needed for this condition in this model was 36 Ohms. So, when the variable resistor was removed, it was replaced by three 12 Ohm resistors wired in series, as shown on page 15.

After the three 12 Ohm resistors were soldered back on the circuit board, a curious thing happened. The next time the model was turned on, it would NOT accelerate all the way up to top speed automatically! The added resistance was limiting the trigger current so the wheel did not have enough mechanical energy to transition from "double triggering" down to "single triggering" mode.

To compensate for this, a momentary contact switch was installed that could temporarily "short circuit" the added 36 Ohm resistor. This gave the added trigger power needed to make the transition once the unit got up to its relative "top speed" in double triggering mode.



With the Trigger Shift Switch installed, all of the electrical and mechanical modifications were finished.

Results of these Modifications:

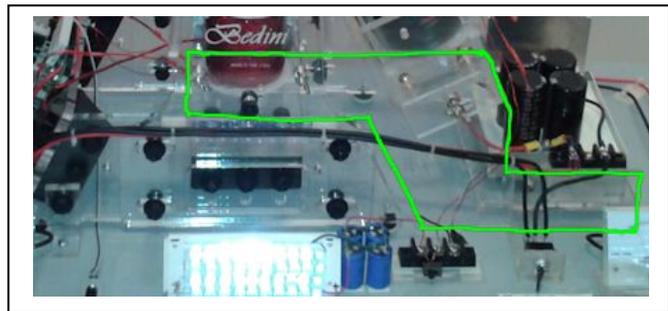
- Wheel runs in clean, circular motion with no side-to-side wobble
- Wheel attains a speed of 365 RPM, which is 80 RPM higher than the speed before the large wire and trigger refinements were installed
- Current draw dropped from 1.8 amps to 1.4 amps at higher speed
- Attains smooth running at highest speed with lowest input current!

Additions to the Frame

The next operation was to extend the frame to accommodate the mounting of the capacitor discharge circuit and the additional coil that would become the "low drag" generator. Since this unit was being prepared as a public demonstration, both of these features were incorporated as a single frame extension on the back side of the machine using clear acrylic.



The frame extension pieces bolt to the vertical supports of the original SG frame using one large black nylon nut and bolt which is also reinforced by the addition of two brass bolts and wing-nuts. The shape of the clear acrylic extension pieces is shown here, outlined by the **GREEN** line.

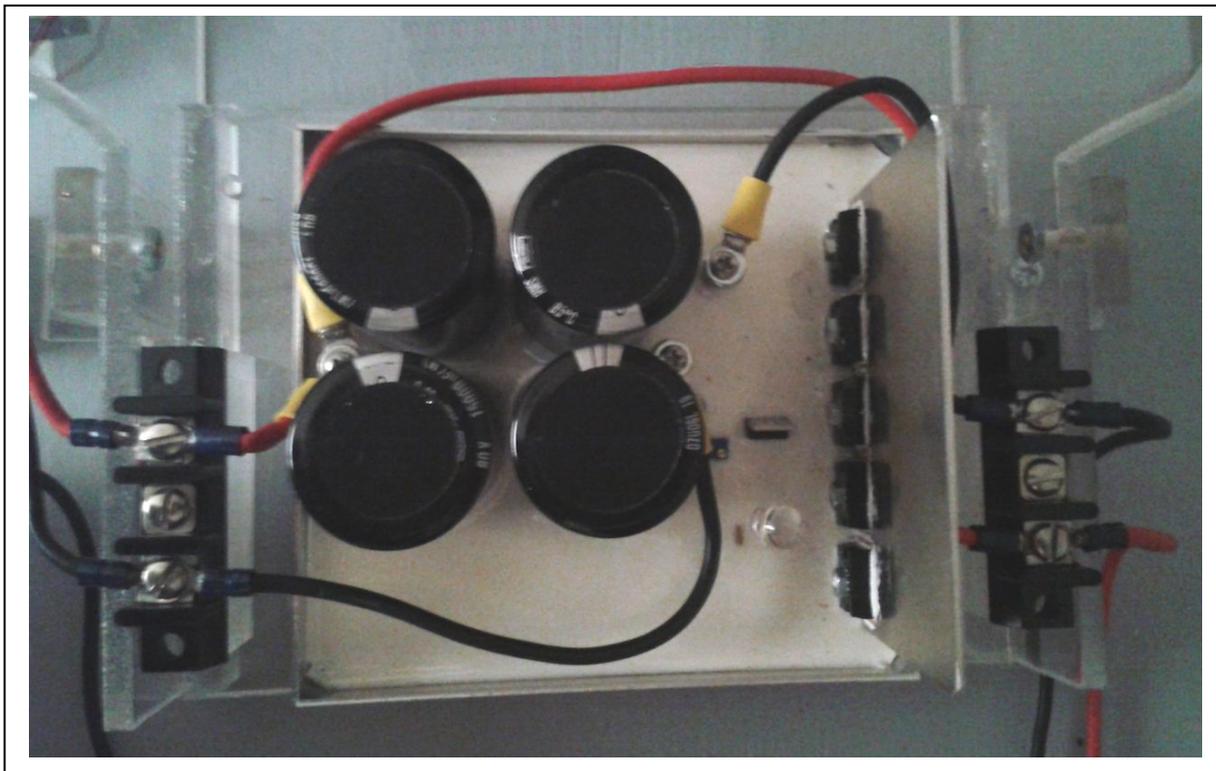


Mounting the Capacitor Module

The lower platform was designed specifically for mounting the Comparator Circuit Module that John's company sells. The module has 4 small bolts coming out of the bottom of the potted base. Four holes were drilled in the acrylic plate and the capacitor system was bolted in place.



Two terminal blocks were mounted, one on either side of the capacitor module, to lead to external wiring of the system.

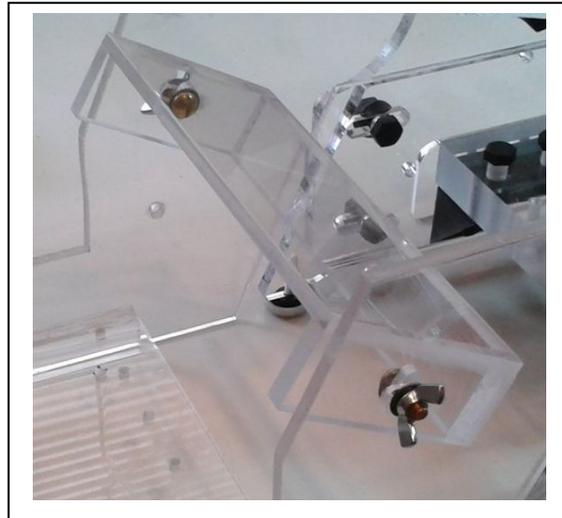


Here is an overhead photograph of the Capacitor Module wired in place. The wires coming in from the left provide the pathway to charge the capacitors with the coil discharges from the SG machine. The wires going

out on the right provide the pathway to discharge the capacitors to the secondary battery (B2). The module senses the voltage in the capacitors, discharging them when that voltage rises to about 24 volts and then shuts off the discharge when the voltage drops to about 18 volts.

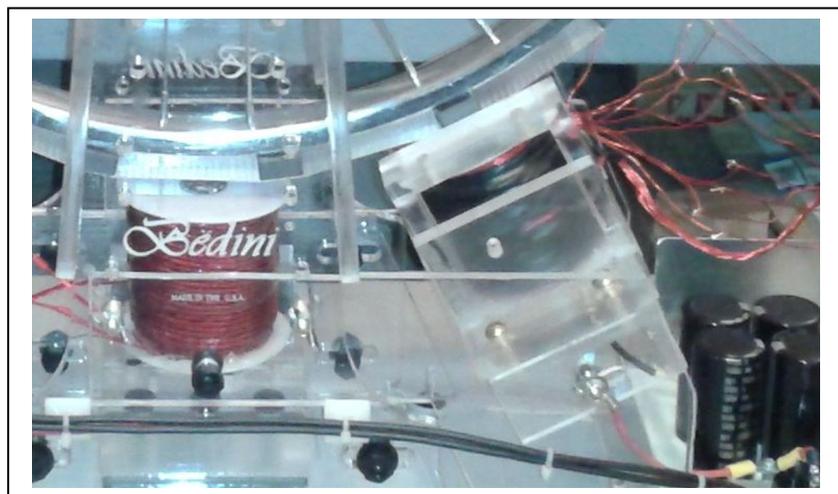
Mounting the Extra Generator Coil

The extra coil used for the generator needed to be adjustable, so the coil could be moved closer or farther away from the wheel. The platform shown here will hold the generator coil and allow it to be adjusted both for height and angle of approach to the wheel.



On top of this basic platform, a complex frame holding system was created. Since the magnets on the wheel were going to be exerting a strong attraction force toward the core in the generator coil, the coil had to be held absolutely rigidly to avoid vibrations in the frame and the possibility of an accident if the coil moved uncontrollably toward the rotating wheel.

A frame was built around the coil to clamp it in place, holding it down from the top. These acrylic pieces were then bolted down to the platform using two brass bolts and nuts on each side of the



frame. Brass was used so the structure remained completely non-magnetic. The complete generator design will be shown in Chapter 4.

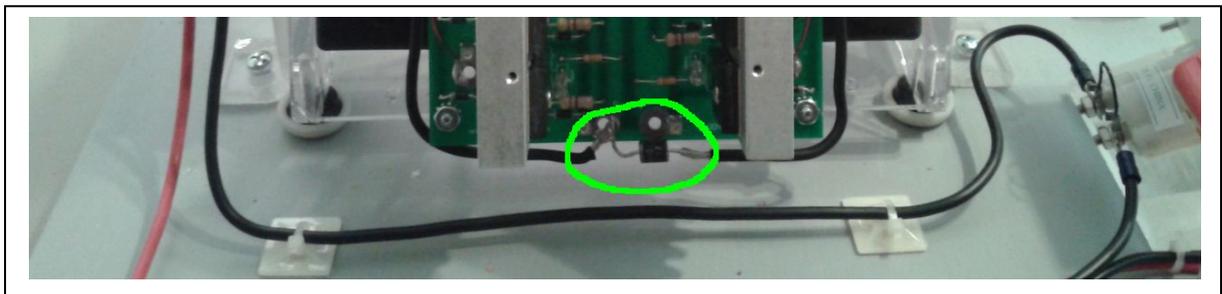
Adding the "Generator Mode" Circuitry

At the **2013 Bedini - Lindemann Science and Technology Conference**, John introduced the attendees to the new "Generator Mode" of operating the SG machine. The method seemed to draw a little bit more energy from the run battery, but cause the second battery to charge much more rapidly.

A number of demonstrations had been given of this process, but none of them was a "fully metered test" that quantified the level of benefit. So, the **Bedini SG: The Complete Advanced Handbook** would not be complete unless this recent innovation was thoroughly explored and reported.

The Classic SG Circuit routes the discharges from the main coil directly to the Output circuit to charge either the capacitor or the secondary battery. The so called Generator Mode Circuit re-routes the discharges of the main coil back through the Run Battery and then to the Output circuit. The benefits of this will be discussed in the next chapter of this book.

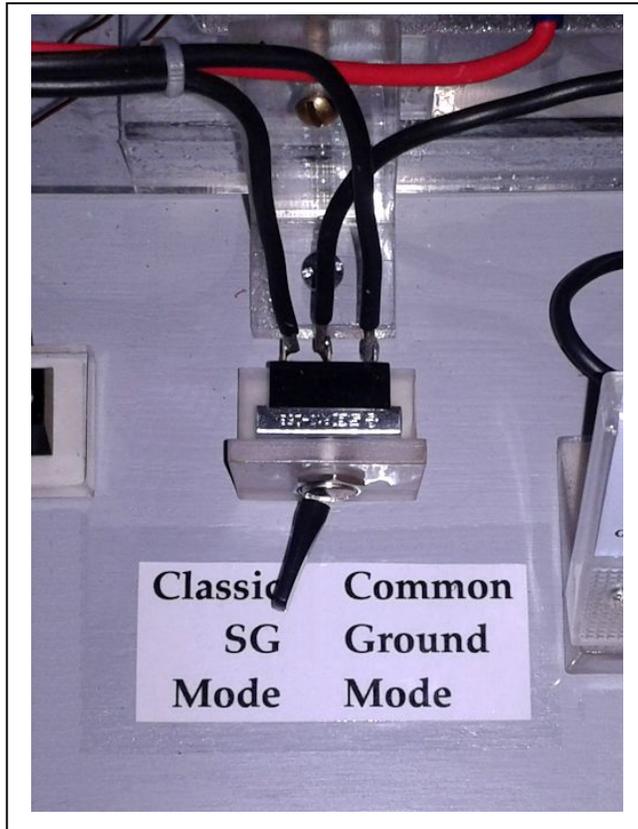
This new circuit places both the Run Battery and the Secondary Battery into a "common ground" connection where they had been in a "series connection" before. In order to isolate and balance the new arrangement, John introduced another Diode into the circuit on the ground line extension leading to the Output circuitry, shown here, circled in **GREEN**.



Since this was a display model designed for public demonstrations, both the SG Classic Mode connections and the Generator Mode connections

were built into the machine. A switch was added to the circuitry so that the machine could be run in either mode, simply by flipping the switch.

John has always referred to this circuitry as the "Generator Mode" of operation. For the purposes of the Demonstration Model, and because there was an actual "Generator Coil" on the machine, it was decided to refer to the Generator Mode circuit as the "Common Ground Mode", as can be seen in the label in the photo to the right.



The **BLACK** wire that comes from the center connection on the switch goes off to the right with the **RED** wire to charge the capacitors. The other two

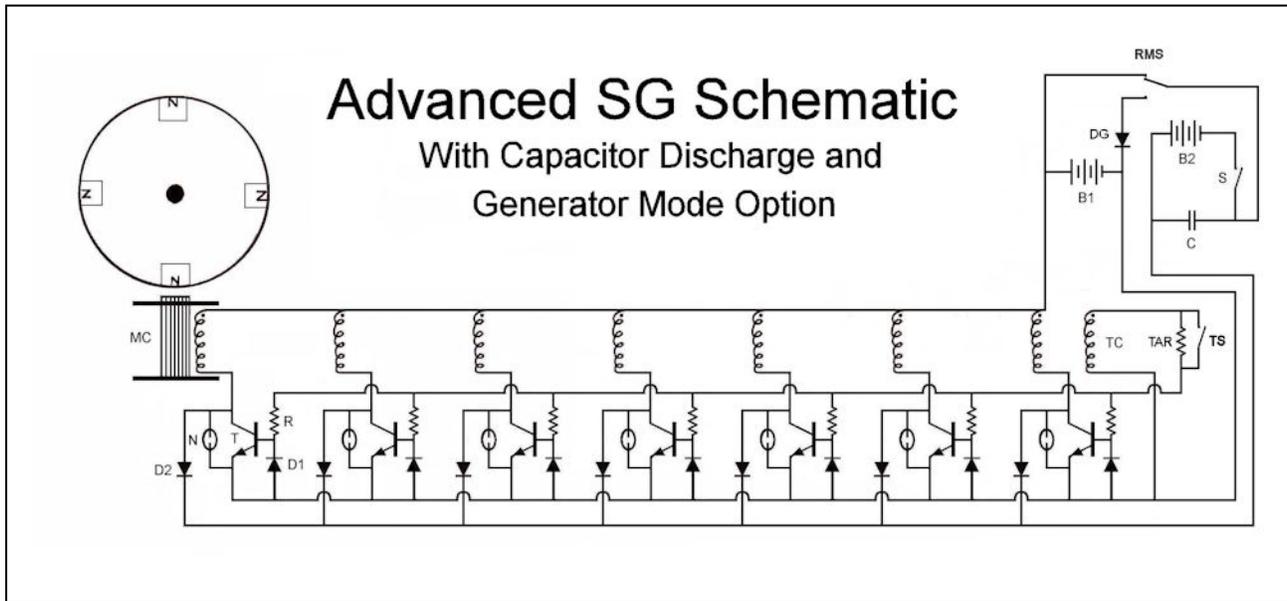
BLACK wires that are attached to the outer connections of the switch and feed off to the left of the photo, connect to the either the Run Battery positive terminal (+) to create the Classic SG Mode circuit, or the Run Battery negative terminal (-) through the new diode to create the Common Ground or Generator Mode circuit.

So, the Generator Mode is a very simple modification of the circuitry consisting of one new wire and one new diode. The **Run Mode Switch** simply allows an easy way to alternate between the connections for demonstration purposes.

Full Schematic of the Advanced SG Machine

This completes the discussion of the features of the Conference Demo unit.

So, here is a complete schematic of the circuit of this fully "fine tuned" machine with all of the **Intermediate** and **Advanced** modifications included.



Parts Designations:

- T = Matched set of seven MJL21194-G NPN Transistors
- D = All Diodes marked either D1 or D2 are the 1N4007
- R = Matched set of seven 470 Ohm, 1 Watt Carbon Resistors
- N = Seven Neon Indicator Lights, 606C2A
- C = 60,000uf @ 80 VDC Photo Flash Capacitor
- TAR = Trigger Adjustment Resistor (Demo Model, 36 Ohm, 10 Watt)
- TS = Trigger Shift Switch (Momentary Contact type)
- DG = Diode for the Generator Mode Circuit, 6A100 (6amp, 1000volt)
- S = Capacitor Discharge Switch (Comparator Circuit or equivalent)
- RMS = Run Mode Switch, (Single Throw, Double Pole type)
- MC = Main Coil, Seven strands of #20 Gauge Magnet Wire, 130ft long
- TC = Trigger Coil, One strand of #23 Gauge Magnet Wire, 130ft long
- B1 (Run Battery) = 12v @ 35ah, flooded cell, Lead Acid Battery
- B2 (Charge Battery) = 12v @ 35ah, flooded cell, Lead Acid Battery

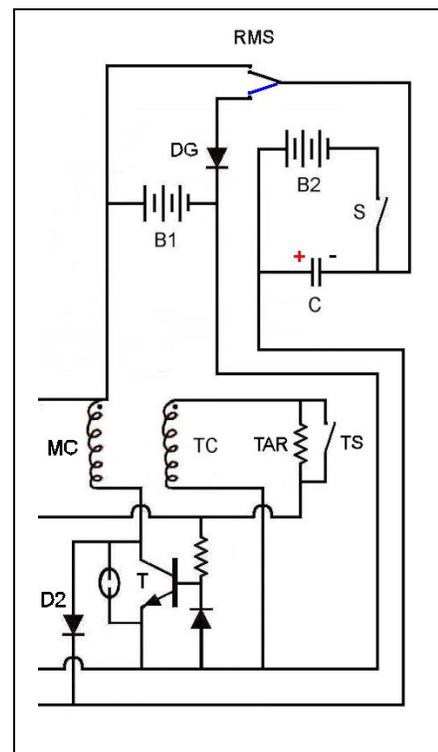
Benefits of Running in "Generator Mode"

It's been about a year and a half since John started demonstrating what has become known as the "Generator Mode" at his shop. He said that it would draw a little bit more power from the front battery but that it charged the back battery much faster. He always said that the "trade-off" was well worth it, but at the time, no fully metered tests were offered as supporting evidence.

So, one of the primary goals of the Conference Demonstration machine, after it was fully "fine tuned," was to quantify what the Generator Mode was doing, and why.

The first thing to understand is the difference between the Classic SG circuit and the Generator Mode circuit. The image here is a clipping from the right hand side of the full circuit schematic on the previous page. It shows a single main coil winding and its associated transistor section, along with the rest of the circuit.

The Generator Mode modifies the Main Coil discharge pathway after the transistor turns off, and routes it back through B1 (the Run Battery) on its way to be collected in the Capacitor. You can see that the top of MC is connected to the positive terminal of B1 and completes the discharge path to the negative terminal of the capacitor C through RMS. When RMS is in the upper position, (Classic SG Mode) the discharge path by-passes B1 and



goes directly to the negative terminal of C. When RMS is in the lower position (**Blue**), (Generator Mode) the discharge path goes back through B1 and through Diode DG on its way to the negative terminal of C. In both cases, the path to the positive terminal of C is routed through Diode D2.

Here is a comparison of the two circuits in simplified form. For clarity, the same circuit component parts designations used in the two previous drawings are used again here.

In the **Classic SG Circuit**, energy moves through the system in 3 distinct steps.
Step One: Energy from B1 is transferred to MC when switch T conducts.

Step Two: When switch T breaks the circuit, the energy stored in MC discharges through diode D2 and is collected in capacitor C.

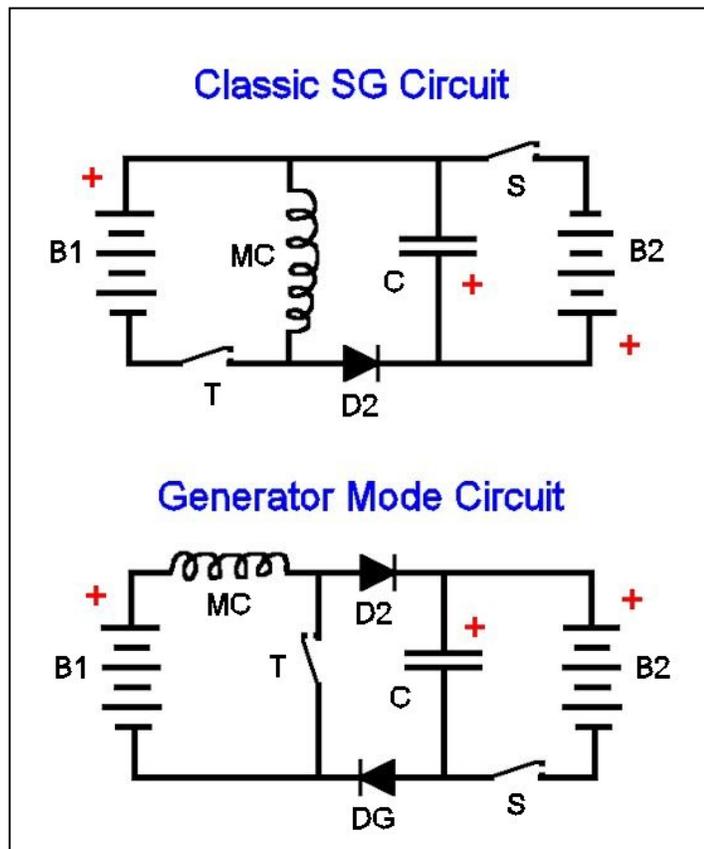
Step Three: When the energy collected in capacitor C is sufficient, switch S temporarily conducts and discharges the energy into battery B2.

In the **Generator Mode Circuit**, energy moves through the system similarly, except in Step Two.

Step One: Energy from B1 is transferred to MC when switch T conducts.

Step Two: When switch T breaks the circuit, the energy stored in MC discharges back through battery B1 as well as through diodes D2 and DG, and then is collected in capacitor C.

Step Three: When the energy collected in capacitor C is sufficient, switch S temporarily conducts and discharges the energy into battery B2.



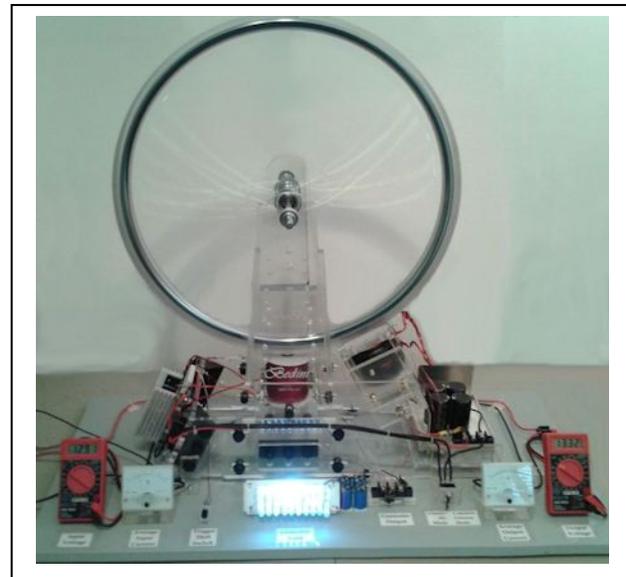
Hopefully, it is clear by now that the difference between the two circuits is that the Generator Mode circuit grabs energy from battery B1 TWICE each cycle, whereas the Classic SG circuit only grabs energy from battery B1 ONCE each cycle. This fundamentally alters the operation of the circuit and effectively changes the position of both the Main Coil MC and the Transistor T in relationship to the rest of the major components.

There are a number of ways to characterize this, but here is a simple analogy. The Classic SG circuit acts like a simple DC-to-DC buck converter, whereas the Generator Mode circuit acts more like a DC-to-DC boost converter.

So, that is enough at this point on the circuit and the theory. Now, what does a fully metered working model look like on the bench?

Classic SG Baseline Input Measurements

In order to understand the benefits of running in Generator Mode, we have to understand what we are comparing it to. As explained in the previous chapter, the Conference Demo unit was a clean running machine. Its top speed with a fully charged Run Battery was a little over 365 RPM, but this speed was routinely measured on a photo-tachometer.



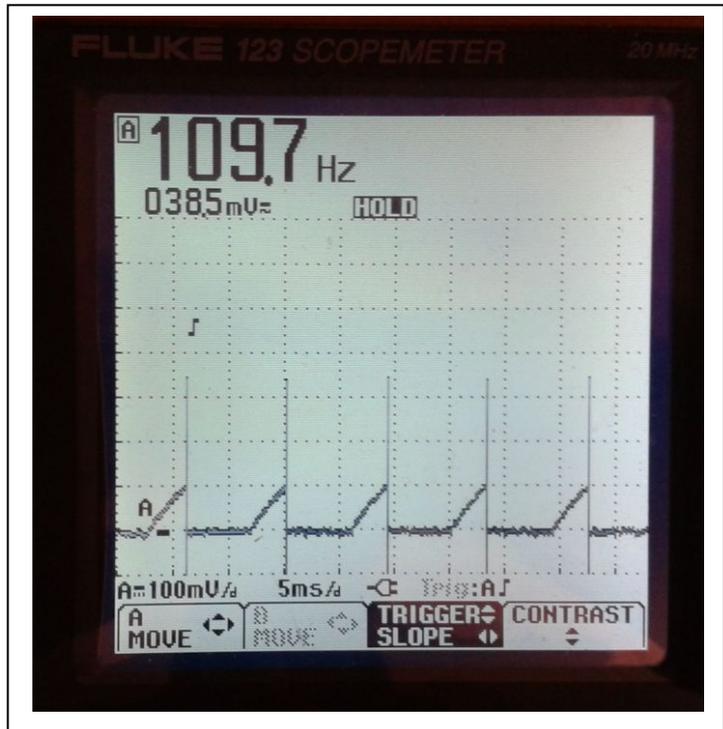
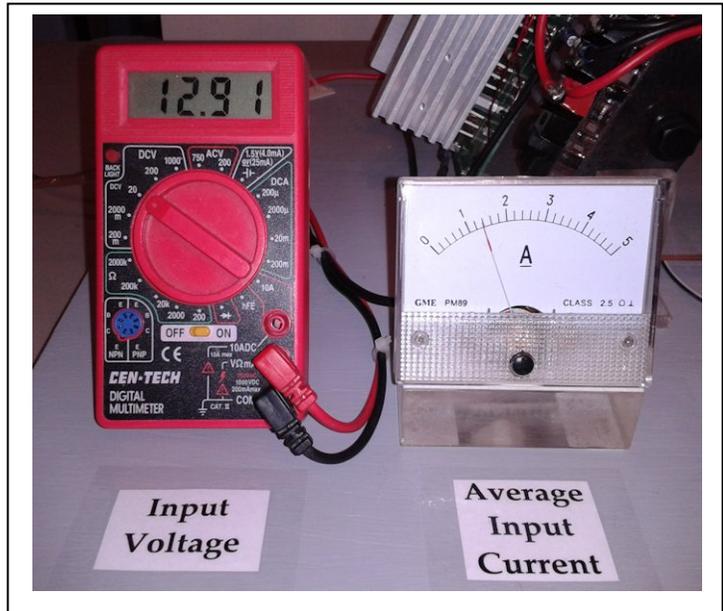
Typically, the SG circuitry is designed to draw approximately 0.25 amps per transistor, so a seven transistor circuit is expected to draw 1.75 amps from the Input Battery. The Conference Demo unit, with its balanced wheel, new bearings and fine tuned trigger circuit, was drawing 20% less

than that. The in-line mounted analog Ammeter typically indicated just a shade under 1.4 amps at top speed.

This meter was labeled the "Average Input Current" for obvious reasons. The SG is a machine that runs on a series of DC pulses and an analog meter of this kind can only provide an average of the value of those pulses.

Although these meters do not provide a digitally precise measurement of the current used by the machine, they do provide a reasonably accurate indication of the average value.

To get a better understanding of the current input of the machine, a Fluke digital oscilloscope was used. The analog Ammeter is a 50mV movement measuring the voltage across a 0.010 Ohm resistive shunt. When this voltage was simultaneously observed on the Fluke meter, this image was produced. It shows pulses that peak at a height of about one division repeating 109.7 times per second.



Let's look at the speed of the wheel first. We know that there are 18 magnets on the wheel, so the following calculation can be made:

$$109.7\text{hz} \div 18 = 6.094 \text{ RPS} \times 60 = 365.66 \text{ RPM}$$

This is within one RPM of the speed measured by the tachometer, so this is encouraging. Next, let's look at the calculations for current.

The average value of the current can be calculated from the Fluke Scope image by measuring the "area under the curve" defined by the graph line on the scope. The waveform has a peak amplitude of about one division. The scope setting is that one division equals 100mV. From this we can determine the peak current value using the shunt resistance of 0.010 Ohms and Ohm's Law ($E/R = I$). That calculation is here:

$$0.100 \text{ volts} \div 0.010\Omega = 10.00 \text{ amps}$$

Next, the width of the base of the wave-form is measured as about 36% of the total wave length and the rising line roughly bisects this area. This defines the "area under the curve" as one half of 36% or 18% of the 10 amp peak value. This gives us the following calculation.

$$0.100 \text{ volts} \div 0.010\Omega = 10.00 \text{ amps} \times 18\% = 1.8 \text{ amps}$$

This calculation deviates from the indication on the analog Ammeter by a significant margin, and may suggest one of two things:

1. that the analog meter is way out of calibration, or
2. that our estimate of the peak value shown on the scope is too high.

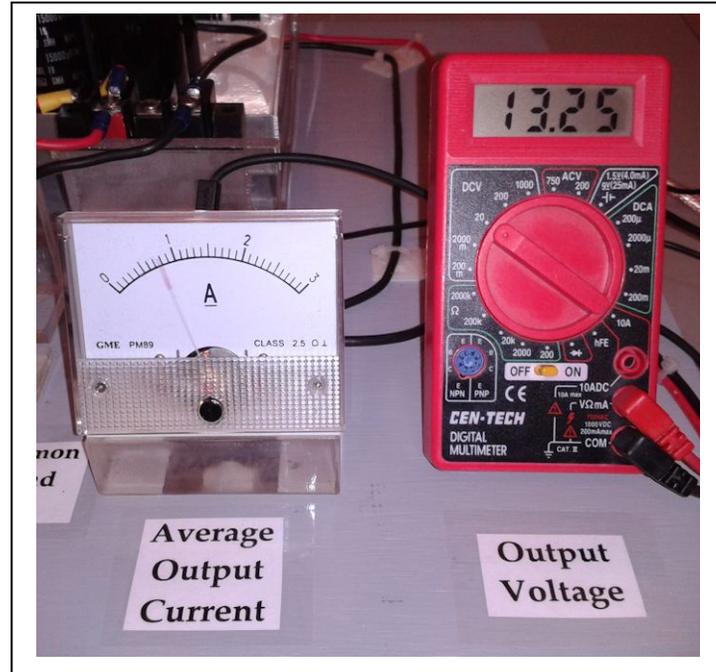
Most engineers will immediately choose #1 as the problem and confidently put their faith in the Fluke Scope image. With my years of experience with these machines, my tendency is believe the analog meter, based partially on the voltage reading of the battery indicating a slow discharge rate.

At this point, if you are willing to look at these measurements as "important indicators" rather than "absolute values," you may be better prepared to accept the importance of their relationship to other measurements taken on the machine in the same manner.

Classic SG Baseline Output Measurements

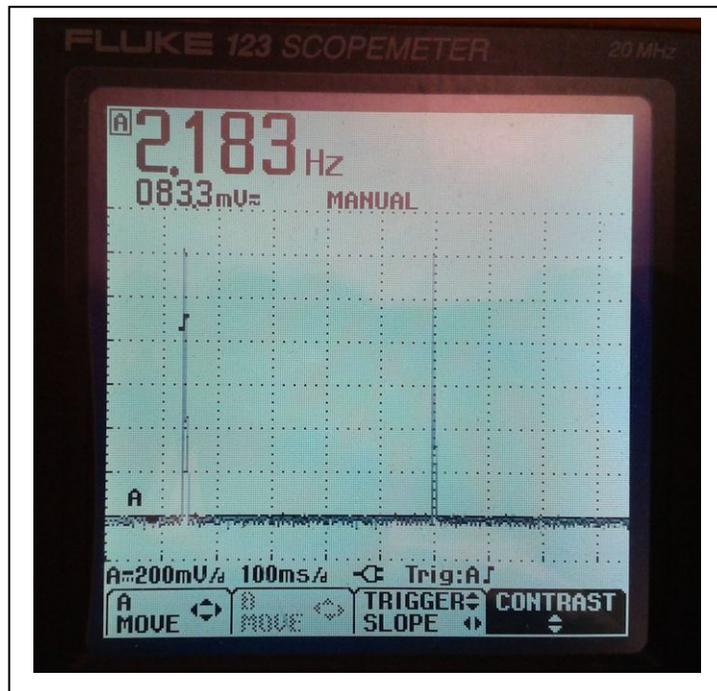
OK, let's move on and look at the indications on the Output Meters. Whereas the Input Analog Ammeter was a 0-5 amp scale, the Output Analog Ammeter is a 0-3 amp scale. This meter is also a 50mV movement, but its Resistive Shunt is 0.0166 Ohms.

This meter is measuring the currents associated with the Capacitor Discharges into the charge battery (B2). While running, the indicator needle is bouncing between "0" and "1.2" on the scale. The digital Output Voltage is taken directly across battery B2.



The operational indication on the Output Analog Ammeter suggests that the current coming out of the machine may be averaging about 0.6 amps, which is about 45% of the average current being applied to the Input.

When the Fluke Scope Meter is applied across the resistive shunt of the Output Ammeter it produces this image.



The first thing we can see is that the capacitor circuit is discharging into the charge battery B2 at a rate of 2.183 times per second. While this discharge

rises to a height on the scope of 6 divisions, its total width is quite narrow, and its duration is expended in approximately 16 milliseconds (0.016 seconds). With a setting of 200mV per division, the peak value of the current impulse as it begins can be calculated as:

$$200\text{mV/d} \times 6 \text{ divisions} \div 0.0166\Omega = 72.28 \text{ amps}$$

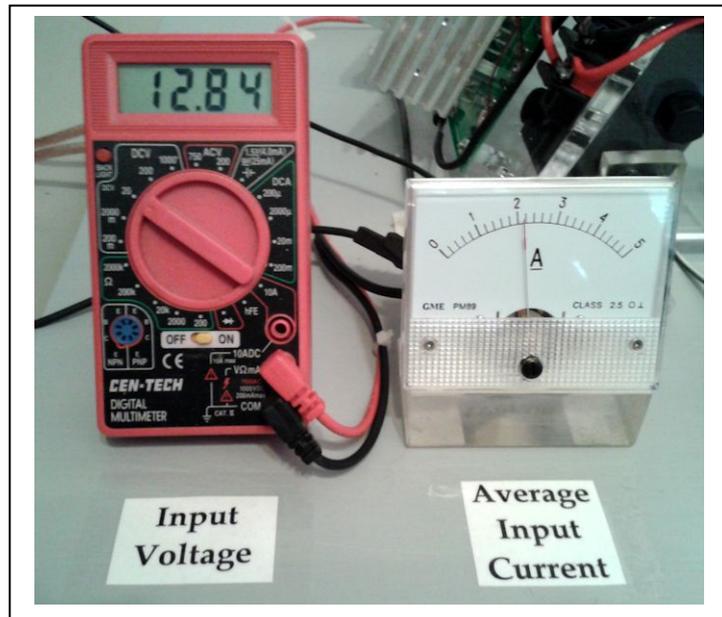
So battery B2 is being charged by 72 amp pulses 2.18 times per second. The exact number of joules of energy this represents is not quantifiable from these measurements. The average output current this represents can be estimated by the "area under the curve" method from the scope image. The area under this waveform is about 1% of the total area, so the average current output by this method is around 0.7 amps, which is similar to the analog ammeter. Regardless of the absolute value of these impulses, the battery is responding to them quite well.

SG Generator Mode Input Measurements

When the unit is placed in Generator Mode, a number of things change. The wheel slows down a little, the input current goes up, and the voltage of the Input Battery drops.

Here are the Input Meters for a typical run of the Generator Mode. The analog Ammeter is reading about 2.15 amps and the speed is registering

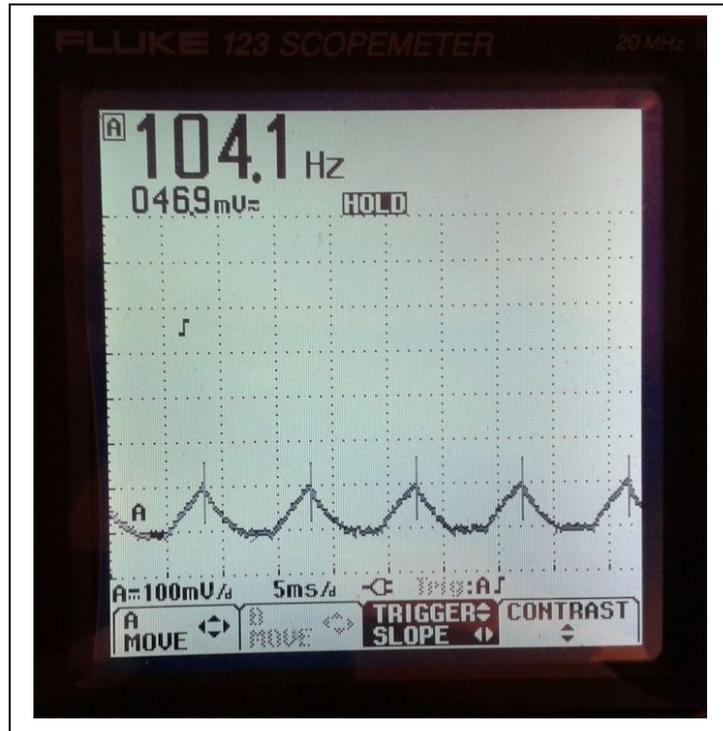
at about 335 RPM. So, according to the analog ammeter, the current input has risen from 1.4 amps in the Classic SG Mode to 2.15 amps in the Generator Mode. The ratio of increase can be calculated as follows:



$2.15 \text{ amps} \div 1.4 \text{ amps} = 1.53$. That represents **an increase of 53%**.

With the Fluke Scope Meter across the ammeter shunt, we can now finally see what the Generator Mode circuitry is doing to the input waveform.

The thin line at the tops of the triangles is where the transistors shut off. The rising wave before that is the standard input we saw on page 27, and the falling wave after the transistors shut off is the extra energy the



Generator Mode Circuit takes from the run battery (B1) on the discharge of the Main Coil, MC.

So, this is what the analog Ammeter is interpreting as an increase in the Average Input Current of 53%. Attempts to quantify this input current using the "area under the curve" method produce a similar figure. With the input calculated as 18% of the 10 amp peak value, the output adds another 10% on that, for a total Average Input Current of 2.8 amps.

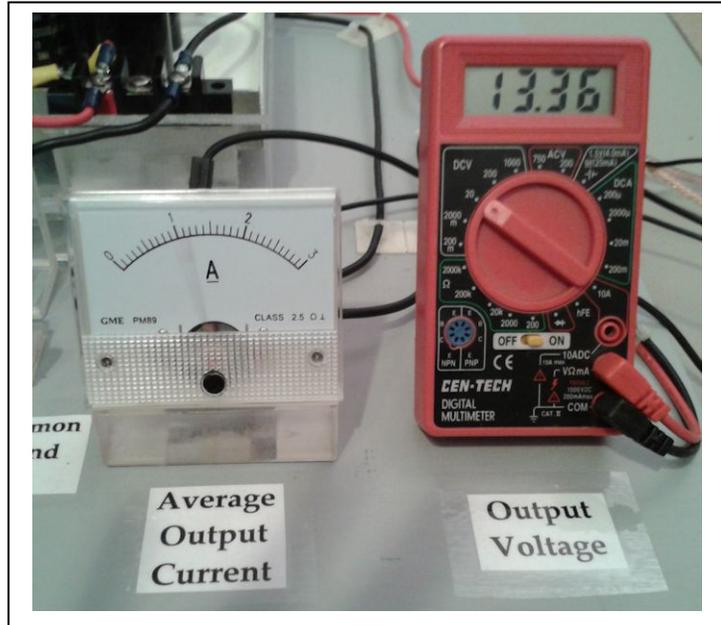
The ratio of this increase can be calculated as follows:

$2.8 \text{ amps} \div 1.8 \text{ amps} = 1.55$. This represents **an increase of 55%**.

