Electric Heater with COP = 17

This document is one of the bonuses for
The Quantum Key, http://www.thequantumkey.com

This information has been kindly
placed into the public domain by Rosemary Ainslie

CONTENTS

RESOURCES

Rosemary Ainslie's Blog http://rosemaryainslie.blogspot.com/

The Quantum Key, Chapter 11, Aetheric Energy Machines
http://www.thequantumkey.com

For discussion, visit this forum http://www.energeticforum.com/renewable-energy/4006-rosemary-ainslie-magnetic-field-model.html

& Replication Thread: http://www.energeticforum.com/renewable-energy/4314-cop-17-heater-rosemary-ainslie.html

For more information http://www.free-energy.ws/rosemary-ainslie.html

Circuit that defies basic laws of physics

Own Correspondent

An electrical circuit that produces 17 times more power than it takes in?

It defies the most basic laws of physics but it's intrigued the MTN ScienCentre at Canal Walk in Cape Town sufficiently to put it on display.

And respected electronics journal Quantum has published details of the circuit, devised by Rosemary Ainslie of Marina da Gama, after conducting its own tests.

"It works," said editor Pierre van Rhyn. "But I cannot yet say why or how."

Even Sasol, the synthetic fuels giant, has offered a bursary to any academic institution wishing to take the "discovery" forward and develop applications for it.

"We are willing to offer a bursary to a post-graduate student who would want to take up this technology and develop it," said John Marriott, general manager of Sasol Limited.

In the meantime though, Ainslie says "Stellenbosch University has refused to even allow a demonstration of the device".

"This technology needs academic evaluation of the magnetic field model which suggests that all forces are underpinned by a magnetic force," she said. "But it is a non-classical theory and, understandably, represents a big stumbling block for them."

Ainslie (54) believes her "discovery" – made after five years of work – could all but eliminate electricity bills.

If the technology to use the device existed, it would take from the national grid just enough electricity to power itself then use that power to create more energy, from sources which are not yet fully understood, to boil a kettle or heat a geyser.

The former secretary and property agent claims to have based her "solid state switching circuit" on the back of a theoretical model of magnetic fields she developed after reading numerous scientific publications.

Her prototype device was developed with the help of a group of engineers. Electronics technician Brian Buckley assembled the apparatus.

Using two 12-volt batteries as its power source, the circuit is made up of what appears to be a fairly simple solid state switch with a load resistor.

In the Quantum article, Ainslie and Buckley explain the relatively simple circuit design and invite readers to develop or study it.

"Basically, what this equipment shows is that energy efficiency can be increased through circuit design," Ainslie said. "I am not trying to make this a secretive thing. I offer the design of the circuit in the magazine to anybody to build and test independently.

"To use this technology for household applications in normal high voltage power grids one would have to produce very strong transistors. It would, however, be relatively simple, within the constraints of existing technology, to apply this device to alternative energy supply sources."

The experiment has been demonstrated to representatives of BP, Sasol, ABB Electric Systems Technology Institute in the US, Spescom and Fluke Instruments. Fluke provided sophisticated testing equipment and certified the results.

ABB Electric Systems Technology Institute in North Carolina, a National Aeronautics and Space Administration (Nasa) supplier, conducted independent tests. Cape Hope Metrology Laboratory certified the experimental data on components that had been calibrated at Telumat's metrology laboratory.

Said Ainslie: "The fact that the academics refuse to evaluate the apparatus is understandable. Science does not allow for these results. They are trained in classical thinking and this states that these results are impossible.

"But the fact is that science is only advanced on experimental evidence. In effect, it is bad science to deny the experimental results or to assume errors of measurement without first doing the experiment or evaluating the measurements protocol."

Van Rhyn, an engineer involved in electronics and applied science, said: "The scientific community had the same qualms about microwaves. I published the article because I want my readers to discuss it and replicate it."

The concept is now also being taken seriously by Professor Mike Bruton of the MTN ScienCentre.

"Physics is not my field of expertise, but I believe there is enough evidence here to make a case for serious debate.

"We investigated the equipment and have brought it to the centre for display. Mrs Ainslie couldn't give us the oscilloscope with which to display the wave patterns and the computer on which she displays the models, and we hope we can find some support to get our own."

Ainslie said: "The technology needs to be developed on two fronts. We need an academic institution to evaluate the implications of the magnetic field model and design this for publication. Parallel to this, we need industry to come forward to build prototype applications, otherwise the income and job-creation benefit of my work could be lost to South Africa."

How the amazing invention works

So, why is it supposed to work?

Rosemary Ainslie explains that the circuit comprises a solid state switching device with inductance added to the windings of the load resistor.

This is then run at an oscillating frequency, which results in a "startling" over unity efficiency by a factor of 17. "These results were required in terms of a magnetic field model that has been developed".

In terms of this model, electric current is determined to comprise the transfer of discrete and discontinuous magnetic particles that can only move to or from that supply source.

"It proposes that energy that is dissipated actually emanates from magnetic fields within the structure of the load resistor itself.

"These fields were trapped inside the cooling structure of the load resistor in the process of formation and are responsible for binding the atoms into atomic abodes. Under certain extreme conditions these fields can 'peel off' as photons.

"This results in the fatigue or degradation of the structure, as can be seen over time.

"In effect, the experiment was designed to prove that classical concepts of energy transfer err, as they assume a depletion of energy from the supply source as energy is transferred." – **Own Correspondent**

A UNIFYING FIELD MODEL

Rosemary Ainslie
Donovan Martin

ABSTRACT

This field model suggests that the universe is structured from a single magnetic dipole with a velocity of twice the speed of light. It is proposed that the particle, its composites and its field amalgams, permeate space to create a ten dimensional binary system. Its varying properties are deduced through a necessary but atypical methodology, using symmetries and an applied principle of correspondence. Manifestations of this tachyon vary, depending on its velocity and mass which are inversely proportional. Its composite structures are shown to correspond, both with known manifest particles and with magnetic flux. And it is suggested that its movement in a field generates constants that are evident in our tangibly measurable dimensions. By a logical extension of the use of symmetry and correspondence principles, it predicts certain innate potentials. One such is the reconciliation of the mass/size ratio of the proton to the electron, as justification for its proposed composite particulate state. Another relates to its energy potential, the transfer of which results from an apparent break in magnetic field symmetries. The electromagnetic application has been experimentally proven in a test, described in an appendix to this document. This suggests that this model may be consistent with the fact. There is reference to a broader general reach that may point to resolutions that include, but are not limited to, outstanding questions relating to gravitational fields and to dark energy and dark matter. It enables a resolution of paradoxes especially as these relate to questions of locality. It presumes to describe particles and particle interactions in defiance of the prescriptive use of mathematics and suggests that fractal geometry may be a preferred means to describe both particle interactions and the fields' varying manifestations.

INTRODUCTION

As an amateur, the prospect of attempting a meaningful comment on physics is, at best, inappropriate. I am aware of this. My defence is that I am curious. Then without putting too a fine a point on it, science seems to have lost direction. Its best endeavours have somehow been snaffled by the constraints imposed on it by faster than light speeds.

Quantum theorists always worked with paradox the most fundamental of which is possibly Heisenberg's Uncertainty Principle. But relativity theorists look for a total reconciliation of all things, so to speak, most famously indicated in Einstein's comment that 'God does not play dice with the universe.' As I understand it, the problem for classicists centres on the fact that paired particles, although spatially separated, are seen to synchronise their spins at precisely the same moment. This begs the question as to how the one can know what the other is doing at a coincident moment? And the proof of this synchronous adjustment, this want of locality, may also prove that relativity cannot reconcile all things, so to speak. The restraint that harnesses it, is somehow, teasingly and ironically, hidden away in precisely these questions of non-locality. Particles indeed appear to communicate at superluminal speeds through space, the outside limit of which has yet to be established. But this has apparently been proven at separation distances as great as eleven kilometres.