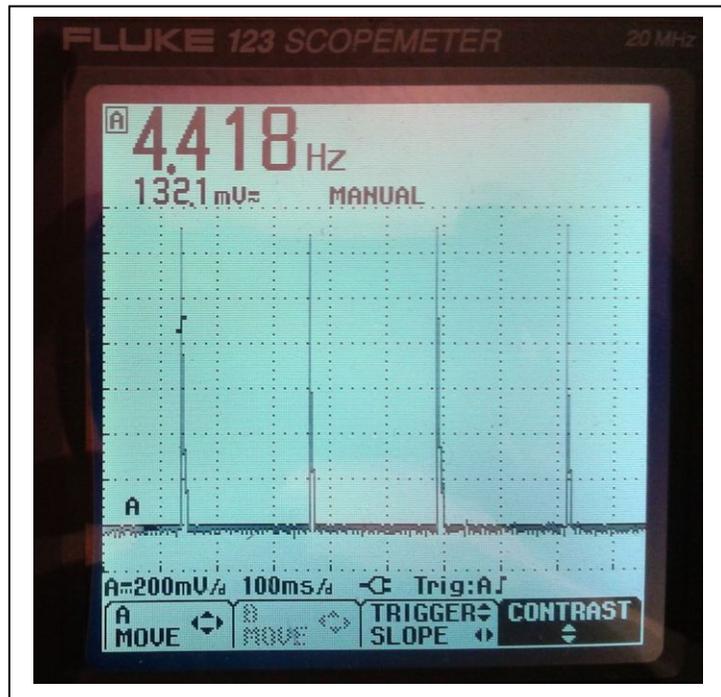
So, despite the variations in the absolute values indicated, at least the measurement methods are remaining essentially proportional in their ability to indicate the increase in the Average Input Current relative to the two modes of operation.

SG Generator Mode Output Measurements

The indicator needle on the Output Analog Ammeter is now bouncing between "0.5" and "1.5" amps. The Volt Meter is clearly showing an increased charge rate as it now indicates 13.36 volts whereas before it was showing 13.25 volts. But the big action is showing on the Fluke Scope Meter image.



The Fluke is showing that the capacitor is discharging 4.418 times per second and the peak current per impulse is now rising to 6.6 divisions. This equates to 78 amp impulses being delivered to the charge battery (B2) 4.418 times per second.



The charge rate has increased from 2.183 times per second in the Classic SG Mode to 4.418 times per second in the Generator Mode. The ratio of this increase can be calculated as follows:

$$4.418 \text{ Hz} \div 2.183 \text{ Hz} = 2.023 \quad \text{This represents **an increase of 102%**.$$

Since the capacitor discharge system is voltage controlled, and the discharge and re-set trip points have not been changed between the two tests, it is reasonable to believe that the number of Joules per pulse has also not changed, and therefore, the actual quantity of energy being delivered to the charge battery (B2) has more than doubled while the energy expended at the input has gone up by about half as much!

Charging Benefits

This data certainly supports John's statements concerning the benefit of the Generator Mode. For the purpose of this narration, it would take a lot more time to fully quantify these energy translations and eliminate all of the measurement ambiguities, but you are welcome to do that for yourself on your own model. The purpose here is simply to point you in the right direction.

Running the SG in Generator Mode seems to add a little electrical current to the otherwise low current spikes coming from the discharges of the Main Coil MC. Since the capacitor is charging and discharging twice as fast, the temporary electret effect also has less time to dissipate, so more of the spontaneous recovery of its electrical charge can be delivered to the secondary battery. That is, at least, one reasonable explanation.

In other materials, John discusses the "widening" of the waveform used to charge the capacitor as the primary explanation for the energy gain from using this method. You are encouraged to explore this process as deeply as you wish, and even come up with your own explanation should you so desire. The point is this; you now have been shown THREE distinct energy gain methods used by John to effectively off-set all of the electrical losses.

These are:

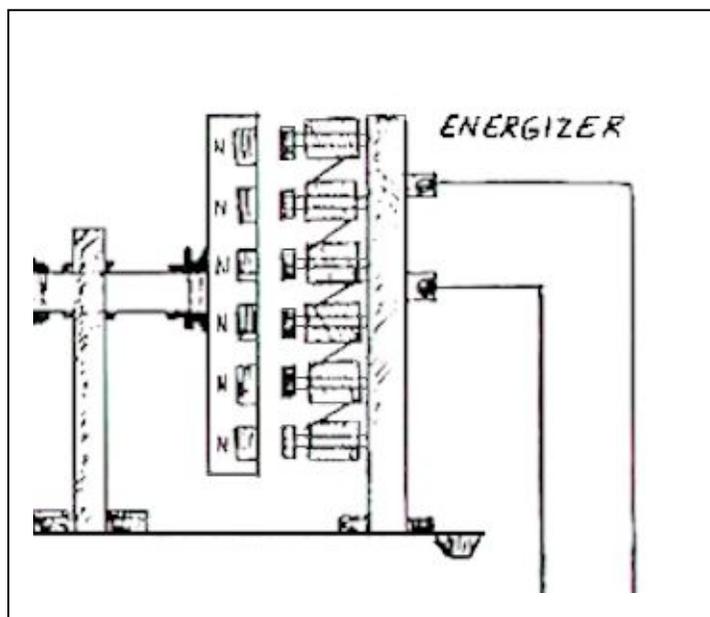
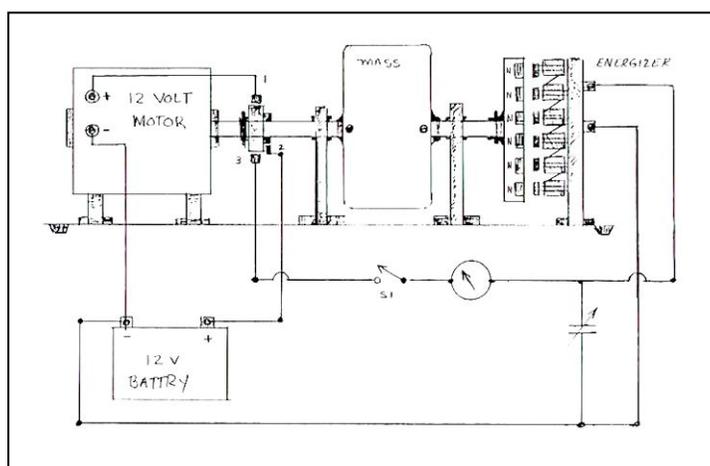
1. the rapid "finishing time" of the batteries when cycled repeatedly
2. the "temporary electret effect" that appears in the capacitor
3. the Generator Mode of operation

SG Energizer "Self-Rotation" Functions

Without fail, every time someone has referred to the SG machine as "an electric motor," John has tried to correct them. He has always said "it's not a motor, it's an Energizer."

Of course, John knew exactly what he was talking about, but most of the rest of us have resisted understanding this for a very long time. So, once and for all, here is what John has been trying to tell us!

The original machine described in John's 1984 book titled *Bedini's Free Energy Generator* was an electric motor turning a flywheel and an electric generator that had a number of unique features, which he called the ENERGIZER. Here is an enlargement of the image of that drawing. It is clearly made up of a wheel with all North Facing permanent magnets on it, spinning in front of a group of stationary coils with iron cores in them. It is clearly designated as the "Energizer."



The function of the Energizer is critical to the operation of the energy gain mechanism. On page 13 of John's original book, he states:

"There are many different ways to explain this theory."

On page 21, he states that:

"The battery is really charging itself."

On page 22, John says:

"The waves we want to generate are like those that come from old DC generators, with the exception of armature drag, bearing drag and no excited fields."

And finally he says that:

"I have run some tests in my lab and discovered that certain types of energizers, generators and alternators do what we need."

To reiterate John's discovery, here is a quote from Chapter 1 of **Bedini SG, The Complete Beginner's Handbook**:

"The energizer was a special generator that didn't slow down as much as a normal generator when electricity was coming out of it. The rotating switch allowed the battery to be charged part of the time, and then run the motor the rest of the time. As the years went by, John realized that if he could get the energizer to turn itself, he could eliminate the electric motor and really simplify the system."

"The original energizer consisted of a wheel with a series of permanent magnets on it that would rotate in front of a number of coils of wire. As the magnets moved passed the coils, pulses of electricity would come out of the coils to charge the battery. But John also knew that the wheel could be made to turn if a pulse of electricity was put back into one of

the coils at the right time. It was just a matter of developing the right switching method."

"The new system consisted of an energizer, a battery, and a special timing circuit. That eliminated half of the components, including the electric motor, the rotary switch, and the flywheel."

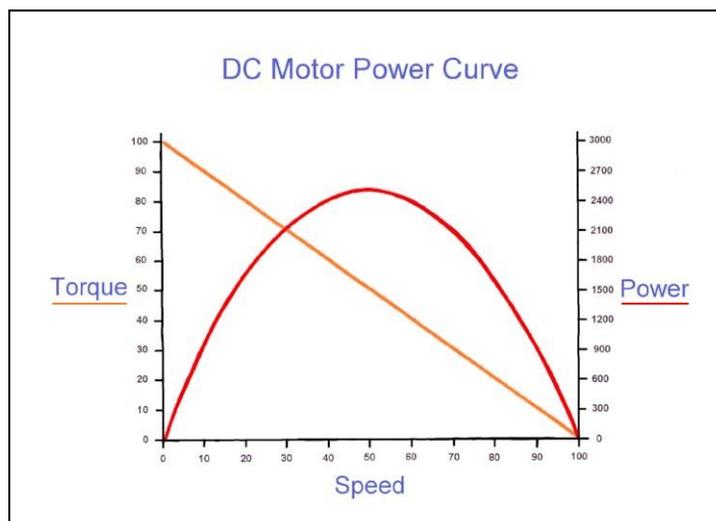
By a simple substitution of words, the machine can be seen to be the original "low drag generator" with an added circuit to cause it to self-rotate. Over the years, John has run hundreds of experiments on this "technology platform" and developed a "self-rotating" method that recovers 100% of the electricity needed to keep it turning. So, this brings us to the SG as we know it. The only things missing are all of the other non-energized coils that make up the rest of the low drag generator!

The Development of Rotating Mechanical Force in an Electric Motor

In order to understand what John means when he says the SG is not an electric motor, we have to understand what an electric motor is and how it develops mechanical energy.

This graph illustrates the power curve of a typical DC motor with a commutated armature. It shows the relationship

between the Speed, the Torque produced, and the consequent Power, which is a cross-product of the Speed and Torque. In this diagram, the Torque is shown by the **Orange Line** and the Power is shown by the **Red Line**. In a motor like this, the Torque is a direct consequence of how much electric current is moving through the armature windings in front of the stator magnets.



So, when the motor is just starting, the speed is the lowest, but the current draw and the torque is the highest. As the motor runs faster and faster, the current draw and the torque produced start dropping off due to the production of the back EMF in the windings. As the Torque approaches its lowest point, there is no longer enough mechanical energy produced to make the motor turn faster, so it reaches its Top Speed. These relationships can be seen by following the **Orange Line** down as the speed increases.

In both of these speed extremes, the power produced by the motor is relatively low, since one of these "multipliers" has a very low value. Only in the mid-range of both the torque and the speed, does the consequent power "cross-product" of these values reach its peak.

This can be seen in the values for Power listed on the far right of the graph. Whereas $10 \times 90 = 900$ near the start-up or the top speed, the mechanical power peaks in the mid-range where $50 \times 50 = 2500$. This is why a motor like this must be slowed to 50% of its unloaded speed in order to accurately measure its power on a dynamometer test.

While being a little counter-intuitive, this "power curve" produces a very handy performance feature. When mechanical energy is withdrawn from a machine, the removal of this energy usually *slows the machine down*. This is true of almost all mechanical systems.

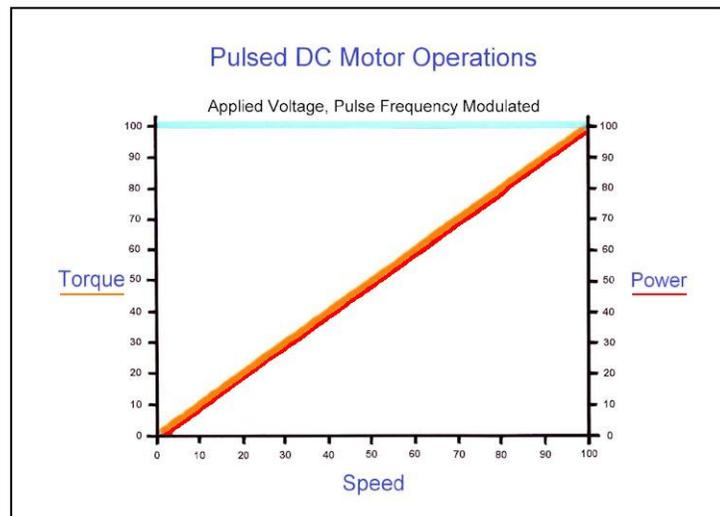
In the case of the DC Motor, its performance is such that if a mechanical load is applied to the motor at its top speed, it will slow down. But, as the speed drops, the power RISES to match the mechanical load, to keep the drop in speed to a minimum. The best thing about this, is that this speed-power regulation of the machine happens automatically, as long as the applied voltage remains the same. This makes this type of electric motor extremely useful for the production of mechanical energy.

So, the ability of an electric motor to produce MORE mechanical power as it slows down is the specific feature that John is saying is NOT present in the Self-Rotating Energizer.

The Development of Rotating Mechanical Force in the SG Energizer

The SG Energizer produces a mechanical attraction each time the coil turns ON. This attracts one of the permanent magnets on the wheel until it is directly over the coil, at which point, the coil turns OFF and the magnet slips past.

Each time this process happens, it draws a specific quantity of electric current from the run battery and produces a specific quantity of mechanical energy on the wheel. As the speed increases, this process is repeated more times per second, and therefore the power increases in a direct relationship to the speed. In the graph above, this is shown as the **Orange Line** (Torque) and the **Red Line** (Power) rising together.



[This is, at least, what the torque-power curve of the SG looks like when it is operating in "single triggering mode."]

While this torque-power profile is interesting and has some advantages, it is NOT the same as a standard electric motor power curve. It also means that the SG Energizer is NOT capable of producing more mechanical power as it slows down and is therefore NOT suitable to provide mechanical energy to external loads like an ordinary electric motor does.

So, this is what John has been trying to get us to understand; that the SG is a "self-rotating Energizer" designed to produce excess electrical energy (when all of the extra coils are present) while producing *enough* mechanical energy to keep itself spinning.

SG Energizer Extra Coil Generator

In addition to the SG Advanced circuitry and optimized operations, the Conference Demonstration model had an "extra coil" generator as well.

The power coil (behind the Bedini Logo) and the generator coil can be seen next to each other in this picture. Since the permanent magnets on the wheel were only a single Ceramic #8 magnet each, and since these magnets were the only magnetic field input for the operation of the generator coil, this coil was designed to operate on this relatively low magnetic field.



The Generator Coil

The purpose of the Demonstration Model was to "demonstrate the principle" of the Low Drag Generator using a single coil. To maximize the low magnetic field levels, it was decided to widen the iron core of this coil so it could capture more of the magnetic flux from the permanent magnets.



Therefore, a plastic spool like the one used for the power coil was cut in half and the center section was extended by 1 inch.

This produced a coil core area that more closely approximated the rectangular shape of the magnets. The open area was then filled with the same R45 iron welding rod material used in the power coil.

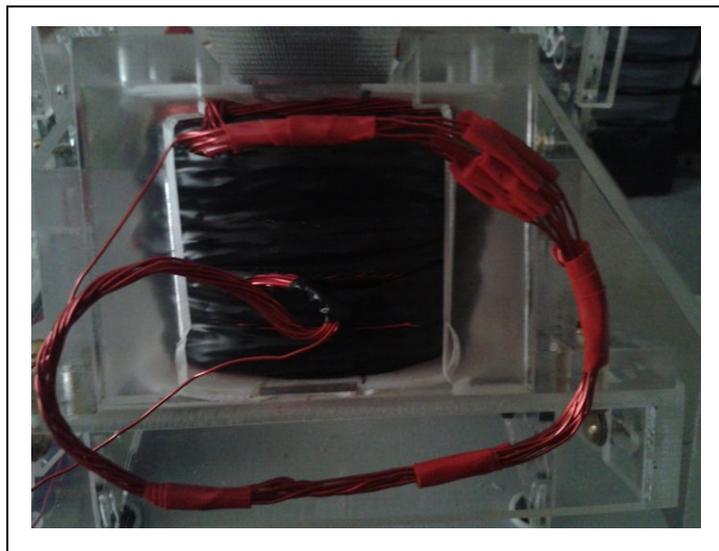
This simple modification produced a coil core with 3 times more iron in it and allowed much more of the magnetic flux from each magnet to be captured.

When this coil form was wrapped with wire, it took about 60% more wire to make each turn, but the core captured 300% more magnetic flux than the simple round core would have. Over all, the trade-off was well worth it.



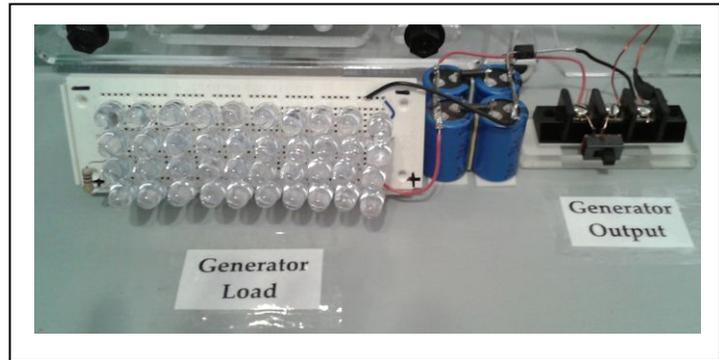
Once the coil form and core material were positioned, the iron rods were glued in place using cyanoacrylate (super glue) adhesive, similar to the process shown on page 61 of the **SG Beginner's Handbook**.

The coil form was then wound with 10 strands of #16 wire that had been twisted into a bundled cable like the power coils use. The process to make a coil like this is shown on page 57 of the **SG Beginner's Handbook**. These individual wires were then connected in series to produce a single #16 wire about 1,000 feet long.



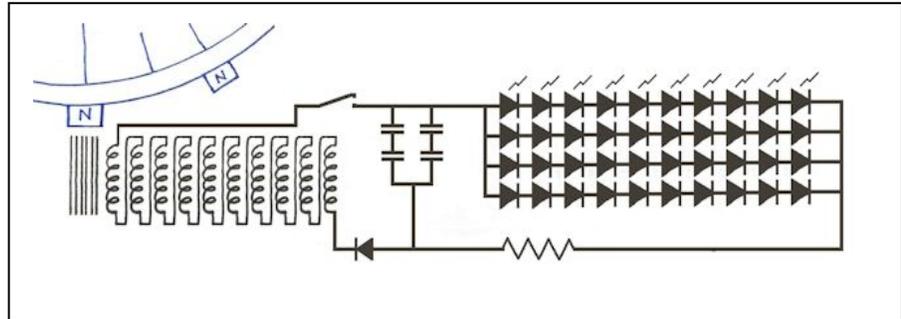
The Circuit

The output of this coil came directly to the circuit shown here. It consisted of an ON/OFF switch, a diode, a capacitor, a resistor, and 40 LEDs.



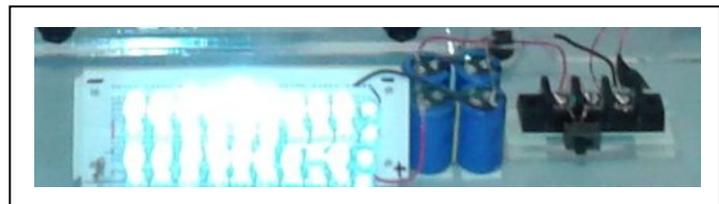
The switch was a simple toggle type. The diode was a 6A100. The four capacitors together had a capacitance of 470uf. The resistor was rated for 100 Ohms at one watt. The 40 LEDs were wired as 4 parallel strings of 10 LEDs connected in series.

The complete circuit is shown here.



The Test Results

In actual operation, the extra generator coil lit up all 40 LEDs to a brightness too bright



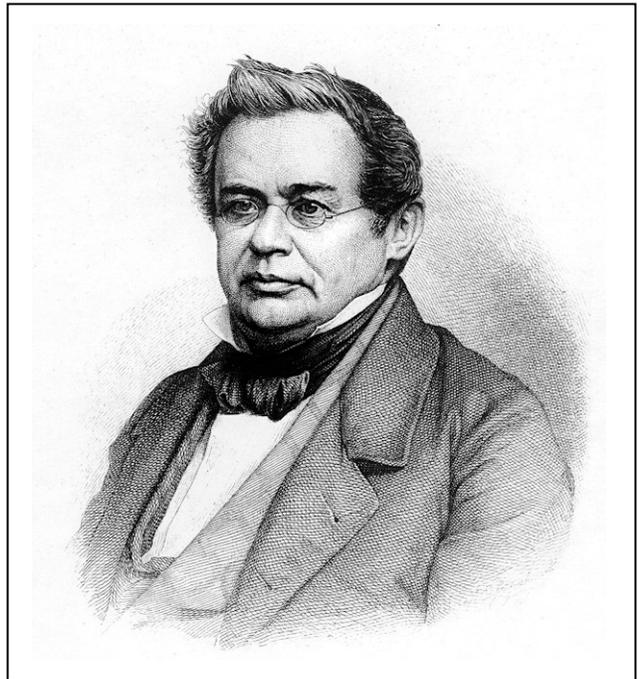
to look at directly. On the Conference film it was stated that turning the lights ON and OFF did not change the speed by even one RPM. The exact results of specific tests will be discussed in more detail in Chapter Six.

For all practical purposes, the generator coil produced extremely **LOW DRAG** on the SG Energizer while lighting 40 LEDs. Everyone at the Conference saw this done. Nobody understood what they were looking at.

What is this? Why can't people understand it? Why does this work?

Understanding Lenz's Law

Heinrich F. E. Lenz was a Russian Physicist, born in the city of Dorpat in the Russian Empire in 1804. His parents were ethnically German speaking Prussian expatriates and so Lenz is quite often referred to as a German Physicist as well.



Lenz originally studied at the University of Dorpat, but later taught Mathematics and Physics at the University of St. Petersburg. While he made many contributions to the sciences of his day, he is best remembered for his early experiments in magnetics and the formulation of what has become known as Lenz's Law.

The use of the symbol " L " for inductance was also chosen in honor of Lenz.

Understanding Lenz's discovery

By 1831, Lenz was studying the new science concerning electric generators and electric motors. His first paper in this field addressed what he called the "Law of Reciprocity of Magneto-electric and Electro-magnetic Phenomena." This paper contained the first published statement of "Lenz's Law." His observation was that when mechanical energy was removed from an electric motor, it behaved like an electric generator in reverse, and

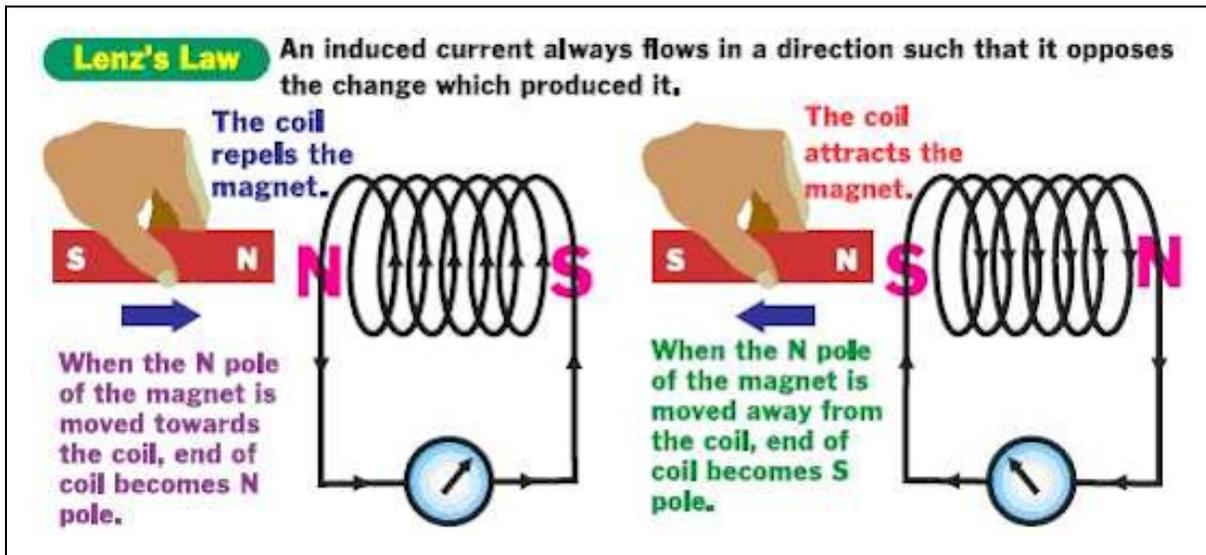
that when electrical energy was removed from an electric generator, it behaved like an electric motor in reverse.

Today, these observations are expressed as follows:

The current induced in a circuit due to a change or motion in a magnetic field is directed to oppose the change in flux or to exert a mechanical force opposing the motion.

This reciprocal action between an induced current and the changes in the inducing magnetic field was present in every experimental arrangement that Lenz studied, and he came to believe that it represented an expression of the "Law of Conservation of Energy." It also supported the idea that "a change in the energy state of a system could not propagate itself."

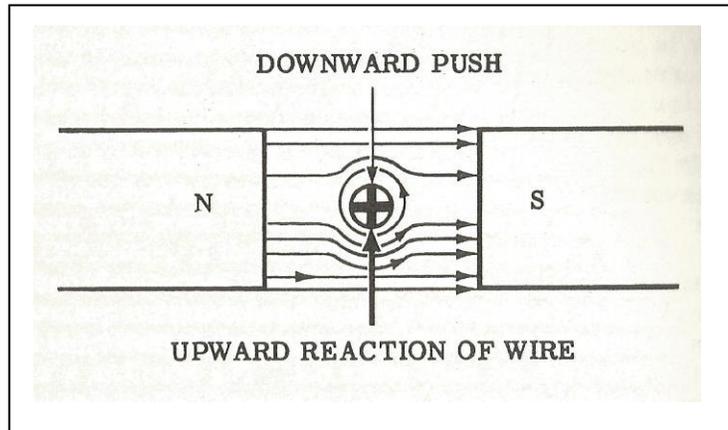
Here is one of the simplest illustrations of Lenz's experimental results.



If the North Pole of the permanent magnet approaches the coil, current flows in the coil in a way that produces a second magnetic field that repels the magnet's approach. When the North Pole of the permanent magnet is then pulled away, the induced current in the coil reverses and produces a magnetic field that tries to attract it back in.

In its most basic presentation, Lenz's Law can be illustrated like this:

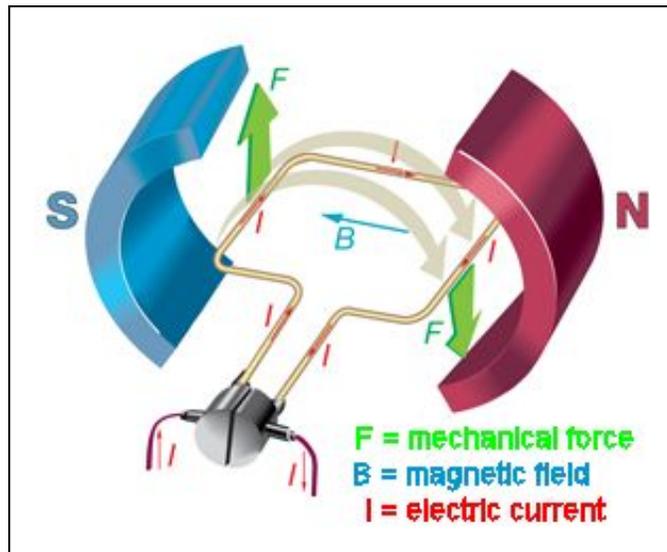
If a wire is situated in a magnetic field such that a North Pole is on the left and a South Pole is on the right, and a mechanical force moves the wire in a downward motion, a current in the wire will be produced that creates a magnetic field



around the wire that tends to oppose the field above the wire and reinforce the field below the wire. These induced magnetic effects from the current in the wire create an upward mechanical reaction force on the wire in direct opposition to the downward motion that initiated it.

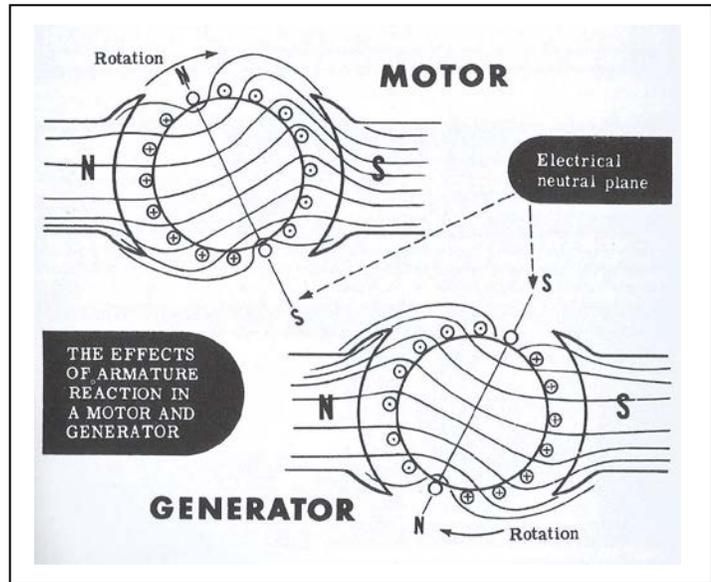
So, Lenz's Law describes a complex interaction between magnetic fields, electric currents, and mechanical forces which are all tied together because of a specific geometry of materials and motions.

This image describes how these forces behave in an ordinary DC motor. When the magnetic field is described as \mathbf{B} , and the electric current is described as \mathbf{I} , then a mechanical force appears on the wires, shown as \mathbf{F} . What makes the motor spin is the appearance of this mechanical force. But when this force moves the wires through the magnetic field \mathbf{B} , it induces a potential in the wires



that will try to reverse the flow of current. If the mechanical force in the direction of \mathbf{F} becomes the "input" to the device, the machine becomes a "generator" and produces electric current in the opposite direction shown.

Lenz was the first to describe these interactions. When the current leads, the force appears as the reaction, and we call the device a "motor." If the force leads, then the current appears as the reaction in the opposite direction, and we call that device a "generator." But really, it is the same machine with the ability to appear as either a motor that inherently



generates against itself or a generator that inherently motors against itself, depending on which force leads the other. Modern theory calls this the "armature reaction" and shows it as an angular displacement of the "electrical neutral line" in the rotor.

It is extremely important to understand that you can't "DEFEAT" Lenz's Law. It is an accurate description of the behavior of the forces of Nature as they appear within this specific configuration of materials. What you CAN DO is study the minute details of how this process manifests itself and learn how to engineer around it! That is what John Bedini did in the 1980s.

Since most commercially available electric motors and generators use the same basic geometry as is illustrated above, these machines all behave in a manner that is consistent with the assumption that Lenz's Law is universal in its appearance and that it is an example of the "Law of Conservation of Energy" as Lenz believed. Luckily, this is not true.

The goal is to produce electricity from magnetic induction without the appearance of the associated mechanical reaction forces produced by the interaction of the induced currents and the primary magnetic fields. This is what allows you to make an electric generator that does not slow down when electricity is removed from it. The question is: what's the trick?

Modifying the Appearance of Lenz's Law

Let's review the specific conditions under which Lenz's Law appears.

When a current carrying wire is placed in a magnetic field, the interaction of the magnetic field around the wire and the external magnetic field produce a force on the wire that tends to move the wire in such a way as to lower the flow of current. This is referred to as the "back EMF" or reverse electro-motive force.

When a wire that is connected to a complete circuit is placed in a magnetic field and physically moved perpendicular to that field, a current is induced in the wire that produces a force on the wire that makes moving it in its original direction more difficult. This is referred to as the "back MMF" or the reverse magneto-motive force.

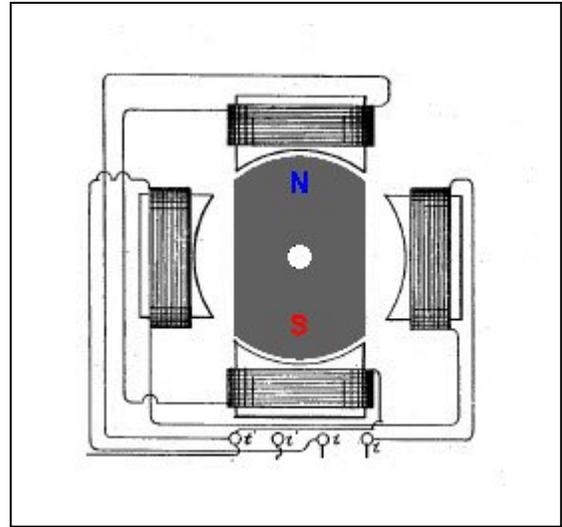
In the first instance, the motion of the wire impedes the flow of current by inducing a reverse voltage. In the second instance, the flow of current impedes the motion of the wire by producing a magnetic repulsion against the external magnetic field. Lenz believed these two phenomena were reciprocals of each other and that their appearance supported the "Law of Conservation of Energy." Satisfied by his discovery, he looked into it no further.

So, this defines the specific arrangement of materials that must be avoided! We definitely do not want to move a current carrying wire directly in front of a magnet!

The question is, **what can we do** to produce electric induction and minimize how much reverse mechanical force it creates in the generator? Well, one simple variation of these components is shown on the next page, where coils are wound on iron pole pieces in the presence of a rotating magnet. While this seems remarkably similar and only sort of "inside out"

of the original configuration, it does provide a number of new features that allow us to modify the appearance of Lenz's Law.

The first difference has to do with the appearance of mechanical force. In the first arrangement, if there is no current flowing in the wire, there are no mechanical forces produced at all. In this new arrangement, if there is no current flowing in the wire, the rotating magnet is still attracted to the iron in the pole pieces.



So, for instance, in the diagram on page 43, if the magnet approaches the coil, but the coil is not connected to the meter or anything else, then no current is induced in the coil and no magnetic resistance appears in response to the movement of the magnet. In that set of circumstances, the magnet is not attracted or repelled by anything else in the system, whether it is moving or not.

If, however, we introduce some iron into the coil, now there is a force produced on the magnet even if no currents are being generated! Also, this new magnetic force is a "universal attraction" in that the magnet is attracted toward the iron as it approaches AND it is still attracted back toward the iron as it tries to leave.

This arrangement of materials produces a set of forces that essentially cancel each other out to produce "no net force" on the movement of the magnet as it passes the iron pole pieces. But, "no net force" is completely different than "no force." This situation is quite deceptive and most engineers believe that the second arrangement of components is identical to the first in all operational characteristics, but it is not.

So, this gives us two simple processes to start engineering the appearance and/or the avoidance of Lenz's Law. The first is by winding coils of wire around stationary iron pole pieces that are either magnetized or demagnetized by moving magnets past them. The second is by controlling WHEN electric currents are allowed to flow in the wires.

This is what John Bedini figured out in the early 1980s. Remember what he said:

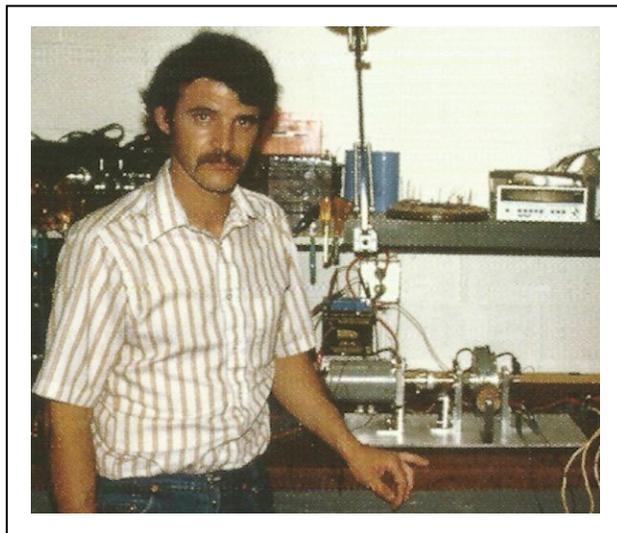
"I have run some tests in my lab and discovered [that certain types of energizers, generators and alternators do what we need.](#)"

And what does he say we need?

"The waves we want to generate are like those that come from old DC generators, [with the exception of armature drag](#), bearing drag and no excited fields."

Ideally, he was looking for a generator that could produce DC pulses with a radiant spike (like from the sparks at the commutator) while producing a minimum of mechanical drag on the rotor, have low bearing losses, and eliminate excess energy use in the "field windings" by replacing them with permanent magnets. "Energizer" is the name he gave to any electric generator that operated with all or most of these parameters.

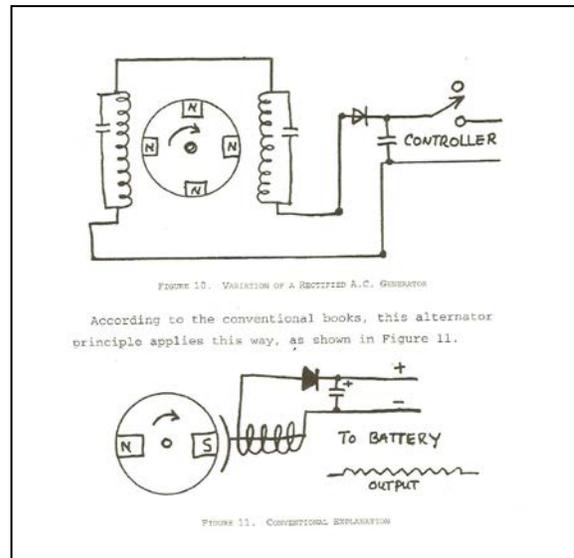
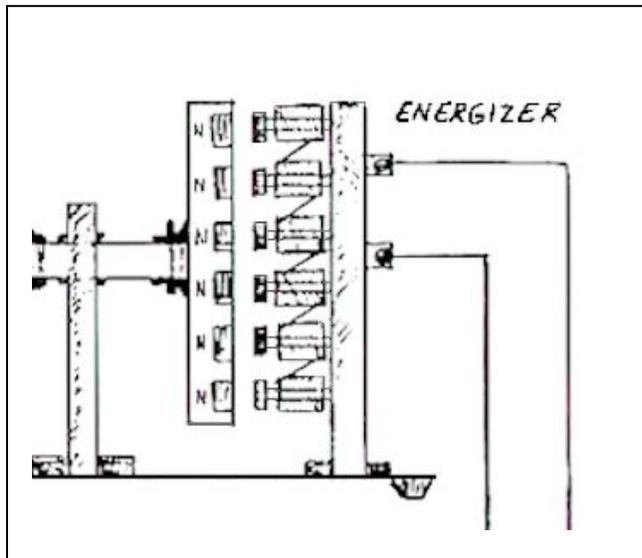
Here is a picture of John next to one of his working prototypes in the early 1980s. The unit has an electric motor on the left and the "energizer" on the right. This picture shows the unit without the flywheel.



The Simple Low-Drag Generator

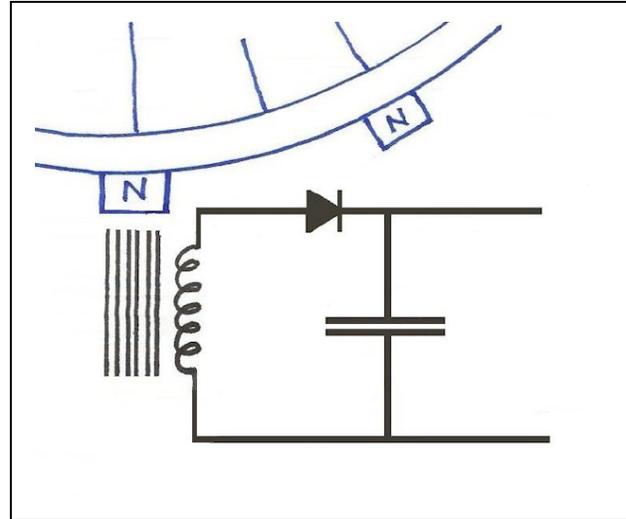
In the previous chapter, we looked at the theoretical possibility of building a generator that minimizes the appearance of mechanical drag (the reverse motoring effect) while it is producing electric current. In this chapter we will look closely at the design of the simple "energizer" that John Bedini developed in the 1980s that accomplished this goal.

Basic Configuration



These two images are taken from John's original book titled **Bedini's Free Energy Generator**, published in 1984. In the first image we can see that the "energizer" appears to be made from a wheel with North facing permanent magnets on it directly in front of a structure holding a number of coils of wire with a core material that crudely looks like steel bolts. In the second image, two basic arrangements are shown with the lower one showing what appears to be a wheel with two magnets on it facing a coil of wire wound on some core material, presumably iron. The coil is connected to a simple circuit consisting of a diode and a capacitor.

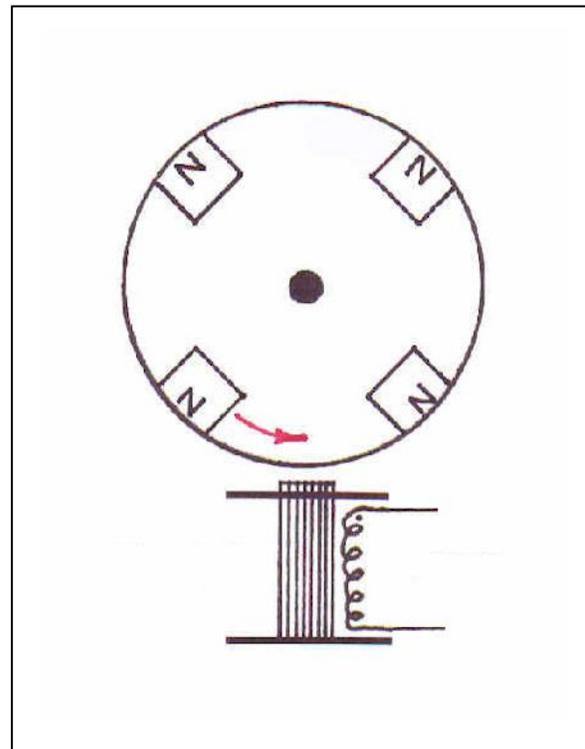
To make these ideas clear, the next image simply shows a coil of wire on an iron core facing a wheel with some North Magnets on it and connected to a simple circuit consisting of a diode and a capacitor. So this is the basic "Energizer" construct and method.



This is the "basic configuration" of an "energizer" or a "low drag" generator. Next, let's see WHAT this does and WHY it works.

Analysis of Lenz's Law Forces

In order to simplify this, just imagine this arrangement of components. At the bottom, there is an iron core with a coil of wire wrapped around it, and above the iron core, there is a wheel with a series of North facing magnets on it. The **RED** arrow represents the direction of rotation on the wheel.



As the wheel rotates, the magnets move passed the iron core and produce a complex series of events which include:

1. magnetization of the iron core
2. attraction forces that act on the wheel
3. voltage production in the coil due to the changes of magnetic flux in the iron core

The drawing to the right illustrates all of these interactions.

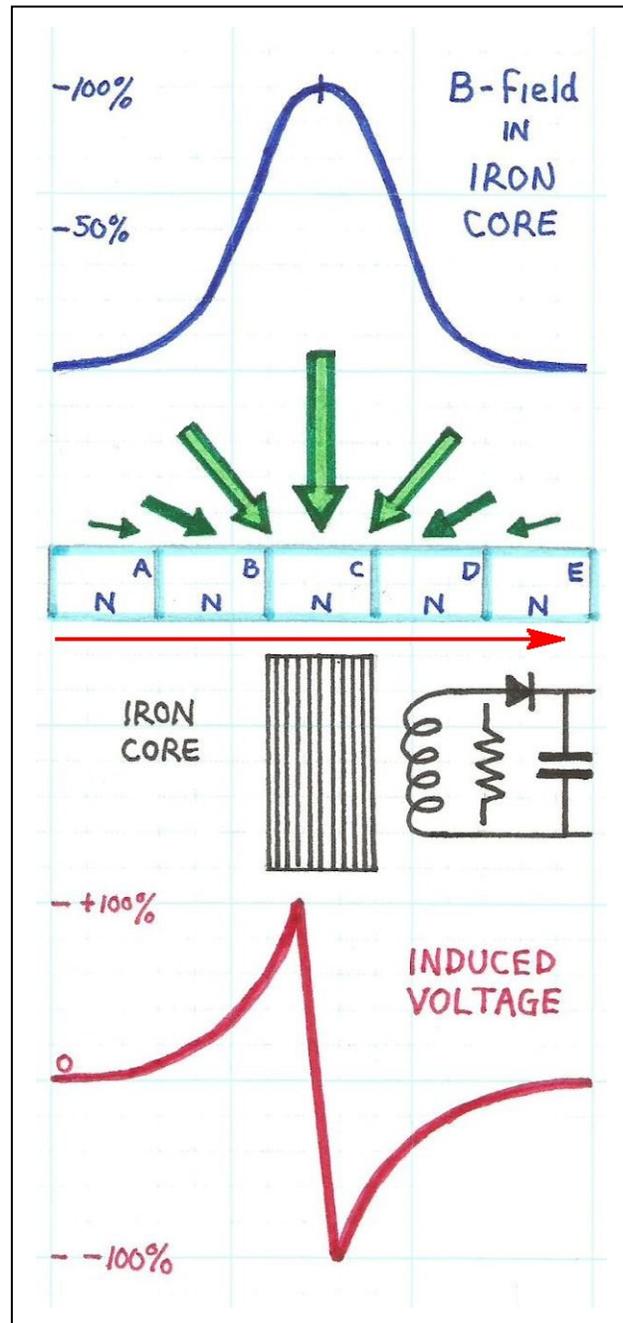
In the middle of the drawing, the iron core of the coil is shown as a **Black Rectangle** with a number of vertical, parallel lines in it.

To the right of the iron core, the coil is shown connected to the diode and capacitor circuit, but also the symbol for a resistor is shown unconnected but close by.

The **Blue Boxes** above the iron core represent a permanent magnet on the wheel, and five possible positions it could be in as it passes the iron core. The **Red Arrow** represents the direction the magnet is moving through Positions A to E. The N represents the North Pole of the magnet facing the core.

Above the **Blue Boxes** are a series of **Green Arrows**, which represent the mechanical force applied to the wheel as the magnet passes the iron core. The **Green Arrows** point in the direction of the mechanical force, and the size of the **Green Arrows** represents the relative strength of the mechanical force in that position.

Above the **Green Arrows** is a **Blue Graph** which represents the strength of the magnetic field in the iron core. Finally, at the bottom of the image, the **Red Graph** represents the Voltage Induced in the coil as the magnet moves passed the iron core.



So, this is the complex "snapshot" of events that occurs each time a magnet passes the iron core. Let's go through each of these processes, one by one.

The **Blue Graph** shows the strength of the magnetic field in the iron core as the magnet moves from Position A to Position E. The magnetic field in the core starts magnetizing slowly when the magnet is in Position A, then as the magnet arrives at Position B, the magnetization rises rapidly and peaks when the magnet is directly over the iron in Position C. As the magnet moves passed this position, the magnetization of the iron falls off rapidly until the magnet reaches Position D, and continues to weaken as the magnet moves to Position E.

The mechanical force applied to the wheel follows a similar profile with regard to strength, but not with regard to direction, as illustrated by the **Green Arrows**. So, the force on the wheel when the magnet is in Position A is weak, but it is parallel to the direction the wheel is turning, (**Red Arrow**) and it ADDs to the momentum of the rotation. This is a positive motoring force applied to the wheel by the permanent magnet.

This positive mechanical force continues to ADD to the rotation of the wheel as the magnet moves through Position B and all the way up to Position C. Even though the magnet continues to contribute a significant positive force on the wheel in its forward direction, the actual force vector of the attraction of the magnet to the iron core is progressively swinging more and more vertical in its orientation.

When the magnet is in Position C, the magnet is not applying any force on the wheel to either promote or retard its rotation, but its attraction is at its maximum. At this position, the magnetic force on the iron is 100% vertical, meaning it is 90° out of phase with the plane of rotation.

As the magnet moves passed Position C, the mechanical forces on the wheel reverse, and now begin to retard the forward motion of the wheel.

As the magnet moves from Position C to Position E, it produces a "reverse motoring action" on the wheel that is essentially of the same magnitude as the "forward motoring action" of the magnet moving from Position A to Position C. So, the entire movement of the magnet past the iron core produces "no net torque" on the wheel, as long as no current is generated in the coil and no Lenz Law forces are produced.

Even if no current is produced in the coil, a voltage is induced in the winding in response to the magnetization of the iron core. This is shown in the **Red Graph** in the illustration on page 51. The Induced Voltage tracks the CHANGES in the strength of the magnetization of the iron core.

So, as the magnetization of the iron core rises rapidly from Position B up to Position C, the Induced Voltage rises rapidly as well. But when the magnetization of the iron core reaches its highest value at Position C, the CHANGES in magnetization stop, and the Induced Voltage drops to zero.

Then, as the magnetization of the iron core starts dropping, this represents a CHANGE in magnetic flux in the opposite direction, and so the Induced Voltage reverses and rapidly rises to its highest negative value. As the magnetization of the iron core falls rapidly moving toward Position D, the negative voltage of the coil also drops. As the magnet moves to Position E, the iron core loses all of its magnetic field and the Induced Voltage returns to zero, as well.

This completes the analysis of the behaviors of the magnetic fields and the mechanical forces they produce. Now, let's look at what happens when currents are induced in the coil and what changes they produce.

Changes of Drag Co-Efficient with Different Loads

While standard electric generators produce a linear relationship between electrical loads and mechanical drag forces, this design of generator does

not. That is why this design of generator is sometimes referred to as an "indirect induction" generator, because of the buffering effect created by the addition of the stationary iron cores.

Direct induction generators exhibit a linear relationship between current production and the appearance of mechanical drag or reverse motoring torque. Indirect induction generators exhibit a non-linear relationship between current production and mechanical drag.

As an example, under one set of tests run on the Extra Coil Generator on the 2014 Conference Demonstration Model, the following data was collected:

Wheel Speed when Generator had No Load (Open Circuit)	370 rpm
Wheel Speed when Generator had 40 LED Load	365 rpm
Wheel Speed when Generator had 0 Ω Load (Short Circuit)	360 rpm
Wheel Speed when Generator had 100 Ω Load	Stall
Wheel Speed when Generator had 300 Ω Load	Stall
Wheel Speed when Generator had 1,000 Ω Load	360 rpm

A standard generator exhibits maximum speed with an Open Circuit Load and stalls with a Short Circuit Load. Our test generator exhibits nearly the same Top Speed for Open Circuit and Short Circuit Loads, and stalls with medium loads. This demonstrates that the generator is NOT a "low drag" generator under all circumstances, but that it can produce significant current and low drag under specific conditions.

Loading Effects of the Diode and Capacitor Circuit

From the data shown above, you can see that the loading effects of lighting 40 LEDs, using the diode and capacitor circuit, only drops the speed of the SG wheel by 5 rpm. This is a loss of only 1.3% of the speed and it sits right in the middle of the Open Circuit and Short Circuit loading effects.

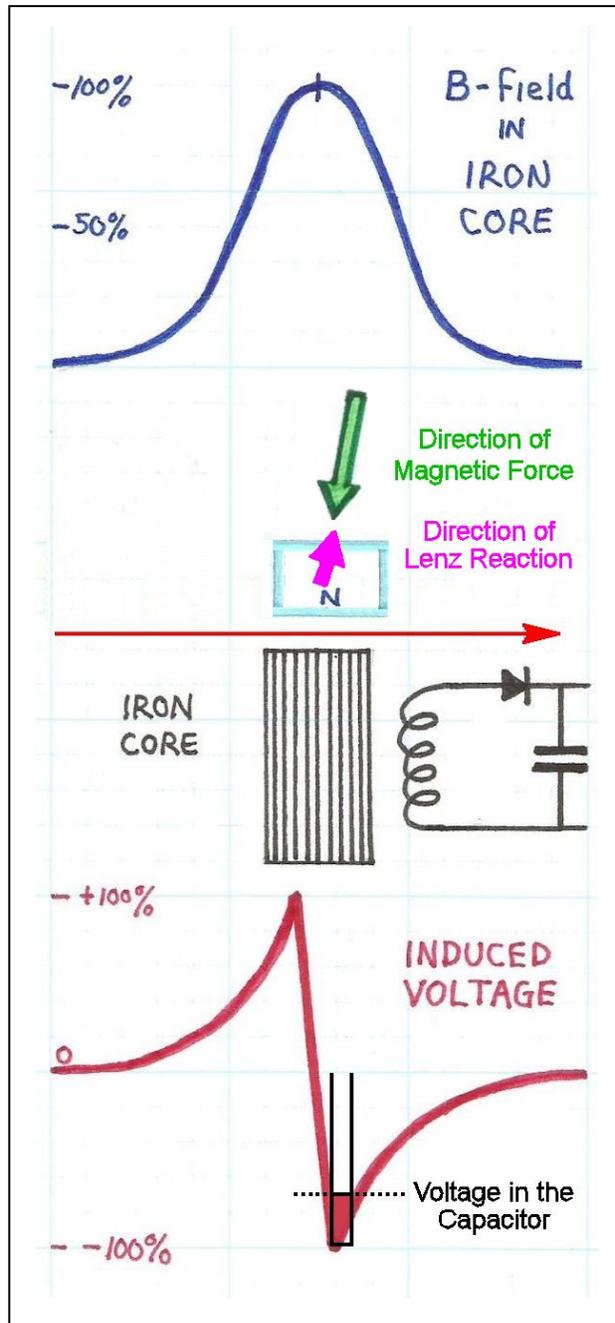
This is nearly an ideal loading characteristic for the generator in its present configuration. So, how does this work?

This image is a "snapshot" of the timing of current production for charging the capacitor. The diode is connected to the coil so that it clips the trailing voltage peak as the magnet begins to leave Position C.

This allows 100% of the attraction forces to add to the forward momentum of the wheel while the magnet approaches the iron core as no current flows during this period.

The voltage in the capacitor is drawn down by the load to just below the peak voltage generated by the coil. As the coil voltage rises above the voltage in the capacitor, current flows through the coil, filling the capacitor AND producing a mechanical Lenz Law reaction against the external magnetic field.

The period during which the current flows is defined by the black area indicated on the Induced Voltage graph. The Lenz reaction produced by this current is applied back toward the external magnetic field in exact opposition to the angle by which it is induced. In this case, it reduces the permanent magnet's attraction to the iron core, which is still mostly vertical in its orientation at this moment.



So, Lenz's Law has been satisfied exactly as required! It's just that in this configuration, the geometry does not apply the reverse mechanical force directly against the forward progress of the rotation of the wheel, which is still indicated by the **Red Arrow**.

Now we can see the genius of John's little circuit. It automatically regulates when current is produced to a select "window of opportunity" where both the voltage and the current generated can be the highest for the least possible mechanical drag. When built properly, this is the quintessential event that the Energizer is designed to produce repeatedly.

The design of this machine has been in the public domain for 30 years. The only reason more people do not understand this technology is that almost no one ever built it and therefore, no one actually observed what it did.

Variations on the Design

There are dozens of modifications that can be made to this arrangement of components to improve its operation. This is a short list of some of them:

- A larger wheel makes the Lenz reaction even more vertical
- More closely spaced magnets produce more events per revolution
- A larger capacitor narrows the period of current production
- A larger flywheel maintains top speed more consistently
- A well regulated top speed reduces electric motor input

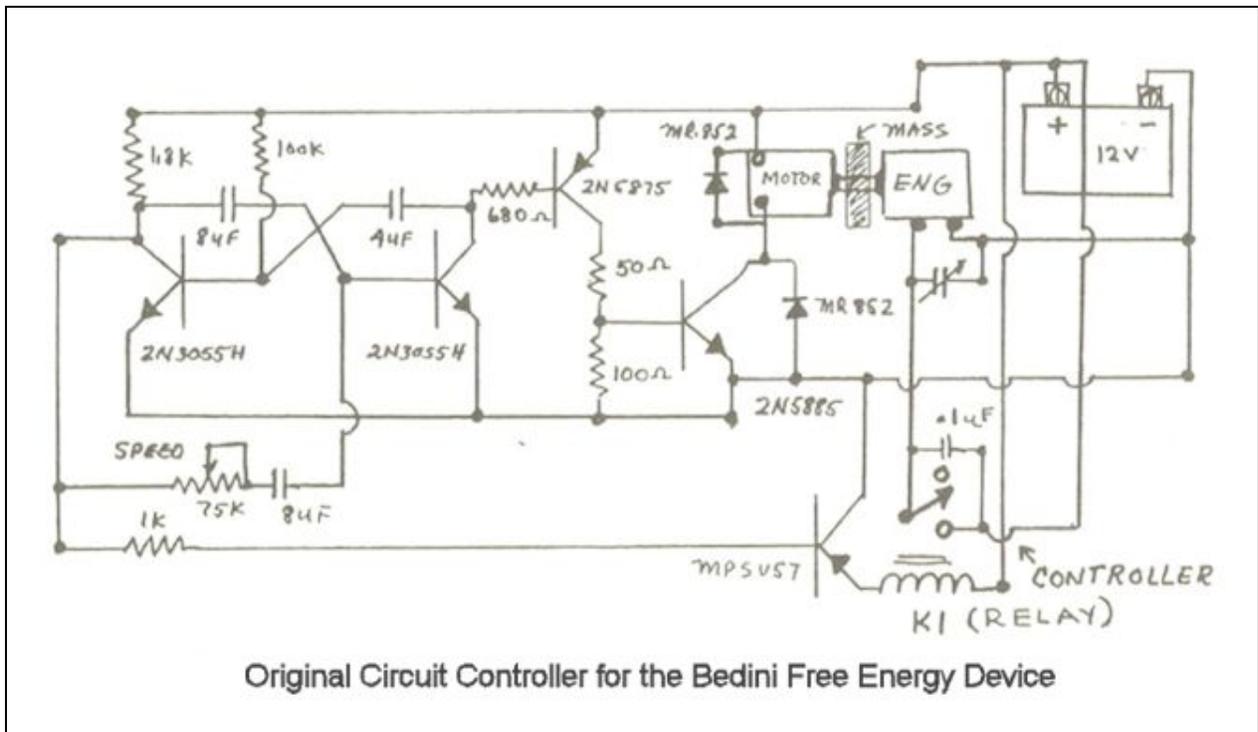
So, size definitely enhances all of the benefits of the phenomena being captured here. OK, let's put all of the pieces together and look at the entire machine, including the largest model of John's original energizer design ever shown in public.

Detailed Analysis of the "Watson Machine"

A Little History

Before John published his booklet in 1984, dozens of experiments had been run. So, he knew it worked. The problem was that he didn't know exactly WHY it worked. Tom Bearden suggested an operational theory at the time, which was all they had to go on. So the theory of the "phi-dot current" and the idea that "the battery charged itself" came from that period. John has always said that "there are many different ways to explain this theory" and the simple idea of harnessing a "low-drag" generator is one of them.

Here is the schematic of the "original" circuit and controller that John used.

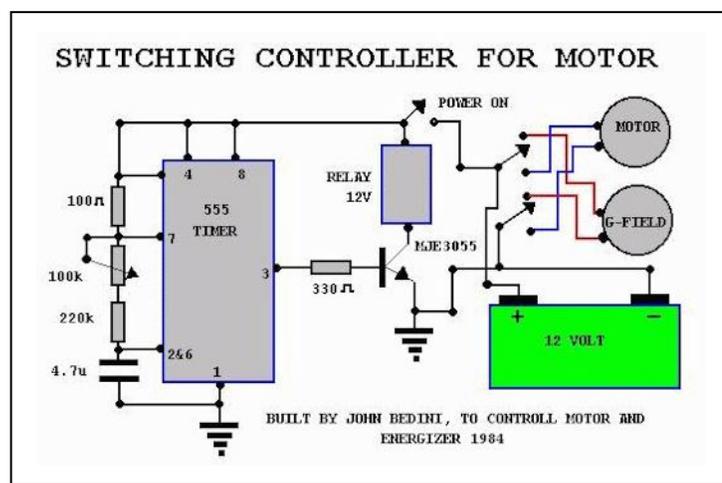


The machine was an electric motor, a flywheel and an energizer. It ran and charged a single 12 volt lead-acid battery. The circuit was a flip-flop timer made from discrete electronic parts that ran the motor from the battery part of the time while the energizer charged a capacitor. Then, the circuit disconnected the motor from the battery and discharged the capacitor into the battery followed by a bunch of spikes directly from the energizer. At that point, the cycle started again. The timing was asymmetrical and the repetition rate of the flip-flop was changeable. While the motor was turned ON and OFF directly from a transistor, the capacitor was discharged through a mechanical relay contactor.

Since the Energizer could charge the capacitor with low drag, running the machine at "top speed" for the motor allowed it to draw the least energy from the battery. The size of the capacitor was chosen to give the battery a significant reverse current surge to optimize charging and the size of the flywheel was chosen to maintain the highest possible speed during the capacitor discharge phase when the motor wasn't under power.

To get the system to work, these various parameters needed to be fussed with a bit to find the best balance, and then the speed at which these phases were switched was the last thing to be fine tuned. John could always tune his units up, but most others had trouble with this.

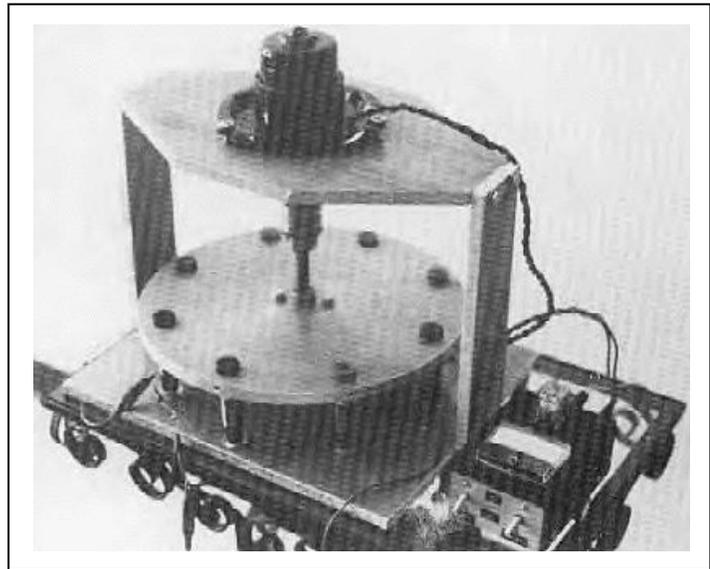
After John published his book, Jim Watson contacted him, and they had numerous discussions on the phone. Jim wasn't very familiar with electronics, and asked John to develop an even simpler control circuit. In response to this, John developed this 555 based timer/relay circuit.



Using this simpler circuit controller, Jim Watson built his first machine.

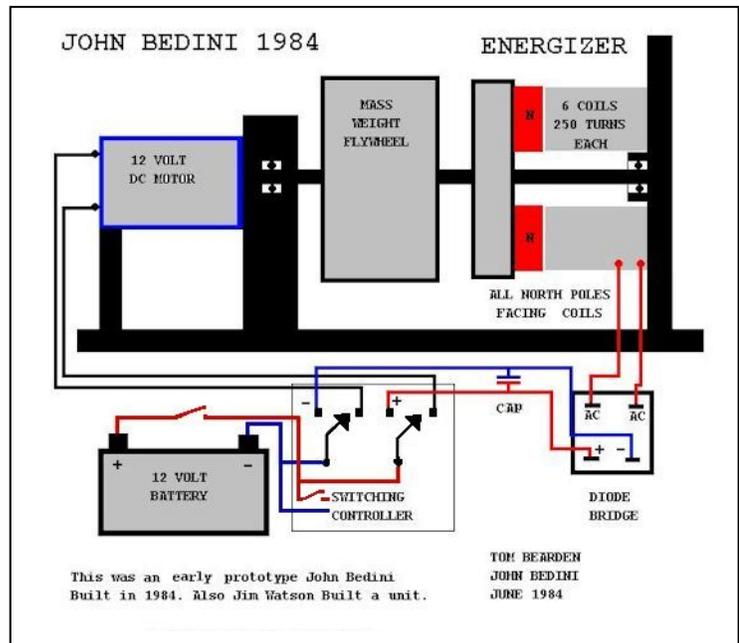
That model is shown here.

A 12 volt automotive fan motor turns a flywheel with eight Ceramic #8 magnets in it. The magnets face eight energizer coils mounted to a base plate using steel bolts as the coil cores. All Energizer coils are connected in series.



All of the circuitry, including the capacitor, is in the box to the right, with the mechanical relay visible on top. The two switches allowed the motor to run directly from the battery to get the unit up to speed, and then be put in "run mode" so that the circuit automatically switched the functions as described before.

The basic equivalent circuit is shown here. The switch over the battery turns the unit ON. This connects the battery directly to the motor through the relay when it is OFF. The second switch turns the relay switching controller ON and OFF.



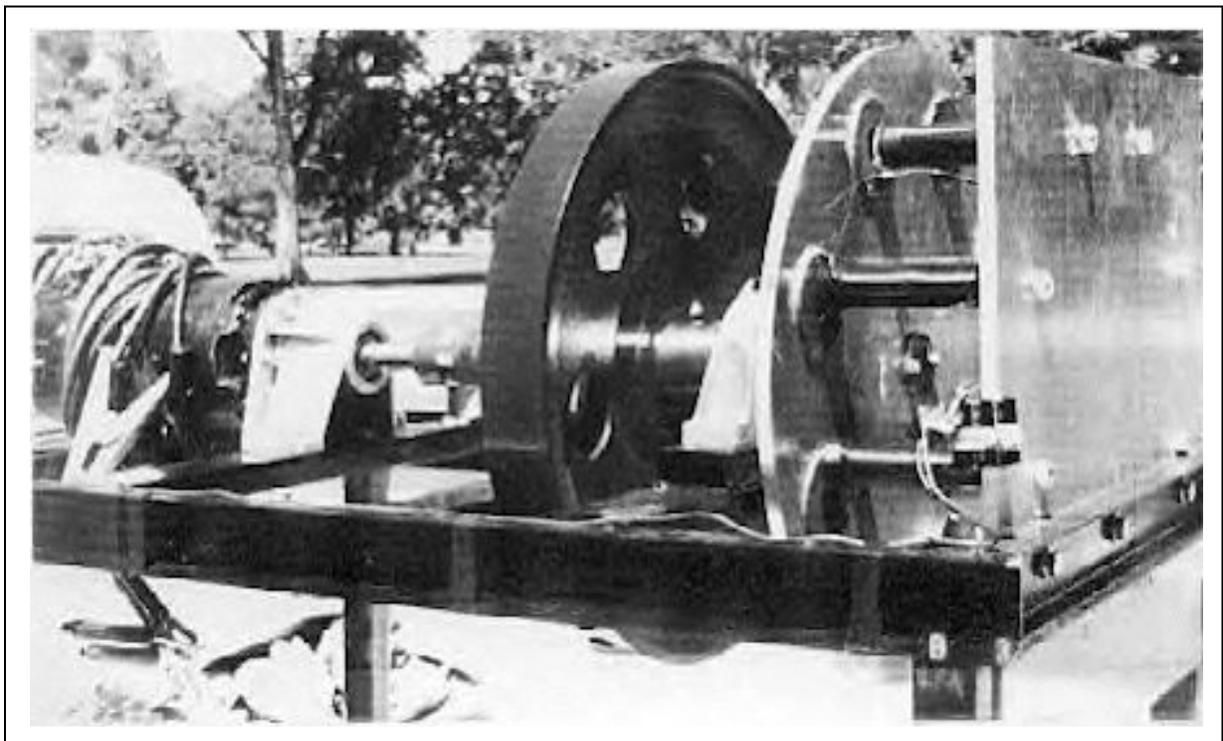
Also, you will notice that the Energizer is connected to the capacitor through a "full wave bridge" rectifier, whereas a single diode has been discussed before. The FWB simply clips both the forward and trailing

peaks of the Energizer wave form to charge the capacitor. This doubles the output for a little more drag on the system. With a standard motor and flywheel arrangement, this trade-off works fine.

Essentially, all of these pictures and diagrams have been on John's website since 1996, and none of this deviates from the fundamental method that was published in his 1984 book titled **Bedini's Free Energy Generator**.

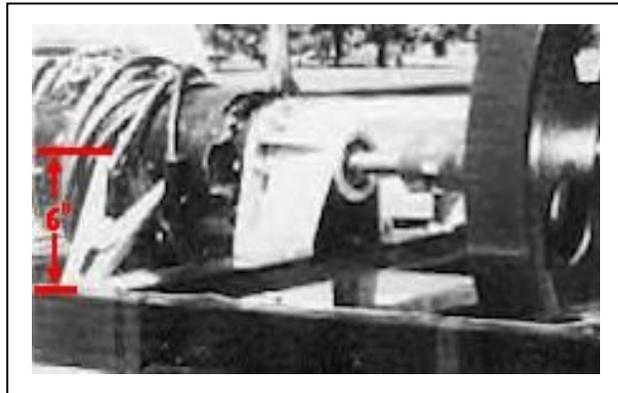
The Machine that Rocked the Boat

Jim Watson was sufficiently impressed with his first model that he decided to build a bigger one. In the run up to the Tesla Centennial Symposium in Colorado Springs that summer, Jim would only tell John that he was working on a "surprise" for the conference. Jim was an accomplished automobile mechanic, so working on big machines was well within his level of expertise. Here is a picture of what Jim Watson demonstrated for the attendees at the first Tesla Society Conference in the summer of 1984.



The Scale of this Machine

There has been a lot of speculation about this on the internet, so it seemed like a good time to address the real size of this machine. There are almost no clues in the picture as to how big it is. The only scale that can be reasonably inferred by the image is based on the jumper cable clamp bracketed by the **RED** marks. If we assume that that clamp is 6 inches long, all other lengths and diameters may be inferred from it.



Jumper Cable Clamp:	. . .	6" Length (15.36 cm)
I-Beam:	. . . . .	4" Height (10.24 cm)
I-Beam Frame:	. . . . .	6 ft Length (184.32 cm)
	. . . . .	2.5 ft Width (76.80 cm)
Drive Motor:	. . . . .	6" Diameter (15.36 cm)
	. . . . .	9.25" Length (23.68 cm)
Shaft emerging from gear box:		1.25" (3.20 cm)
Flywheel	. . . . .	24" Diameter (61.44 cm)
	. . . . .	2.5" Rim (6.40 cm)
	. . . . .	2.5" Shaft (6.40 cm)
Coils	. . . . .	6.6" Length (16.89 cm)
	. . . . .	2" Diameter (5.12 cm)
Ring Magnets	. . . . .	5.25" Outside Diameter (13.44 cm)
	. . . . .	2" Inside Diameter (5.12 cm)
	. . . . .	1.5" Thickness (3.84 cm)
Energizer Wheel	. . . . .	25" Diameter (64.00 cm)
	. . . . .	0.75" Thickness (1.92 cm)
Capacitors	. . . . .	2.8" Height (7.17 cm)
	. . . . .	1.42" Diameter (3.63 cm)

Construction Details

The electric motor was a 24 volt, Series Wound, high speed motor, originally used as an aircraft starter motor. This motor was connected directly to a gear reduction box. The exact gear reduction ratio is not known, but is presumed to be between 6-to-1 and 10-to-1. The shaft emerging from the gear reduction box is visible and measured as 1.25". This shaft goes directly to a shaft coupler and mates to the 2.5" shaft going through the Flywheel.

The Flywheel is supported by two large bearings, one on either side, with only the nearest one visible in the picture. The target speed for the Flywheel is 500 rpm. Its construction is Cast Iron, presumably refurbished from an old steam engine. Its weight is 102 lbs (46 Kgs).

The Energizer wheel is most probably a $\frac{3}{4}$ " thick Aluminum Plate, which rides on the end of the 2.5" shaft beyond the second bearing. The Ring Magnets are 1.5" thick, and therefore stick out about .4" on either side of the wheel. The Ring Magnets are 5.25" Diameter speaker magnets, made of #8 Ceramic Barium Ferrite material. There are 7 Ring Magnets on the wheel.

The back plate of the Energizer is also an Aluminum Plate. The coil cores are Steel Bolts connected directly to the plate. There are 8 coils mounted to the plate facing the 7 Ring Magnets on the wheel. Since the coils are out of phase with each other, each one has its own rectifier feeding the capacitors.

There are three capacitors that are about 15,000uf each, wired in parallel. The target voltage of these capacitors at discharge is 50 volts DC.

Not shown are the two 12 volt batteries wired in parallel, the control circuit timer and the mechanical relay that provided the switching. The schematic for the large machine is identical to the schematic for the small machine. The relay system was made of automotive relays, rated for about 50 amps.

Other Unique Features

The Ring Magnets moving passed the coils produced an unusual wave form. As the first side of the ring approached the coil, the voltage would swing to a Positive peak. Then, as the coil was fully aligned with the first side of the ring, the voltage dropped to zero. As the coil entered the center of the ring, it produced the first Negative peak, but then quickly reversed again as it engaged the second side of the ring, producing a second Positive peak. This was followed by a second Negative peak as the second side of the ring magnet left the area of the coil. So, there were four peak voltage events per interaction of each coil with each ring magnet.

At 500 rpm, there would be 8.33 revolutions per second, and 8 coils being energized by 7 ring magnets each revolution producing 4 peak voltage events per interaction. This produced 1,865.92 charge impulses per second to charge the capacitors. ($8 \times 7 \times 8.33 \times 4 = 1,865.92$)

Remember, the coils were 6.6 inches long and 2 inches in diameter, and they were producing 1,866 peak voltage events per second to charge the capacitors!

John reports that the relay timing was set for "once per second" switching, meaning that the machine would run the motor from the battery for one second while the capacitors were being charged. Then the relay would switch, and the machine would run from the flywheel while the capacitors discharged into the battery followed by the rest of the whole second of Energizer impulses going straight to the battery. At the end of the second second, the relay would switch again, and the cycle would repeat.

The method allows 100% of the output of the Energizer to be transferred to the battery while the motor runs from the battery only 50% of the time. The motor running at high speed while the very large flywheel ran at lower speed provided a very stable operation to the Energizer and maintained a relatively low power requirement to the motor.

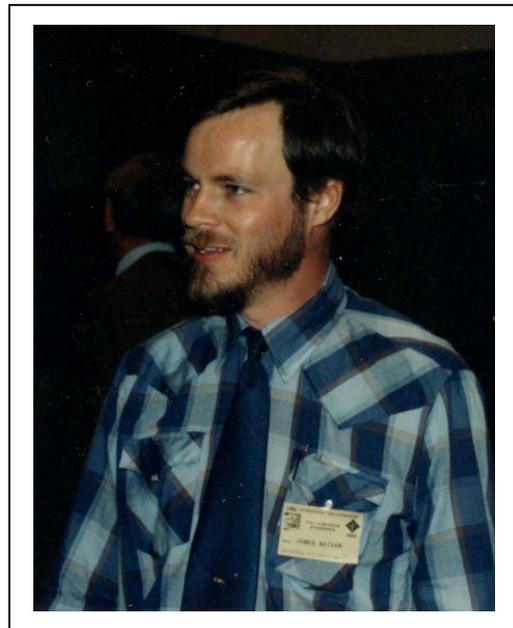
The Myths and the Facts

Based upon the testimony of multiple eyewitnesses, these are very close to the dimensions of the machine. In recordings taken from the presentation, the weight of the flywheel was given by Jim Watson as 102 lbs. This makes the machine large, but quite a bit smaller than many have guessed.

So this establishes the size of the machine as closely as possible from the photograph and from other sources. Remarkably, Jim Watson did not let John inspect the machine at close range.

Jim Watson's large model of John's "Free Energy Generator" design was shown at the Tesla Centennial Symposium, held at Colorado College, in Colorado Springs, on August 9th through the 12th, 1984. The published *Proceedings of the Tesla Centennial Symposium, in the Light of Modern Physics* does not mention either Jim Watson's demonstration or John Bedini's presentation on his "Cigar Box Tesla Switch." Apparently, to be included in the published "Proceedings" document, the presentations had to be written up ahead of time, and Jim's and John's remarks were essentially spontaneous in nature.

While the MACHINE seems to have disappeared immediately after this demonstration, Jim Watson did not. Reliable witnesses who visited Jim at his home soon after the conference, did not see the large model there. In fact, no one has reported seeing the machine since its original demonstration in August of 1984. No other photographs of it have ever surfaced, either. But here is a photograph of Jim Watson attending the 1986 Tesla Symposium, taken by Jeane Manning.

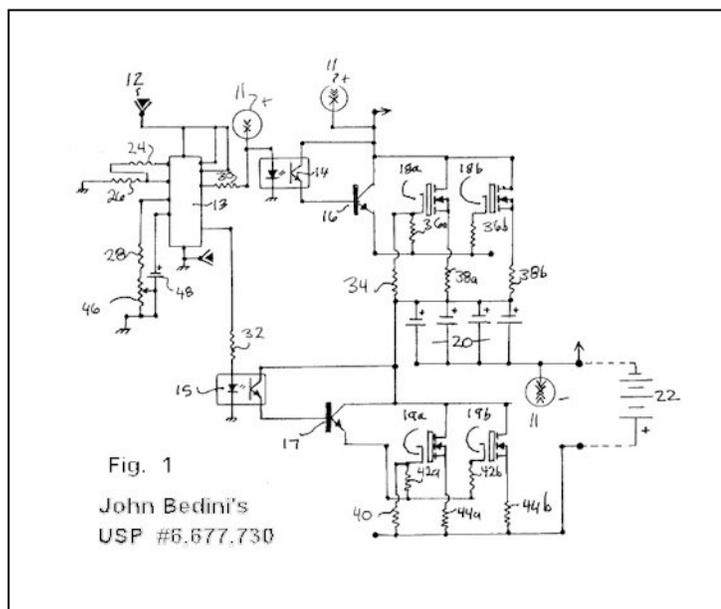


Two reliable witnesses also saw him at a conference he attended in a less conspicuous way in Denver in 1990. Regardless of these multiple appearances, no one was ever able to get him to discuss the machine demonstrated in 1984. Apparently, "something" happened that accounts for the machine's disappearance and Jim's silence, but exactly what that is, nobody knows.

In some ways, John did not understand all of the interest in Jim's machine. First, it was nothing more than the exact design he had developed and published earlier that year, except it was bigger. Second, when the unit was running, the relay system was rapidly overwhelmed by arcing and John doubts whether the unit could have run for more than 20 minutes before a complete "meltdown" of the relays. This feature made it an interesting "demonstration," but it was not a practical stand-alone power supply in its present form.

To put this into perspective, here is Figure 1 from John Bedini's US Patent #6,677,730. It shows a solid-state circuit for charging a capacitor and discharging it into a battery.

One of the operational models of this design used a group of capacitors with a combined capacitance of 120,000uf, charged to about 25 volts. It was discharged about once a second through six parallel N-channel MosFets into a large 12 volt battery.



few hours of run time. The battery, on the other hand, would move immediately into a "cold boil" condition, and the voltage on a 100 AH battery would jump half a volt every time the capacitor discharged.

The Watson Machine was discharging 45,000uf capacitors charged to about 50 volts, once a second into the batteries. That actually represents more Joules per discharge than John's circuit. Doing this across a mechanical relay system rated at 50 amperes just wasn't going to last very long!

To this date, no definitive test data has ever been provided concerning the operational performance of the "Watson Machine." The reality is, no one really knows what it was capable of. It is reasonable to deduce, however, that the large aluminum plates, the coil cores made from steel bolts, and the extremely simplistic switching limited its performance in significant ways. In spite of these weaknesses, visually, the machine seemed to "self-run" during a short demonstration and appeared quite powerful, with its large flywheel running at top speed and battery gaining in voltage!

Shortly after John got home from this Symposium, he was threatened and told "not to work on these technologies" any longer. These threats he took very seriously and it convinced him to change the course of his work in this field in a number of specific ways.

First, he decided that he would not attend any more of these types of conferences. Second, he decided to keep working on these technologies, but not publish anything more on the "self-running" systems. Third, he decided that he would not build any models that were large enough to be a practical power supply, which he certainly knew how to do. These decisions remained in place for 20 years, until 2004, when larger systems started being built and tested again, as well as the plans being released for the first "School Girl Motor" project on the internet.

John also finally consented to begin appearing at a conference held in his local area in 2010, and more and more accurate information about his discoveries has been released every year since then.

Chapter Eight

Detailed Analysis of the "G-field Generator"

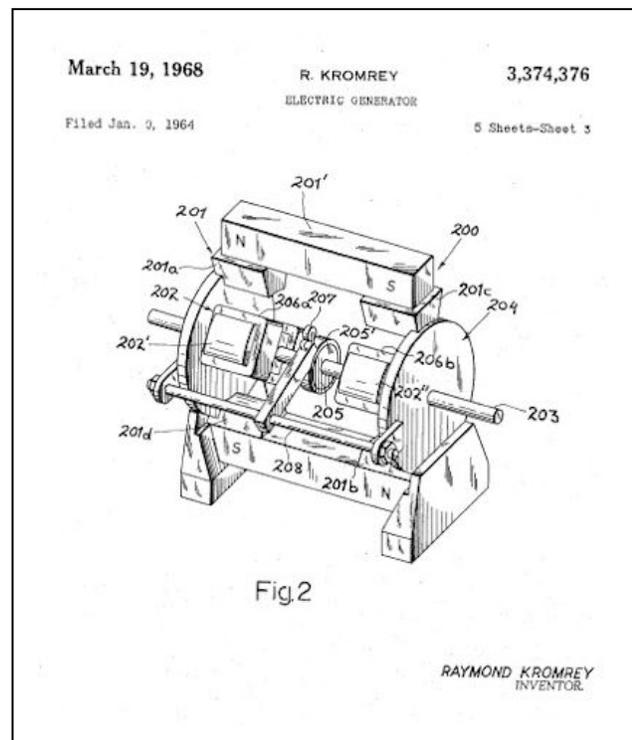
John has always said that "certain types of generators do what we need" and that what we need is to produce electric current with a low mechanical drag component. We have looked closely at the Energizer construct, which is a rotating magnet facing a stationary iron core with a coil wrapped around it. But John also did extensive testing of a generator that had the inverse construct; that is, a rotating iron core with a coil wrapped around it moving passed a stationary magnet. This is the "G-field generator."

The original design of this generator was developed by a Swiss engineer named Raymond Kromrey. Kromrey did extensive research and testing on this concept in the 1960s, and received US Patent #3,374,376 on the basic design in March of 1968.

Here is an image from the patent.