Latterly too is a clamorous search for dark matter, something that can account for the fact that the stars within galaxies orbit at a constant speed. This flies in the face of logic. Like questions of non-locality, it is counter intuitive. It seems that new and paradoxical insights into the movement of gross and subtle matter threaten to dismantle classical theories. What is known is crumbling in the face of small and large evidence that all is not as it seems.

The conclusions of this model may reconcile both a classical requirement for locality and quantum theorists' denial of this. The locality paradox suggests that something else is there, some principle that lurks behind the manifest, some order behind the chaos. And this something enables instantaneous communication or, action at a distance. Like those great Gothic churches, perhaps classical theory only needs buttressing. But to allow this may require the identification of a fault line in the foundations. The proposal is that one force, fundamental to all the forces, has been entirely overlooked. At the risk of over working a metaphor, it was somehow buried under the corner stones of physics. It then faded from sight in the face of the extraordinary and brilliant achievements of quantum electrodynamics.

Here's the thing. On simple electric circuitry, changing electric fields invariably induce magnetic fields and changing magnetic fields invariably induce electric fields. But magnets can and do interact with other magnets without inducing a measurable electric field. It may indeed be there, hidden in the body of the material itself. But it's neither evident nor measurable. My own take is that a magnetic field is a primary force compared to which the electromagnetic forces are secondary phenomena. This was my starting line, the 'kick off' for this proposal.

THE METHODOLOGY

As a means to determine the properties of a magnetic field a principle of correspondence was applied. What is meant by this is that, on a fundamental level, everything seen, all gross amalgams of matter such as an electric kettle or a rock, simply comprise collections of molecules and atoms. In effect the whole is the sum of its parts. If things could be ground down to their finest structure, and given that we had instruments to detect this matter in a powdered form, so to speak, then we would simply find a collection of atoms that were manufactured by forces into their earlier state as an identifiable, gross amalgam. It's fatuously

self evident but nonetheless, correct. The correspondence principle proved a surprisingly incisive tool. And here's how it works. Just as a kettle is simply the sum of its parts so too, a magnetic field may be the sum of its parts. This being given, then to determine the parts of the field, all that is needed is to first determine the nature of the field as a whole and apply those same properties to its individual parts. For ease of reference the following only refers to permanent bar magnets but the principles apply to all magnetic fields.

THE FIELD MODEL

Flux seems to extrude and then intrude the crystalline structure of a magnet at one of two poles, commonly defined as a north and south respectively. That it exists at all is evident in its influence on magnetisable matter and other permanent magnets. This influence is manifest. A north pole from one magnet repels other magnetic norths and a south pole repels other magnetic souths. Conversely, a north and a south pole attract. This suggests that a magnet only has precisely two poles and that neither manifest independently.

These fields appear to exit and then enter the body of the magnet. And extrusion and intrusion are probably equal as there is neither a gain, nor a loss of weight to the magnet itself. If replacement is consistent with displacement, then it may be that the fields somehow belong to the body of the magnet and simply orbit through and around it. An orbit describes a single direction on a circular path. Put simply, an orbit chases its tail.

If this describes some properties of a magnet and if the whole of the field is simply the sum of its parts, then the inference is that flux may comprise smaller parts or particles. And in the same way, these particles would both extrude and intrude the body of the magnet. They would each comprise a north and a south pole. Each north of one would repel the north of another and each south would repel another south. Equally, a north and a south pole from different particles

would attract. All these movements exactly reflect the laws of charge. So, by implication, the polar attribute of a magnet may, in fact, be a charge attribute in each magnetic particle. Correspondence to the field would then suggest that each particle is in fact, a magnetic dipole with a neutral charge. And, as there is no gain, nor loss of weight to the body of the magnet, if replacement is consistent with displacement, then it is reasonable to infer that the quantity of these particles would be constant within the body of the magnet.

The question then is this. If flux comprises magnetic dipoles why is it that we cannot find them? They remain elusive even to the most sophisticated equipment available to modern day science. The answer to this goes to the heart of questions of locality. Light is the ultimate gauge of speed. If light is required as a comparative measure of speed and if magnetic particles are both smaller and faster than light, then light would never detect that particle. On a macrocosmic scale it would be like wind that we cannot see blowing a balloon that we can see. And, if we lived in some medium that was somehow separated from that wind so that we knew nothing of its force, then we might mistakenly, assume that the balloon has its own energy to move it through space. This is the fundamental question that this model attempts to address. Is energy the property of the particle or does it, in fact, belong to a field that moves the particle? Or indeed, is it perhaps a combination of the two? I am now rushing in where angels proverbially, fear to tread. But as light speed is a critical value to this field model, it is possibly required that I digress to enlarge on this point more fully.

I do not buy into the logic that precludes superluminal speeds for the reasons given above. The puzzle is to find some property that relates to the mass of a photon without offending classicists who describe a photon as having no mass. For instance, while a rock may weigh, for example, 10 tons, if that rock were positioned outside earth's gravity it would weigh precisely nothing. So, weight only has relevance within a gravitational field. Therefore, the weight of an object would somehow relate to the size of an amalgam and its atomic density.

But in the context of this model, I am proposing that mass may be applied to anything that has an inferred or defined boundary. In terms of this, mass relates to volume and not weight. And given that the particle is the ground reference point and that the photon may be the smallest evident particle, so to speak, then I am proposing that a photon has a mass, or an inferred boundary of 1. But I will get back to this point.

Returning to the argument that a magnetic field comprises particles, for ease of reference it would be as well to name this. My first choice was a luminon as this hearkens to an earlier concept of luminiferous aether that was assumed to fill all space. But I have since become aware of the search for zero point energy or the God Particle and, as I am proposing that the magnetic field in fact holds this particle, it would perhaps, be more appropriate to call it a zipon. This is loosely based on an acronym of Zero Point Energy compounded with concepts of infinity, which makes it more of an acronymic oxymoron. In any event it is easier to say zipon than luminon. But I am not married to any of these names and hope that someone will come up with something more appropriate. For now and for purposes of this exercise I shall simply refer to it as a zipon.

What has been deduced is that the zipon may be the smallest part of magnetic flux. If it exists at all then it may be a magnetic dipole that moves at superluminal speeds orbiting in fields of such particles, around a fixed position in space. It may have the mass of something less than a photon which, combined with superluminal velocity, makes it a tachyon. In as much as they move in fields structured by these orbits, then clearly they would defy Pauli's exclusion principle. And they would congregate in some equally structured amalgam that is self-sustaining, so to speak. The object then is to find the pattern that could sustain a closed system.

It has already been said that magnets move together with their poles aligned north to south. But to reach this alignment the entire structure of the

magnet is propelled through space. It suggests that the requirement to fuse with other magnets overrides the requirement to move apart or even to remain in a rest position, this latter option resulting in no movement at all. If so, then a logical progression of this would be that many zipons would attach, head to toe or, north to south. And if that string were open then the first and last zipon in that string would not be conjoined. For both stability and enhanced symmetry that string would need to attach their open ends which would then change the shape of the string into a circle.

However, when two magnets do conjoin they come to rest, so to speak. So also, conjoined zipons would also reach some kind of rest state. This would conflict with the proposal that they are invisible or immeasurable precisely because they move at such extreme velocities. What principle then would apply that could account for the velocity of a conjoined string of zipons?

The answer is again evident in correspondence. Given a critical proximity, magnets will always move towards or away from other magnets. So, within that proximity, one string would adjust its position against another. And, if each string is a closed circle, as suggested, then one movement of one zipon would result in a sympathetic and corresponding movement of all the zipons comprising that closed string. This ripple effect would result in an orbit. On a fundamental level the proposal is that this first orbit ultimately occurs on many levels and in many dimensions. And the velocity of the orbit is determined by the rate at which each zipon moves to displace its position against neighbouring zipons and neighbouring strings in a field of zipons.