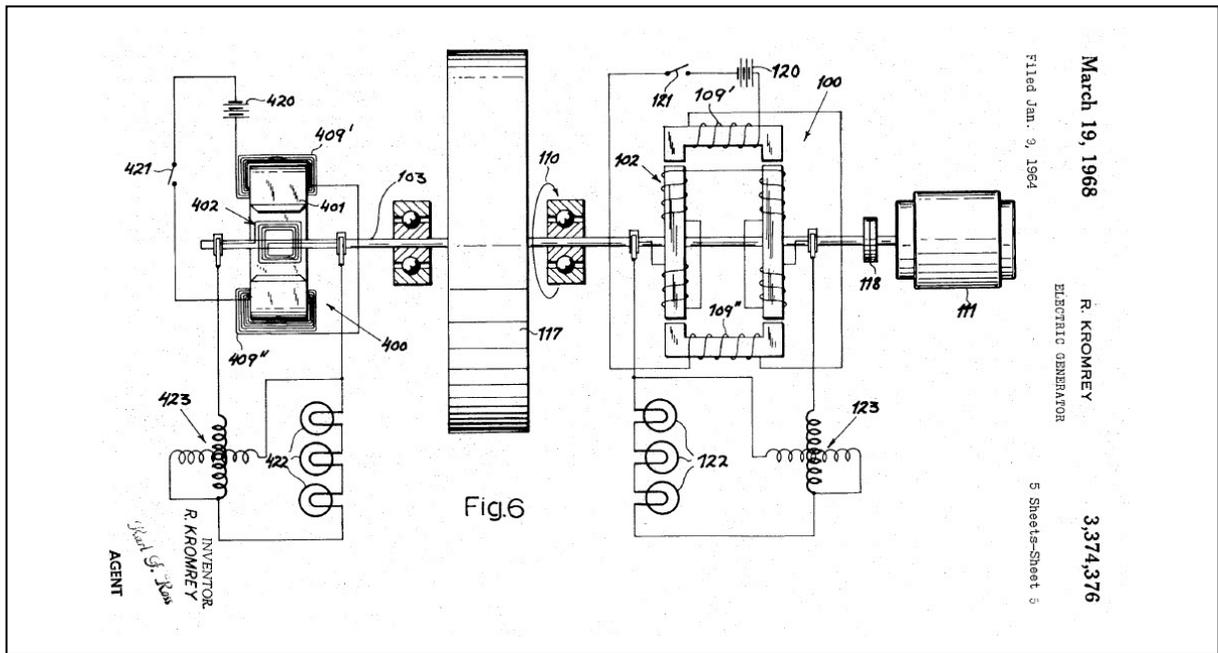
The invention is titled "Electric Generator" in the patent. In other reports, Kromrey refers to it as the "Ferromagnetic Generator" and also as the "Molecular Generator."

Being a firm believer in the "Law of Conservation of Energy", he postulated that the energy gain produced by the machine was coming from an interaction with the Gravitational Field, but he also believed that the specific mass of the rotor was involved in this gain.



Summary of Operational Characteristics

The US Patent is written in a relatively simple manner, and the patent is granted on a single claim based on the physical design alone. There is no attempt to officially "claim" that the generator does anything unusual.



However, in the body of the patent, experimental data is offered that supports an extremely unusual analysis of the machine. Here is the image of Figure 6 from the patent, and the paragraphs from the patent text that explain it.

It describes a "side by side" test of a standard generator and the new generator with regard to mechanical drag under load.

Upon engagement of the clutch 118, shaft 103 with its flywheel 117 is brought to an initial driving speed of 1200 r.p.m. whereupon the switch 421 in the energizing circuit of conventional generator 400 is closed. The lamps 422 light immediately and the corresponding wattmeter 423 shows an initial output of 500 watts; this output, however, drops instantly as the flywheel 117 is decelerated by the braking effect of the magnetic field upon armature 402.

Next, the procedure is repeated but with switch 421 open and switch 121 closed to energize the generator 100. The lamps 122 light up and the wattmeter 123 shows an output of 500 watts which remains constant for an indefinite period, there being no appreciable deceleration of flywheel 117. When the clutch 118 is released and the rotor speed gradually decreases, the output of generator 100 is still substantially 500 watts at a speed of 900 r.p.m. and remains as high as 360 watts when the speed drops further to 600 r.p.m.

In a similar test with a generator of the permanent-magnet type, such as the one shown at 200 in FIG. 2, a substantially constant output was observed over a range of 1600 to 640 r.p.m.

So here we see for the first time, in Kromrey's patent, the fundamental components of John's "Free Energy Device" consisting of an electric motor, a low drag generator and a flywheel.

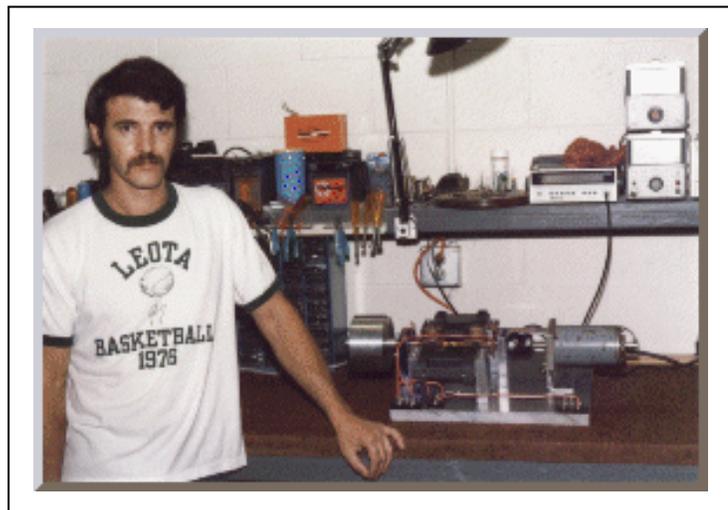
A Little Back Story...

When John first discovered the Kromrey Patent, he knew it might hold the key to what he was looking for. He immediately attempted to contact the inventor in Switzerland. Unfortunately, by the time John did this, Raymond Kromrey had already died. He was able, however, to track down his surviving widow.

John explained to Mrs. Kromrey that he was interested in the generator and wanted to have her permission to do some further research on it. Much to his surprise, he found that Mrs. Kromrey hated the generator and that she was really quite bitter that it had "stolen" her husband from her in his last years. She told John he could do anything he wanted with it and not to contact her again.

John Bedini's Replications

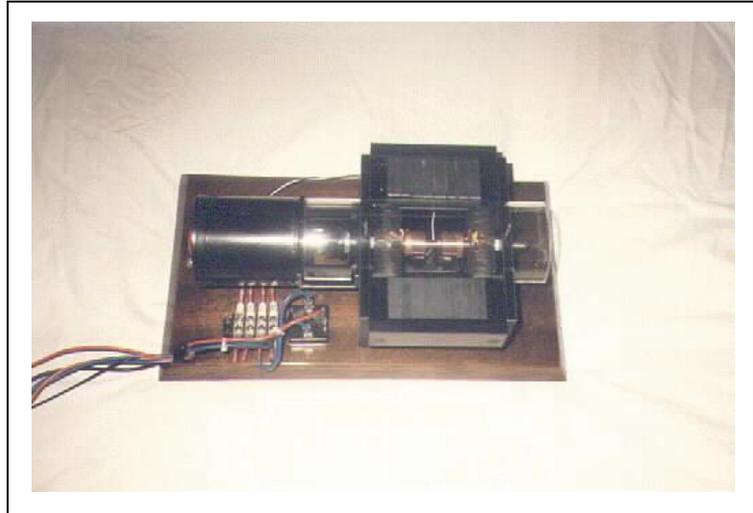
Left completely on his own, John began to replicate the machine and see if he could duplicate the results Kromrey reported. Here is a picture of an early model of the "G-field Generator". He named it that because Kromrey believed the excess energy was coming from the Gravitational Field.



The early models proved that Kromrey was correct about the low drag characteristics of the generator. But there was something else that he

hadn't mentioned. The machine was HORRIDLY LOUD when running. It made this deep, harsh growl sound like a Buzz Saw as the magnetic fields were cut. No modifications were ever found to quiet the thing down.

In spite of this, John tried to get more people interested in this technology by building and selling dozens of these fully operational models with a partner who eventually screwed him out of most of the money.



This was not working out the way John wanted it to!

The Electrical Engineering Department of one University on the East Coast purchased one of the generators, and then another nine, and tested them extensively. When pressed to give him some test data, they only told John two things; one, that they could "not teach this science to their students", and two, that,... oh by the way.... "it makes a good battery charger."

So here we see how John's work moved this technology forward. Kromrey knew the generator had very low drag under short circuit loads, but he had never attempted to take the output and use it to charge a battery, and he had definitely not thought of using the output to run the drive motor to make the system "self-run." These ideas developed gradually during John's research.

The other difficulty the Kromrey Generator had was that the electricity was generated on the rotor, which meant that the power could only be taken out of the machine using brushes or sliding contacts. Both commutators and brushes or AC slip-rings and brushes are stipulated in the patent.

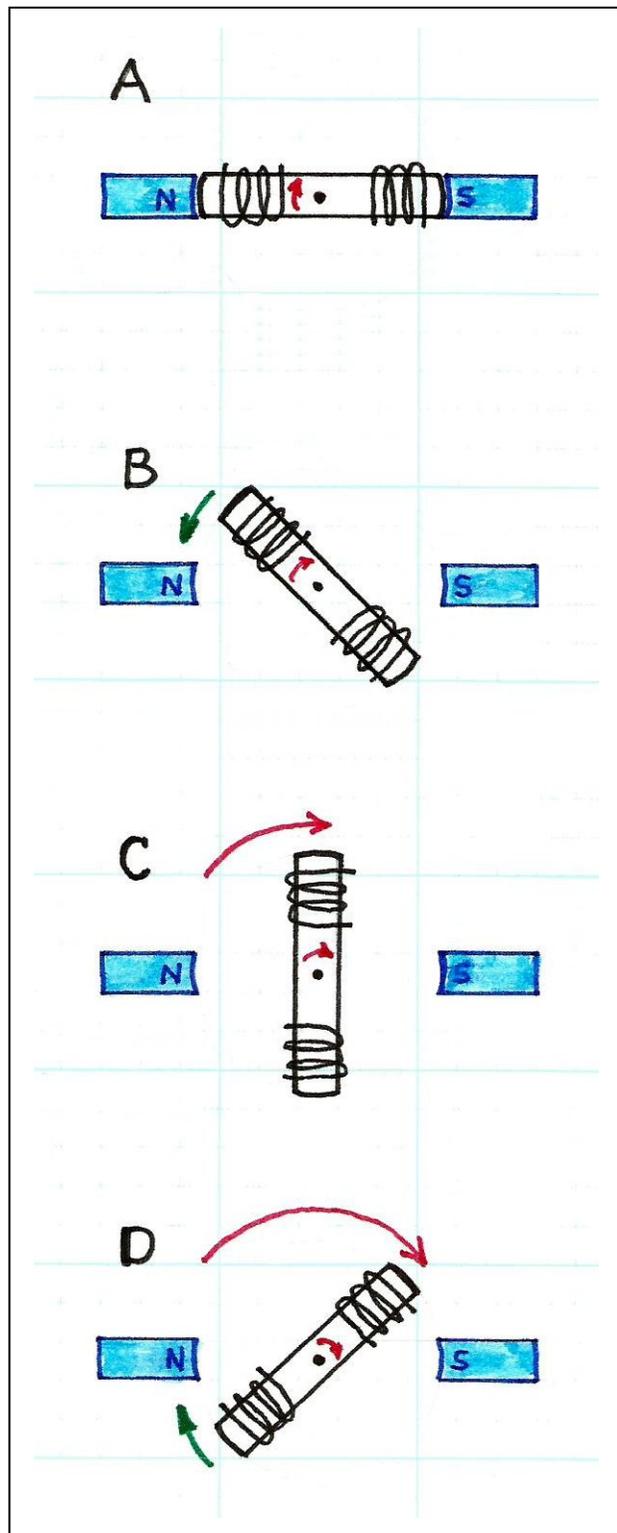
Analysis of the Magnetic Force Vectors during Operation

Kromrey's original design for the generator had a number of unique benefits when it came to providing electric current without drag. Some of these features are illustrated in the image to the right, where we are looking at the generator in a side view.

In Position A, we can see the rotor is aligned with the stator magnet, and is therefore magnetized to its maximum degree. The dot in the middle of the rotor piece represents the axle around which the rotor will pivot and the little **Red Arrow** indicates the direction of rotation.

In Position B, the rotor has moved out of alignment with the stator magnet as it rotates in a clockwise direction. The **GREEN ARROW** represents the attraction force between the stator magnet and the rotor iron, which in this case is in opposition to the direction of rotation.

However, as the rotor proceeds from Position B around to Position D, the rotor is far enough away from the stator that no external magnetic forces can attract it in either direction.



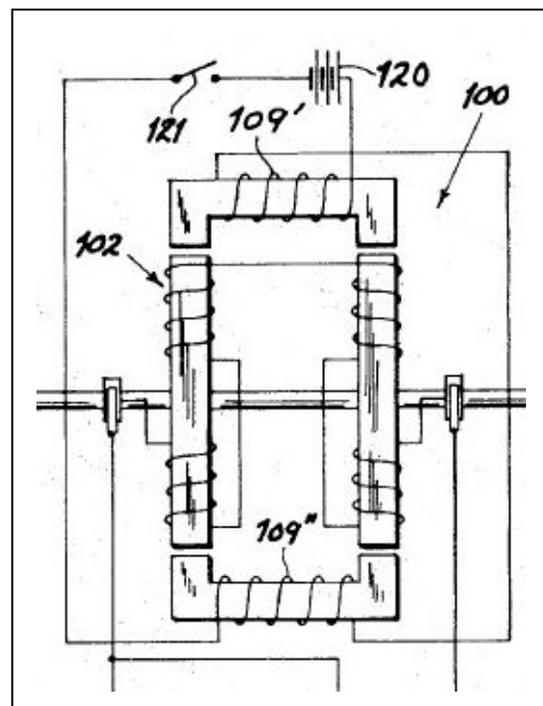
During this period, the iron in the rotor is trying to de-magnetize and the Lenz Law reaction of the load current is trying to retard that change in magnetic flux. Upon careful examination, it becomes obvious that the lower the impedance of the load, the higher the current production on the rotor, the slower the magnetic field decays and the longer the magnetic field persists, all the while producing no interaction with the stator.

Herein lies one of the reasons Kromrey called this the "Ferromagnetic Generator." The more iron the rotor piece had in it, the longer the magnetic field could persist while producing current into low impedance loads. It also meant that the rotor didn't need to be re-magnetized as often to continue to produce current, essentially allowing it to produce full power at lower speeds, which is exactly what Kromrey reported.

Kromrey stated that a short circuit load completely neutralized the magnetic attraction as the rotor left the alignment Position A, so that the **GREEN ARROW** shown at Position B above didn't even appear!

And there is one more interesting feature. You may recall the discussion in the **SG Intermediate Handbook** where the Inertial Properties of electricity are discussed. Here, in the Kromrey generator, the rotor arms and the output coils are subjected to a very significant centrifugal force during operation and the winding of these coils is apparently designed to take advantage of this.

Here is a close-up taken from Figure 6, also seen on page 67. Notice how the four sections of the rotor coils are wound and how they are connected together.



Highlights from Kromrey's Report

Before his death, Raymond Kromrey produced a 15 page report titled the **Operating Principles of the Ferromagnetic Generator**, a complete copy of which is included in the Appendix section of this book.

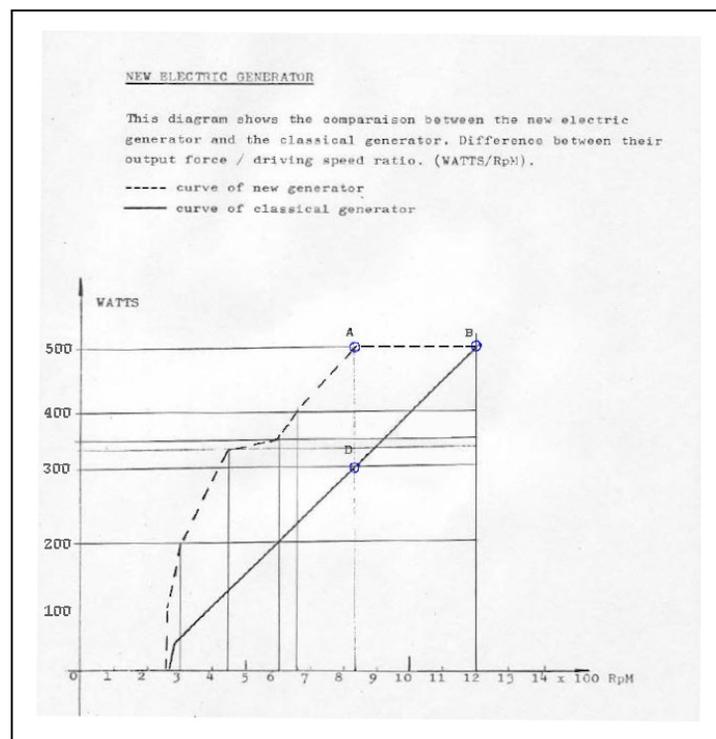
In it he discusses his theories about how the generator worked and where the excess energy was coming from. But most importantly, he publishes some test data and summarizes its performance

Here is a list of some of the claims:

- Transforms the acceleration due to a permanent magnetic field into electrical energy
- Has negligible braking effect under short circuit conditions
- Able to produce maximum power into extremely low impedance loads without overheating
- Able to produce stable power levels over a wide range of speeds

This graph is from Kromrey's report. It illustrates the unusual, non-linear speed and power curve of the machine.

It shows that the new electric generator was able to produce 330 watts at about 450 rpm, where the classical generator could only produce about 120 watts. It also shows the new generator reached maximum output of 500 watts at about 830 rpm and continued to produce 500 watts all the way up to about 1200 rpm (and beyond).



Summary

Clearly, Kromrey's Generator was able to produce both electric current and power while either avoiding or re-directing the Lenz Law reactions against the stator. Its ability to produce electricity without mechanical drag was discovered in the 1960s and re-verified by John Bedini in the early 1980s.

But the machine was really loud when running, and it required the complication of sliding contacts to get the power out. John was looking for something better. At minimum, he wanted a generator that had low drag, but also one that ran quietly, and didn't need brush contacts.

By June of 1984, when he published **Bedini's Free Energy Generator**, the Energizer design shown in the book accomplished all of these goals.

Oh Yes, and This....

The last little "detail" about the Kromrey Generator that has been generally overlooked is the fact that it produces a different "quality" of electricity than classical generators. This, of course, is not supposed to exist, but John documented this fact on countless occasions. During a demonstration of a large machine in Los Angeles to a group of VIP guests in a hotel conference room, John was able to light 3000 watts of light bulbs from the machine across insanely small, #30 gauge wire without any heating effects. The input electric motor was drawing 525 watts from a metered supply.

The phenomena was deemed "so incredible" that most of the engineers present simply started looking for the "real wires" buried under the carpet! Of course, there weren't any, but the demonstration was so far outside the classical "world view" of the electrical engineers, that no one believed what they saw, and all of the potential investors were dissuaded from getting involved.

Here's a brief article on that meeting:

'Free energy' device awes LA crowd

By JIM TOWNSEND
Editor - Publisher
The National Educator

Bill Jenkins, talk show host of the top rated KABC radio show, "Open Mind" and National Co-Chairman of Redeem Our Country (ROC), used his guest speaker's spot on Town Hall, to introduce a "free energy" device to the public on March 12th.

Town Hall, a long running forum of many years, invited the dynamic Jenkins and his associates John Bedini and Steven Werth, to demonstrate a device called "a gravity-field generator which operates at an efficiency level of 180 percent, and is powered by a battery bank which requires no recharging.

The Town Hall meeting was held in the world famous Biltmore Hotel in Los Angeles and left the audience gasping for more information than the program time would allow. (Following the program, the audience, which included representatives of public utility companies, industry and investment brokers trying to

get a foot in the door, were still asking questions when we had to leave.)

Bedini, 37, is president of his own electronic firm in Sylmar (Calif.) which manufactures audio power amplifiers. He told Town Hall that instead of selling his generator patent to the highest bidder, he has placed it in the public domain, and plans to make it universally available at a nominal cost.

The project began two years ago when Bedini was listening to Bill Jenkins' radio program "Open Mind," 9:00 p.m. to midnight on KABC, Los Angeles. Jenkins was interviewing Tom Bearden, a nationally-known theoretical physicist, on the subject of scalar interferometry, and the implications which the use of that fundamental electromagnetic wave has for the world.

Fascinated by what he heard, and by Bearden's references to the remarkable and little-known electronic discoveries of Nikola Tesla, the Yugoslav-American geni-

us who was a contemporary of Thomas Edison, Bedini obtained a copy of Tesla's book of patents.

Approximately 18 months later, Bedini had synthesized a number of Tesla's electronically-revolutionary concepts, some Bearden innovations, plus his own ideas, and had produced a working model of a free energy device. "It uses stressed, pulsed scalar waves, out of phase, which tap the energy of the zero point of vacuum. It's a perfectly natural phenomenon. You won't find the concept in the physics textbooks, but it works," said the inventor.

Radio journalist Bill Jenkins, who introduced Bedini to the Town Hall audience, said that the generator is expected to be produced in different sizes

with different power capabilities, and will be adaptable to a wide variety of uses. "In a few weeks," he added, "John Bedini should be able to announce how and when the device will be made available. Meanwhile, he invites the nation's thinking people to consider the many ways in which his unprecedented scientific breakthrough can be used to solve a multitude of human and fiscal problems in this energy-hungry world," Jenkins concluded.

Note: The gravity field generator is only the tip of the iceberg, so those interested in details of the study should send \$10 to Tesla Book Co., 1280 Magnolia, Milbrae, CA 92030 for two books that will provide info on things to come.



Town Hall guests (from left) Steven Werth, KABC's Bill Jenkins and John Bedini.

NPL announces Pat Brooks' 9th book!

Chapter Titles:

A Armageddon Troops
Being Trained

C Calling All Patriots

A Anatomy of the Red Revolution

L Look Out for the "Bewares"!

L Learn to Recognize the
Trojan Horse

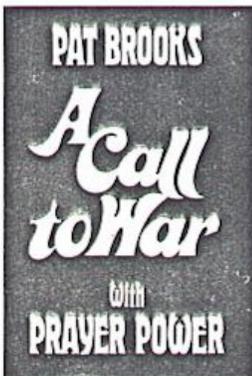
T Tithe to God or Serve Mammon?

O Overcoming Through Fasting

W Win With Praise — Out Front!

A Attack Satanic Strongholds

R Right Thinking, Right Action



Chapter Nine

Other Advances, Old and New

The whole time all of this was happening, John and his brother Gary were running Bedini Electronics, Inc., an electronic manufacturing company building and selling high fidelity audio amplifiers, designed by John. This put him in contact with a wide variety of other electrical engineers and electronic circuit designers living in the Los Angeles area, and elsewhere.

One such colleague was a brilliant engineer named Ron Cole. Ron worked for the local NBC television station in Los Angeles (KNBC) and was an exceptional inventor and model builder in his own right. Ron was the person who introduced John to Ed Gray back in 1974. As they got to know each other better, they found they had many of the same interests, and in later years, they would work together on projects into the wee hours of the night.

Early on, both Ron and John knew that Ed Gray's motor was able to run, produce significant mechanical energy, and keep its batteries charged all at the same time. But Gray's system was impossibly complicated and needed very high voltages to accomplish its feats. This set them both out on a quest to find a "simpler way" to accomplish the same end result.

The discovery and experimentation with the Kromrey Generator convinced them that there was a "low voltage" path to understanding the self-running electro-mechanical machine. After this was established, it was just a matter of running enough experiments to find the best way.

But Ron worked for a big corporation, and could not afford to be openly associated with a radical technology like this. So for the most part, he worked with John privately, and it was a very creative collaboration.

G-field Morphs into the G-flux Configuration

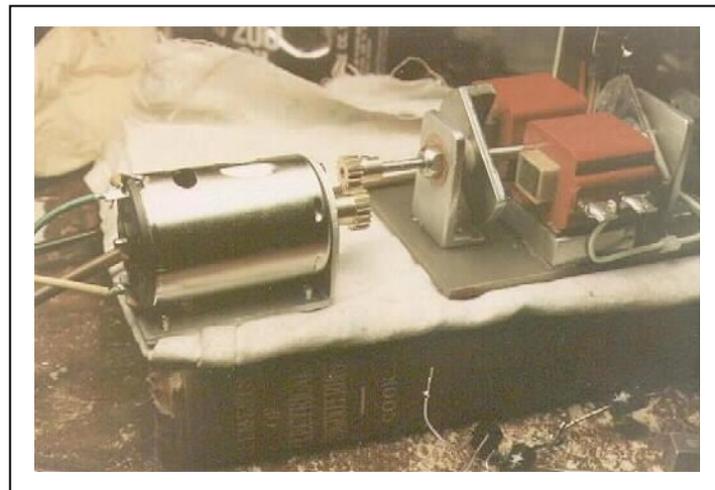
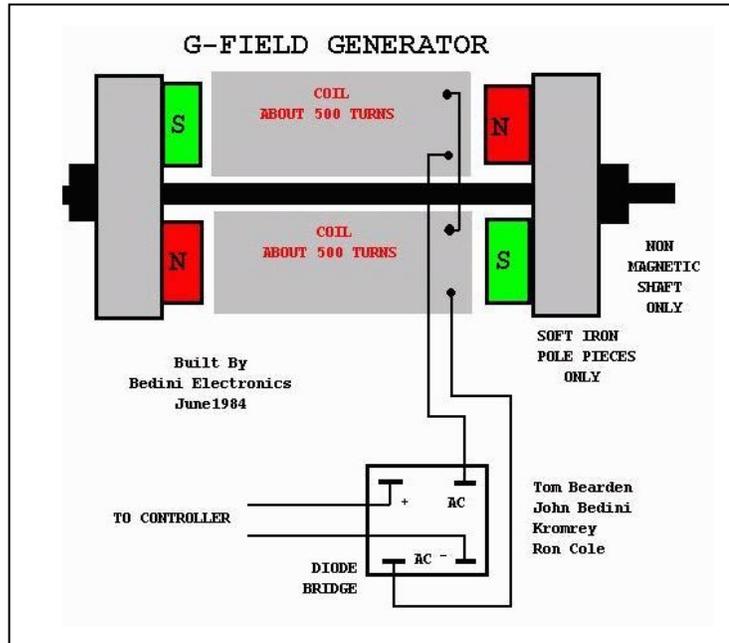
One of the first drawings to show up with Ron Cole's name on it is this image. John has been putting Tom Bearden's name on these drawings to honor his work in testing the designs and offering theoretical ideas, but Tom really didn't help John design any of these devices.

This was the first variation of the "G-field Generator"

where they tried to get away from the sliding contacts and put the coils in the stator again. This image is dated June, 1984, which is exactly when John published his book. But this design was not in the book.

Here we see one of the early models of this configuration, built by Ron Cole at his shop. Test results on this type of machine were very good, and demonstrated many of the same performance benefits that Kromrey's design did.

With one exception. This generator showed the standard "reverse drag profile" of most other switched reluctance generators. That is, it shows maximum drag under "open circuit" conditions and minimum drag under "short circuit" conditions, where the "sweet spot" is a very low impedance load.



Here is the data from one set of tests on this machine.

Test 1: No Load (open circuit)

Input Power 25.4 Volts at 3.90 Amps= 99.00 Watts

Output Power 48 volts

Test 2: Load = 37.33 Ohms

Input Power 25.3 Volts at 3.90 Amps= 98.67 Watts

Output Power 28 Volts .75 Amps= 21 Watts

Test 3: Load = 13.50 Ohms

Input Power 20 Volts at 3.39 Amps= 67.80 Watts

Output Power 50 Volts at 3.70 Amps= 185.19 Watts

Test 4: Load = 0.63 Ohms

Input Power 21.9 Volts at 2.30 Amps= 50.37 Watts

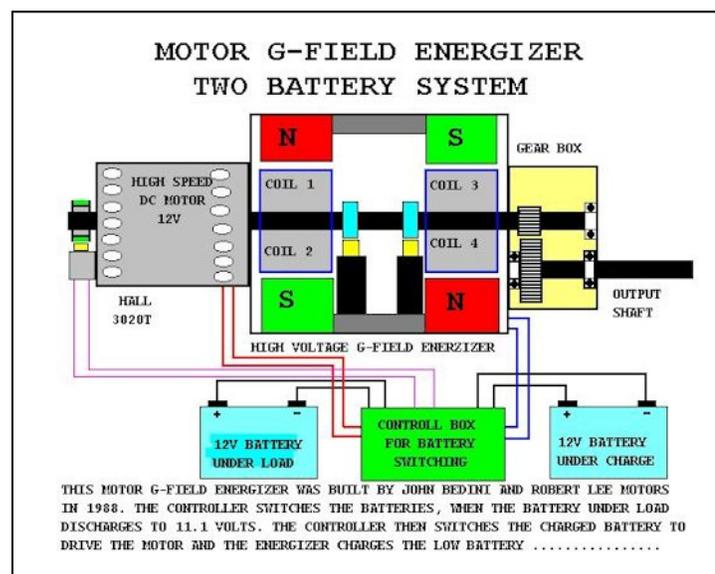
Output Power 20 Volts at 31.75 Amps= 634.92 Watts

These test results have been posted on John's website since 1996 and have been generally ignored. This is understandable, since they do not specify the speed of the generator during the various test results or the specific output circuit showing a rectified output driving a resistive load.

But there is other evidence that this design behaved with extremely low drag under low impedance loading conditions, including battery charging.

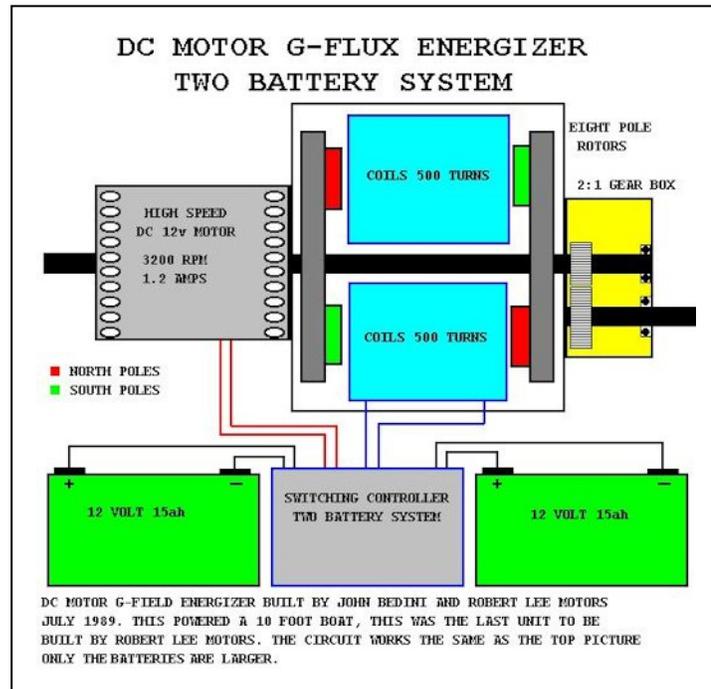
Two Battery Systems

This image, dated 1988, shows a Kromrey style generator charging a second battery while the drive motor is run from the first battery. The excess mechanical energy is then geared down for use by an external mechanical load.



The green control box includes circuitry that monitors the battery voltages and automatically switches the batteries when the run battery drops to 11.1 volts.

In this image, dated 1989, we see that this configuration is now being referred to as the "G-flux Energizer." The caption in this image also says that this design was being developed to power an electric boat with the excess mechanical energy used for propulsion and the Energizer used to provide extended run times on the battery system.



So, by 1989, we see significant improvements to the Self-running Energizer circuit disclosed in the 1984 book which only used one battery. The drawing above shows a two pole rotor but specifically stipulates an eight pole rotor. This arrangement was tested on a wide variety of systems over the years, such as in this model.

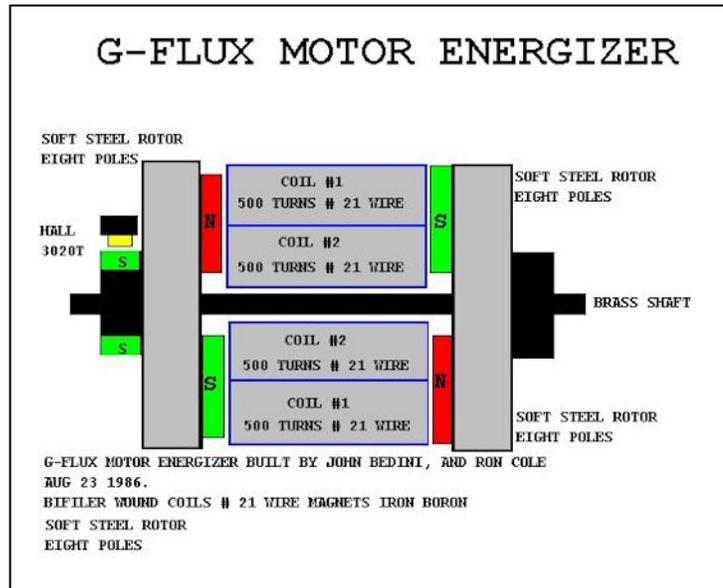
Switching Circuits and Motor Control

While John was focusing on simplification, and the single-sided, self-triggered circuit that evolved into the SG circuit we know today, Ron was interested in using these configurations to produce more mechanical energy, like a standard electric motors does.



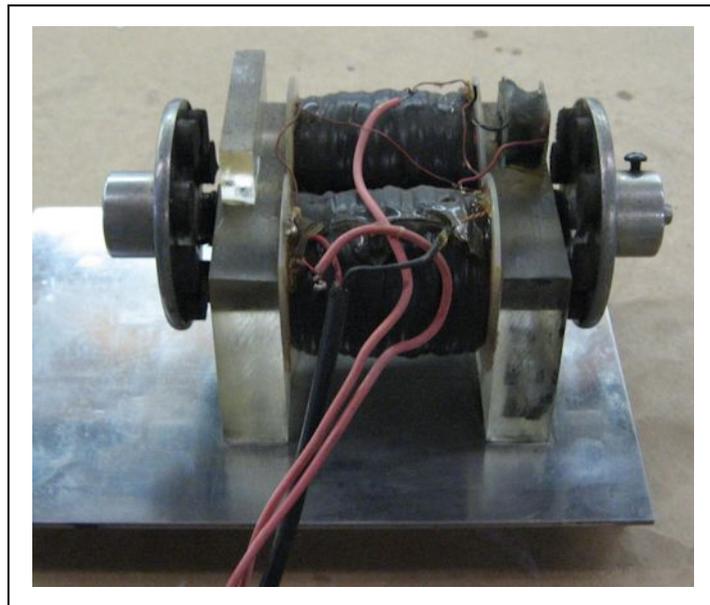
For this type of operation, Ron needed a double-sided switching circuit, so the coils could be energized and then completely disconnected from the supply before being reconnected in the opposite polarity.

Here is an example of one of the compound, self-rotating Energizer designs from this period. It is designed to both motor and generate, but has both North and South magnetic poles, so the double-sided switching circuits were required. This image is dated Aug 23, 1986.

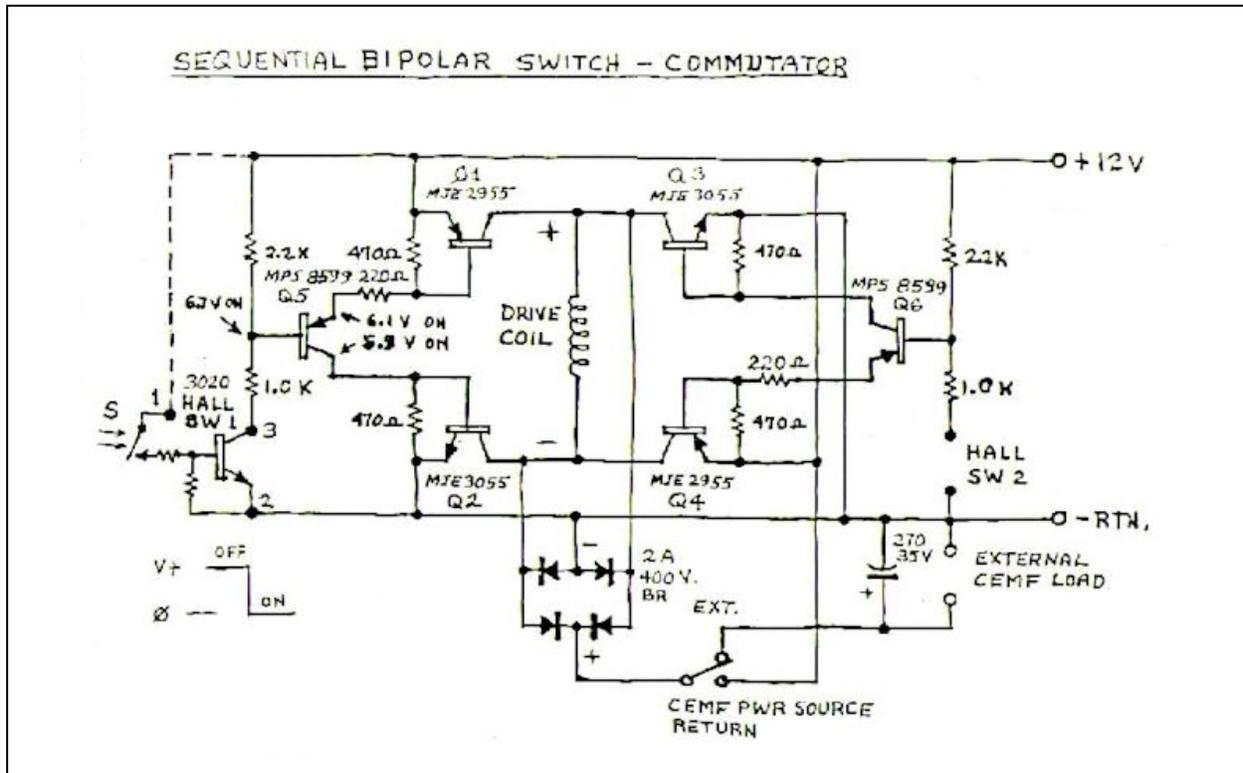


It also stipulates eight poles on the rotor, as well as a "hall effect" device on the left end of the shaft, with its own small magnets, to control the motor timing.

This image shows a model of this topology built by John in about 1983. It used early NEO magnets, listed as "iron boron" magnets in the drawing, and fairly wide air-gaps between the rotors and the coils. It had both motor and generator coils on the same cores in the stators. Unlike the drawing, this model had a separate "trigger coil" mounted in the upper right hand corner, shown with the very fine magnet wire coming out of it.



Here is the circuit used for the motor drive section of this type of combined motor-energizer which used both magnetic poles on both sides of the rotor.

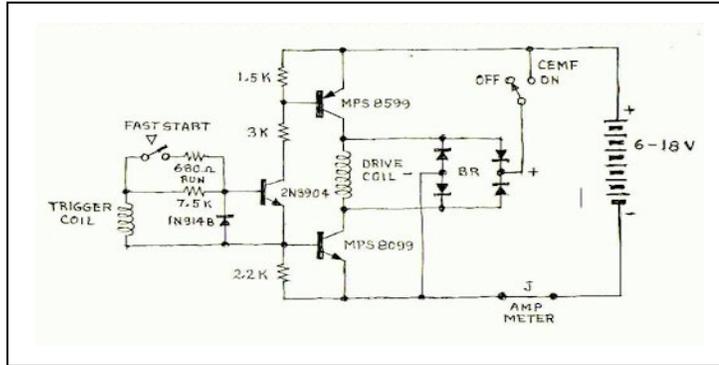


This circuit shows only a single battery supply with the inductive recovery collected through a full-wave bridge rectifier and stored on a capacitor, which is then optionally offered to an external load or back to the primary supply. The point of the circuit was not to define all of the recovery options, but to clearly define the drive coil design for a bi-polar configuration with full disconnect and full reversal of the coils during operation. The Bedini "Window Motors" used this circuit, as well.

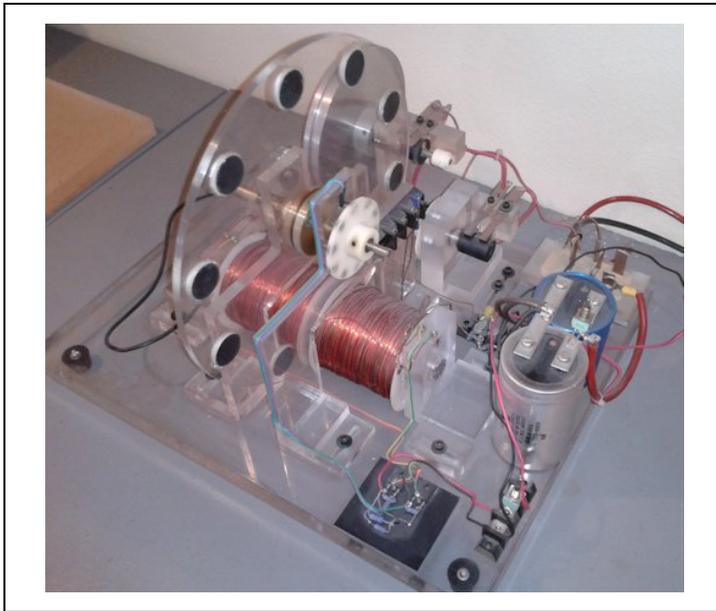
Mind you, electronic commutation of this type was not used in commercial motors for another 20 years, so this was very sophisticated stuff for 1986.

Ron and John also developed a single-sided drive circuit that John has used in various models of his "Monopole" motors since this time.

Here is a variation of the "Bedini-Cole Switch" that is triggered by a "trigger coil" like the SG, but it could also be triggered by a Hall Effect device like the circuit on the previous image.