The movement of flux is orbital but the orbit itself has a fixed justification. This is evident in the directional flow of current that only varies in relation to an applied voltage or in a permanent magnet that moves its entire structure to adjust to other magnetic fields. Therefore its direction or justification can be described as being coherent. Equally therefore, correspondence principles suggest that the

field would reflect the coherent positioning of each zipon within the field. And all those zipons would move with a shared justification.

To describe such groupings of these circular strings and their relationship to the field as a whole, is possibly, enabled by drawing an analogy. Imagine a string of beads, each bead coloured, one half black, the other half, white. Each bead would represent a zipon and the two colours would represent the two magnetic poles. The entire length of those beads would form a one dimensional string.

Now, inside that first string is a second identical string and inside that is a third string, and so on, until one has filled a saucer full of such strings. Due to the proximity of neighbouring strings, all those strings continually move away from each other resulting in an orbit. Or, perhaps this would be better described as a merry-go-round where the strings orbit on a shared and spinning axis.

The merry-go-round, or beads, would be a two dimensional magnetic field. Now, pile many merry-go-rounds, one of top of another until one has a cylinder of merry-go-rounds moving together. That would be a three dimensional magnetic field. In fact, that cylinder would have exposed charges at the top and the bottom, which could also be unstable, so, under perfect conditions these would also conjoin and one would then have a toroid.

In effect I am proposing that the background structure of the universe could comprise this highly structured field of zipons, evenly and smoothly distributed throughout a really big toroid. If this is right then these zipons would comprise an invisible force located throughout space with a velocity less than a photon and fixed justification or orbit. And most critically, as a force it may also reconcile questions of non-locality and the requirement for dark matter. But thus far the proposal has been purely speculative depending as it does on the tenuous possibility that there is some merit in the principles of correspondence.

My object now is to try and extend that correspondence which, in turn, may prove the proposal that these zipons do indeed exist as a first principle.

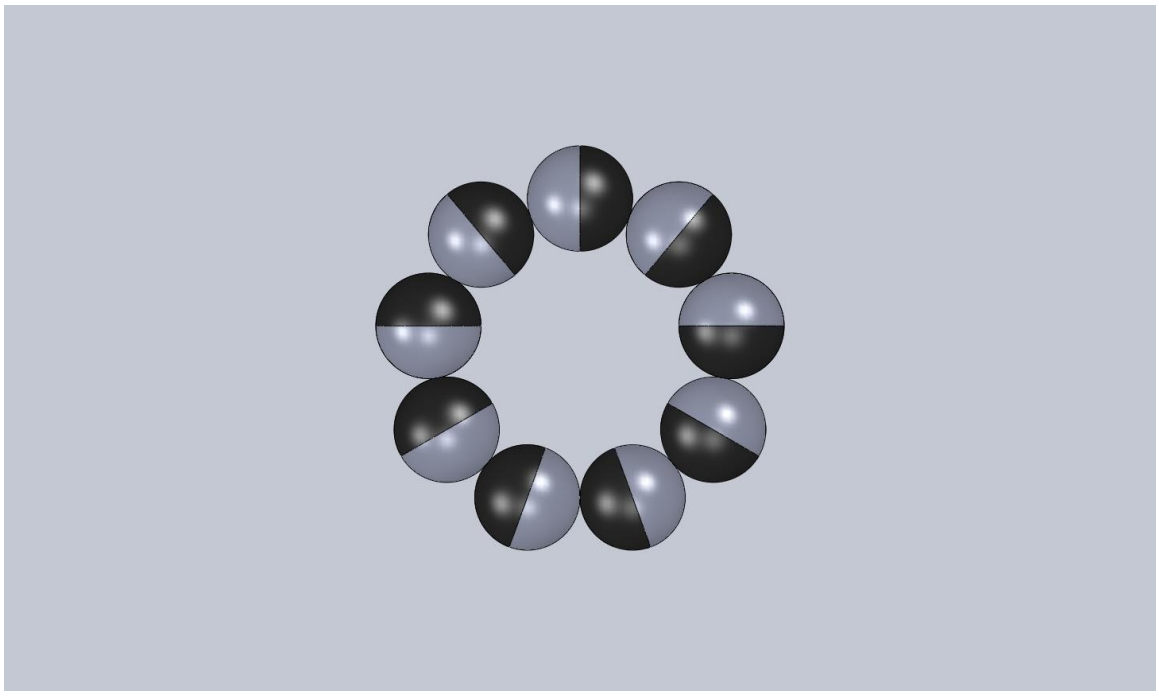


Figure 1. Zipon two Dimensional closed string

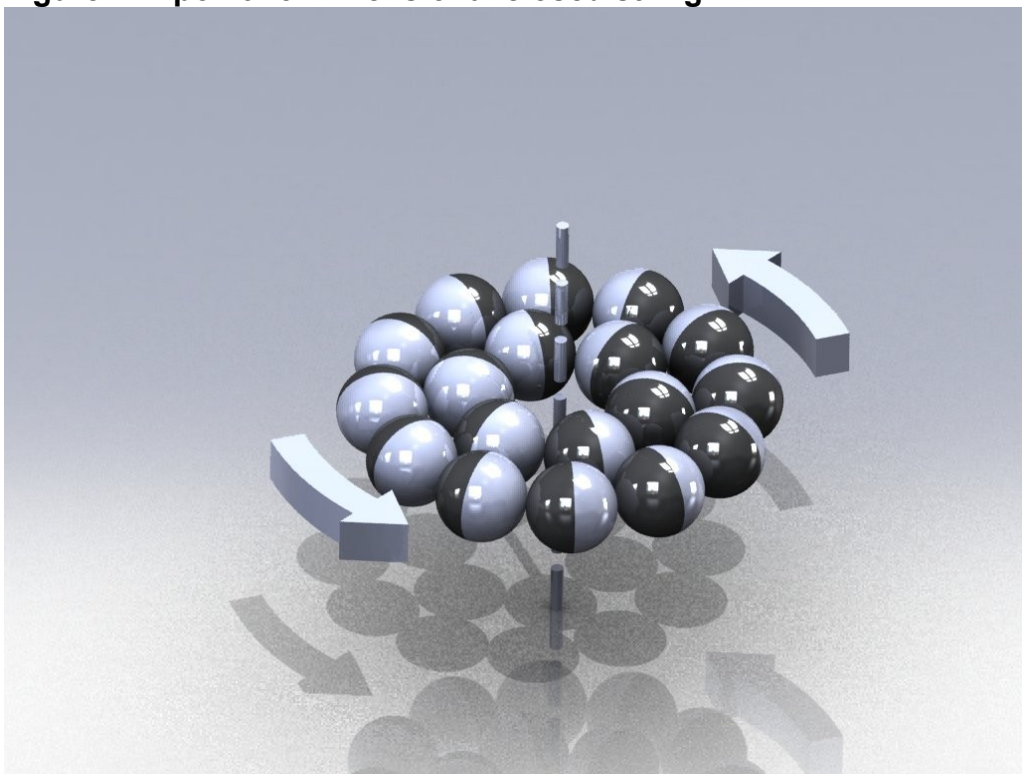


Figure 2 Spin indication about central axis

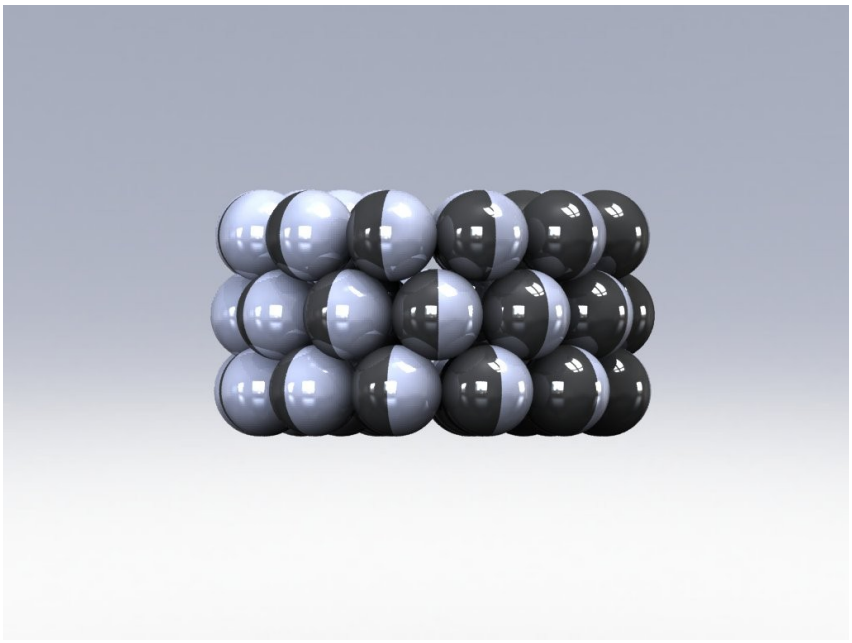


Figure 3 Zipon's packed in a tight cylinder

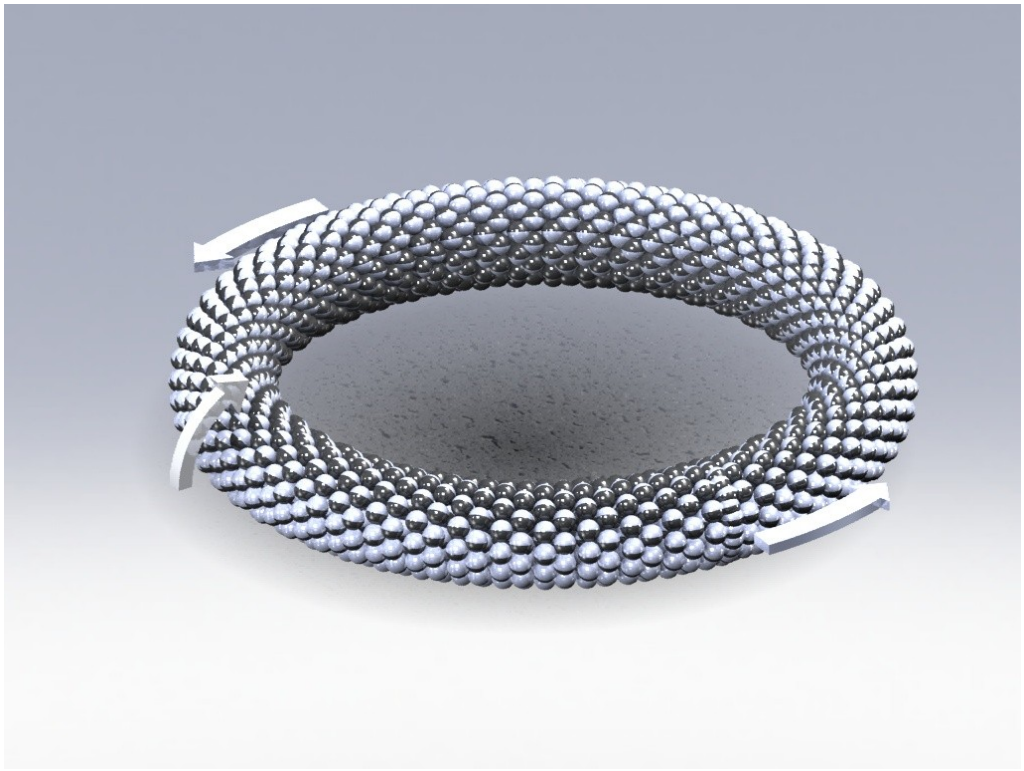


Figure 4 Zipon Toroidal Field formation

THE PARTICLE MODEL

So far the arguments, largely based on a rule of correspondence, suggest that the most perfectly balanced magnetic field may be toroidal in shape. And, because of the complex positioning of the poles or charges of each zipon within those strings, the entire structure and each part of each structure would be orbiting sympathetically with the next. If, prior to the singularity, such a coherent structure existed, forming a universal and skeletal backdrop, then it would only need a minute disturbance to spoil those symmetries. This may be as small as a single misplaced magnetic monopole. Or perhaps God stirred that structure with a great spoon.

VIRTUAL PARTICLES

Then some of those zipons within that structure would break away from the field. The question is, if they did break away, what would happen? Zipons that have disassociated from the field are referred to as Truants. The assumption is made that the zipon is removed from its position in the field by some event and it then manifests as matter. Essentially each truant would still be a magnetic dipole. It would retain the properties of the zipon but, in relation to the field, the truant's direction and orbit would be asynchronous. Whatever its charge, it would oppose the justification of the field.

It is proposed that zipons interact with each other and with expelled zipons or truants. To describe these interactive associations it is, perhaps, first necessary to establish the physical properties that enable any interaction at all. All interaction is limited to a boundary constraint. This may be explained through the use of the following analogy. Imagine that a machine is designed to propel stones inside a vacuum. Therefore no extraneous forces are brought to bear on

that interaction. Then it is reasonable to infer that the heavier the stone the shorter the distance thrown, and the lighter the stone then the proportionately greater would be the distance thrown. But if the stone were either too big or too small, too heavy or too light, then the machine could neither lift it nor detect it. Such extremes in weight or mass would represent a boundary constraint. At either extreme, the machine would not be able to throw the stone. Equally, if one truant were too small or too big, then the field would not be able to influence that truant.

The proposal is that as the truant is manifest, it may have a velocity equal to or less than the speed of light. Correspondingly, its velocity would be less than that of a zipon in the field. In fact, what I am proposing is that the truant gains mass in an inverse proportion to its loss in velocity. In effect, it slows down to the speed of light, which then makes it measurable. At that point, the truant would be outside the boundary constraints of the field.

A truant, by definition, presents a conflicting charge to the field. Theoretically, it could manifest in an almost infinite variety of directions and sizes, or charges and masses, depending on the force at which it was first expelled. But without having another truant to anchor it out of the field, some partnering truant with which it could orbit then, when that initial separation force is expended, it would lose its mass and regain velocity. Then, just as magnets move towards other magnets, so too would the one truant gradually and inevitably accelerate until it was again the same mass/size as the zipon in the field. Then it would simply slip back into the field as a zipon. Presumably these are nuances or virtual particles.

COMPOSITE TRUANTS

While unstable truants may manifest in an infinite range of mass and charge, stable composites need to comprise some combination of, two, three or

nine truants else they would eventually decay and accelerate back into the field. This numerate limitation is difficult to explain. Broadly, the argument goes like this.

Given that the field is greater than the truant, by virtue of the sheer number of zipons in the field, then the truant will be positioned within the field and would, therefore, only experience the field's single justification or charge. For ease of reference I shall simply refer to charge. So, with single truants, one charge for the truant and one for the field, then the truant would eventually decay into the field. They cancel out.

A composite of two truants would give two charges and one charge for the field. Then the charge of the field and one truant cancel out leaving one charge for the truant. This would result in a single direction. And, as the photon is the only particle that moves in a single direction, which in effect, is a straight line, I am proposing that a photon comprises two truants. It's interesting to note that two truants would have a neutral charge. The only neutral charge in the field is in the radial arms between the zipons, which also precisely describes the path that photons follow when they radiate outwards in straight lines from a source.

A composite of three charges for three truants and one for the field, then one would cancel out with the field, leaving two charges for the truant. This would result in a bidirectional path or a spiral within the field. As the electron is seen to spiral in a bubble chamber then I am proposing that the electron may be a composite of three truants.

A composite of four, five, six, seven and eight truants would all variously subdivide into one, two and three composites, as the field only has one justification. But a composite of nine truants would in essence, be the same as three electrons. And, as it is proposed that an electron is a stable particle then too, a composite of three electrons, or nine truants, should be stable. If

therefore, I can reconcile the mass of the electron to the proton then it may indeed, indicate that a proton is a composite of three electrons which, by default, may then also prove the composite of the photon. But before I do this, I need to describe the interactive association between stable composite truants.