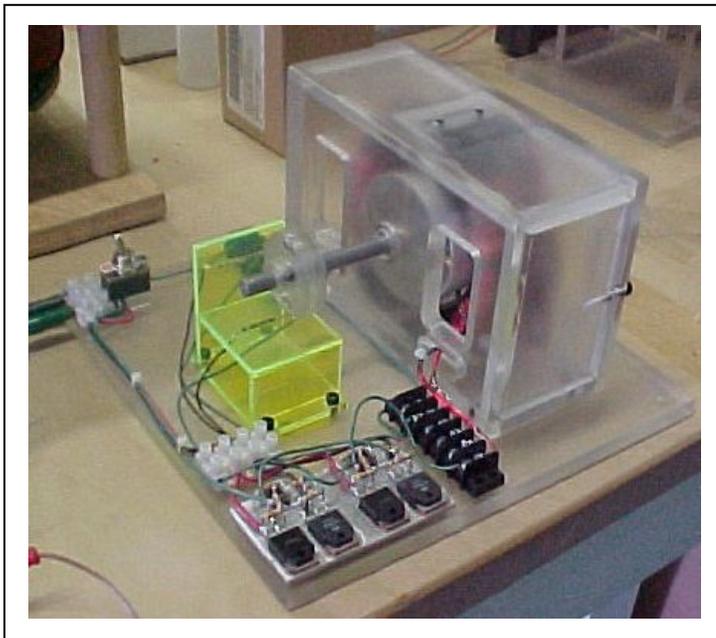


In this image, we see a classic twin coil design, set to run in the "forced repulsion mode" using the single sided Bedini-Cole switch, seen mounted on the black plate in the lower right. The Hall Effect device is triggered by a second set of smaller magnets mounted in the small white wheel on the shaft.



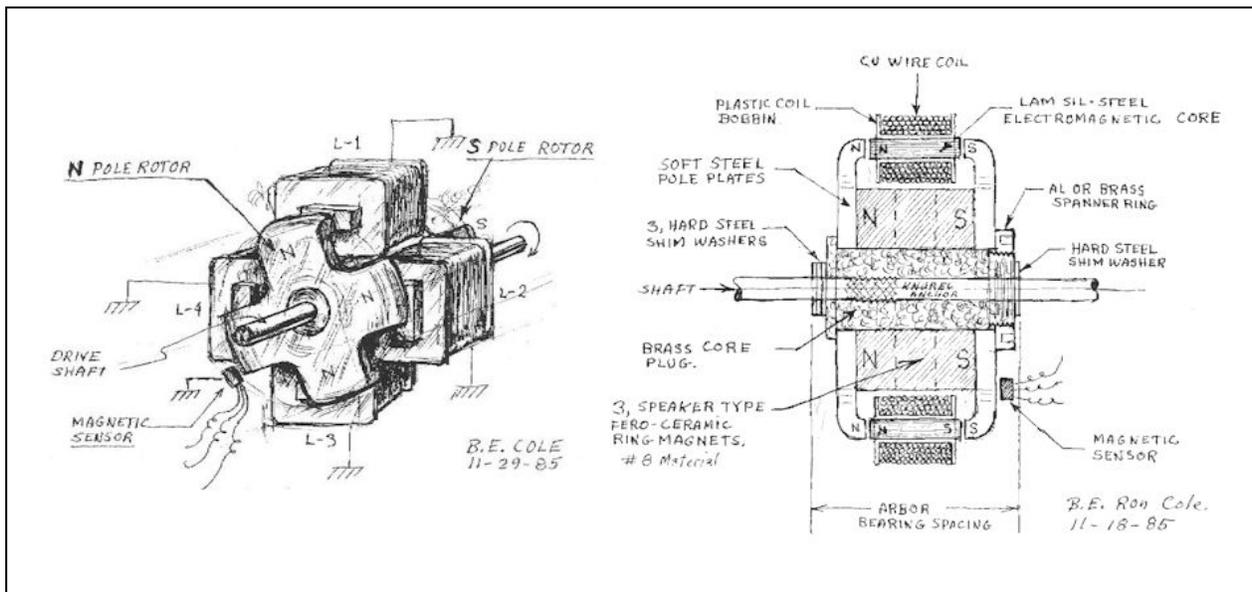
And here is another version of the double-sided switch triggered by magnetic reeds. This "Neutral Line Motor" designed by John and built in 2003 could reach 11,000 rpm.

The point is, this was all R&D, and dozens of variations were tried and found to have merit. The circuits that John has had on his website are just a "sample" of the many circuits that were built and tested.



Monopole Version of the G-flux Motor Energizer

One of the most interesting designs developed by Ron Cole during this period was this Monopole configuration, using ceramic ring magnets and iron pole pieces on the rotor. The design was extremely compact and it allowed high flux densities in the coil cores from low flux density ceramic magnets. It was also universal in its application, working equally well as a high torque motor with inductive recovery or as a low drag energizer powering low impedance loads, or both. It could operate as a repulsion motor using the Bi-Polar Switch or as an attraction motor with single sided switching, like an SG. This one configuration could do it all.



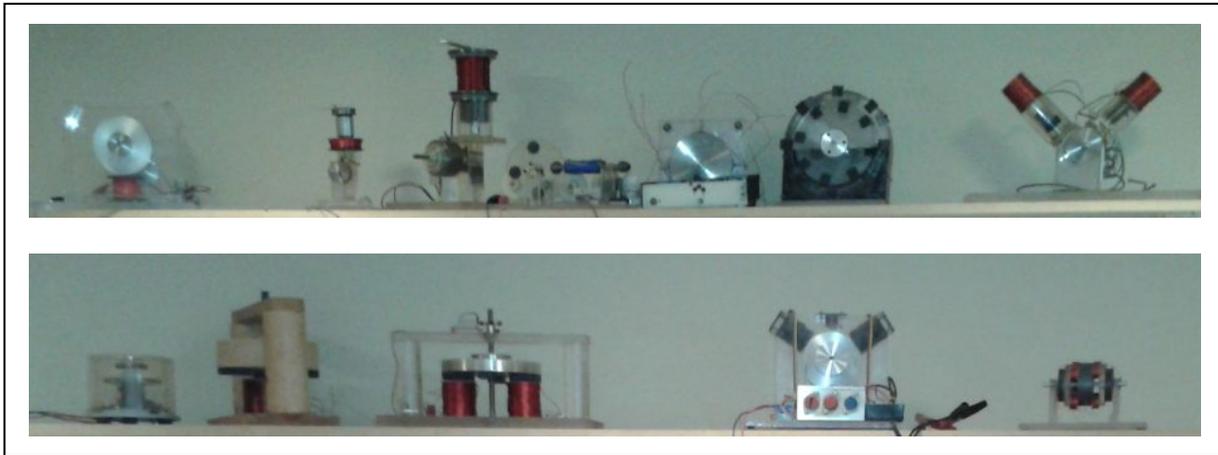
And this shows another talent that Ron Cole had, besides being a brilliant circuit designer and engineer. He was also a gifted illustrator.

It should be fairly clear by now that this technology was developed to a very high level through the 1980s, but because of the threats John received in 1984, they were very careful about who they let know. When Ron Cole died, all of his working models and files were confiscated by NBC because his contract stated that anything he developed during his period of employment belonged to them.

The Period of Quiet (1989 - 2004)

John moved to Idaho in 1990 for reasons associated with his audio amplifier business, and to be closer to his father, who lived in Coeur d'Alene. At this point, he had all but given up on ever trying to bring this technology out as a product. At the same time, he decided to start building small models of many of the variations of the systems that had been developed in the 1980s.

This is the period where John perfected the simple little circuit that can allow a toy motor to run an intolerably long time on a single 9 volt battery. Dozens of models were made with this circuit using both plastic and wood. Here is but a small sample of the working models in John's Museum!



Shawnee Baughman built her Science Fair project motor during the 1999-2000 school year and John had the plans for that circuit posted on the Keelynet website by March of 2000. All of the electrical engineers and supposed "smart guys" who frequented the site dismissed the plans as "meaningless." Since none of them bothered to build a model, it was a classic case of "condemnation without investigation."

John had 20 years of working models in his shop! He simply could not understand why no one was willing to even look at this technology.

The SG Project Takes Off (2004)

In the summer of 2004, Sterling Allan visited John's shop. He was shown everything that was there. Since Sterling wanted to be the one who broke the "Free Energy" story to the world, he asked John if he could publish a set of plans and a parts list, so people could build one themselves. Since John had already done that with Keelynet, he agreed to issue an up-dated set of plans for Sterling.

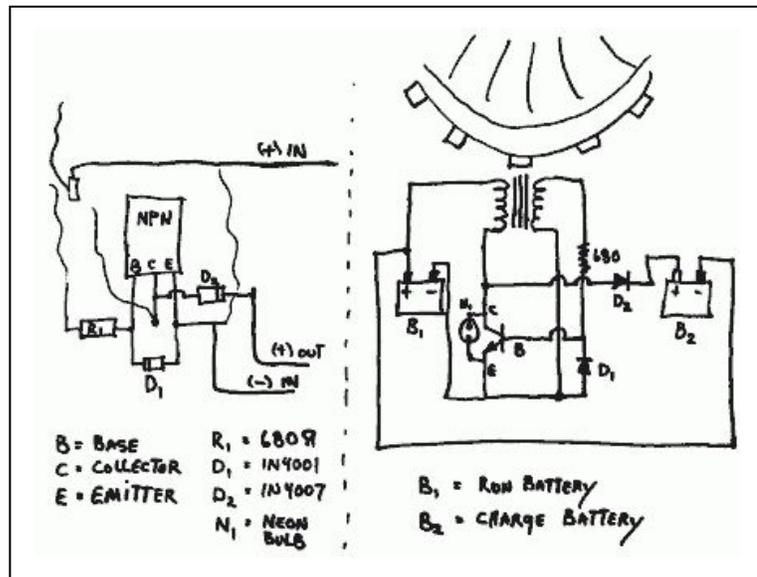
Here is an image of the schematic and parts list given to Sterling for the "one transistor" circuit in September of 2004.

This new set of plans had two differences over the Keelynet circuit. First, he called it the "School Girl Motor" to purposely insult

all of the supposed smart guys who had not looked at it before, and second, he used the two battery system where the motor ran from one battery and charged the second battery directly from the recovered energy.

Sterling also started a discussion forum on Yahoo Groups so people building the project could communicate with each other.

Sterling even built a model which worked quite well for a first attempt, being able to recharge the second battery at about 90% of the rate of the discharge of the first battery.



In spite of this, Sterling eventually declared that the technology was a "hoax" and that it was not a free energy machine since it did not run indefinitely without the batteries going down.

But the "cat was out of the bag" so to speak, and people from all around the world started reporting good results and wanting to learn more. By 2005, the discussion threads were turned over to Rick Friedrich to moderate, eventually being turned over to John in 2011.

The discussion threads were a major advancement over the earlier period of "no publicity," but they produced a lot of confusion, because so many people were posting on how they thought the circuits worked. Finally, the effort was made to explain John's discoveries in a definitive series called the **Bedini SG Handbook Series**, of which this is the last volume.

The Bedini Ferris Wheel (2010)

From August 1984 until November 2010, the "Jim Watson Machine" had been the largest model of John's technology ever shown in public. That changed on November 13th, 2010, when John unveiled his "Ferris Wheel" machine to an audience of over 400 attendees at the first Bedini Technology conference in Coeur d'Alene, Idaho. This picture was taken by one of the participants from the back of the room. The 14 foot diameter "Ferris Wheel" machine can be seen in the distance.



The machine took over two months to build and cost over \$20,000. It was designed to demonstrate John's technology to the crowd in a dramatic manner. Beyond that, it has

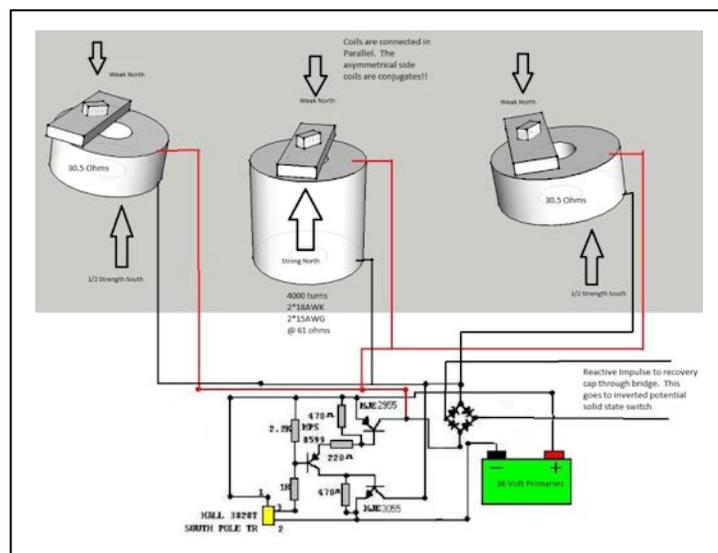
had a relatively prosaic life. It was shown again at the 2011 conference, after which, it has never been fully assembled. The problem was that when fully assembled, the machine was 6 inches taller than the large bay doors at John's shop. It was a lot of work to rebuild the top section of the wheel and since no more tests were run on it, it was never reassembled. It stayed partially disassembled at John's shop through 2012, and was finally moved into storage when John down-sized his shop in 2013. It remains partially disassembled, but potentially operational today.

The machine had three large coils of wire on the bottom and was operated in "full power mode" with the bi-polar "Bedini-Cole Switch" like the one shown on page 82. The only difference was that the components in the switch were modified to operate a very low impedance circuit.



The input was 36 volts (three 12 volt batteries in series) and the output was the same. The batteries boiled continuously during operation, and John never ran it for more than 30 minutes at a time in full power mode. The batteries were too small to be charged that hard.

Although John has not revealed the entire schematic for the Ferris Wheel machine, there is quite a bit of data on the internet. Here is one drawing that is posted on a discussion thread dedicated to this machine. It shows how the magnets on the wheel interface with the three coils,



and the control circuit being basically a "Bedini-Cole Switch." The machine also had a two foot diameter "hub motor" section that operated as a motor during the "idle mode" and as a generator in "full power mode." The circuitry used here was also a modified Bedini-Cole Switch with recovery to the charge battery system.

For more information on the technical details of the Ferris Wheel machine, go here: <http://www.energeticforum.com/john-bedini/6786-bedini-ferris-wheel-regauging-motor.html>



One Battery, Two Batteries, Three Batteries, Four...

This book would not be complete without mentioning the significance of the role of the battery in all of John's systems. To date, John has built and demonstrated machines and circuits that "self-run" using one battery, two batteries, three batteries, and four batteries. All of the systems he has demonstrated have at least one battery. The battery is a central component in all of John's work.

In John's 1984 book **Bedini's Free Energy Generator**, he shows the method of building a self-running machine using one battery. This process draws energy from the battery to drive an ordinary (direct induction) DC motor to produce mechanical energy. This mechanical energy is used to sustain the rotation of a flywheel (stored momentum) and an Energizer (low drag generator) that is used to charge a capacitor (stored electrical charge) while dissipating very little of the mechanical energy.

Ordinary DC traction motors of this type use their internally generated

"back EMF" to limit the current consumed by the motor in direct relationship to the speed. This means that the faster it turns, the less current it draws. So, the system works better as the motor approaches its "top speed." Speed also favors the Energizer, since it will produce more "peak voltage events" per second to charge the capacitor, the faster it goes.

The "sweet spot" for this machine is a very low friction mechanism! Mechanically, it must be perfectly aligned and fitted with free-running bearings so that it is capable of reaching its highest possible speed for the lowest expenditure of mechanical force. As the speed rises, the motor draws less and less electrical energy from the battery, while the Energizer is able to put more and more back in from the capacitor discharges.

At a critical speed, the system starts putting more energy into the battery than it is taking out and it moves into "self-running" mode. The machine has three energy storage components in it. They are the Flywheel, the Capacitor, and the Battery.

During "self-running" mode, all three energy storage components reach maximum capacity. The Flywheel maintains maximum speed, whether the electric motor is running at the moment or not. The Capacitor is constantly charged by impulses from the Energizer in a way that removes almost no momentum from the Flywheel. At operational speed, the electric motor draws minimal electricity from the battery about 50% of the time while 100% of the output from the Energizer is either collected in the Capacitor or delivered directly back to the battery the other 50% of the time.

The battery is the primary energy reservoir of the system. It has the energy to start the system and get it up to operating speeds, and it has the capacity to absorb all of the excess energy produced by the system. To make a home power plant out of a system like this, just put more and more batteries in parallel with the first, and use a switching process that won't burn itself out. After that, just "let it run".... as John always says.

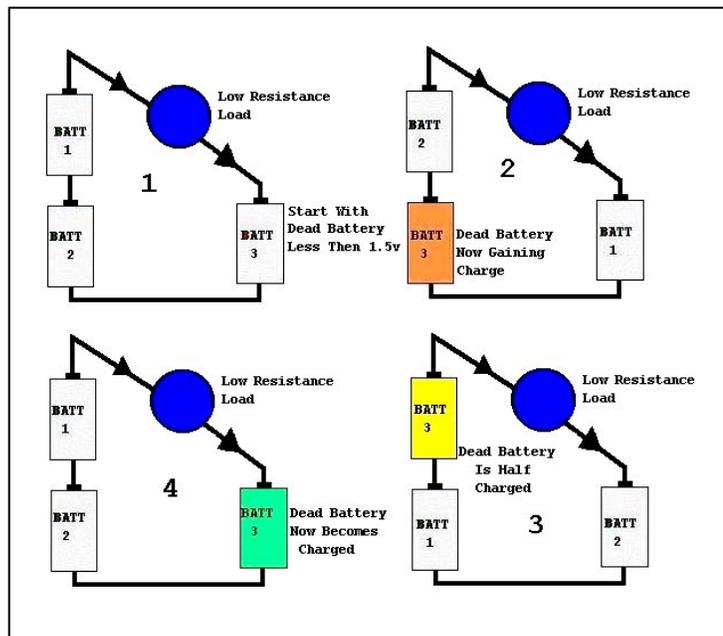
As straight forward as this seems, John found that most people could not make it work. For the most part, it wasn't their fault. The problem was the battery. The fact is, batteries do not like to be "charged and discharged" simultaneously or even sequentially, in rapid succession. It has to do with the energy required to constantly overcome the inertial momentum stored in moving the large lead ions back and forth in the electrolyte.

To get around this "inertial mass" loss mechanism at the molecular level, John developed his two battery systems, where one battery runs the machine and the other battery is charged for a number of hours, and then they are switched only once or twice a day. This worked much better, but still most people could not get it to work. Most of the reasons experimenters have gotten bad results with the two battery systems are covered in detail in the **Bedini SG Intermediate Handbook**.

And this brings us to the consideration of the three battery systems. For the most part, the three battery system was presented as a method to explain why the four battery system worked. In the last few years, however, a couple of skilled experimenters have found that it has a number of specific merits, all by itself.

This diagram has been on John's website since 1996 and shows a method whereby a dead battery can be charged

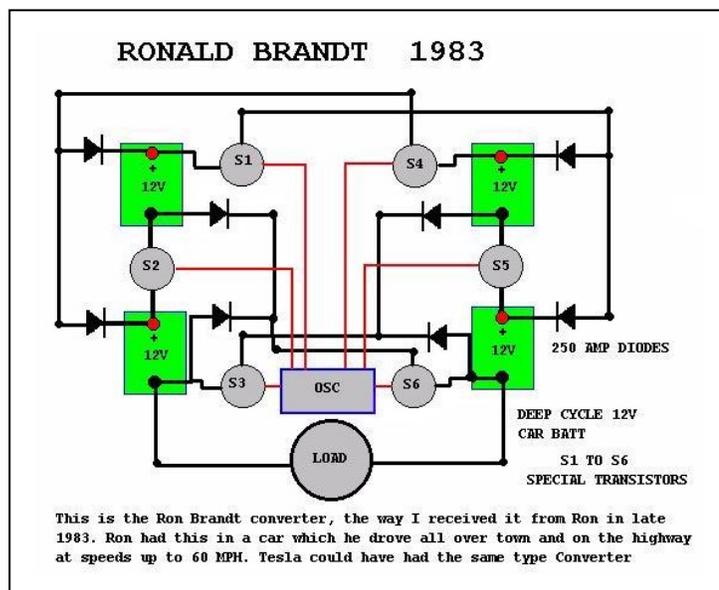
while running a "low resistance load", like an electric motor turning an Energizer, for example! This method allows an ordinary electric motor to operate while the current is conserved to charge a battery at the same time.



John shows that by rotating the batteries around to each of the positions, all of the batteries improve in their state of charge, all the while running the load. This is where most "self-respecting" scientists lose interest. As long as you believe in the "Law of Conservation of Energy," you will NOT consider investigating this phenomena. As long as you believe that the load "consumes" electricity, you will not investigate reports that it is being "conserved" at the same time as it is being used.

To learn more about these developments, check out this discussion thread with more than 300 posts: <http://www.energeticforum.com/renewable-energy/10610-3-battery-generating-system.html>

But this gets even worse with the four battery systems! This drawing has been on John's website since 1996, and his work with circuits like this dates back to 1983. First introduced to these ideas by Ronald Brandt, this circuit topology John eventually named the "Tesla Switch."



The circuit shows a load being operated between the Negative Terminals of two batteries that are alternately connected in series and parallel with two other batteries, producing a fluctuation of current between two points of "equal" potential.

When switched abruptly between these two states, the load operates on a "cold form" of electricity without discharging the batteries. John was interested in this phenomena because it elicited the expression of the same kind of "modified electricity" that he so clearly demonstrated with his tests on the Kromrey Generator.

Historically, the circuit can be traced, not to Nikola Tesla, but to the 1915 Patent issued to Carlos F. Benitez, a Civil Engineer living in Guadalajara, Mexico.

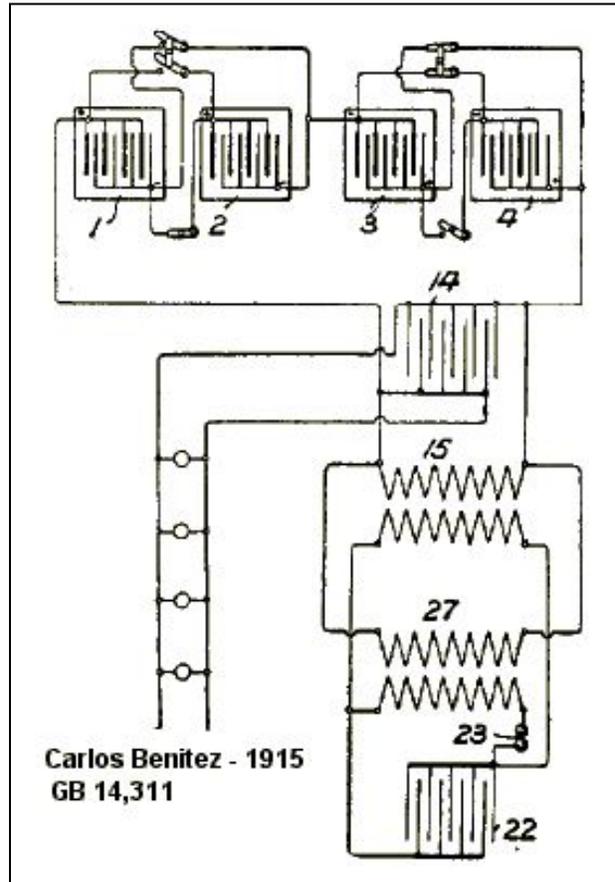
Here is the primary image from that patent. It shows four batteries being connected sequentially in series or parallel, and loads being operated from the fluctuations of current between the Negative Terminals.

The Benitez Patent descriptions clearly disclose the method, but the patent does not mention the change in the "quality" of the electricity.

Ronald Brandt was the first to clearly state that the currents moving in this system had "unusual properties" and John Bedini is absolutely the first person in history to get a system like this operating with purely solid-state switching.

Here is a picture of John showing this first solid-state demonstrator at the 1984 Tesla Centennial Symposium.

Whether Ronald Brandt rediscovered this method through experimentation, or somehow knew of the prior work of Benitez, is not known. What is known is that he introduced John to it.



Every system John has shown uses batteries. While at first glance, the one and two battery systems seem to be dependent on the low drag performance of the Energizer style of generator, this is NOT what John was interested in!!! John was interested in the various methods of eliciting the modified forms of electricity, and their effects on the batteries.

Once you grasp the significance of the "cold form" of electric currents that blatantly appear in both the Kromrey Generator and the "Four Battery Switch", the more easily you can comprehend why Tom Bearden theorized ideas of the "Phi-dot" current and the idea that "the battery charges itself." This is exactly what they were seeing!

In these early days, the experiments were running way ahead of the explanations. They were grasping to develop a language with which to describe these discoveries, and Tom Bearden was the only one who volunteered to rise to the challenge. But outside of the inner circle, where the evidence of these realities was firmly established, there was nearly unanimous rejection of these ideas!

[For more information on the "Four Battery Switch" method, take a look at this, and other discussion threads at the Energetic Forum:
<http://www.energeticforum.com/renewable-energy/5227-carlos-f-benitez.html>]

Trade-off....#1

Here is what all of the experimental evidence suggests. Voltage and current are two separate and distinct aspects of "electricity." They can appear individually, or together. When voltage appears without current, the presentation is a "cold form" of electricity, most notably recognized as the spike produced by the discharge of an inductor into a high impedance load. This is the so-called "Radiant Energy" produced by the SG circuits.

When current appears without voltage, it too presents itself as a "cold form" of electricity, most notably recognized as the energy capable of running loads between the two negative terminals of the "Four Battery Switch."

Voltage without current is generated by the free-fall collapse of a magnetic field when the current is interrupted abruptly and the energy discharges into a high impedance load. Current without voltage is generated by the fluctuation of potentials in a low impedance circuit when the current is interrupted abruptly and the reflection of this fluctuation appears across a very low impedance load between two negative terminals.

Both of these forms of "cold electricity" flow through ordinary wires at room temperature with NO RESISTANCE. Ohm's Law does not describe their behavior within a circuit. Classical measurements on these modified forms of electricity are routinely inaccurate. Regardless of these measurement issues, these forms of electricity can and do perform real WORK in external circuits.

Only when voltage and current appear together do we have the standard presentation of electricity we have been incorrectly told is the "only one." So, normal "hot electricity" appears in the middle of the spectrum, where voltage and current appear together. By contrast, "cold electricity" effects appear at both ends of the spectrum, where either voltage or current appear without the other. If there is such a thing, THIS is one of the real secrets of free energy. Any circuit or machine that allows these conditions to manifest, will exhibit positive results in the real world that are difficult to quantify by measurement methods accepted by standard science!

Trade-off....#2

In the electro-mechanical machines, the appearance of these cold forms of electricity are directly related to the structures containing the magnetic

fields. In the designs that close the magnetic fields down to closed loops, it is possible to produce more mechanical energy (stronger motoring effects) and what appears to be a higher "efficiency" generators, but the appearance of the modified forms of electricity is greatly reduced.

Conversely, when the magnetic fields are produced in structures that have large air-gaps in their return path, such as a coil of wire energized by a permanent magnet from only one end, a maximum of these modified forms of electricity are encouraged to show up, especially when combined with abrupt switching techniques. From a classical point of view, these structures are considered to be "very inefficient" and they exhibit a very low "power to weight" ratio, and are written off as if they are useless and archaic. From John's point of view, they are the simplest way to effectively gather this "cold form" of energy from the environment, or as Kromrey first said, from the gravitational field.

The Next Big Advancements

John is a prolific inventor, so there is no way to keep up with his creativity. At the 2014 Energy Science and Technology Conference, John unveiled his latest Linear Amplifier/Regulator circuits which can be used to shunt power from the charging battery back to the run battery without having to switch batteries. While he is not planning to publish that circuit anytime soon, you can purchase a model of this circuit at teslachargers.com

The next really big "advancement" has to come from thousands of people from all around the world who start to experiment with these technologies, learn the science, and build their own working systems. In 1984, this technology went "public" with the publication of John's book **Bedini's Free Energy Generator**. In 2004, this technology went "public" again, in the discussion forums. In 2014, it has to go public once more, this time with thousands of self-running models showing up all over the world.

Summary and Conclusion

At this point, the Bedini SG project has revealed at least a dozen designs of machines whereby John has already demonstrated, and you can learn to build, a system that produces enough energy to run itself and more.

These include the following:

1. An ordinary DC brush style motor turning a flywheel and a low drag generator running from and charging a single battery.
2. An ordinary DC brush style motor turning a flywheel and a low drag generator running from one battery and charging a second battery.
3. An ordinary DC brush style motor turning a flywheel and a low drag generator running from a three battery supply and charging an additional battery bank to power external loads.
4. An ordinary DC brush style motor running in pulse mode, with inductive recovery, turning a flywheel and a low drag generator running from one battery and charging a second battery system.
5. An ordinary DC brush style motor, running in pulse mode with inductive recovery, turning a flywheel and a low drag generator running from a three battery supply and charging an additional battery bank to power external loads.
6. A standard SG Energizer running from one battery and charging a second battery.
7. A standard SG Energizer running from a three battery supply charging an additional battery system.
8. A multi-coil SG Energizer turning an additional low drag generator running from a three battery supply and charging an additional battery bank to power external loads.
9. And many other variations!!!

In general, all of these systems fall into two main classes of machine. The first is the "motor/generator" combination, whereby the following performance characteristics are attained.

Electric Motors that:

1. are based on standard induction principles, but operate on minimal current due to "top speed" operation, reinforced by a flywheel.
2. are based on alternate motoring principles, using either attraction or repulsion, but use a pulse method so that an inductive collapse process allows some of the electricity to be recovered while mechanical energy is produced.

Electric Generators that:

1. are based on design principles that include coils wound on iron cores that are magnetized by moving magnets, and where the magnetic return path incorporates a large air-gap at least part of the time.
2. are based on design principles that allow Lenz's Law to neutralize or partly neutralize any reverse torques when low impedance loads are applied.

The second general class of machine are those that use battery configurations and/or abrupt switching methods to elicit "cold electricity" characteristics, which when applied back to the batteries, increase the charging efficiency by 200-to-300%. When a number of these principles are used together, COPs > 2 become increasingly easy to attain.

In spite of developing both methods, John was always more interested in the cold electricity effects, as the gains were always higher.

Nothing Guaranteed

Everything reported in this book series is true and factual. But that does

not guarantee that "anybody" can duplicate these results. Each of these phenomena live in a narrow "window of opportunity" that the machine either captures or not, depending on the precision of its application.

To get a machine like this working requires:

1. a significant knowledge and understanding of the science
2. a general knowledge of math and engineering protocols
3. a minimum skill level of precision model building

If you do not understand the science, if you do not understand the mathematics that underpins electrical engineering, or if you do not have the requisite model building tools and skills, then it is not reasonable for you to believe that you can build one of these machines, beyond the model described in the **Beginner's Handbook**.

This technology is not an article of commerce yet. Right now, it only exists at the cutting edge of human understanding. The world's economic model is going to experience a difficult period of adjustment as this technology becomes more widely accepted. But that process is beginning right now.

Conclusion

This completes the **Bedini SG Handbook Series**. It completes the reporting and analysis of John's work to date, November 2, 2014.

It has taken two and a half years to write these three books. Thank you for your patience and for your interest in this material. It has been an honor and a privilege to work with John over the last 10 years, and to help you understand his life's work.

Appendices

Appendix #1

US Patent #3,374,376 Issued to Raymond Kromrey Page 100
Title: Electric Generator

Appendix #2

Operating Principles of the Ferromagnetic Generator Page 109
Written by Raymond Kromrey

Appendix #3

GB Patent #14,311 Issued to Carlos F. Benitez Page 125
Title: System for the Generation of Electric Currents

Appendix #4

Report on Visit to John Bedini (September 3, 1984) Page 135
Written by Eike Mueller

Other Resources:

A&P Electronic Media

Home of the Best Collection of Information Products
on the Planet! <http://www.emediapress.com>

Tesla Chargers

Home of "ready to use" battery chargers
designed by John Bedini <http://teslachargers.com>

Appendix #1

United States Patent #3,374,376

Electric Generator

Issued to Raymond Kromrey

March 19, 1968

R. KROMREY
ELECTRIC GENERATOR

3,374,376

Filed Jan. 3, 1964

5 Sheets-Sheet 1

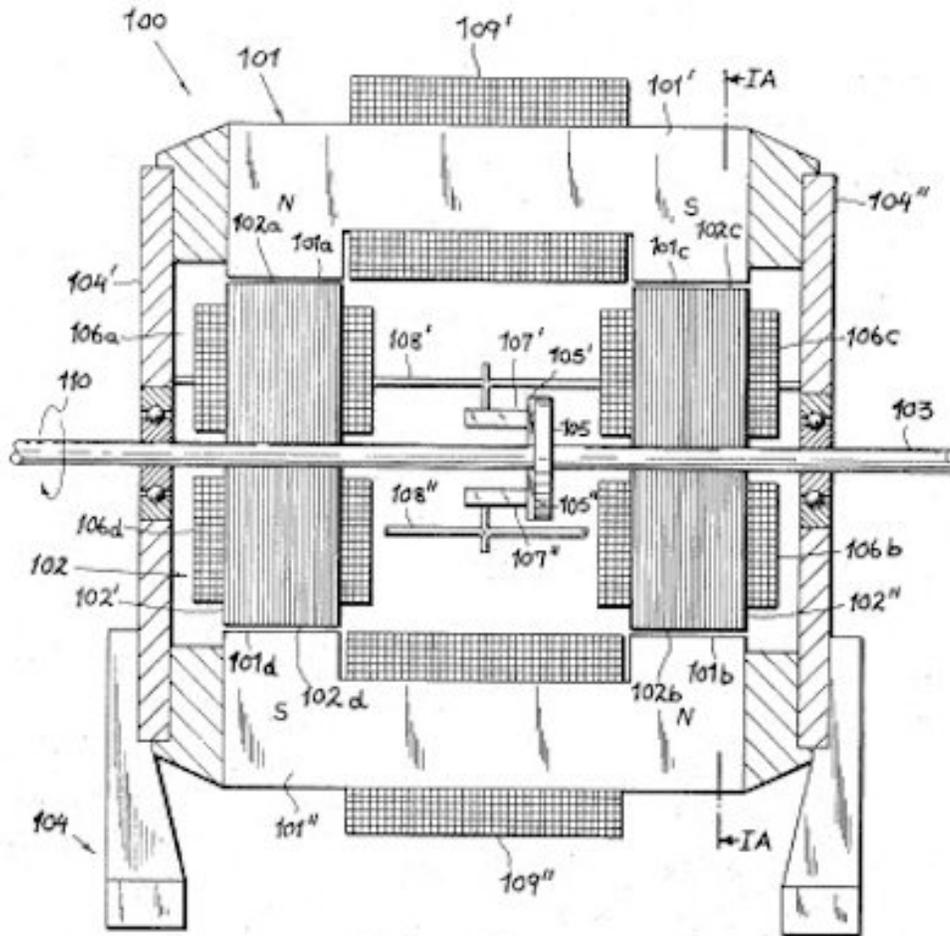


Fig.1

RAYMOND KROMREY
INVENTOR.

BY

Karl G. Kna
AGENT

March 19, 1968

R. KROMREY
ELECTRIC GENERATOR

3,374,376

Filed Jan. 9, 1964

5 Sheets-Sheet 2

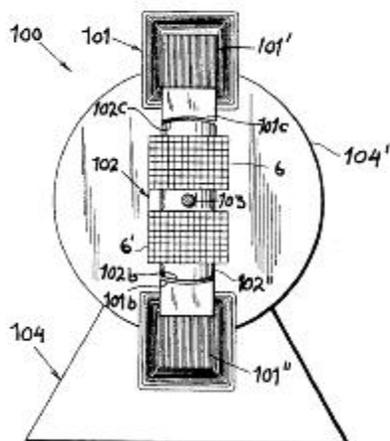


Fig 1A

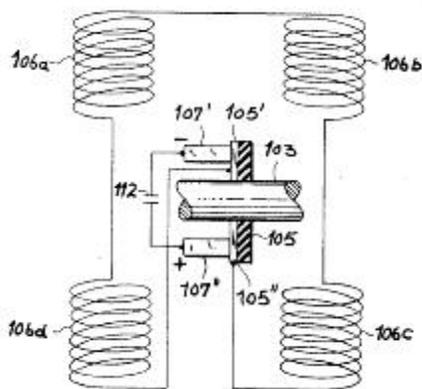


Fig 4

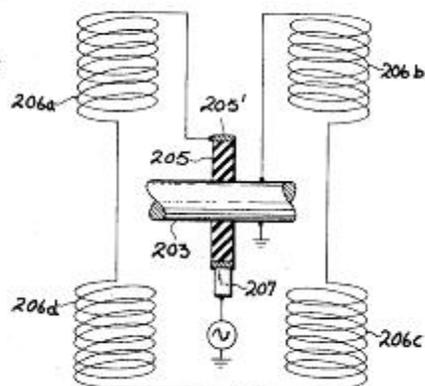


Fig 5

INVENTOR
RAYMOND KROMREY

BY

Karl G. ...
AGENT

March 19, 1968

R. KROMREY
ELECTRIC GENERATOR

3,374,376

Filed Jan. 9, 1964

5 Sheets-Sheet 3

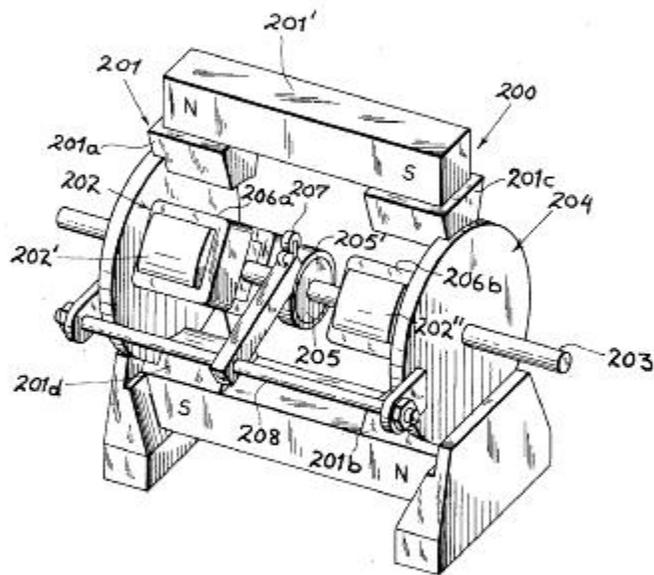


Fig. 2

RAYMOND KROMREY
INVENTOR

BY

Karl G. Kass
AGENT

March 19, 1968

R. KROMREY
ELECTRIC GENERATOR

3,374,376

Filed Jan. 3, 1964

5 Sheets-Sheet 4

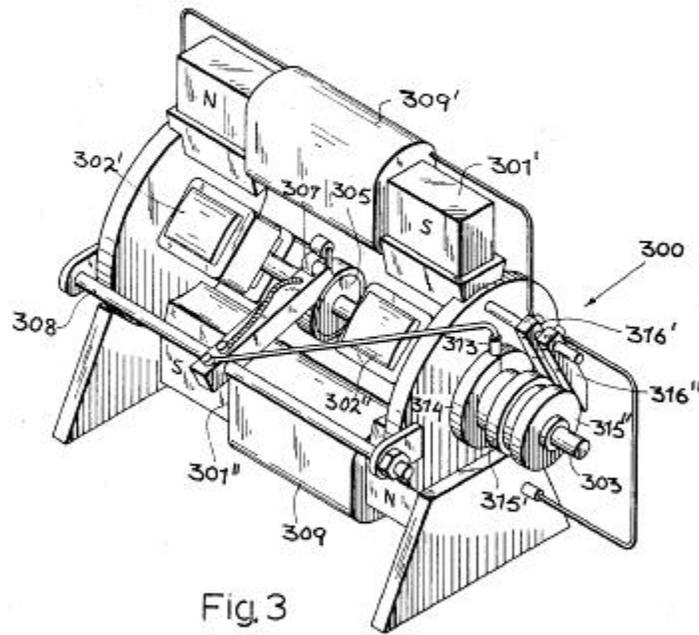


Fig. 3

RAYMOND KROMREY
INVENTOR.

BY

Ray S. Kim
AGENT

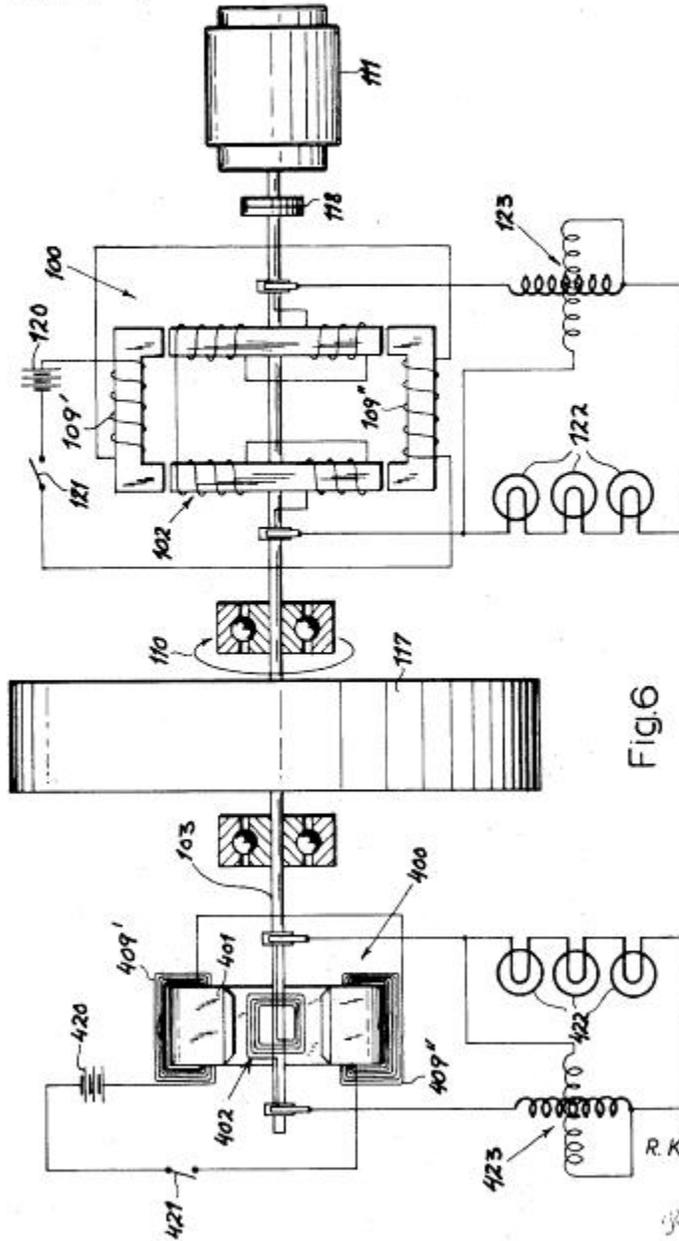
March 19, 1968

R. KROMREY
ELECTRIC GENERATOR

3,374,376

Filed Jan. 9, 1964

5 Sheets-Sheet 5



1

3,374,376
ELECTRIC GENERATOR
 Raymond Kromrey, 15 Rue du Mt. Blanc,
 Geneva, Switzerland
 Filed Jan. 9, 1964, Ser. No. 336,769
 1 Claim. (Cl. 310-112)

My present invention relates to an electric generator serving to convert magnetic force into electric energy with the aid of two relatively rotatable members, i.e. a stator and a rotor, one of these members being provided with electromagnetic or permanent-magnetic means adapted to induce a voltage in a winding forming part of an output circuit on the other member.

Conventional generators of this type utilize a winding whose conductors form loops in different axial planes whereby, upon relative rotation of the two members, diametrically opposite portions of each loop pass twice per revolution through the field of each pole pair of the magnetic inductor member (usually the stator). If the loops are open-circuited, no current flows in the winding and no reaction torque is developed so that the rotor will be free to turn at the maximum speed of its driving unit. As soon as the output circuit including the winding is short-circuited or connected across a load, the resulting current flow tends to retard the motion of the rotor to an extent dependent upon the magnitude of the current, it being therefore necessary to provide compensating speed-regulating devices if it is desired to maintain a substantially constant terminal voltage. Moreover, the variable reaction torque subjects the rotor and its transmission to considerable mechanical stresses which, in the case of widely fluctuating load currents, may lead to objectionable strains.

It is, therefore, the general object of my present and new invention to provide an electric generator which obviates the aforesaid disadvantages.

A more particular object of my invention is to provide a generator of such construction that its reaction torque and, therefore, its rotor speed in response to a given driving torque varies but little upon changeover from open circuit to current delivery or vice versa.

It is also an object of this invention to provide an electric generator whose terminal voltage varies at a considerably lesser rate than its rotor speed so as to be less affected than conventional generators by fluctuations of its driving rate.

I have found, in accordance with this invention, that the foregoing objects can be realized by the relative rotation of an elongated ferromagnetic element, such as a bar-shaped soft-iron armature, and a pair of pole pieces defining an air gap wherein a magnetic field is set up under the influence of a suitable source of coercive force. The armature carries a winding, advantageously in the form of two series-connected coils embracing opposite extremities thereof, which is included in an output circuit adapted to be connected to a load. As the armature rotates within the stationary air gap (or, conversely, the pole pieces swing about the stationary armature), the magnetic circuit is intermittently completed and the armature experiences periodic remagnetizations with successive reversals of polarity.

When the output circuit is open, the mechanical energy applied to the driven rotor member is converted, to the extent that it is not needed to overcome frictional resistance, into work of magnetization which in turn is dissipated as heat; in actual practice, however, the resultant rise in the temperature of the armature will be hardly noticeable, particularly if the armature is part of the continuously air-cooled rotor assembly. When the output circuit is closed, part of this work is translated into electrical

2

energy as the current flow through the winding opposes the magnetizing action of the field and increases the apparent magnetic reluctance of the armature. This explains why, in a system embodying my invention, the speed of the generator remains substantially unchanged when the output circuit is either opened or closed.

As the armature approaches its position of alignment with the gap, the constant magnetic field existing there-across tends to accelerate the rotation of the armature relative to the pole pieces, thereby aiding the applied driving torque; the opposite action, i.e. a retarding effect, occurs after the armature passes through its aligned position. As the rotor attains a certain speed, however, the flywheel effect of its mass overcomes these fluctuations in the total applied torque so that a smooth rotation ensues.

In a practical embodiment, according to a more specific feature of my invention, the magnetic-flux path includes two axially spaced magnetic fields traversing the rotor axis substantially at right angles, these fields being generated by respective pole pairs co-operating with two axially spaced armatures of the character described. It will generally be convenient to arrange the two armatures in a common axial plane, the two field-producing pole pairs being similarly coplanar. The armatures are preferably of the laminated type to minimize the flow of eddy currents therein; thus, they may consist in essence of highly permeable (e.g. soft-iron) foils whose principal dimension is perpendicular to the rotor axis, the foils being held together by rivets or other suitable fastening means.

If the ferromagnetic elements are part of the rotor, the output circuit will include the usual current-collecting means, such as slip rings or commutator segments, according to whether alternating or direct current is desired. The source of coercive force in the stator includes, advantageously, a pair of oppositely disposed yoke-shaped magnets, of the permanent or the electrically energized type, whose extremities constitute the aforementioned pole pieces. If electromagnets are used in the magnetic circuit, they may be energized by an external source or by direct current from the output circuit of the generator itself.

I have found that the terminal voltage of the output circuit of a generator according to the invention does not vary proportionately to the rotor speed, as might be expected, but drops at a considerably slower rate with decreasing speed of rotation; thus, in a particular unit tested, this voltage fell only to about half its original value upon a cutting of the rotor speed to one-third. This nonlinear relationship between terminal voltage and driving rate enables the maintenance of a substantially constant load current and, therefore, electric output over a wide speed range, at least under certain load conditions, inasmuch as the inductive reactance of the winding is proportional to frequency (and consequently to rotor speed) so as to drop off more rapidly than the terminal voltage, in the event of a speed reduction, with a resulting improvement in the power factor of the load circuit.

If the magnetic circuit includes but a single pole pair per air gap, the flux induced in the relatively rotating armature will change its direction twice per revolution so that each revolution produces one complete cycle of 360 electrical degrees. In general, the number of electrical degrees per revolution will equal 360 times the number of pole pairs, it being apparent that this number ought to be odd since with even numbers it would not be possible to have poles alternating in polarity along the path of the armature and also to have the north and south poles of each pair at diametrically opposite locations. In any case it is important to dimension the confronting arcuate faces of the pole pairs in such manner as to avoid bridging of adjoining poles by the armature, hence it behooves to make the sum of the arcs spanned

by these faces (in the plane of rotation) equal to considerably less than 360° electrical.

The invention will be described hereinafter with greater detail, reference being made to the accompanying drawing in which:

FIGS. 1 and 1A illustrate a first embodiment of my invention in axial section and in a cross-sectional view taken on line 1A—1A of FIG. 1, respectively;

FIGS. 2 and 3 are perspective views illustrating two further embodiments;

FIGS. 4 and 5 diagrammatically illustrate two output circuits for a generator according to the invention, designed respectively for direct and alternating current; and

FIG. 6 is a somewhat diagrammatic illustration of an arrangement for comparing the outputs of a conventional generator and a generator according to the invention.

The generator 100 shown in FIGS. 1 and 1A comprises a stator member 101 and a rotor member 102, the latter comprising a pair of laminated armatures 102', 102'' carried on a shaft 103 which is rotatably journaled in end plates 104', 104'' of a generator housing 104 of nonmagnetic material (e.g. aluminum) rigid with the stator. Shaft 103 is coupled with a source of driving power indicated diagrammatically by an arrow 110.

The stator 101 includes a pair of yoke-shaped laminated electromagnets 101', 101'' whose extremities form two pairs of coplanar pole pieces respectively designated 101a, 101b (north) and 101c, 101d (south). The pole pieces have concave faces confronting complementarily convex faces 102a, 102d of armature 102' and 102b, 102c of armature 102''. These faces, whose concavities are all centered on the axis of shaft 103, extend over arcs of approximately 20 to 25° each in the plane of rotation (FIG. 1A) so that the sum of these arcs adds up to about 90° geometrical and electrical.

The magnets 101', 101'' of the stator are surrounded by respective energizing windings 109', 109'' which are connected across a suitable source of constant direct current, not shown. Similar windings, each composed of two series-connected coils 106a, 106d and 106b, 106c, surround the rotor armatures 102' and 102'', respectively. These coils form part of an output circuit which further includes a pair of brushes 107', 107'' that are carried by arms 108', 108'' on housing 104 with mutual insulation; brushes 107', 107'' co-operate with a pair of commutator segments 105', 105'' (see also FIG. 4) which are supported by a disk 105 of insulating material on shaft 103. By virtue of the series connection of coils 106a—106d between the segments 105' and 105'', as illustrated in FIG. 4, the alternating voltage induced in these coils gives rise to a rectified output voltage at brushes 107' and 107''; the unidirectional current delivered by these brushes to a load (not shown) may be smoothed, in a manner known per se, by conventional filter means represented diagrammatically by a condenser 112 in FIG. 4.

In FIG. 2 I have shown a modified generator 200 whose housing 204 supports a stator 201 consisting essentially of two permanent bar magnets 201' and 201'' extending parallel to the drive shaft 203 on opposite sides thereof, each of these magnets being rigid with a respective pair of pole shoes 201a, 201c and 201b, 201d. Rotor 202 comprises a pair of laminated armatures 202', 202'', similar to those of the preceding embodiment, whose output coils 206a, 206b, 206c, 206d are serially connected between a slip ring 205', supported on shaft 203 through the intermediary of an insulating disk 205, and another terminal here represented by the grounded shaft 203 itself. Slip ring 205' is contacted by a brush 207 on a holder 208, the output of this brush being an alternating current of a frequency determined by the rotor speed.

In FIG. 3 I have shown a generator 300 basically similar to generator 100 of FIGS. 1 and 1A, its shaft

303 carrying a pair of laminated soft-iron armatures 302', 302'' rotatable in the air gaps of a pair of electromagnets 301', 301'' bearing energizing windings 309' and 309''. The commutator 305 again co-operates with a pair of brushes of which only one, designated 307, is visible in the figure. This brush, carried on an arm 308, is electrically connected to a brush 313 engaging a slip ring 314 on an extremity of shaft 303 which also carries two further slip rings 315', 315'' in conductive contact with ring 314 but insulated from the shaft. Two further brushes 316', 316'' contact the rings 315', 315'' and are respectively connected to windings 309' and 309'', respectively, the other ends of these windings being connected to an analogous system of brushes and slip rings on the opposite shaft extremity whereby the two commutator brushes are effectively bridged across the windings 309' and 309'' in parallel. In this embodiment, therefore, the stator magnets are energized from the generator output itself, it being understood that the magnets 301' and 301'' (made, for example, of steel rather than soft iron) will have a residual coercive force sufficient to induce an initial output voltage as is known per se. Naturally, the circuits leading from the brushes 307 to the windings 309', 309'' may include filter means as described in connection with FIG. 4.

In FIG. 6 I have shown a test circuit designed to compare the outputs of a generator according to the invention, such as the unit 100 of FIGS. 1 and 1A, with a conventional generator 400 of the type having a looped armature 402 rotatable in a gap of a stator magnet 401 with energizing winding 409', 409''. The two generators are interconnected by a common shaft 103 carrying a flywheel 117, this shaft being coupled via a clutch 118 to a drive motor 111 whereby the rotors 402 and 102 of both generators are rotatable in unison as indicated by arrow 110. Two batteries 120 and 420, in series with switches 121 and 421, are representative of means for supplying direct current to the stator windings 109', 109'' and 409', 409'' of the two generators.

The rectified output of generator 100 is delivered to a load 122, here shown as three series-connected incandescent lamps with a combined consumption of 500 watts, generator 400 working into an identical load 422. Two wattmeters 123 and 423 have their voltage and current windings respectively connected in shunt and in series with the associated loads 122 and 422 to measure the electric power delivered by each generator.

Upon engagement of the clutch 118, shaft 103 with its flywheel 117 is brought to an initial driving speed of 1200 r.p.m. whereupon the switch 421 in the energizing circuit of conventional generator 400 is closed. The lamps 422 light immediately and the corresponding wattmeter 423 shows an initial output of 500 watts; this output, however, drops instantly as the flywheel 117 is decelerated by the braking effect of the magnetic field upon armature 402.

Next, the procedure is repeated but with switch 421 open and switch 121 closed to energize the generator 100. The lamps 122 light up and the wattmeter 123 shows an output of 500 watts which remains constant for an indefinite period, there being no appreciable deceleration of flywheel 117. When the clutch 118 is released and the rotor speed gradually decreases, the output of generator 100 is still substantially 500 watts at a speed of 900 r.p.m. and remains as high as 360 watts when the speed drops further to 600 r.p.m.

In a similar test with a generator of the permanent-magnet type, such as the one shown at 200 in FIG. 2, a substantially constant output was observed over a range of 1600 to 640 r.p.m.

Modifications of the specific arrangements described and illustrated will, of course, be apparent to persons skilled in the art and are deemed to be embraced in the spirit and scope of my invention as defined in the appended claim.

I claim:

1. An electric generator comprising a fixed stator and a rotor coaxial with said stator; drive means for rotating said rotor about its axis, said stator being provided with a pair of elongated bar magnets extending parallel to said axis on opposite sides thereof and terminating in transverse extremities, oppositely poled extremities of said magnets confronting each other and defining magnet means having two axially spaced pole pairs disposed in a common axial plane and forming a pair of diametrically extending air gaps for establishing a magnetic-flux path including two axially spaced parallel magnetic fields across said air gaps traversing said axis substantially at right angles, said rotor being provided with two axially spaced parallel elongated ferromagnetic elements slightly shorter than the spacing of said confronting extremities and extending perpendicularly to said axis at locations coplanar with said pole pairs for concurrent periodic alignment of said elements with said fields in said air gaps upon rotation of said rotor; and an output circuit on said rotor including winding means on each of said elements and collector means in series with said winding means, each of said pole pairs and the corresponding elements having confronting arcuate faces centered on said axis, the sum

of the arcs spanned by said faces being substantially equal to 90° in the plane of rotation.

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MILTON O. HIRSHFIELD, *Primary Examiner.*J. W. GIBBS, D. G. DUGGAN, *Assistant Examiners.*

Appendix #2

Operating Principles of the Ferromagnetic Generator

Written by Raymond Kromrey

OPERATING PRINCIPLES OF THE
FERROMAGNETIC GENERATOR

by the inventor
R. Kromrey

The energy relationships valid for earth's system of reference are as follows :

$$1 \text{ kg-m/sec} = 9.81 \text{ Watts} = 2.3 \text{ cal/sec}$$
$$(\text{ 1ft.lb/sec} = \underline{1.36} \text{ Watts} = 0.32 \text{ cal/sec})$$

A conventional dynamo transforms the earth's gravitational energy into electrical energy. In a very wide sense the figures given above are considered valid throughout the entire universe although gravity and, at the same time, acceleration can differ considerably from system to system.

It is well known that the notion of gravity is of primordial importance because it is from gravity alone that the entire science of dynamics is derived.

Having said that, the principle difference between a conventional generator and the ferromagnetic generator is that the former converts the earth's acceleration into electrical energy (using Lorentz's force as an intermediary) whereas the ferromagnetic generator transforms or converts ferromagnetic attraction directly into electrical energy.

It is not entirely fortuitous that the universal formula for gravity and the Coulomb-Poisson formulae have a similar structure :

$$F = \frac{k M_1 M_2}{d^2}$$

the only essential difference being the presence of the coefficient "k".

Apart from this, it is useful to note that the fundamental principle of the conservation of energy lies with the quantitative conservation of motion - anything beyond this remains purely speculative.

What then, are the principal characteristics of the molecular generator ?

We are speaking here of a type of monophasic transformer with the peculiarity that the cores, respectively parallel, two-by-two, make up the stators and rotors. Preferably, the stators should be powerful permanent magnets and the rotor cores should be of soft iron.

When the armature turns, it successively enters and leaves the earth's gravitational field and the magnetic field, and vice versa, in such a way that the soft iron cores are subjected successively to a magnetic attraction and the earth's gravitational attraction.

Since, on the other hand, each action has an equal and opposite reaction, and $Weight = Force = Mass \times acceleration$:

$$W = m.g$$

the production of electricity can be explained quite easily through classical dynamics.

In effect, we know that the electron possesses a mass. For an electric motor, the magnetic field (or inductor) has only a

secondary role, that of deflection, in such a way that the electronic kinetic energy $E = m \frac{v^2}{2}$ (for example the output from a battery), remains conserved if the motor runs without load.

It is exactly the same if the machine works as a generator: the magnetic field has merely an intermediary role of transforming kinetic energy - in this case resulting from the earth's gravitational system - into electrical energy.

For the molecular generator, things happen very differently. Here, the rotor is subjected alternatively to an extra-terrestrial acceleration, enormously superior to that of the earth's gravity, which produces an electronic current.

Since Newton's third law is fundamental, because it even includes the principal of the conservation of energy, the working of the molecular generator is easily explained.

In effect, the two twin cores constituting the rotor, fall from the earth's gravitational field into the more intense magnetic field, and grow heavier because of this.

If, simultaneously, an electric current is produced by short-circuiting, for example, the winding of the armature, it can be seen that the magnetic acceleration first observed, purely with regard to the armature, is subsequently partially consumed in order to accelerate the electrons.

Since the initial acceleration of the rotor diminishes to the advantage of an electronic acceleration, the rotors become lighter. In other words the attraction between rotor and stator disappears so that the rotor continues to turn freely while producing an electric current.

This is completely normal, since a soft-iron induction coil (or rotor) that has become heavier in a magnetic field is essentially subject to the expression :

$$\text{Mass} \times \text{Acceleration} = \text{Weight}$$

and which, on expending its acceleration in favour of a movement of electrons, must obviously lose its attraction for the stator.

Naturally, the foregoing is only understandable if one remembers that, before anything else, electricity obeys the laws of classical dynamics. Electricity is, after all, a branch of mechanics, and not the reverse as the theory of general relativity postulates.

People have always tried to complement Newton's concepts, whereas, in fact, everything was already contained in his work, even the unified field theory.

Here is the explanation :

In Newton's time, it was usual to measure gravitational force by using a simple pendulum and the formula for the duration of an oscillation given by Huygens :

$$t = 2\pi \sqrt{\frac{l}{g}} \text{ from which is derived:}$$

$$T^2 = 4\pi^2 \frac{l}{g} \quad (g = G)$$

G = Acceleration due to the earth's gravity.

Since the density of the earth is not the same for all locations, this simple instrument could be usefully employed in geological prospecting because where mineral deposits exist for example, the pendulum would oscillate more quickly.

At the same time it is quite remarkable that, in itself, the pendulum is the differential of a fly-wheel. Here is the proof :

(diagram ici)

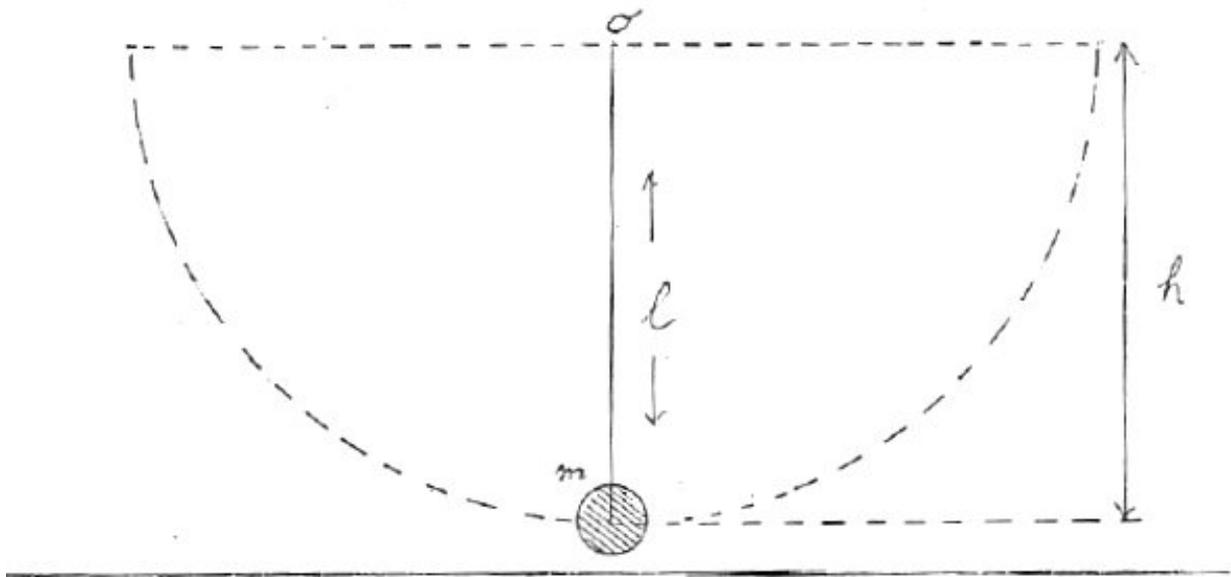
A mass "m" turning around a lever arm of a length "l" has a potential drop of "h". One complete oscillation of the pendulum therefore corresponds to a revolution of the mass "m" at a distance "l" from the centre of rotation "o".

The rate of displacement of the mass "m" is expressed in the equation $v = \frac{2\pi l}{T}$ where T corresponds to the duration of one cycle. Thus in a single cycle, the mass "m" of the pendulum drops twice from the high point (h = l) so that in one vertical drop, the work performed will be

$$P. 21 = \frac{m v^2}{2}$$

But since the pendulum falls through the arc of a circle, must be written successively :

Diagram



$$P. \quad 2 \quad 1 \quad = \quad \frac{I \omega^2}{2} \quad (\omega = \text{oméga}) \quad \omega = \frac{2\pi f}{T}$$

$$P. \quad 1 \quad = \quad I \omega^2$$

$$m. \quad g. \quad l \quad = \quad m \quad l^2 \quad (2\pi f)^2$$

$$g \quad = \quad 1 \cdot 4 \pi^2 \cdot f^2$$

since : $f = \frac{1}{T}$ *also* ~~asset~~ : $1 \cdot \frac{4\pi^2}{T^2} = g$

then : $T^2 = \frac{1 \cdot 4 \pi^2}{g}$ to give : $T = 2\pi \sqrt{\frac{l}{g}}$

What is the significance of the fact that a pendulum is the differential of a fly-wheel ? Quite considerable, as one can see from the following :

If for example, a fly-wheel of considerable mass is placed on the moon at a speed of 1500 rpm, very little energy is expended because the lunar force of attraction is 163 cm/sec.², minimal compared with the earth's force of attraction of 981 cm/sec.².

If the same fly-wheel could be transported immediately within the earth's gravitational field, its rate of rotation would be in no way diminished. On the contrary, the speed of rotation will have a tendency to increase even more and also result in a considerable gain in kinetic energy - and this without coming into conflict with the principal of the conservation of energy.

In other words, if the mass of a body drops in free fall towards the earth's surface, it will travel 4.91 metres during the first second. The same mass falling towards the moon's surface will have travelled only 0.81 metres after the first second. Masses possessing weight and masses that are inert are therefore quite different in the two systems of reference, and it is the same for the respective kinetic energies.

Schools, however, teach the following:

The fact that a body has a mass means, in the first place, that a force is necessary in order to accelerate it; but this would also be the case if the body was not attracted towards the earth's surface - in other words if it was weightless - and from this can be deduced the fact that notions of weight and of mass have absolutely nothing in common.

At the same time, when defining the concept "mass" and the concept "Weight", gravity has been excluded which is obviously an error.

Mach's law no longer holds good. According to Ernst Mach, and also Albert Einstein, inertia is a property of a mass determined by the presence of all the other masses in the universe.

In fact, inertia is in direct correlation with the finite and therefore the contrary of infinity. The system of reference can be determined. For this reason, unity should be defined as acceleration itself. The unity of mass will in future be the mass exerted on a mass identical to the distance 1, acceleration 1.

It is impossible to agree with schools of thought that maintain the following :

to put a ball of iron in motion on the moon will require the same effort as that required to make the same ball of iron in motion on earth.

The example cited corresponds exactly with the experiment of the fly-wheel - set in motion on earth at one time, then at another time on the moon. In the end, it is not the kilogram-masses that have to be moved but the kilogram-weights.

The amount of movement released by an action is essentially linked to the binary system of reference.

The invariability or stability of the oscillation path of the pendulum in Foucault's famous experiment at the Pantheon in Paris, designed to demonstrate the earth's rotation, is not a result of the presence of all the other stellar masses but is a direct result of the mutual attraction of the terrestrial mass and the mass of the pendulum.

Newtonian gravitation is based on instantaneous action at a distance, an opinion which is not questioned . On raising the mass of a litre of water (1'000 grams) to the top of the Eiffel Tower in Paris (300 metres) the water will lose one ten-thousandth of its weight. At 10 kilometres its weight will be only 965 kf and, 10'000 kilometres, only 151 kf.

It is the minute loss in weight by a body raised to considerable distances above the earth's surface that is the real equivalent to the work performed.

The expression "potential energy" is an unfortunate term used to imply that a certain tension exists between two masses that are trying to unite.

In the terrestrial system of reference, it is clear that if a body is raised to a certain height (even of several kilometres) it will only lose a minute part of its weight. This is because it is the enormous mass of the earth - to all intents and purposes alone - which is responsible for the effect of gravity.

It is therefore logical that a body raised to a height "h" corresponds to an amount of work that is practically recuperated if the body is released to make the return journey.

The molecular generator uses, therefore, a gravitational effect (ferromagnetism) to accelerate the electrons. A soft-iron armature is caught by a magnetic field and becomes very heavy over a distance of several centimetres, as it leaves the superimposed acceleration of the locally very intense magnetic field.

The molecular generator can produce energy on two inverse paths, that is to say, as the rotor approaches the stator and also as the rotor moves away from the stator. If the rotor enters the magnetic field (a gratuitous effect), the current produced destroys the attraction. If the rotor leaves the primary magnetic field, then the secondary field gratuitously formed by influence, disappears, causes cut-off, then once more - production of electricity. It is true that for each isolated system of reference the theoretical yield cannot be greater than 1. But the forces of various systems can, at the same time, be

very different.

Also, when two gravitational fields become partners, it is possible (and without contradicting the principal of the conservation of energy) that the following expression is valid:

$$\frac{\text{force recovered}}{\text{force expended}} > 1$$

In other words, each time that two gravitational fields come into action, it is possible to produce energy cheaply.

Again, for example, machinery driven by tidal motion uses the flux and reflux of the sea. The action of the moon's gravitational field associated with the terrestrial field (working at a distance of 384,400 kilometres) raises enormous masses of water to a height of metres, twice every 24 hours, at absolutely no cost - equivalent to approximately 10^{16} kfm of kinetic energy.

This is similar to what happens in the case of the molecular generator. On the one hand, the rotor is subjected to the earth's gravity; and on the other hand, to magnetic gravity, to give another possibility of producing energy cheaply.

To conclude, Newton's Law of Motion are confirmed, with the suggestion that a fourth law be added as follows :

The energy in any given system can only be modified in a finite time peculiar to this system. This results in a variety of forces for different isolated systems.

Here, then, are the principal distinctions between a conventional permanent-magnet dynamo and a molecular generator equipped with permanent magnets of the same force :

1. Theoretically the dynamo is not limited in output- the faster it turns, the bigger the output.
2. For 1 kg/s the dynamo produces 9.81 Watts.
3. A dynamo transforms acceleration due to the earth's gravity (981 cm/sec^2) into electrical energy.
4. When short-circuited, the dynamo has a maximum braking effect on the source used to drive it, e.g. motor, turbine, fly-wheel.
5. The molecular generator can only deliver a given amount of power.
6. This power is limited by the capacity of the permanent magnets with which it is equipped.
7. At low speed, i.e. low frequency, the amplitude of the intensity curves are large.
8. At high speed the amplitude of the intensity curves are small and the periods numerous.

9. In the two cases cited above, the output remains the same.
10. The molecular generator transforms the acceleration due to a permanent magnetic field into electrical energy.
11. In short-circuiting, the molecular generator has a minimum braking effect.

NEW ELECTRIC GENERATOR

This concerns a fully new type of electric generator which operates according to physical theories developed over the last 25 years and which took more than 1/2 million Swiss francs investments for research and testing.

It is now ready for industrial production as working prototypes can demonstrate. It is protected by international patents.

The main characteristics of this generator are:

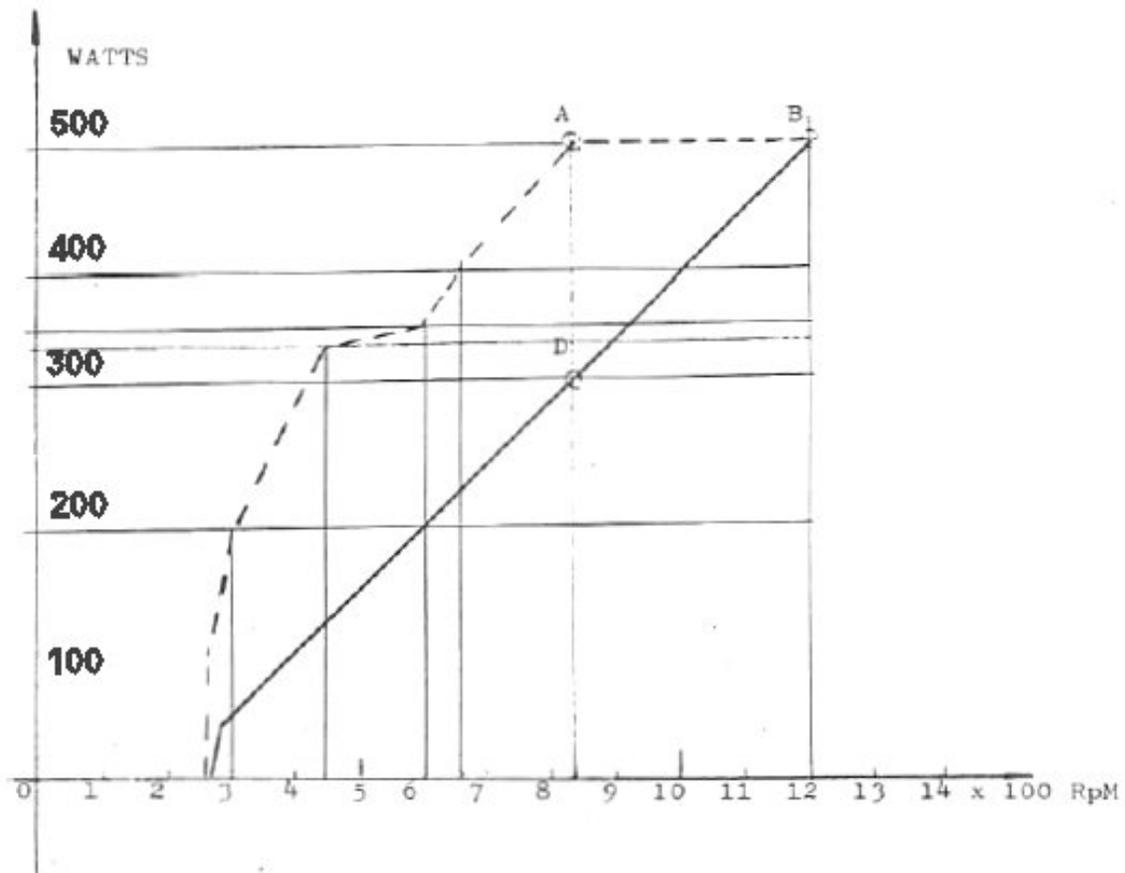
1. Almost constant electric power output in spite of a variation range of its rotor speed of about 35% (cf. output curve : ----- AB, on diagram).
2. Ability to work under short-circuiting conditions without heating of its rotor or any other part and without braking effect *(no back torque)*
3. High production efficiency (ratio output/driving force), better than on conventional equipment (cf. curve ---- and curve — at same speed, D & A level, on diagram).
4. Produces alternative current; frequency adaptable to existing frequency of electric power networks on which it will be connected.
5. Rotor requires a rotating speed of about 1200 ± 400 Rpm.
6. Construction costs about 30% under costs of traditional equipment of same installed power, because of more simple construction, tooling and engineering.
7. For certain construction particularities the use of this generator is mainly appropriated for important power level, above a minimum of 1.000 KVA.

diagram attached.

NEW ELECTRIC GENERATOR

This diagram shows the comparison between the new electric generator and the classical generator. Difference between their output force / driving speed ratio. (WATTS/RpM).

----- curve of new generator
————— curve of classical generator



Appendix #3

Great Britain Patent #14,311
System for the Generation of Electric Currents
Issued to Carlos F. Benitez



Date of Application, 9th Oct., 1915
(Patent of Addition to No. 17,811, 28th July, 1914)
Complete Specification Left, 5th Feb., 1916
Complete Specification Accepted, 17th Aug., 1916

PROVISIONAL SPECIFICATION.

System for the Generation of Electric Currents.

I, CARLOS F. BENITEZ, Civil Engineer, of 141, Ocampo Street, in Guadalajara, Mexico, do hereby declare the nature of this invention to be as follows:—

The invention which forms the object of this Patent of Addition, relates to new improvements in the system for the generation of electric currents, described
 5 in the main Patent No. 17,811, filed July 28th, 1914, and in the Patent of Addition No. 5591, filed 14th April, 1915.

The said system may be still further simplified and improved by the addition of batteries of accumulators, which suitably adjusted in conjunction with the said described system, can be charged and discharged alternately, producing
 10 furthermore an excess of electrical energy, that can be employed at will, for any purpose outside the automatic operation of the arrangement under description.

In other words, in this arrangement I use synthetically in combination: two groups of accumulators connected in series; two groups of accumulators
 15 connected in parallel; both said groups disposed in such way as to utilise the discharge of one of them, for the charging of the other, and *vice versa*; and means for the application of the energy produced by any of the methods described with reference to the English Patents No. 17,811/14 and No. 5591/15, in order to increase the effect of the discharges of each group of accumulators when acting
 20 from one to another; and means for reversing the operations of such groups.

Another object of this new arrangement is to provide means for the operation of said system, using low voltages, condensers of small capacities, and greater facilities for starting.

The advantages of such an improvement will be better understood by
 25 considering the adjoining drawing, which illustrates one method of carrying out the invention:

In the figures: 1, 2, 3, 4, are batteries of accumulators, that once charged from some exterior electrical source, will maintain their charges indefinitely, in the following manner:

30 With the connections established as shown in the figure, *i.e.* when accumulators 1—2 are connected in series through switch 5, (switch 6 being opened): the accumulators 3—4 are connected in parallel through switch 7, (switch 8 being opened).

Under these conditions, supposing the four batteries to be alike, if
 35 battery 1—2, has been previously charged from some exterior source; when discharging they will have a voltage superior to the counter electromotive force opposed by the batteries 3—4 receiving such discharge. In other words, if by means of the conductor 13 the positive pole 9 of battery 1—2, is connected to the positive poles 10, 32, of batteries 3—4, and both negative poles 11, 12 of both
 40 batteries are connected together; an electric current will be established from

[Price 6d.]



System for the Generation of Electric Currents.

battery 1—2, to batteries 3—4, until the voltages of both batteries are alike. Of course the current furnished by the discharge of battery 1—2 alone, would produce a smaller charge in the batteries 3—4, but that current can be increased by any of the methods already described in the aforesaid Patents No. 17,811/14, and 5091/15, and by these means it is always possible to charge and discharge alternately each battery 1—2 and 3—4, from one to another, keeping constant a predetermined charge, and furthermore producing an excess of electrical energy, that can be employed at will.

With these objects in view, and using as an illustration the arrangement shown in the Sheet 1 (Figure 1) of the Patent of Addition No. 5591/15; the condenser 14 is connected in series in the conductor 13. In the same manner, the primary 15 of an ordinary induction coil provided with an interrupter, is connected by each of its poles 16, 17, to the same wire 13. The secondary of same induction coil is connected by each of its poles 18, 19, to the poles 20 and 21, of the second condenser or battery of condensers 22. These same poles are furthermore connected through the spark gap 23, with the poles 24, 25, of the primary 26, of a high-frequency transformer. The secondary 27 of this same transformer is connected by each of its poles 28, 29, with the poles 16, 17, of the induction coil 15. Finally both poles of condenser 14 are connected to the conductors 30, through which a part of the electrical energy provided by these means, can be shunted and employed at will.

This arrangement being made, the electrical energy stored by the accumulators 1—2, passing through the pole 9, wire 13, primary 15 of the induction coil, pole 10 of the accumulators 4, pole 31 of switch 7, and pole 32 of accumulators 3, will go back through pole 12 to the same battery 1—2.

As a consequence of the passage of this electric current through the primary 15 of said induction coil; high-tension currents will be obtained in its secondary, which being collected by the condenser 22, will finally produce high-frequency currents through the primary and secondary of the high-frequency transformer. On the other hand, inasmuch as the poles 28, 29, of this transformer are connected with the poles 16, 17, of the induction coil, said currents will greatly increase the number of amperes furnished by the accumulators 1—2, and the storage batteries 3—4 receiving thus a proper amount of current can be fully charged by these means. The excess of the electrical energy thus obtained can be shunted through the conductors 30, in order to be employed at will, as has been stated.

Under these conditions, as the voltage in one of the batteries is decreasing, and increasing in the other, after some hours work both voltages become alike, and then it is impossible to produce any movement of electricity from one to the other battery, unless the switches 5, 6—, 7, 8, are operated for that purpose. Speaking in other terms, inasmuch as battery 3—4 is charged, and battery 1—2 is almost discharged, if the functions of said batteries are now reversed, the original conditions can be established once more, and the same operations repeated entirely as before.

In order to attain these results, the switches 5 and 7 that were closed, must now be opened, and the switches 6 and 8 that were opened, must now be closed. That is to say, the batteries 3—4 being thus connected in series, and the batteries 1—2 being connected in parallel, the former conditions are reversed, and a current will be caused now from battery 3—4, to batteries 1—2, through the primary 15 of the induction coil, thus obtaining the same results, as often as these operations are performed.

When the resistance offered to the passage of the electric currents by the primary of the transformer 15 is not high, it is possible to simplify the former arrangement obtaining the high-frequency currents directly from the same induction coil 15, in which case the poles 18, 19 of the secondary of said coil must be connected to the poles 16, 17, of the same said coil, and the second battery of condensers 22 and high frequency transformer 26, 27, can be omitted.

System for the Generation of Electric Currents.

Under these conditions the breaker or interrupter employed in said induction coil, acts as spark-gap, and the condenser 14 discharges in the form of oscillations through the primary 15 of same coil, thus directly increasing the amount of electrical energy furnished by the accumulators.

5 Dated this 9th day of October, 1915.

CARLOS F. BENITEZ.

COMPLETE SPECIFICATION.**System for the Generation of Electric Currents.**

I, CARLOS F. BENITEZ, of 141, Ocampo Street, in Guadalajara, Mexico, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

The invention which forms the object of this Patent of Addition, relates to new improvements in the system for the generation of electric currents, described in the main Patent No. 17,811 filed on July 28th, 1914, and in the Patent of Addition No. 5591 filed on April 14th, 1915.

The said system may be still further improved by the addition of batteries of accumulators which suitably adjusted in conjunction with the said described methods, can be charged and discharged alternately, and by so doing, an excess of electrical energy that can be employed at will, independently of the automatic operation of the arrangement under description, can be still further obtained.

In other words, in this arrangement I use synthetically in combination: one or more batteries of accumulators already charged by proper means and connected in series; a second battery or batteries of accumulators connected in parallel, series-parallel or in any other manner producing an inferior voltage to that obtained in the first battery or batteries; both said batteries arranged in such a way as to utilise the discharge of the accumulators connected in series, for the charging of the accumulators of the second battery or batteries; and means for generating high frequency currents, through the circuit connecting both batteries of accumulators, in order to increase the energy of the discharges of each of said batteries when acting from one to the other, securing thus the charging of the second group of accumulators, while the first battery is discharging or *vice-versa*, and producing furthermore a surplus of energy that can be employed at will, without impairing the normal running of this described arrangement; and finally means for the application of this extra energy to any outside purpose.

In this manner, the current given by the battery of accumulators connected in series, is increased when discharging by the electrical oscillations produced by proper means in the same said circuit connecting both groups of accumulators, and the second battery connected in parallel can be thus fully charged, while the first battery is discharging. On the other hand, as the number of electrical oscillations per second can be increased at will in the same said circuit, an excess of electrical energy can be obtained by this process, and the surplus of this energy, can be applied to any outside purpose, without impairing the normal running of the process as above stated.

The advantages of such an improvement will be better understood by considering the drawing left with the Provisional Specification and the annexed sheet which illustrate two different methods of carrying out the invention.

50 In both drawings: 1—2 and 3—4, are batteries of accumulators that once charged from some exterior electrical source, will maintain their charges indefinitely in the following manner:

System for the Generation of Electric Currents.