THE PHOTON

I have proposed that a photon is a composite of two truants. As required by the laws of charge, each truant would present opposite charges and move towards each other to attach, in the same way that magnets attach. But if these truants are positioned in a field with a single justification, as proposed, then in whichever way they are positioned 'out of true' with the field's justification, the one truant would present an opposite charge to the other in relation to the field, as illustrated.
(photon)

This means that if the one truant were substantially attracted to the field's zipon in the juxtaposed string then the other would be substantially repelled. They would respond differently. The one would gain mass and lose velocity. The other would lose mass and gain velocity. In fact, the mass of both truants would exceed the boundary constraints of the zipons in the field. But the one would become larger and more measurable and the second, moving at a velocity that exceeds the velocity of the field, would become smaller and less measurable.

Again, with reference to that machine, the distance covered by each throw is dependant on the force of the throw and the size of the stone. In effect, the strength of the throw is a constant. But we know that it is the speed of a photon through space, that is constant. It is not, in any way, dependant on the size nor frequency of the photon which can in fact, be infinitely variable. And just as the constant in the machine determines the strength of the throw, so it would require

some constant in the field to determine the required energy or force of throw. This is also based on the assumption that the magnetic field moves the particle, as proposed by this field model. In effect, if the magnetic fields in space move the photon through space, then they can achieve something that the machine cannot. They are able to compute the size and frequency of each photon and then adjust the strength of their throw, so to speak, to ensure that each photon moves at precisely the same speed regardless of its frequency. The following concepts are subtle, and determine a velocity, mass and time constant that may underpin our manifest universe.

If one photon were bigger or smaller than another then it would take each manifest truant correspondingly more or less time to move to the zeniths of their orbits, that point when the one truant is as great as it will ever get and the other as small as it will ever get. This time must be relative to something which is constant else there would be no such thing as a predictable passage of time, which there is. The proof of a time constant is ultimately, vested in the velocity of a photon that invariably moves through space over a certain distance within a precise quota of time. It is proposed that this time constant is provided by the orbiting zipons within the magnetic field.

If zipons orbit in space, and if the zipon's velocity is dependant on its size and, if these structured fields are as coherent as has been proposed, then they will, invariably, orbit at a constant speed. This is based on the proposal that mass and velocity are proportionate and that the zipon's mass is constant. This time frame is referred to as a standard zipon moment, that time required for one zipon to displace the position of another in its orbit within a string.

It is proposed that speed and size are relative – velocity replaced by mass and mass by velocity. Then, assume for now that a photon is four zipon moments big. Being neutral, it passes through the radial arms of the orbiting zipons across its strings. It would therefore take two zipon moments for the one

manifest truant to complete the zenith of its orbit, that time which takes it away from the influence of the field. Therefore, it would have crossed two strings. And during those same two zipon moments, the vanishing truant would complete the zenith of its orbit away from the influence of the field following the path of the first truant across two strings, while precisely two zipons within the field would be displaced exactly twice.

Having reached that orbital zenith, then the manifest truant would accelerate during another two zipon moments which means that it would lose mass and gain velocity, which effectively holds it in the same position. And the non-manifest truant would decelerate during those same two zipon moments as it increased in mass at the expense of its velocity, until both truants would again, be the same size as the zipons in the field. The truants would then swap lattices with each other, at that interactive moment, four standard zipon moments later, when they are, again, the same size and speed as the zipons in the field. At this point in the orbit the photon would not be visible. It would momentarily flicker out of our measurable dimensions. Then the orbit would be repeated, like a dance, two steps forward, two steps hold, to every four beats of the music.

Then, regardless of the frequency of the photons and regardless of their size, being half of one, or one or even one thousand zipon moments big, each photon would be propelled through space only at that interactive moment, when they are brought into the range of influence, or the boundary constraint of the zipons in the field. This would then account for the consistency of their velocities through space regardless of the frequencies of each photon. In effect, the rate at which the photons complete a crossing, or an orbit through the three dimensional strings of the field, would be precisely half the rate at which the zipons displace the position of other zipons in the field.

THE QUARK

The point that needs to be stressed is this. In terms of this model, each stable composite particle must comprise a vanishing charge. This is that truant that moves towards a point in space at a velocity that exceeds the speed of the zipons in the field. It is known that the quark comprises the vanishing charge of a proton. In the same way, this model requires that photons and electrons also comprise a vanishing charge or quark, else the particle will not be stable.

THE ELECTRON

It has been proposed that an electron is the composite of three truants. It is possible to deduce their interaction simply by relating this to the known properties of an electron. For instance, the electron always has a fixed justification or charge. Depending on the alignment within a bubble chamber, they will always spiral from right to left or left to right. It proposed that magnetic fields orbit in strings. A spiral is a partial orbit. Therefore at least one truant may be continually interacting with the strings of zipons in the field, to follow this path.

As they are continually interacting with the field, then perhaps one truant may also be of a like mass and velocity to the zipons in the field. Else they would not be within the field's boundary constraints to enable an interaction. Because an electron is a stable particle then that same truant must oppose the charge of the zipon or they would decay into the string, as do nuances.

It is possible to photograph an electron, and it is seen to appear then disappear from view. Because a mass/velocity coincidence with the zipons in the field is required, then at that moment, the particle would simply disappear from view at the coincident phase of their orbit. This is at the point when all three truants would be the same size as the zipons in the field. At that moment it would be out of reach of our measurable dimensions

(electron)

Therefore its composite may be as follows. That first truant would be manifest, the second would be aligned with the field but move in anti phase to the field and the third truant would be the vanishing charge.

THE PROTON

Because the proton spirals in a bubble chamber, in a similar but opposite way to an electron's spiral, it too may be interacting with the strings of zipons in the field. The question is, at what point do the three electrons attach? Simply because the proton is bigger than an electron it is possible that their attachment is at the third smallest truant which would then be the same mass/velocity of the zipons in the field. This would then give the remaining truants more comparative mass as is required by the fact.

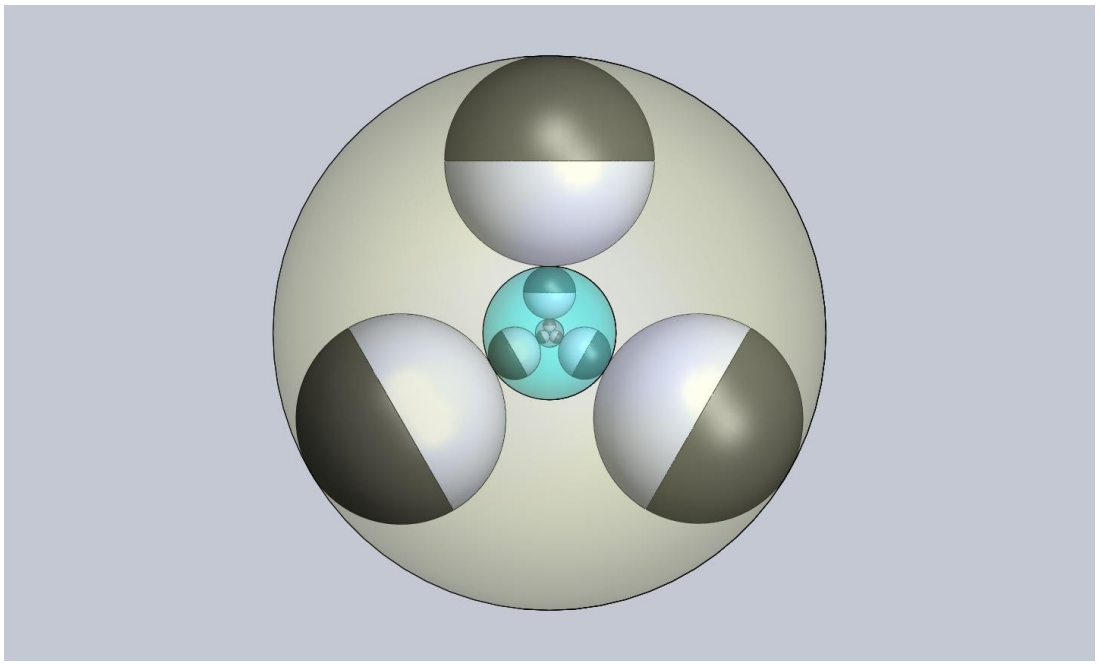
The proposal is that the proton comprises three electrons but, at its formation it immediately formulates into a hydrogen atom. To maintain a requirement for symmetry it is proposed that this is how the fusion unfolds.

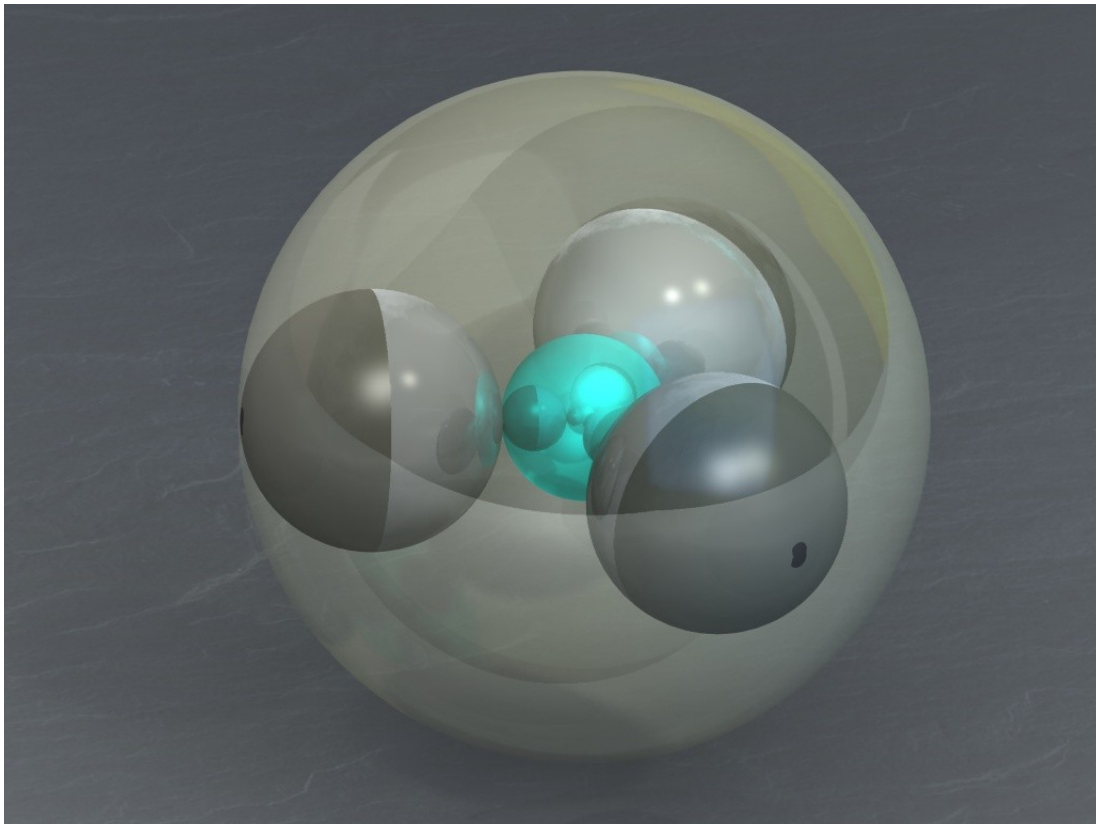
Three electrons are randomly brought together through the interaction of chaotic strings in the primary field. The zipons in those strings are the same mass/velocity of the second truant that binds the electron to the field. These three second truants meet, then disassociate from their electron structure to form a second, entirely independent electron. This is expelled from the structure leaving the three remaining quarks and the three third truants, detached from one another. None of these truants can interact with the primary field as their mass/velocities are outside the zipons' boundary constraints. However the net charges of these third truants and their quarks, align to attract. They move towards each other gaining mass and losing velocity until they attach. They retain the difference in their size ratios being four times bigger or smaller then each other, as they were when they were attached to the second truant that

became the electron. In other words the third truant remains four times bigger than the second truant which second truant was formerly the quark of the electron. Then, three more truants detach from the primary field to form the new anchor or vanishing charge of the proton. This, in turn remains the size of the zipons in the field. Reconciliation of the mass/size ratio between the proton and the electron is then calculated as follows.

If the photon comprises two zipons then the zipon would be half the size of the photon. Velocity and mass have an inverse proportionate relationship. So, if the photon moves at the speed of light (C) then the velocity of the zipon would be 2C. Velocity and mass are inversely proportionate so, if the mass of the photon were given as 1, then the zipon would be 0.5. If the electron comprises 3 truants then its mass would be 0.5 x 3 = 1.5. And, if the proton comprises three electrons then, each electron would comprise 0.5 for the quark. 3 quarks having no volume is 0.5 x 3 = 1.5. Four times bigger for the orbital zenith of the second truant is 1.5 x 4 = 6. And four times bigger for the orbital zenith of the third truant is 6 x 4 = 24. The second and third truant only have two dimensions of volume as they manifest within a prescribed space, that merry-go-round referred to in the field description. Therefore, 3 second truants, having length and breadth is 6 x 6 x 3 = 108. 3 third truants having length and breadth is 24 x 24 x 3 = 1728. This gives a mass of 1837.5, minus 1.5 for the quarks that have neither volume or mass, giving a total of 1836. Some variation of this number is, no doubt, required to accommodate the spherical shape of the truants, but it's complex – a 2 dimensional sphere.

THE PROTON





THE NEUTRON MODEL

I am reluctant to deal with the neutron at all, firstly because it's an unstable particle, and secondly, because I have only resolved its mass. According to this model, instability is due to properties in a truant, or many truants, that prevent a bonding with a contained magnetic field. Being unstable, therefore, means that the neutron does not have an anchor to bind it to the magnetic field, either in the atomic structure or in the primary magnetic field of space. It floats free and, because of this essential instability to bond, it must, inevitably decay back into the field. But because the neutron is evident in all complex atoms it possibly needs to be incorporated in this analysis.

The size of a neutron can be resolved, as illustrated. In effect it is an upside down neutron with three exposed charges on the outer boundaries. But it is not certain that this combination results in a neutral charge. It is possible, however to have an apparent neutral charge if the composite remains detached from the field. If, however, the second and third truant interact with the proton's second and third truant, it may then, perhaps, be indirectly and partially anchored. Essentially therefore, it would simply comprise two manifest truants in each of the three radial arms and a third smaller 'almost vanishing' truant that interacts laterally along the length of the arm. This third vanishing truant would not interact with the field or the proton's quark. As mentioned, the lateral interaction with the proton's second and third truant may enable the relative stability of the neutron within the nucleus of the atom.

It must be stressed that, for symmetry, the manifest and non-manifest truants inside all composites, be they particulate or atomic, must have a continuing interaction. The proposal is that truants form an helical orbit on a shared and spinning axis. In other words they interchange their velocities and masses and charges the one transmuting into the other in a perpetual series of dance steps so to speak. The challenge would be to represent this,

diagrammatically, with fractal geometry. In any event, these interactions would enable variations to the mass and charge of each truant giving rise to the apparent variation of manifest particles. Therefore too, while the mass of a proton can be determined, it is only representative of the quantum of potential variations and not to the moment by moment measurement of each of its truant masses.

Neutron over the proton structure

ATOMIC MODEL

I have proposed that the quarks of a proton can interact directly with the zipons in a magnetic field. But in an atomic structure, the atom is disassociated from the field and operates as a closed system. In effect, the quarks only interact with each other and with the second and third truant. The mass of the second and third truant is too large to be influenced by the boundary constraints of zipons. But protons and neutrons can interact laterally, one with another, as illustrated in the proton model. This, combined with lateral interactions with the neutron's truants, would give rise to the apparent variations in the number and charge of truants that form a proton.