With the connections established as shown by both drawings: *i.e.* with the accumulators 1—2 connected in series and the accumulators 3—4 connected in parallel, if battery 1—2 has been previously charged from some exterior source; when discharging it will have a voltage superior to the counter electromotive force opposed by the battery 3—4 receiving such discharge. In other words, if 5
by means of the conductor 13, the positive pole 9 of battery 1—2, is connected to the positive pole 10 of battery 3—4, and both negative poles 11 and 12 of both batteries are connected together, an electric current will be established from battery 1—2 to battery 3—4 until the voltages of both batteries become alike. Obviously the current furnished by the discharge of battery 1—2 alone, 10
would produce a smaller charge in the batteries 3—4, if some extra energy were not added to the normal output of said battery 1—2.

With this object in view any of the known methods for the generation of high-frequency currents, as well as those described in the aforesaid English Patents No. 17,811/14 and 5591/15, can be employed in conjunction with said 15
batteries of accumulators, in order to provide that complementary energy, and in this manner it is always possible to charge and discharge alternately each battery from one to the other, maintaining constant a storage of electricity and producing furthermore an excess of electrical energy.

Another object of this new arrangement is to provide means for the operation 20
of these same said methods described by the afore said English Patents, using low voltages, condensers of small capacities, and greater facilities for starting.

Referring now particularly to the arrangement shown by the drawing left with the Provisional Specification: the primary 15 of an ordinary induction coil, provided with its condenser 14, and a suitable interrupter (not shown in the 25
figure), is connected in series to the above stated batteries 1—2 and 3—4 through the wire 13. The secondary of same induction coil is connected by each of its poles 18, 19, to the poles 20 and 21 of the second condenser or battery of condensers 22. These same poles are further more connected through the spark-gap 23, with the poles 24, 25, of the primary 26 of a high-frequency transformer. 30
The secondary 27 of this same transformer is connected by each of its poles 28, 29, with the poles 16, 17, of the induction coil 15. Finally both poles of condenser 14 are connected to the conductors 30, through which a part of the electrical energy provided by these means, can be shunted and utilised at will.

This arrangement being made, the electrical energy stored by the accumulators 1—2 passing through the pole 9, wire 13, primary 15 of the induction coil, pole 10 of the accumulators 4, pole 32 of the accumulators 3; will go back 35
through pole 12 to the same battery 1—2.

As a consequence of the passage of this electric current through the primary 15 of said induction coil; high tension currents will be obtained in its secondary, 40
which being collected by the condenser 22, will finally produce high-frequency currents through the primary and secondary of the high-frequency transformer. On the other hand, inasmuch as the poles 28, 29, of this transformer are connected with the poles 16, 17, of the induction coil, said currents will greatly increase the energy furnished by the accumulators 1—2, and the storage 45
batteries 3—4 receiving thus a proper amount of current, can be fully charged by these means. The excess of electrical energy thus obtained can be shunted through the conductors 30, in order to be utilised at will, as has been stated.

Under these conditions, as the voltage in one of the batteries is decreasing and increasing on the other, after they have been working some time, their 50
voltages become alike, and then it is impossible to produce any movement of electricity from one to the other, unless their functions are reversed. Speaking in other terms the battery 1—2 connected in series must now be connected in parallel, and *vice-versa* the battery 3—4 connected in parallel must now be connected in series.

With this object in view, and in order to illustrate this particular point, said 55
batteries 1—2 and 3—4, have been connected respectively through the

System for the Generation of Electric Currents.

switches 5, 6, and 7, 8, in such a manner that by reversing the position of said switches, the connections of said batteries are easily reversed; but in practice far better results can be attained by the use of the commutator shown in the adjoining Sheet No. 2, as will be further explained.

5 By these means the original conditions of voltage can be easily re-established each time that the discharging battery is becoming exhausted, and a reverse current can be obtained through the primary 15 of the induction coil, thus securing the same results as often as these operations are performed.

10 As the resistance offered to the passage of the electric currents by the primary of the transformers is not high, it is possible to simplify the former arrangement obtaining the high-frequency currents directly from the same induction coil 15, in which case the poles 18, 19 of the secondary of said coil must be respectively connected to the poles 16, 17 of the primary of same said coil, and the second battery of condensers 22 and high-frequency transformer 26, 27, can be omitted.

15 Under these conditions the breaker or interrupter employed in said induction coils, acts as spark-gap and the condenser 14 discharges in the form of oscillations through the primary and secondary of same coil, thus directly increasing the amount of electrical energy furnished by the accumulators.

Such arrangement is particularly illustrated in the annexed sheet Fig. 1, in which: each one of the poles of the accumulators composing the batteries 1—2

20 and 3—4, are correspondingly connected to the several poles of a commutator 31.

This commutator as shown by the figure, consists of a rotary cylinder 32, provided with the conductive paths 33, 34, 35, 36, 37, 38, 39, 40, properly isolated and distributed on its surface, in such way, as to connect alternately in

25 series or parallel the different units composing the above mentioned batteries 1—2 and 3—4.

Same cylinder 32 is furthermore provided at one of its ends, with the two conductive paths 41, 42, that can be better seen in the cross sectional view of Figure 2, the same said cylinder passes through a ring 44, fixed to the same base 31

30 of the apparatus, and provided with the contacts 45, 46, 47, 48. On the other hand the pole 45 of this ring is connected to the pole 10 of the battery 3—4, and its pole 46 is connected through the wire 49, to the pole 9 of battery 1—2. Pole 47 is connected through wire 13 to pole 16 of the primary of a transformer, and pole 48, is connected through wire 55, to the back contact stud 50 of an

35 ordinary breaker.

A back wall 51, fixed to the same base of the commutator, is provided with the metallic strips or brushes that can be clearly seen in the figure, in contact with the cylinder 32, and connected respectively to each one of the poles of the accumulators; and finally the rotative shaft of same cylinder is provided with

40 a handle or pulley 52 affording means for the operation of this commutator.

Condenser 14 of the induction coil, is connected as usual by its pole 52 to pole 17 of the primary of same transformer, and its other pole 53 instead of being connected to the back contact stud 50 of the breaker, as is generally the case, is grounded through wire 54, and pole 56 of the commutator.

45 Under these conditions when the circuit is broken by the interrupter, condenser 14 is charged and immediately afterwards discharges *via*: primary 15 of the transformer, secondary of same transformer, wire 55, pole 48, path 41 of the commutator, and battery (3—4) in parallel.

As a consequence of the passage of the electric current produced by this discharge through the primary 15 of the transformer, induced currents are produced

50 in its secondary and one of these currents the inverse passing through pole 19 is immediately utilised for the charging of same said battery in parallel. The direct current that is produced when the discharge of said condenser 14 is finished, passing through pole 18 and entering the primary 15 through pole 16, produces

55 a new charge in the same condenser 14, that again discharges in identical manner, and the same phenomena are reproduced several times in the beats or intervals of breaks and makes produced by the interrupter.

System for the Generation of Electric Currents.

On the other hand, if the pole 56 of the commutator is not grounded, each time that the condenser 14 receives a new charge, the neutral fluid of its outer coating is influenced through its dielectric and an induced electric current is forced to move *via* wire 54 and pole 56. In other words this extra energy equally increases the normal output of said battery 1—2.

By these means the current given by the accumulators connected in series, is properly increased by the induced currents produced in the secondary of the induction coil, and by the rapid chargings and dischargings of the condenser produced in the above described manner, and the accumulators connected in parallel receiving thus a proper amount of current, can be fully charged while the first battery is discharging. However, as the first battery is discharging its voltage is progressively decreasing, and in order to maintain in the circuit a given current for the charging of the second battery, the resistance of the same said circuit must be accordingly reduced.

In order to attain this result without touching the wiring, the back contact stud 50 of the breaker can be adjusted, in order to secure a proper resistance through the interrupter in accordance with the decreasing voltage, and in this manner it is always possible to maintain a given current in the circuit, until the very last limit of energy in the discharging battery is attained.

Better results in every respect can be still obtained by the use of a closed core type transformer combined with an electrolytic interrupter, since with these interrupters practically there is no lost time in the intervals between breaks and makes, and the resistance of such devices can be easily adjusted at a distance wherever the operator may desire.

Once the limit of energy in the discharging battery is attained, the connections of the accumulators must be reversed, and with this object in view the commutator shown by the figure can be employed, and the cylinder 32 must be revolved until the paths 37, 38, 39, 40, come in contact with the brushes connecting the poles of the accumulators, and the contacts 45, 47, are connected through path 42. By so doing the functions of both said batteries are at once reversed, and the accumulators 3—4 being now connected in series, they will discharge through pole 10, *via*: poles 45, 47, wire 13, primary 15, wire 55, pole 48 (now in connection with pole 46 through path 41), wire 49 and pole 9 of battery 1—2, that is now connected in parallel through paths 39, 40.

In other words the working conditions can be thus completely reversed by the simple operation of the commutator, and a continuous current can be maintained through wire 55, in which the primary 57 of an ordinary transformer, or any other suitable device, can be inserted in series, in order to profit the surplus of the electrical energy thus obtained, without impairing in the least the running of the mechanism.

Obviously means can be disposed in order to obtain an automatic operation of the commutator, from time to time, in accordance with the capacity of the accumulators employed, and in consequence, for a given weight of batteries, greater power can be secured by this process, with smaller capacities, than with the greater units, since the same 4 volts can be obtained from a 60 amp.-hours accumulator, as with a 10 amp.-hours capacity.

I desire also to explain clearly that the arrangements shown are entirely illustratives. That in practice in each case the accumulators composing each battery, can be connected as described or a suitable combination of series-parallel can be arranged in each group, and that the connections of the several apparatus employed can be varied in accordance with the particular conditions of power that must be satisfied.

Having now particularly described and ascertained the nature of my said invention, and in what manner the same is to be performed, I declare that what I claim is:—

In a system for the generation of electric currents:

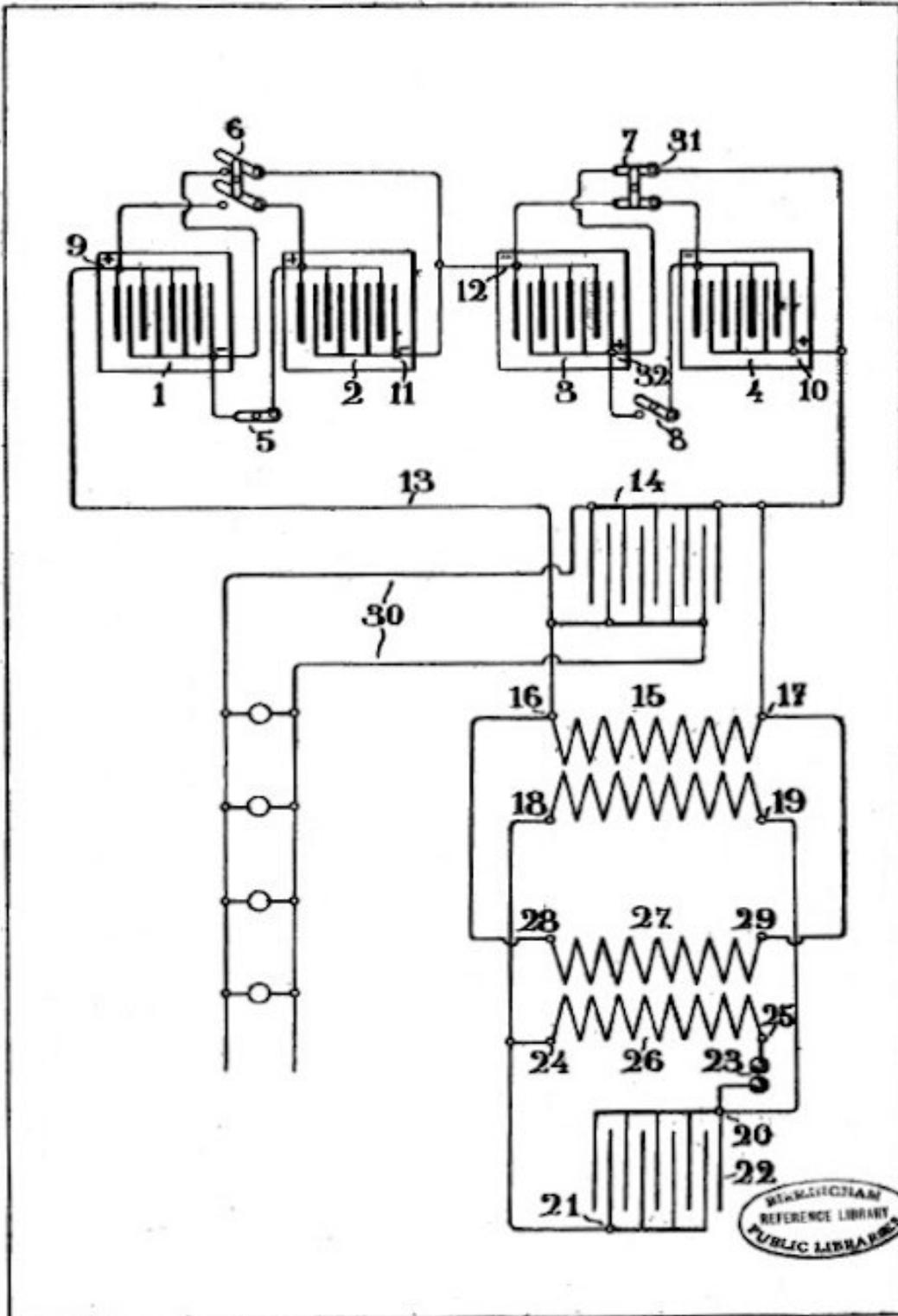
System for the Generation of Electric Currents.

1. Disposed in combination: One or more batteries of accumulators already charged by proper means, and connected in series; a second battery or batteries of accumulators connected in parallel, series parallel, or in any other manner producing an inferior voltage to that obtained in the first battery or batteries;
- 5 both said batteries arranged in such a way as to utilise the discharge of the accumulators connected in series for the charging of the second battery or batteries; means for generating high frequency currents through the circuit connecting both batteries of accumulators, in order to increase the energy of the discharges of said batteries, and for utilising part of this energy thus
- 10 increased in any outside purpose; and means for reversing from time to time the respective connections of such batteries; all substantially as herein described and for the specified objects.
2. Disposed in combination: Mechanisms or apparatus arranged, connected and operating substantially in the manner described, in connection with the
- 15 appended drawings and for the purposes shown.

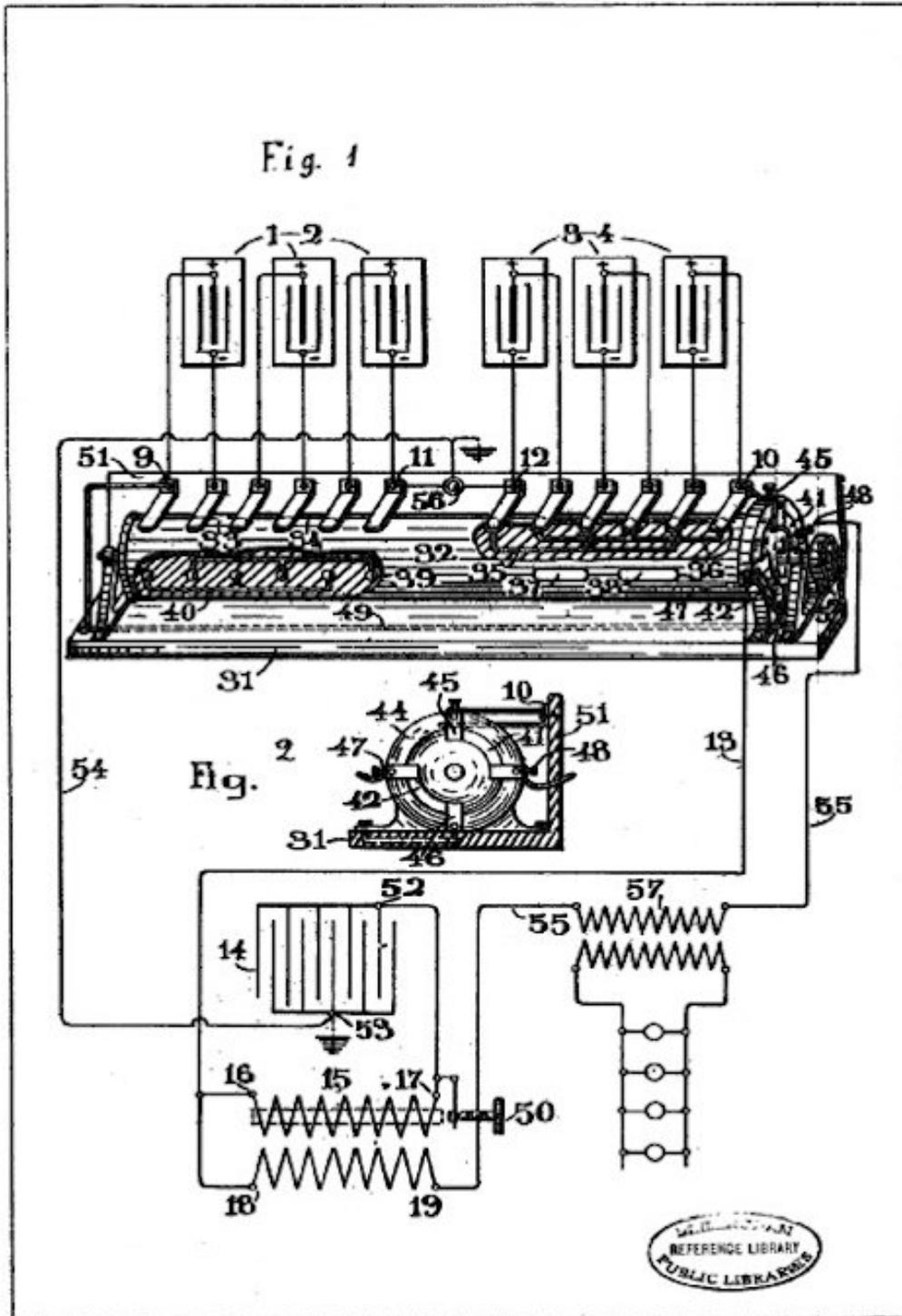
Dated the 4th day of February, 1916.

CARLOS F. BENITEZ.

Redhill: Printed for His Majesty's Stationery Office, by Love & Malcomson, Ltd.—1916.



MEMORANDUM
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Appendix #4

Report on Visit to John Bedini

September 3, 1984

Written by Eike Mueller

EM/409031

Report on Visit to John Bedini

With Comments by Tom Bearden
And Additional Experiments by Eike Mueller

3 September 1984

By: Eike Mueller

FOREWORD

Following an invitation by John Bedini, I went with him to Los Angeles immediately after the Colorado Springs Tesla Symposium on 10-12 August 1984. We had two days together to work on the Kromrey Converter and the Tesla Switching Device.

One thing came out very clearly: every time when we locked into the "free energy" all commonly known physical laws are no longer valid. The things happening react directly opposite to what one would expect. Specifically the more we loaded a specific circuit, the more output energy we gained, while using a constant input energy level. I will come back to this effect later, when I describe the experiments in more details.

At this point I want to take the opportunity and thank John Bedini and his lovely wife for their hospitality and assistance. It takes persons like John to get the "free energy" rolling. Without his publication [1] of the detailed plans for his free energy device, we would definitely not have seen the free energy devices demonstrated during the Tesla Symposium.

Also many thanks to Tom Bearden, who took his time and explained the results of the tests performed on 13-14 August 1984. His comments are contained in the concluding chapter of this report.

Kromrey Converter

John Bedini found that the material generally available concerning Kromrey's Converter had been altered. Rebuilding the Kromrey Converter from the patent papers ended up in a non-functioning device. Bedini found the necessary modifications which made this machine perform.

Our first goal was to determine the converter's efficiency. We found this to be quite difficult as the efficiency changes with the load applied.

FIGURE K-1 shows the first setup we used. We drove the Kromrey Converter from a 12 V motorcycle battery. We connected at the output of the converter a condenser and a rectifier bridge in parallel. The rectified current was then put back into the motorcycle battery. To detect any current flow, we connect into the positive line a 12 V light bulb.

The result of this test was that the light bulb was lit up. However, after 15 minutes the battery voltage had dropped from 11.05 V to 9.10 V. The speed of the converter was stable at 1020 rpm.

[1] "Bedini's Free Energy Generator" by John Bedini, Tesla Book Company, Millbrae, California 1984

BEDINI, MUELLER 13 AUGUST 84 TEST # 1
 KROMREY DEVICE

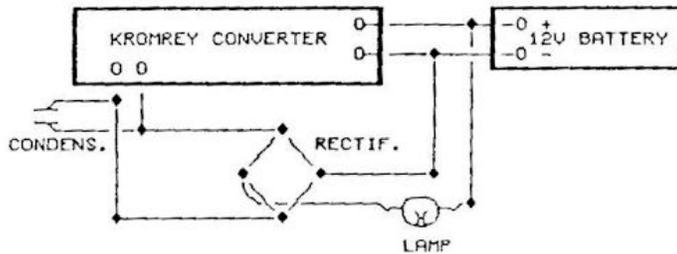


FIGURE K-1
 KROMREY CONVERTER
 TEST SETUP

SPEED OF CONVERTER: 17 RPS.
 VOLTAGE AT BEGINNING: 11.05 V AFTER 15 MINUTES: 9.10 V

In the next test we introduced a separate battery (BATTERY #2) for charging from the converter.

We recharged the battery #2 from 12.30 V to 12.40 V within 4 minutes, and we measured a current into battery #2 of 0.8 amperes.

BEDINI, MUELLER 13 AUGUST 84 TEST # 2
 KROMREY DEVICE

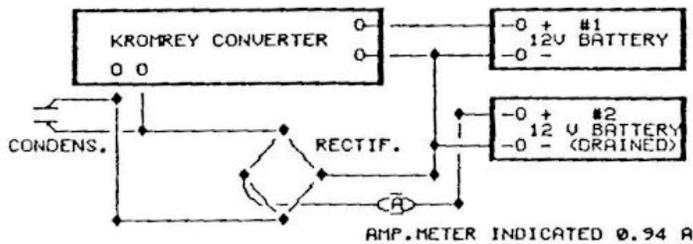
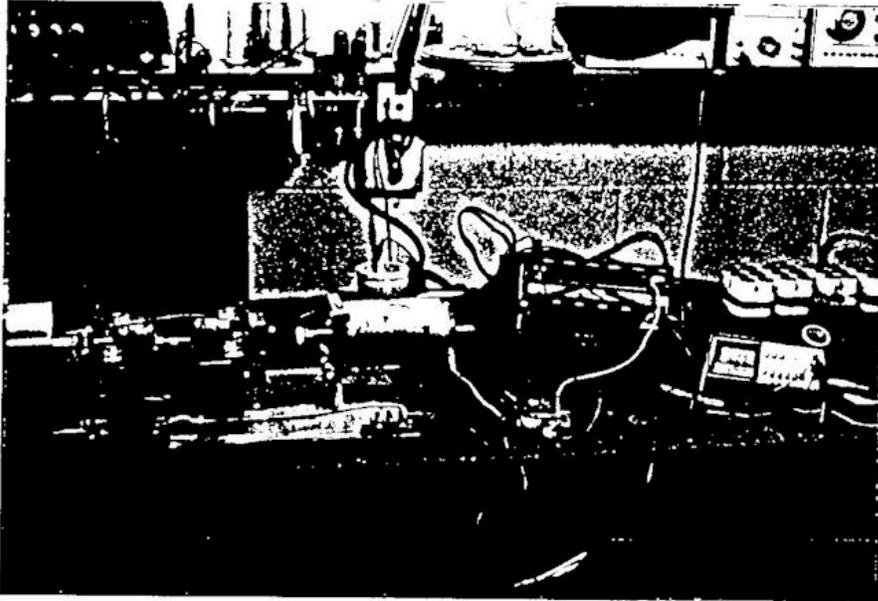


FIGURE K-2
 KROMREY CONVERTER
 SETUP 2

CHARGING OF BATTERY #2 VIA KROMREY CONVERTER AND BATTERY #1
 VOLTAGE BATT. #2: 12.35 V, AND AFTER 4 MINUTES: 12.40 V

PICTURE C-1.1 shows the second test setup. On the left side is the Kromrey Converter, powered by an electric motor (center). Battery #2 is the battery in the front (center right) and battery #1 is the one behind it. The voltmeter shows the voltage of battery #2. The 12 V light bulb is on the table in front of battery #2.



PICTURE C-1.1
KROMREY CONVERTER
SECOND TEST SETUP

Because the Kromrey Converter turned too slow on one 12 V battery, we decided to drive the Converter using 24 V via two 12 V batteries, connected in series. PICTURE C-1.2 shows this setup.



PICTURE C-1.2

84 8 13

Next we wanted to find a correlation between the normal charging of battery #2 using a commercial battery charger, and charging this same battery with the Kromrey Converter. We drained the battery #2 to 8 V, connected it to the Kromrey Converter, and after reaching 11.51 V, we measured the time it took to charge the battery from this voltage level of 11.51 V to 12.45 V. We reached this voltage (12.45 V) after 11 minutes. The indicated current into the battery was 0.94 A.

We then repeated these steps using the commercial battery charger. Because we ran out of time after nearly 2 hours, we disconnected the battery from the charger. The battery voltage had reached 12.41 V. The measurement is depicted in FIGURE K-3.

BEDINI, MUELLER 13 AUGUST 84 TEST # 3
 KROMREY DEVICE
 COMPARISON MEASUREMENT USING A
 CONVENTIONAL BATTERY CHARGER
 BATTERY #2 VOLTAGE: 11.51 V
 AFTER 119 MINUTES: 12.41 V

FIGURE K-3

CHARGING CURRENT AT BEGINNING: 0.60 A; AT THE END: 0.37 A
 NOTE: HE DID NOT REACH 12.45 V EVEN AFTER 2 HOURS.

We wanted to find the correction factor for the Kromrey Converter by comparing the same effect, i.e. the charging of the same battery from one specific voltage to another specific voltage. The calculation of this factor is shown in FIGURE K-4. This correction factor C_K was determined by dividing the area Y (amperes over time, for charging with the commercial battery charger) through area X (amperes over time, Kromrey).

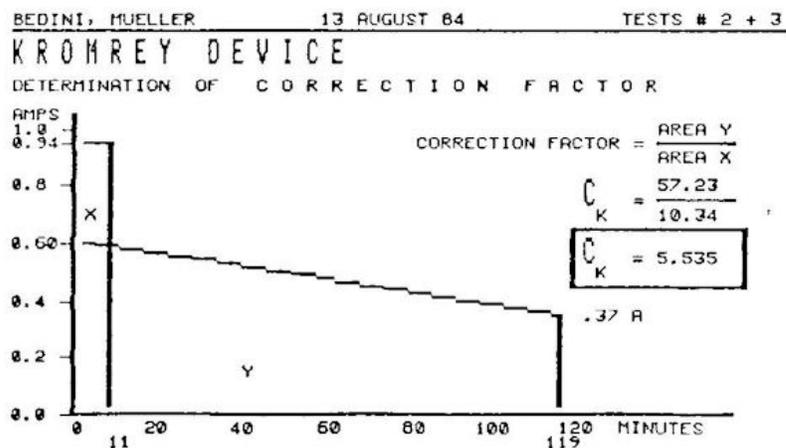


FIGURE K-4

TABLE K-1 shows the combined test results. Because we detected an increase in the speed of the Kromrey Converter as well as a decrease in the input energy when we increased the output load, we decided to measure the input energy and speed when the output was shorted. Again, the input energy dropped and the speed increased.

MEASUREMENT	NO LOAD	LOADED WITH BATTERY	SHORTED	CORRECTED FACT. 5.535
- INPUT VOLTAGE	25.30	25.00	24.90	
- INPUT CURRENT	3.90	3.00	2.20	
WATTS IN	98.67	75.00	54.78	
- SPEED IN REV/SECOND	40.00	45.00	73.00	
- OUTPUT VOLTAGE (DC)	48.00	10.80	N/A	
- OUTPUT CURRENT	N/A	0.95	1.05	
WATTS OUT	N/A	10.26	N/A	56.78
WATTS IN/OUT		7.31		1.32

TABLE K-1

Using the earlier determined correction factor of 5.535 we calculated the energy we put into the battery to 56.78 Watts (from 10.26 * 5.535). Looking at TABLE K-1 we see that it takes only 54.78 Watts to run the Kromrey Converter when the output is shorted. This result led us to continue with these tests and load the converter output even more. The results of these tests can be seen in TABLE K-2 on the next page.

Here again, we detected that we will get a higher efficiency of the total device, the more we load down the output side. This effect is totally contradictory to the conventional laws of physics.

MEASUREMENT	NO LOAD	LOADED WITH LAMP & BATT.	LOADED WITH RESISTOR 13.5 OHM	LOADED WITH RESISTOR 0.43 OHM
- INPUT VOLTAGE	25.40	25.30	20.00	21.99
- INPUT CURRENT	3.90	3.90	3.37	2.30
WATTS IN	99.06	98.67	67.00	50.37
- OUTPUT VOLTAGE (DC)	48.00	28.00	50.00	20.00
- OUTPUT CURRENT	N/A	0.75		
- RESISTANCE (OHM)			13.50	0.43
WATTS OUT	N/A	21.00	185.19	634.92
WATTS OUT (CORRECTED)		116.24		
WATTS IN/OUT		0.85	0.37	0.08

TABLE K-2

We used the Kromrey correction factor for the first case, when we had connected the battery to the converter output. We did not use this factor in both other cases when we used resistors in the output circuit.

These above test results show that the efficiency of the Kromrey Converter is well above 100%.

The Tesla Switch

We used as a starting point for our experiments, the switching device John Bedini had built for the Tesla Symposium (FIGURE T-1). Our goal was to upgrade this switching device for ordinary car or motorcycle batteries.

To get a better understanding of this system, we first built only one half of the circuit. FIGURE T-2 shows our first arrangement.

BEDINI, MUELLER

13 AUGUST 84

TEST # 11A

TESLA SWITCH

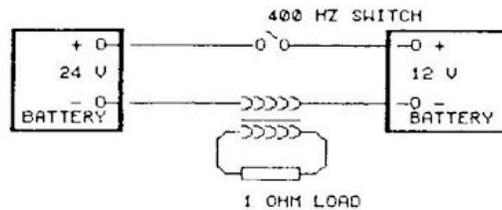


FIGURE T-2

TO RAISE THE VOLTAGE FROM 11.51 V TO 12.45 V TOOK 5 SEC.

COMPARE THIS RESULT WITH TESTS # 3 AND 5, FIG. K-4

NOTE: 1 OHM RESISTOR REMAINED COLD AFTER 15 MIN. RUN TIME.

Using the setup shown in FIGURE T-3, we performed the same kind of test we did earlier, using the Kromrey Converter. This time we used a 12 V battery with one dead cell as if it were a 10 Volt battery (dead cell not in the loop). The supplying battery was a freshly charged 12 V battery.

In the first step we drained the 10 V battery. When we connected this battery to the conventional battery charger it showed a voltage of 1.7 Volts. After 12 minutes 20 seconds we had reached a voltage level of 10.24 Volts.

Again, we drained the battery and then connected it to the Tesla Switch. After 1 minute and 24 seconds we had reached 10.24 Volts. We detected that the temperature of the battery was higher than it was before, when we had used the conventional battery charger.

BEDINI, MUELLER

13 AUGUST 84

TEST # 11B

TESLA SWITCH

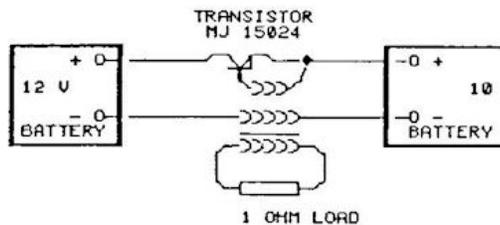


FIGURE T-3

TO RAISE THE VOLTAGE FROM 1.7 V TO 10.24 V TOOK 1 MIN 5 SEC.

NOTE: 1 OHM RESISTOR REMAINED COLD AFTER 15 MIN. RUN TIME.

Because we had already learned that the efficiency will go up the more we load the circuit (see TABLE K-2), we decided to load this Tesla circuit also. We modified our test setup slightly by introducing amperemeters and two light bulbs. A 110 V, 40 W bulb was used on the secondary side of the transformer, and a 12 V, 280 W quartz lamp was connected in parallel with the 10 V battery. FIGURE T-4 shows the arrangement and the currents we measured. Again, we found that when we connected the quartz lamp, the 110 V light instantaneously became brighter.

BEDINI, MUELLER 13 AUGUST 84 TEST # 12
TESLA SWITCH

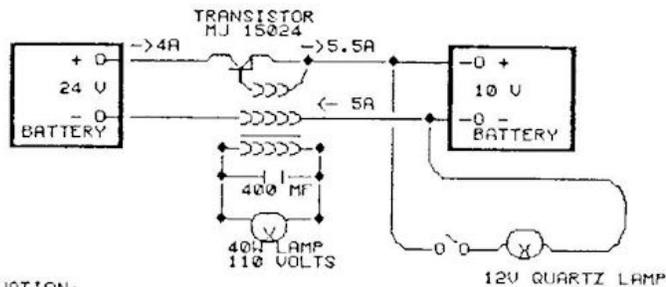
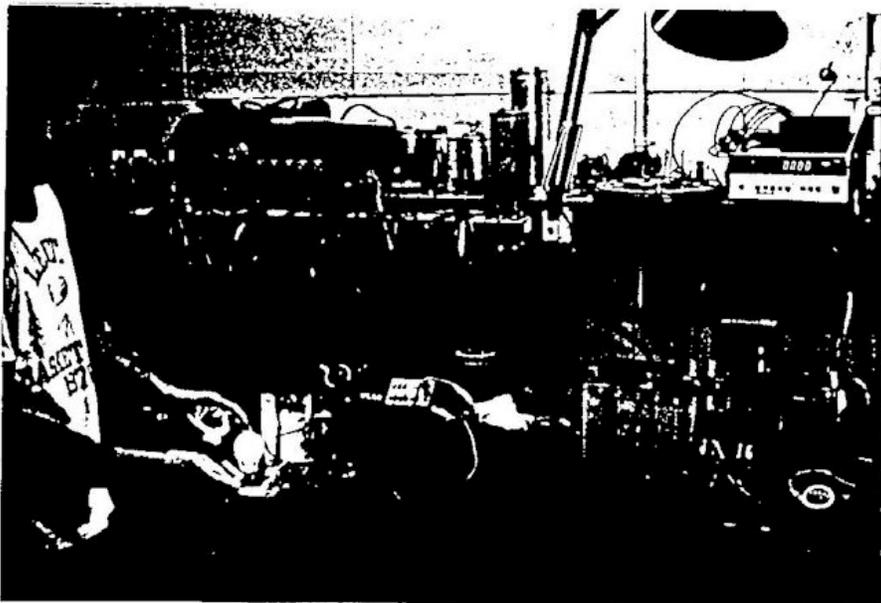


FIGURE T-4

OBSERVATION:

WHEN 12V QUARTZ LAMP WAS ADDED, THE 40W LAMP BECAME BRIGHTER

PICTURE C-2.1 shows this experiment. The quartz lamp is on top of the 10 V battery and the 110 V light bulb is in front of the transformer.



PICTURE C-2.1

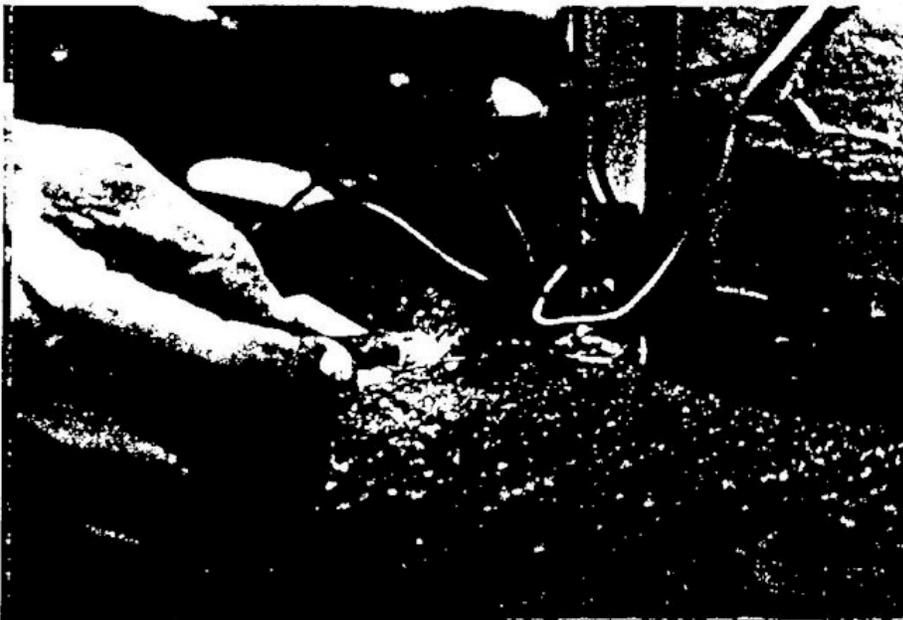
When we compare all the measured values we get the following table:

CURRENT FLOW FROM THE 24 V BATTERY:	4.0 A	AT 24.0 V	--->	96 WATTS

CURRENT FLOW INTO 10 V BATTERY:	5.5 A	AT 10.6 V	--->	58 WATTS
INTO QUARTZ LAMP:	30.0 A	AT 9.0 V	--->	270 WATTS
40 WATTS 110 V LIGHT BULB:			--->	40 WATTS

WATTS IN/OUT = $96/368 = 0.26$

Every time when we disconnected and connected the 110 V light bulb in the setup as shown in FIGURE T-4 we saw a spark about a half-inch long. The light of this spark was noticeably different from the light of sparks observed when experimenting with high voltages. PICTURE C-3 shows such a spark. We discovered that in addition to X-rays we were also generating scalar waves. These were detected using a scalar wave detector built by John Bedini, which was based on a plan by Tom Bearden.



PICTURE C-3

Simplified Diagrams

At the end of this report I now show two simplified switching diagrams. These have been modified from the original diagram of Mr. Ronald Brentte which was given to John Bedini, Ken Moore and I updated the original diagram to make it more understandable to the layman.

BEDINI, BRENTTE, MUELLER 23 AUGUST 1984 PICTURE 5
TESLA SWITCH SAME NUMBERS USED AS IN ORIGINAL

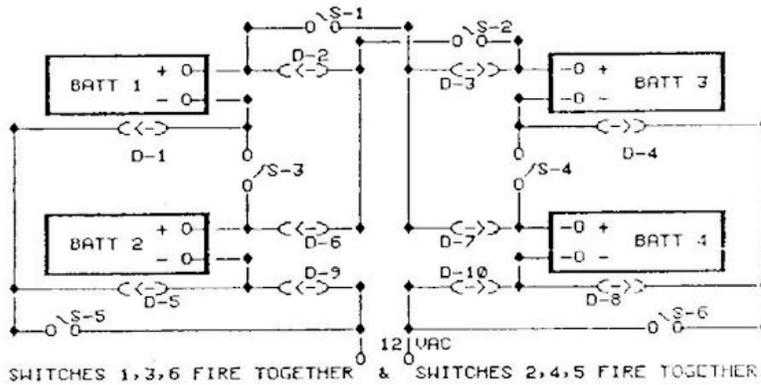


FIGURE T-5
Original Diagram of
Mr. Ronald Brentte

FIGURE T-6 shows how a circuit can work using three double-pole relay switches driven by a pulse rate generator (Ken Moore).