The most fundamental atom in the periodic table, is the hydrogen atom. This model suggests that it forms a nucleus of one proton comprising three electrons, as referenced. Orbiting the proton is at least one disassociated energy level that binds the expelled electron to its orbit. Around the nucleus of this structure are other orbiting strings of zipons that have disassociated from the field. These form the atom's energy levels, the number of which, precisely corresponds to the force that generated the proton and its expelled electron in the first instance. Each hydrogen atom, thereby is contained by its own magnetic flux field.

What is now proposed is that, as the atom increases in complexity, as more energy is introduced to the system, so the zipons, from those atomic energy levels, those fields that have been disassociated from the primary magnetic field, are then transmuted into truants, electrons, neutrons and protons. And at the formation of each new quark that forms the basis of each new proton in that changing atom, a new electron would also be formed which would then collect in the energy levels of the atom. Correspondingly, each new electron would then belong to a specific energy level and its orbit would be determined by the justification of that energy level.

As more zipons become transmuted into protons, neutrons and electrons, so the density of the atomic structure is increased, always at the expense of the number and size of the energy levels and a corresponding increase to the electron cloud. And it is proposed that the electron is not able to nosedive into the oppositely charged proton precisely because it is forced to interact with and orbit, the zipons that form the electron cloud.

DEMARCATION OF SPATIAL BOUNDARIES

When one considers the extraordinary volume of empty space between the proton and the electron in atoms, it begs the question as to how matter resists the encroachment of extraneous material into that atomic space. Given that emptiness, so to speak, it should be possible for some permeability between atomic structures. This, in fact, is never evident and is widely attributed to the interplay of the strong and weak nuclear forces that bind the atom. While in no way contradicting this conclusion, this model proposes that these atomic spatial demarcations are defined, not only by the electron cloud around a nucleus, but to the zipons that comprise the atomic energy levels which, in turn forms the electron cloud. In other words, while it may be possible to separate an electron from, say a hydrogen atom, it may not necessarily result in the removal of the

proton's energy levels. They can remain. Separation of an electron from its atom, would then result in an intrinsic imbalance to the ratio of truants forming the proton in an atom, and the number of zipons that circle the nucleus. This imbalance predisposes the atom to a readiness to bond with compensatory atoms, which resulting molecules can partially compensate for this imbalance. In other words, the spatial demarcations on an atomic level are determined by those energy levels which, in turn, comprise a structured field of zipons that belong to that atom or bonded atoms forming a molecule.

THE DARK IN THE NIGHT SKY

Photons from stars are so plentiful that they should, in fact, light up the night sky. If the path through space is constructed by a smooth distribution of orbiting zipons, then the radial path of photons, through the neutral arms of the field, would allow an easy passage, so to speak. The only thing that can block a magnetic field is another magnetic field. The earth's magnetic fields shield it from the sun's energy levels. It is proposed that photons can only move through magnetic fields. As they encounter the complex structures of the earth's magnetic fields and its atmosphere, which structures comprise vast amalgams of disassociated atoms and molecules, then its path would become more varied and in some instances, blocked. Loosely bonded amalgams such as the atmosphere and water, would enable a continued easy passage through their amalgams by virtue of an abundance of extraneous energy levels or magnetic fields. But these magnetic fields within and around those atoms, would slow the photon's frequency to an extent to make it momentarily visible during each interaction.

But as the photon passes through solid amalgams of denser atomic structures, the photon's velocity is more critically varied. This interaction also slows down the frequency of the photon and being slower means that the second

manifest truant becomes ever more visible. As it reaches more critical levels of penetration in that amalgam, it would eventually reach the atom's own tight energy levels around the electron cloud. Depending on the frequency of the photon it may then be deflected at some angle relative to the angle of impact, and its frequency or velocity at the time of the impact. Smaller faster photons would find the bound state of more solid amalgams to be relatively transparent. And, conversely the bigger slower photons would not be so penetrative. In effect, the photon's frequency is altered by its passage through, and interaction with, magnetic fields. The resulting frequency then depends on the force of interaction with primary magnetic fields in space, secondary magnetic fields around atomic structures, and tertiary magnetic fields that bind the nucleus of atoms. The density of each of these fields may vary which would then account for the visible spectrum of colour at the point of interaction, and for the absence of colour in space.

COINCIDENCE WITH STRING THEORIES

Briefly, therefore, this magnetic field model proposes that all of reality is contained within ten dimensions described as follows. The first reality comprises our measurable dimensions of length, breadth, depth and its movement in time. All such measurements are constrained to the speed of light. The magnetic fields comprise length breadth and depth that share our own spatial dimensions, but they determine the movement of all matter through space and in time. Their time, velocity and size is constant and, because their velocity is invariably twice as fast as the speed of light, their time constant precedes our own time frame. This is the second reality. The third reality is the movement of the vanishing particles that move at velocities that exceed the magnetic fields' constants. Technically, however, they do not occupy any spatial dimensions as their mass has been entirely forfeit to velocity. They, therefore, exist in a different albeit simultaneous time frame to the first reality in an entirely different area of space that, in fact, is best described as non-spatial.

So, four dimensions to the first reality, four to the second and only two to the third makes a total of ten dimensions which would then contain all universal manifest and non-manifest matter. So, it is that this model proposes that the entire universe comprises innumerable zipons that interact and move to create a ten dimensional binary system being our universe. Matter and matter particles may have a limited interactive property. But it is the magnetic fields comprising zipons that move such matter through its fields.

GROSS AMALGAMS OF MATTER

I have tried to justify the model in terms of correspondence principles and the requirement for symmetry at the most basic level of particles and atoms. I can continue using that symmetry to illustrate the 'growth' of matter into identifiable amalgams but cannot do so without introducing concepts that are properly related to gravity.

But, before I get there I would again refer to the evident ability of matter to amalgamate into structures that are spatially separate. It is proposed that all amalgams of matter accrete within magnetic fields. In other words, when matter is divorced from the primary field it first collects as flux from nebulae, made up of photons and electrons. This flux is gradually structured into accretions as it responds to the primary magnetic fields surrounding the flux. These primary fields then release a number of its zipons in a quantity that relates to the force of the singularity that separated the flux from the primary field. These detached zipons then form secondary and tertiary magnetic fields firstly around each manifest particle and then around each atom and so on, finally resulting in the formation of stars. And the manifest star structures are also bound by energy levels – zipons that have disassociated from the primary field, in a number that precisely relates to the mass of the star. Therefore, what is visible and measurable is the star. What is invisible are the energy levels that, firstly, hold

the star and then whole galaxies, in a closed or nearly closed system. In other words, just as electrons are trapped within the energy levels of atoms, so are planets trapped within the energy levels of stars and stars trapped within energy levels of galaxies. And those energy levels comprise orbiting zipons that move with a fixed justification around the earth, the sun and the galaxies in exactly the same way as orbiting fields of zipons move around atomic structures.

Of interest is the possibility that at the time of the singularity, the flux that was separated from the field of zipons needed some time to form the stars. This may account for the difference in the rate at which such stars and subsequent star systems moved apart. This, in turn, may account for the difference in the apparent rate of expansion that is evident between the young and the old universe. And the evidence of colliding galaxies may be the single fact that contradicts claims of a universal spatial expansion. Also of interest is that this would account for the consistency in the velocity of stars within galaxies. If the orbits of stars are not determined by its own energy but by the force applied by these binding energy levels then the rate of the orbital velocity would remain constant with that binding field.

GRAVITY

While the proposal is that magnetic fields may account for the demarcation of spatial boundaries, it does not answer questions concerning gravity. If the rule is that magnetic fields keep matter within certain orbits what then accounts for the movement of some of that material in a straight line towards gross objects in space? And why is it that matter particles are entirely exempt from the influence of a gravitational field if their composites are, in fact, influenced? And, in short, what then makes a gravitational field?