BEDINI, MUELLER, MOORE 23 AUGUST 1984 PICTURE 3
TESLA SWITCH - SIMPLIFIED DIAGRAM

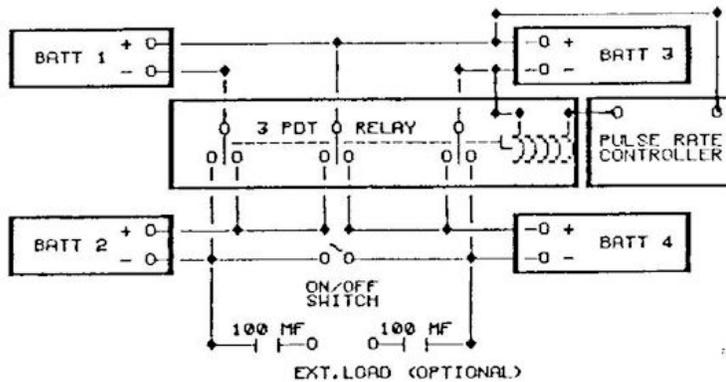
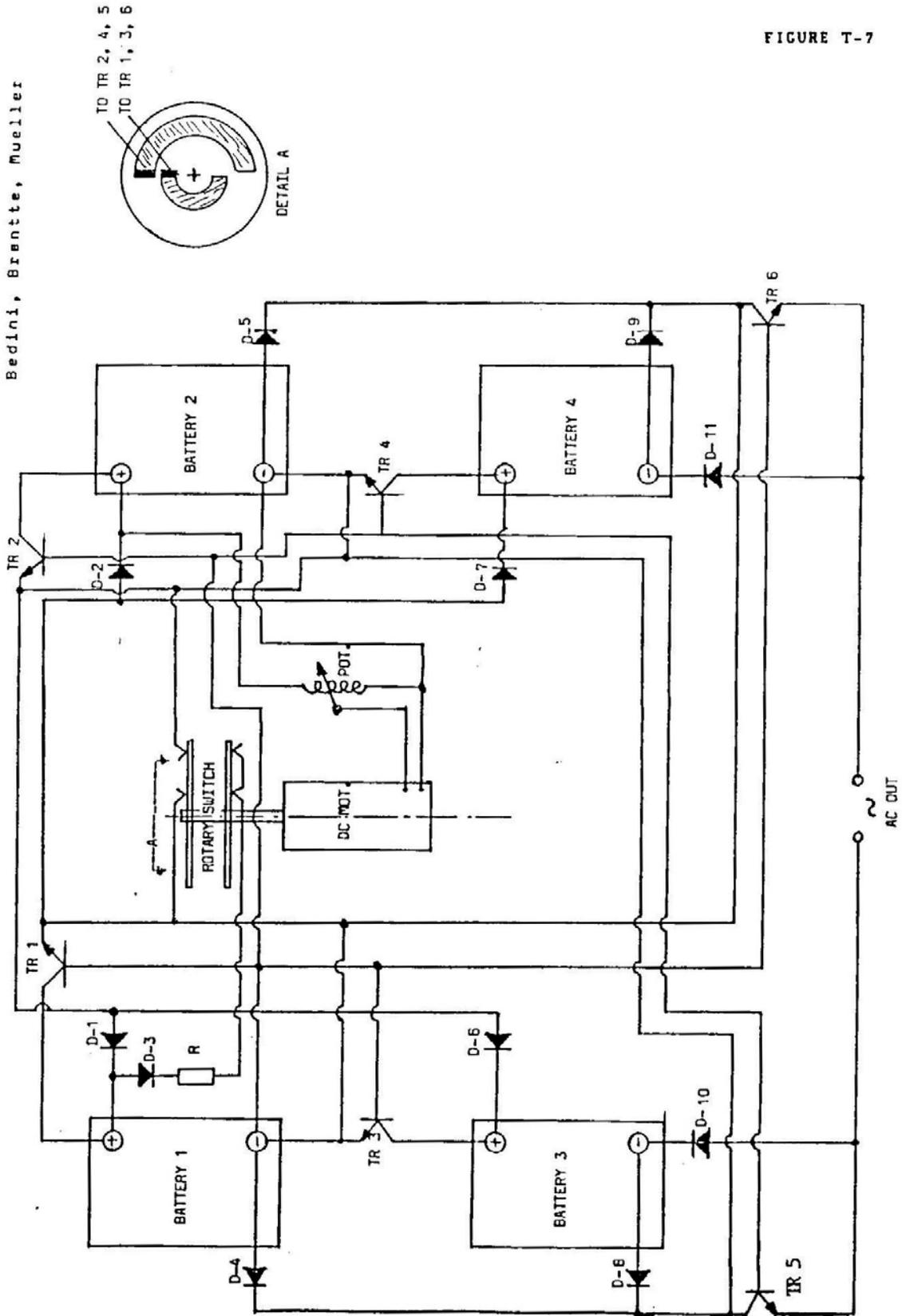


FIGURE T-6

FIGURE T-7 shows the circuit diagram for a setup using MJ 15024 power transistors driven by a rotary switch device.

FIGURE T-7

TESLA SWITCHING DEVICE



COMMENTS BY TOM BEARDEN

- The Observation/Detection Process -

From the standpoint of modern physics, the "universe" we detect, measure, and see is always the "output" of an interaction between the detector/observer and "that unobserved reality" that is really there before the interaction. The "basic reality, before observation/detection" is comprised of something referred to as "action," having the units of angular momentum. That is, unobserved reality is composed of "energy multiplied by time," or "momentum multiplied by length," or the product of two other "locked together" (canonical) variables.

The best way to visualize a photon -- the basic electromagnetic quantum -- is to think of it as "a little piece of energy welded to a little piece of time," with no seam in the middle. In other words, the photon is a sort of "fusion of energy and time, without separation in any fashion." When we speak of "energy," ultimately we speak of photon exchange, whether the photons are "virtual" (smaller than can be individually detected) or observable (large enough to be individually detected).

Even with the macroscopic mechanical interactions, ultimately the forces are generated not by colliding objects but by exchange of virtual photons, in the view of modern quantum physics.

At any rate, when we make a "detection," the smallest amount of change involved in the unobservable universe is one "quantum" of action. However, we do not actually detect a whole quantum: instead we detect one piece of the quantum and lose the other piece. In other words, if we detect all the little piece of energy in the quantum, we lose all the little piece of time. If we detect a little piece of momentum, we lose all the little piece of length. The point is, one can imagine that we "split" or "fission" the quantum when we "detect", and we only detect one part of it. FIGURE 1 shows the operation of the detection process. Specifically, according to quantum mechanics we can never directly detect or observe the piece of "time" at all. Time is not observable, even in principle, in quantum mechanics.

In my first crude paper along these lines [1], I pointed out that quanta do not superpose; instead, a single quantum change occurs at a time, and a single detection occurs at a time. In conceptually modeling the fundamental detector itself, it was necessary to utilize a "fusion" process on the fragments of the quantum resulting from the fission/detection process. In other words, one has to clear out the residue before another "fragmenting" can occur. The way this happens is that the two pieces are fused together, back into a full quantum, disappearing into the basic action continuum.

Thus the passage through time of a body occurs in little time jumps. (FIGURE 2). And each little piece of time helping to make an individual jump is removed before the next jump occurs. That is, our march through time is not at all through a continuous time dimension as

Minkowski spacetime and relativity model it. Instead, we march through time like a peculiar sewing machine, one stitch at a time, and each stitch made is removed before the next one is made. This explains precisely why we cannot "see through time" as we see along the physical dimension. The time dimension is continually fragmented and destroyed.

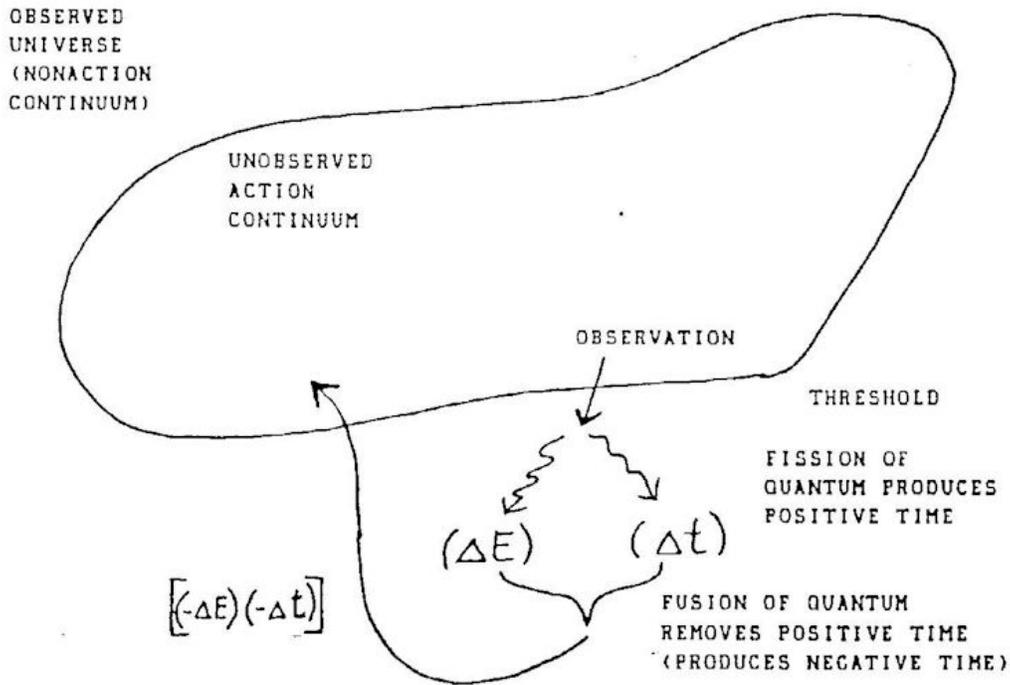


FIGURE 1. The Operation of Physical Detection at the Quantum Level.

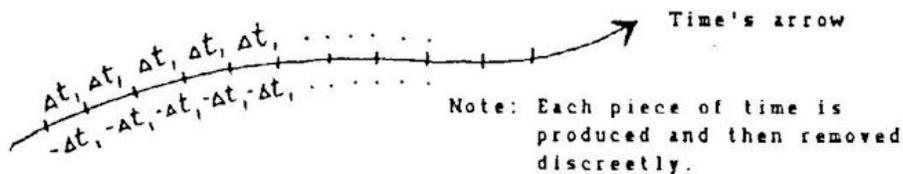


FIGURE 2. Passage of Object Through Time Occurs in Discrete Jumps

FIGURES 1 and 2 show the situation. Note that we can consider the "successive ripping out of time stitches" as the negative stream of time.

In this model, everything exists in both positive and negative time streams that usually are balanced. In this fashion, a completely new definition of mass was obtained, Newton's laws of motion (relativistic form) were derived, and the square law of gravitation was derived, albeit crudely. [2]

Now notice that, when an action quantum is split into conceivable energy and time, it may be split in two ways: a) it can be split into positive pieces of energy and positive pieces of time, or b) it can be split into a negative piece of energy and an negative piece of time. FIGURE 3 shows these possibilities of splitting. Note that, if we consider both the fission and fusion processes, both splits actually occur, depending upon which time stream one chooses to observe from.

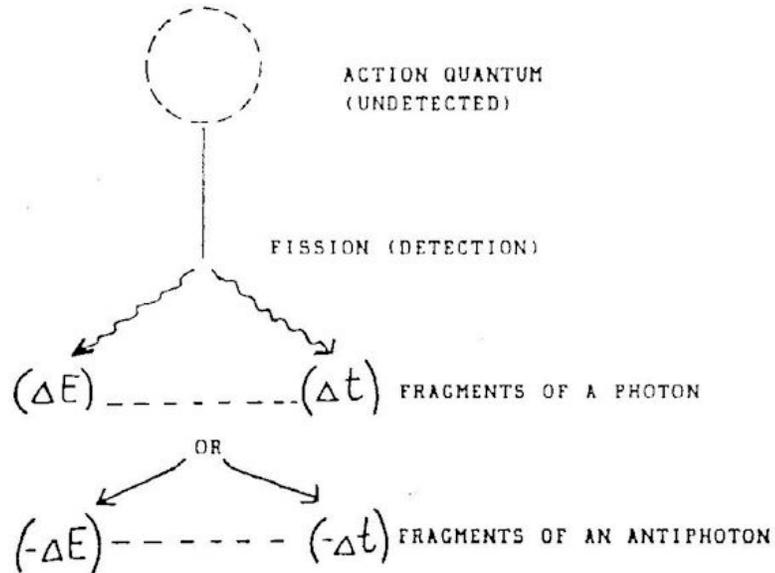


FIGURE 3. Two Possibilities of Action Quantum Fissioning

This is most interesting. We now have a concept whereby each object is passing through both the negative time flow and the positive time flow in an interweaved manner; to the microscopic observer, this appears to be simultaneously.

So an object may be said to possess both positive and negative energy, simultaneously, as a first order approximation. It possesses positive energy in positive time, and negative energies in negative time. In all normal processes, we have considered and developed only positive time processes. However, we point out that negative time operation is well-known in modern physics. Feynman diagrams involve extensive negative time travel. Originally Dirac did not predict the positron as a positive particle travelling forwards in positive time. Instead, he predicted a negative particle (traveling in negative time, in our

view), which we could only observe (with positive time instruments!) as a positive particle traveling forwards in time. In the view of modern physics, real particles already travel backwards in time sometimes.

But if we can actually produce some extra negative time in a device which normally is observed only to produce positive time, we shall obtain a reversal of entropy. Systems which tend to disorder in positive time, tend to order in negative time. Such an effect (production of negative time) involves the concomitant production of negative energy. However, negative electromagnetic energy will still run motors and burn light bulbs. The photon, you see, is its own antiparticle: and an antiphoton is just observed as another photon.

We will choose to regard an antiphoton as consisting of negative energy and negative time, and producing these two fragments if detected in the laboratory frame. The production of antiphotons and negative time will yield negentropy and additional or "free" negative energy, appearing to us to violate the ordinary "conservation of energy" law. This is no problem; production of unbalanced time streams, and hence the appearance of negative energy and negative time, is itself a "curved spacetime" phenomenon. Any system exhibiting this effect is existing in a locally curved spacetime (FIGURE 4). That is, it is now a general relativistic system, and energy need not locally be conserved. The system can appear to contain either a source or a sink, depending upon the individual system's functioning, to an external laboratory observer. We will return to this effect shortly.

Note the two time lines are of equal length. The negentropy device is producing negative energy and negative time, with respect to the lab observer.

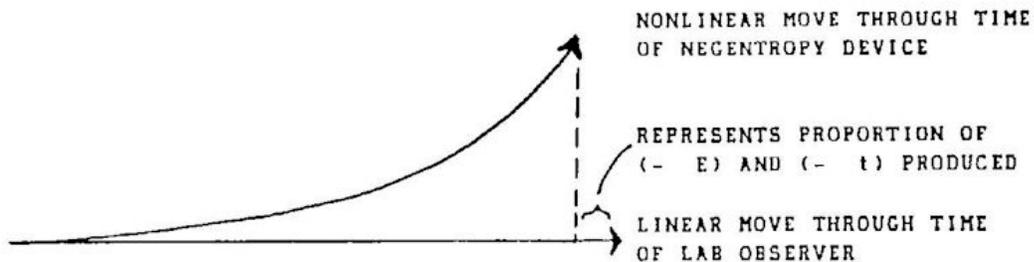


FIGURE 4. Production of Negentropy by Local Curvature of Spacetime Vacuum.

Three Kinds Of Electromagnetics

There are actually three types of electromagnetics (TABLE 1), as I pointed out in my paper [3] to the IEEE Colorado Springs Tesla Centennial Symposium on 11 August 1984:

- a) The ordinary kind of EM, described in classical electromagnetic theory. In classical EM theory, the vector force fields are considered primary and causative, and the potentials are considered to be only mathematical figments. In a region where the force fields are zero, classical EM theory assumes that all the electromagnetic effects cease.
- b) Quantum mechanics, which holds quite a different view of EM. In QM theory the potentials are considered to be real and fundamental, and the EM force fields are merely created from them by differentiation. That is, QM considers the force fields such as E and B to be derived effects, not fundamental causes. Further, when these derived force fields are zero, this only means that the gradients of the potentials are horizontal and hence "zero vectors." The potentials are still there, however, and their interference in a region of zero EM force fields can and does still cause effects. Thus, when classical EM effects reduce to zero, QM EM effects can still exist due to the potentials. In addition to violating classical EM theory, this also violates classical mechanics. It is true and experimentally proven nonetheless. [4] [5]
- c) An extension to the EM view of quantum mechanics, which I have named "scalar electromagnetics." The view of a potential by QM is essentially that it is composed of randomly fluctuating little virtual flux vectors, each representing a moving virtual particle and hence a moving virtual force. That is, QM fundamentally assumes that the virtual vector substructure comprising a potential stress of spacetime is totally statistical and sums to zero. My own contribution, arrived at by noting the work of many unorthodox researchers, is to point out that the virtual substructure need not to be random at all. We can simply form EM force field vector zeros by opposing or summing ordinary E and B vectors, for instance, to a zero vector. In this case, the sum of the absolute values of their magnitudes represents an artificial potential, an artificial stress in spacetime, but one that now has a rigorously deterministic substructure. This represents a deterministic ordering placed into the virtual state (inside the zero vector, in its substructure). We have therefore violated one of the fundamental assumptions of quantum mechanics. We have deliberately ordered and formed the stress of spacetime itself. In other words, we have accomplished general relativistic warping or curving of spacetime as we deliberately chose, and partially ordered the otherwise statistical disorder of the virtual-flux vacuum-ether. The third kind of electromagnetics allows us to transcend many of the limitations of classical EM and of quantum mechanics.

TABLE 1

THREE KINDS OF ELECTROMAGNETICS

CLASSICAL

- > POTENTIALS JUST MATHEMATICAL CONVENIENCES
- > ACTIONS CAUSED BY NONZERO FORCE FIELDS
- > NO ACTION WHEN FORCE FIELDS ZERO

QUANTUM MECHANICS

- > POTENTIAL REAL
- > STATISTICAL SUBSTRUCTURE
- > FORCE FIELDS BY DIFFERENTIATIONS
- > ACTIONS WHEN FORCE FIELDS ZERO

ARTIFICIAL POTENTIALS

- > POTENTIALS REAL
- > FORCE FIELDS EXTERNALLY ZEROED, INTERNALLY ACTIVE
- > ZEROS INDIVIDUALLY DIFFER
- > SCALAR INTERFEROMETRY
- > SCALAR RESONANCE

TABLE 2 shows the specific characteristic features of each of the three kind of electromagnetics. The first two EM's are already proven; the third follows by simple summation of ordinary force field vectors to zero, to produce artificial potentials.

Note what an astounding change this simple vector summation-to-zero, to make an artificial potential, represents to physics. In deliberately forming order in what was previously vacuum disorder, we have accomplished -- simply and directly -- the production of negentropy. We have reduced disorder and increased order.

If so, we must inevitably have produced negative time and negative energy, as seen by the external, linear laboratory observer, as was shown in FIGURE 4.

TABLE 2 COMPARISON OF EM CONCEPTS

Characteristic	Theory Classical EM	Present linear Quantum Mechanics	Scalar EM (Artificial 0)
Vacuum spacetime	Linear no charge	Linear, Charged (virtual) statistically.	Nonlinear, Charged (virtual) with deterministic components.
virtual substructure	none (fluid equations)	yes statistical	yes, statistical deterministically weighted
force in vacuum?	cause yes	effect yes	effect no
zero force fields	no effect	Bohm-Aharonov effects	substructure effects engineerable
potentials	fictitious	real, primary statistical substructures	real, primary deterministic substructures
causative agent	force fields	potentials	potentials and infolded fields of substructures
charge	with mass	with mass	massless
relativistic effects due to	velocity	velocity interfering potentials	interfering potentials
hidden variables	no	statistical negligible	deterministic major role
vector theory applied to EM	okay	okay	requires revision
vacuum EM wave	transverse	transverse	longitudinal with swirls
energy/mass conservation	yes	yes	not necessary an energy conserved
charge conservation	yes	yes	not necessarily
action at a distance	no	no, except Bohm-Aharonov	yes, scalar interferometer

TABLE 2 (continued) COMPARISON OF EM CONCEPTS

Characteristic \ Theory	Classical EM	Present linear Quantum Mechanics	Scalar EM (Artificial θ)
scalar (zero-vector) resonance	no	no	yes
inertia is electrical	no	no	yes
gravity is electrical	no	no	yes
mass is electrical	no	no	yes

Negative Time Effects

Eike Mueller's tests of John Bedini's free energy devices directly demonstrate the effects of the production of negative time. That is, the Bedini devices produce some negative time and negative energy, during any macroscopic interval in which they produce positive time and positive energy.

For example, in all three devices Bedini has built to date, a battery is used as an accumulator for the energy, whether it be positive energy or negative energy. By feeding back some "negative potential current" (or ϕ -dot) to the battery, the battery accumulates -- and charges up with -- negative timespace energy. The battery can furnish the extra negative energy to motors and light lights, with certain peculiarities to be mentioned shortly.

First, however, a most unusual effect occurs in the battery. Note that in modern theory the vacuum is considered to be filled with little "holes" or negative energy states, each normally filled by the electron. (FIGURE 5). This "sea of little negative energy electrons in holes" is called the Dirac sea, after the eminent scientist P.A.M. Dirac, who conceived the theory.

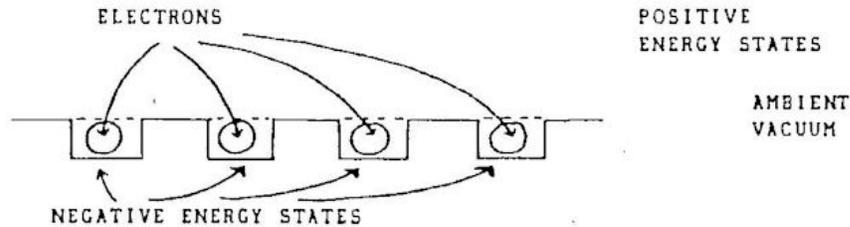


FIGURE 5. The Normally-Filled Dirac Sea

Now, in the negative time portion of the machine's operation, we shall consider that the Dirac sea is inverted. That is, the negative energy electrons will now "fall out of" the holes during the negative time portions, producing negative energy. This of course is real energy, and drives motors and lights. However, a battery which has been charging with negative energy has accumulated a pool of emptied holes in its Dirac sea (FIGURE 6). Everything seems normal, until we remove the battery from the negative-entropy device and hook it up to a normal battery charger. Now we find an amazing effect: the battery will at first "eat" or consume electricity, while the electrons in the charging current are filling the empty Dirac holes. During this filling time, the battery will not recharge to recover its voltage. After these Dirac holes have been filled again with electrons, the battery will start to charge up normally, and will contain normal, positive energy when charged (FIGURE 7).

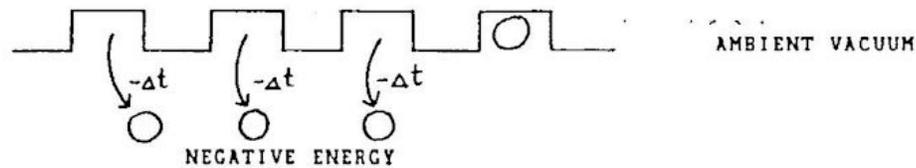


FIGURE 6. The Partially-Emptied Dirac Sea

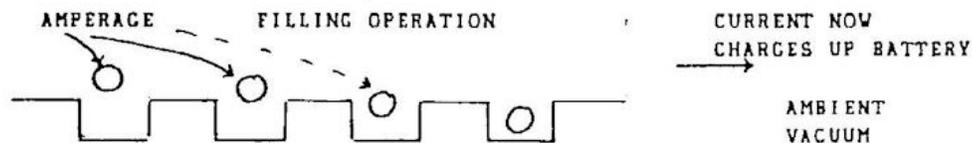


FIGURE 7. Filling The Dirac Sea Holes

On one test, a Bedini battery removed from the operating Kromrey-type device consumed electrical current for 110 minutes before the Dirac holes were filled and the battery started to charge normally.

At the Colorado Springs Tesla Centennial Symposium, the battery from Tom Watson's Bedini-type free-energy device was stolen -- probably by agents who know of the effect, and wanted to see if the battery exhibited the "Dirac fill time" effect. That is, they could absolutely ascertain whether or not his device was real, simply by testing the battery to see if it exhibited the effect.

On any free-energy device which is powered from a recharging battery, this is a positive test to ascertain whether the device is genuine or a fake.

Other negative time effects are evidenced by a motor running at least partially on negative energy. The way to understand these effects is to reverse in our minds what would happen to a normal motor running on positive energy and positive time.

For example, one may visualize a motor running at constant speed as containing some constant value of energy at any given time. If all the energy is positive and the time passing is positive, when one shorts the terminals one removes positive energy. The motor thus dies. On the other hand, if the motor contains a negative energy and negative time, shorting the terminals removes negative energy and negative time. This is equivalent to increasing negative energy in positive time. Therefore the laboratory observer will observe the motor to increase its speed when the terminals are shorted. Eike Mueller directly observes this effect in the Bedini device.

Similarly, if one adds additional loads to a negative energy/negative time motor, one is again removing negative energy and negative time, which is identical to adding negative energy in positive time. Thus again the motor increases its speed precisely as Eike Mueller's tests showed.

Additional negative time effects are exhibited. Utilization of negative energy produces IR^2 cooling instead of heating. Thus resistors and semiconductors run cold. The more load added, the more negative energy current drawn -- and devices get cooler, even though the lights get brighter and the motor runs faster. Also, to the negative energy/negative time operation, the frequency/temperature spectrum appears to be inverted. That is, instead of "heating up" through infrared, into visible, into ultraviolet, and into X-rays and gamma rays, the negative energy device exhibits "cooling down" from gammas to X-rays to visible to infrared. In this manner one finds that a simple low voltage (positive instrument measurement!) spark exhibits profoundly unusual effects: Its negative time/negative energy/"voltage" may be extremely high. The spark therefore may appear of extraordinary length for the (seemingly) low voltage indicated by positive-time instruments. In addition, the spark may be unusually rich in UV emission or X-ray emission. For uncontrolled very high-energy negentropy devices, even gamma emission may be observed from seemingly

"low voltage" devices. The long-sought X-ray laser and gamma ray laser should be easily constructable along negative entropy device principles.

These are just some of the exciting effects that have become apparent in the negentropy devices built by John Bedini. Further, John has magnanimously released sufficient details so that other experimenters can produce working models of two of his devices. Tom Watson has already successfully replicated the first Bedini motor, and scaled it up into a much larger device. In addition, Eike Mueller himself has replicated a simplified version of Bedini's Tesla switch device.

We are on the threshold of a new science, a new world, and a new life, given to us by the pioneers such as Tesla, Moray, Bedini, and others.

Let us get on with it and put it to immediate use to power our cities, our homes, and our industries.

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- [1] Bearden, Thomas E., "Quilton/Perceptron Physics: A Theory of Existence, Perception, and Physical Phenomena," March, 1973, NTIS # AD 763210
- [2] Ibid.
- [3] Bearden, Thomas E., "Tesla Electromagnetics and Its Soviet Weaponization," presented to the IEEE Tesla Centennial Symposium, Colorado College, Colorado Springs, Colorado 11 August 1984
- [4] Y. Aharonov and D. Bohm, "Significance of Electromagnetic Potentials in the Quantum Theory," The Physical Review, Second Series, 115 (3), August 1, 1959, pp. 485-491.
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ADDITIONAL TESTS BY EIKE MUELLER

30 August / 1 September 1984

In the first series of tests I used the rotary switch. The batteries were labeled as #1 and #2 (left side) and #3 and #4 (right side).

Here are the major events.

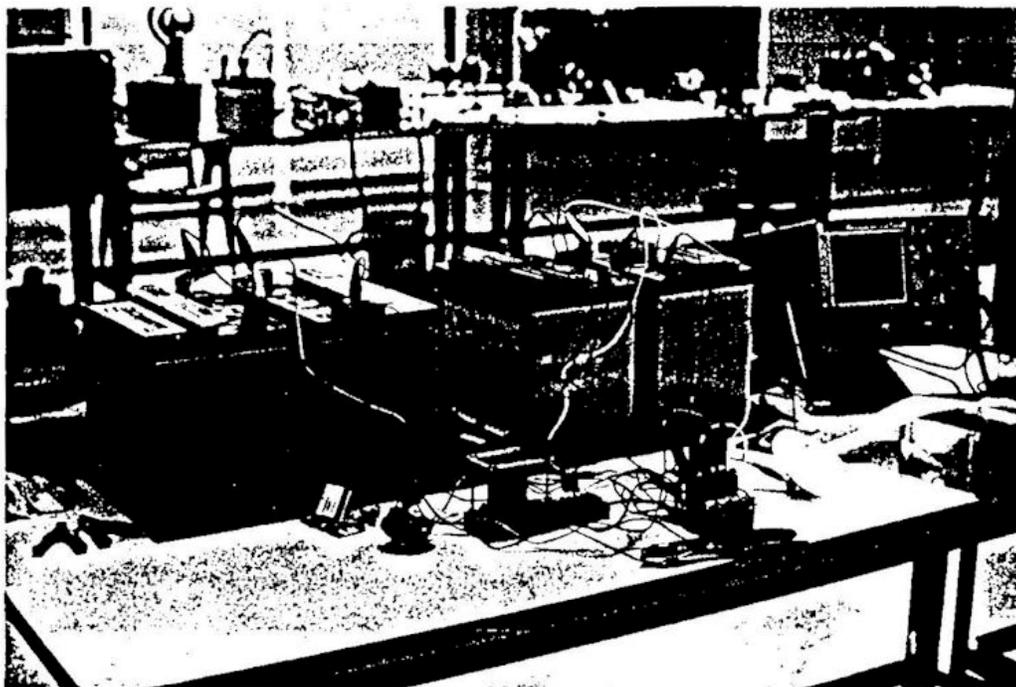
- EVENT 1 Start at 12:25 pm; voltage measurements taken.
- EVENT 2 At 12:45 pm voltage measurements taken.
- EVENT 3 At 1:00 pm the 12V, 75W lamp replaced by a 110/10V transformer.
- EVENT 4 At 1:15 pm voltage measurements taken.
- EVENT 5 At 1:30 pm test stopped, voltage measurements taken.

TABLE 1 shows the detailed voltage measurements during the conduct of this test.

TIME	12:25	12:45	1:00	1:15	1:30
EVENT	1	2	3	4	5
VOLTAGE					
BATT. #1	12.0	12.0	12.1	12.1	12.1
BATT. #2	11.9	11.9	12.2	12.2	12.2
BATT. #3	12.2	12.1	12.7	12.8	12.8
BATT. #4	12.2	12.2	12.7	12.7	12.8

TABLE 1 TESLA/BRENTTE/BEDINI SWITCHING DEVICE FIRST SERIES

PICTURE 1 shows the conduct of this test. The batteries were labeled from #1 to #4 from left to right. In the center the rotary switch, and to the left of it the potentiometer for its speed control (frequency control of circuit), can be seen. To the right of the rotary switch is the relay which switches the battery banks. To the right of the relay is the 12 V, 75 W quartz lamp which is connected to the negative terminals of batteries #2 and #4.



PICTURE 1 FIRBST BETUP OF TESLA SWITCH EXPERIMENT

At 3:00 pm the Tesla switch was reconnected. This time the relay was driven by the timer which was built by Louis Pollaehn of COMTEC. FIGURE 1 shows the circuit diagram for this timing device and PICTURE 2 shows the solid state timing device in operation.

LOUIS POLLAEHN'S TIMER

30 AUG. 84

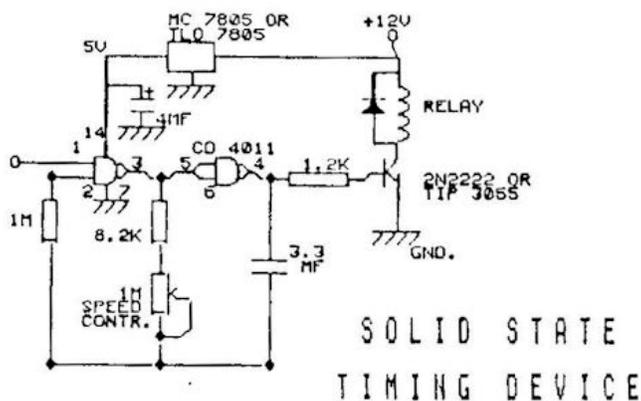
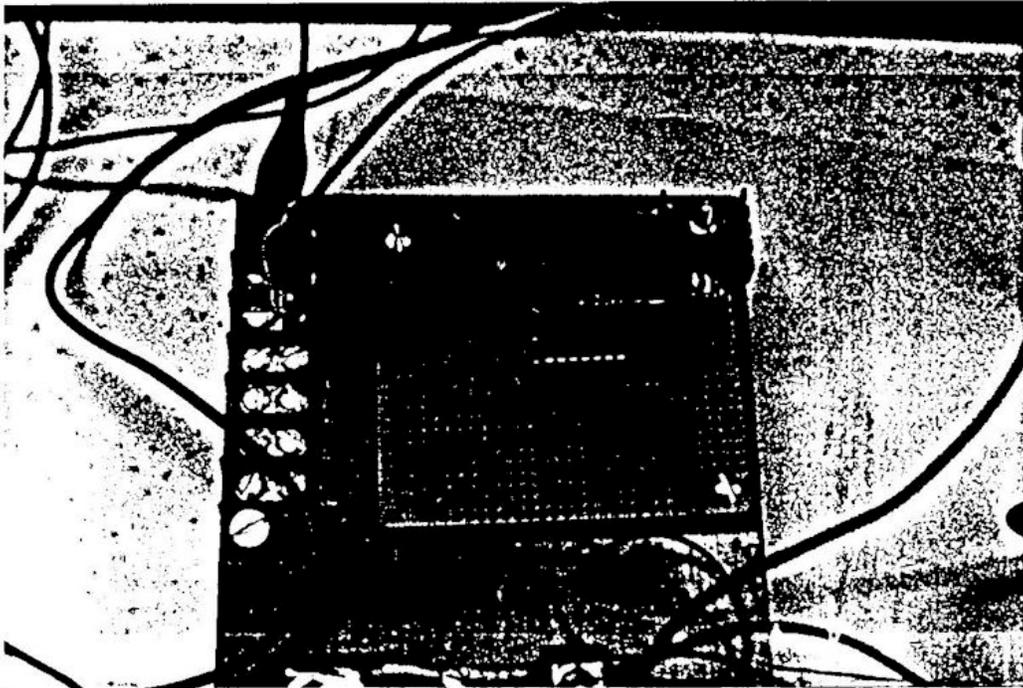


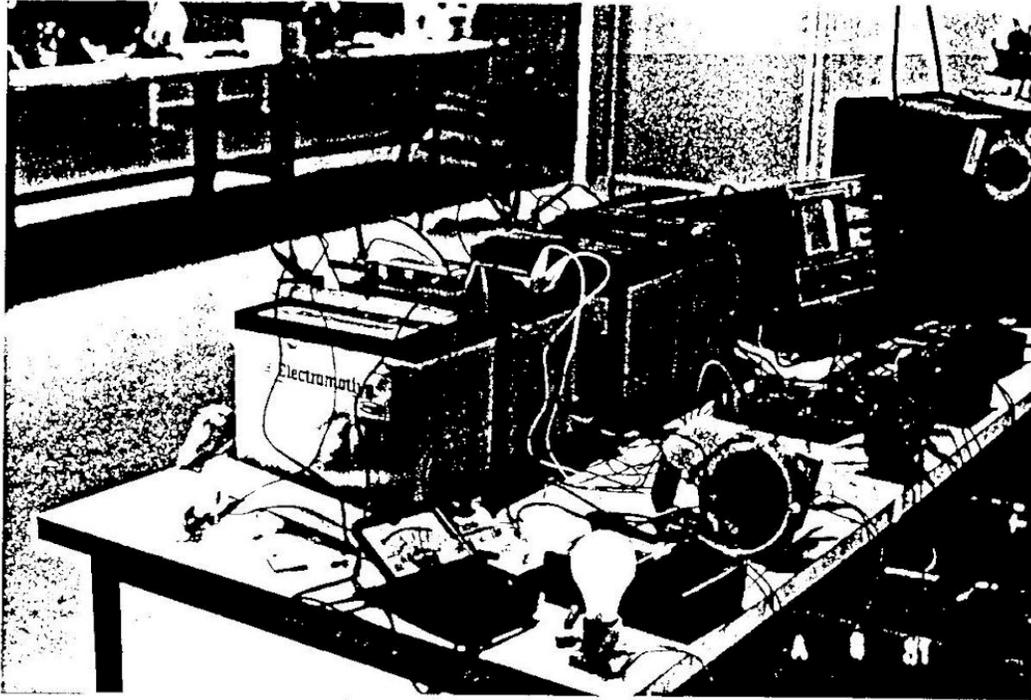
FIGURE 1 CIRCUIT DIAGRAM OF TIMING DEVICE BY LOUIS POLLAEHN



PICTURE 2 THE SOLID STATE TIMING DEVICE IN OPERATION

Test history:

- EVENT A At 3:10 pm test started, load was a 110/10 V transformer between the two negative terminals of batteries #2 and #4. The secondary side the transformer was connected to two 40W, 110V light bulbs in parallel.
- EVENT B At 4:00 pm voltage measurements taken
- EVENT C At 4:30 pm a small 110 V fan was added in parallel to the two 110 V light bulbs.
- EVENT D At 5:40 pm a 12 V, 75 W quartz lamp was connected to battery #1.
- EVENT E At 6:00 pm voltage measurements taken. PICTURE 3 shows this setup. At left is the quartz lamp connected to battery #1. In the center foreground are the two incandescent lamps. To the right of the lamps is the 110 VAC fan. Behind the fan and out of sight is the relay. Next is the 110/10 V transformer, hooked up to the two negative terminals of batteries #2 and #4. The solid state timing device is located between the transformer and battery #4



PICTURE 3 Tesla/Brentte/Bedini Switching device loaded with two 110V light bulbs, 110V fan and a 12V 75W quartz lamp.

EVENT F At 6:30 pm voltage measurements taken

EVENT G At 7:00 pm one 110 V light bulb disconnected.

EVENT H At 7:25 pm the same 110 V light bulb connected back into the circuit.

TABLE 2 shows the results of this test.

TIME	3:10	4:00	4:30	5:40	6:00	6:30	7:00	7:25
EVENT		F	G	G	E	F	G	H
VOLTAGE								
BATT #1	12.0	12.5	12.5	12.3	12.1	12.1	12.0	12.0
BATT #2	12.1	12.5	12.5	12.4	12.2	12.1	12.1	12.1
BATT #3	12.0	12	12.4	12.3	12.4	12.5	12.4	12.4
BATT #4	12.3	12.3	12.2	12.5	12.4	12.5	12.4	12.3

TABLE 2 TESLA/BRENTTE/BEDINI SWITCHING DEVICE SECOND SERIES

TABLE 3 shows the continuation of above measurements.

Here again first the events:

EVENT I 8:30 pm voltage measurements taken.

EVENT J 9:15 pm voltage measurements taken.

EVENT K 10:30 pm voltage measurements taken.

EVENT L 11:05 pm voltage measurements taken.

EVENT M 11:30 pm voltage measurements taken.

EVENT N 10:30 am (1 Sep) discovery after unit has been operated during all night that both 110 V lamps were out and that one wire was broken due to overheating. Voltage measurements taken.

EVENT O 11:30 am voltage measurements taken.

EVENT P 3:00 pm all lights again out, voltage measurements taken. The low voltage of battery #2 - marked with (*) in the TABLE 3 - is most probably caused by the back EMF from the transformer. The ideal transformer would be an inverter transformer 10 V to 110 V.

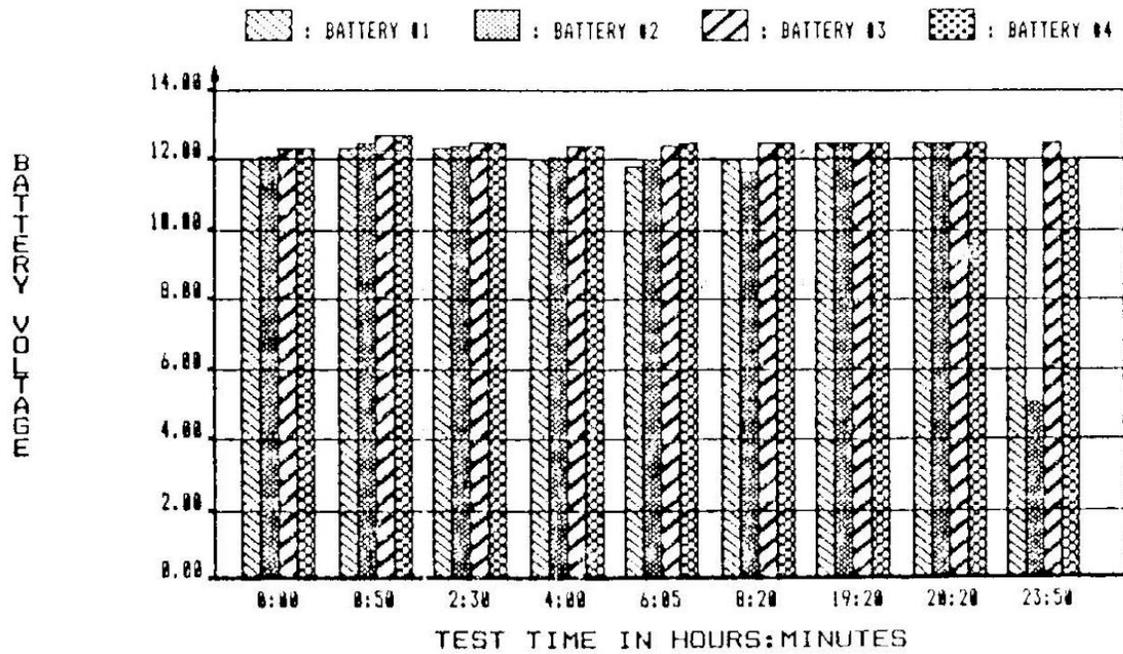
The summary of this test can be seen in TABLE 3 which is a direct continuation of TABLE 2.

TIME	8:30pm	9:15	10:30	11:05	11:30	10:30am	11:30	3:00pm
EVENT	I	J	K	L	M	N	O	P
VOLTAGE								
BATT #1	11.7	11.8	12.0	11.8	12.0	12.5	12.5	12.0
BATT #2	12.1	12.0	12.1	11.9	11.7	12.5	12.5	5.8 (*)
BATT #3	12.4	12.4	12.4	12.5	12.5	12.5	12.5	12.5
BATT #4	12.4	12.5	12.5	12.4	12.5	12.5	12.5	12.0

TABLE 3 CONTINUATION OF MEASUREMENTS SHOWN IN TABLE 2

The total test run is summarized in GRAPH 1 on the following page. In this graph I show the voltages of all batteries over the test time in hours.

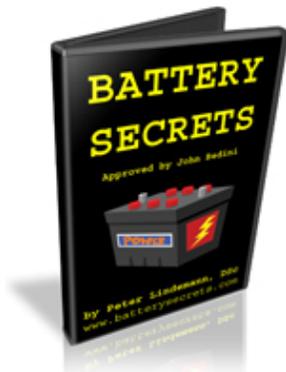
TESLA/BRENTTE/BEDINI SWITCHING DEVICE TESTS



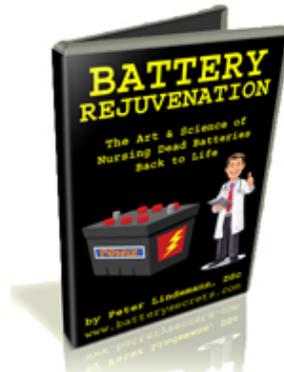
GRAPH 1 TESLA/BRENTTE/BEDINI SWITCHING DEVICE TEST SUMMARY



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