Our earth has a magnetic field. We do not know if it is induced or permanent but we do know that the polarisation of Earth's fields has changed

during the course of its long history. We have evidence in rare earth magnets that indicate that this polarisation has shifted, often. We also know that it is impossible for a permanent magnet to change its polarisation unless artificially acted upon to do so. Therefore, because of the switching poles, it's likely that the earth's magnetism is the result of an induced rather than a permanent magnetic field.

If the magnetic field is induced then there must be some ferrite material in the Earth's crust to conduct that magnetism. In fact there are vast quantities of this material. And there must be an electric field within that core to bring about the induced magnetic field. This electric field may very well result from movement of the core, hot and molten, against the more solid crust. This would, at its least produce friction and possibly, a consequent electric field. An electric field, in turn, would produce an induced magnetic field in the crust of the earth which field would then extrude and intrude at its north and south poles respectively. It does. So this may be the explanation of our earth's magnetic field. As a point of interest – this interaction may very well be a closed or nearly closed system. It may also be the explanation for the axial spin of the earth – contained, as it would be, within energy levels or magnetic fields around the sun.

The question then is this. Is the magnetic field and the gravitational field one and the same thing? To explore this question one must analyse the nature of a magnetic field and the moment that particles within the magnetic field are moved.

If one assumes that all magnetic fields orbit, a movement both from and then towards a certain point in space, then the entire orbit expresses two alternate moments being forward and then backward, or, off and then on. And the result would be that the entire field would be neutral. But each zipon within the field would in fact, be moving in a single direction inside their strings of zipons. This justification or charge of the zipon in the field, introduces an

anomalous association. It means that the zipon is charged, having a fixed direction, but the entire field is neutral, having no fixed direction. The part is charged but the whole is entirely void of charge.

However, stable particles, those truants that are 'out of true' with the field, are too small to experience the neutral charge of an entire magnetic field. They interact with a very limited number of zipons that all move in the same direction, unless, as in the case of an electron, it can be moved to the centre of a magnetic field as in a bubble chamber. At this point it would merely express a spin as is evident. At all other times it would move in a path that would be coincident with the charged property of a limited number of zipons in the field. So, the influence of these zipons acts like an applied vector. Therefore, in terms of this model, potential difference is simply the sum of the zipons in a field of zipons that move with a single justification or charge. This may be better explained by the concept of neutral symmetrical orbit, expressing a single broken symmetry at each of its parts.

This single charge, or broken symmetry is macrocosmically evident in our Earth's magnetic fields. All matter that is contained within the Earth's magnetic field, has only ever experienced a single direction of that magnetic field that encompasses the Earth and its atmosphere. The second half of that orbit is hidden within the material of the Earth itself. In effect the symmetry of the orbit has been apparently broken but is, in fact, merely shielded. So, whether this magnetic field is vast, as is evident in our Earth's magnetic fields, or whether it is small, as is evident in the energy levels of atoms, it invariably applies a vector to contained matter. And the sum of this vector is, in fact, potential difference.

Gross and identifiable matter is in a bound state. Referring back to the kettle and the rock – the molecules and atoms in both objects have been bound into a certain identifiable amalgam. This model proposes that in the process of manufacture – energy, in the form of heat or of some force, was applied to

amalgamate those smaller atoms into that form.

According to this model it may be that the 'things' that were transferred through space and 'borrowed' from the environment around that energy force were magnetic fields induced from the body of the earth – as mentioned. In the process of cooling, these secondary fields are trapped inside that hot or molten structure and remain inside the cooling structure, thereby binding the structure into atomic abodes and resulting in the identifiable amalgam. Re-heating of these abodes, as a result of interactions with the applied magnetic vectors can alter that structure. Under extreme conditions the trapped magnetic fields can then 'peel away' as photons. This results in the fatigue of that structure which is evident over time.

In other words gross amalgams of matter may be bound by magnetic fields that have disassociated from the Earth's primary field. They separate atomic abodes and neutralise the amalgam. Their quantity, size and justification are precisely proportionate to the quantity, size and charge of atoms within that amalgam. And because magnetic fields move towards a state of zero net charge they would enable an arrangement of those atoms into their most balanced formation. This is proposed because gross amalgams of solid state ionised atoms cannot find a rest state unless their atoms are somehow separated so that the one will not experience the charge of another. Symmetry in this analysis is everything. Therefore, if ionised atoms are separated by these extraneous magnetic fields into some form of atomic abode then, equally, all structures of solid and liquid amalgams may have been manufactured by these fields that arrange amalgams into crystalline structures.

At the risk of repetition – but for better clarification. In terms of this model, therefore, magnetic particles, or zipons, are mono directional but the whole field is neutral – moving first forward and then back to itself. Our Earth's magnetic field, conversely, is only mono directional. The second half of the orbit is

contained within the Earth's material structure which effectively breaks the symmetry of that orbit. This 'single direction' is experienced as 'potential difference' to particles, atoms and molecules. All amalgams are bound by these disassociated fields, either or both, from their own energy levels or from the primary magnetic field of the Earth that have been trapped in that amalgam. They orbit. And that orbit has a justification. This means that one half of all the zipons trapped inside amalgams of matter conflicts with the single justification of the earth's magnetic field. This conflict of direction and charge, results in an interaction of these bi-directional magnetic fields and the Earth's mono-directional magnetic field, to move the smaller of the two fields in some direction.

The resulting interaction is complex. Magnetic vectors or gravity, will move solids towards the centre of the magnetic field – being the surface of the Earth. If that solid amalgam comprised anti-matter then it would be moved to the outer boundaries of the magnetic field. This would put anti-matter, not at the surface of the Earth's magnetic fields but at the outer boundaries of the final magnetic field in the universe. This magnetic field model proposes that our universe would be toroidal in shape and its outer boundaries would comprise vast collections of anti-matter.

Before concluding this exercise it is important to stress that this magnetic field model has determined that atoms – in a solid state comprise a predominance of matter particles to magnetic particles. Liquids have equal quantities. Gases have a predominance of zipons. Each of these states interacts with the Earth's magnetic vectors differently. For example, it is proposed that 'like' gases have a consistent charge evident in the outer boundaries of their atomic structure. Their energy levels are externalised, so to speak. If many atoms from a single gas were, therefore, contained within an artificial environment, then all those fields – having a like charge or justification – would repel each other. This would account for the equal dispersion of these particles in space. Atoms in a liquid state would have equal quantities of zipons to their

matter particles. Therefore, their interaction with each other would be neutral but the whole would still respond to a downward movement within a gravitational field. Atoms in a solid state would have a greater quantity of matter particles to zipons.

I must also give some brief reference to the fact that magnetic particles, or zipons, are plastic, being able to rearrange their strings to increase or decrease in number and in range of influence through space. Matter is contained by them but is largely invisible to them. In effect, it is the cloth behind the tapestry of our universe. And because of the elegance of the orbit, these fields remain neutral and therefore, undetectable except when artificially exposed through voltage imbalances.

FIRE AND COMBUSTION

The one thing that argues in favour of extraneous fields accounting for the binding of amalgams, is the event of combustion. In terms of this model, what is proposed is that some friction or force is applied to those zipons that bind atoms into gross amalgams. In other words, these fields are extraneous to the atom itself and were introduced to the amalgam at the point of manufacture. They then hold matter together, like a universal or cosmic glue. This applied force or friction would then induce a state of chaos to that binding structure by breaking the symmetry of their strings' orbit. Then zipons from these broken strings, or atomically extraneous energy levels, would peel off, to transmute into really slow truants, or flames. Each truant would then be evident in our own measurable dimensions. Slower is bigger and being big it would be outside the boundary constraints of any adjacent surrounding flux fields. As virtual particles or truants, they momentarily lose their anchor, so to speak, from a magnetic field. Their frequency would slow to a point where the truant becomes relatively stationery. It is then joined by many more truants as it is still a fundamental, neutral particle. Being neutral, it can share a path in the same way that they shared a path in the

field as a closed string. As the first string unravels, it imbalances other adjacent strings from juxtaposed atomic energy levels. Then more and more binding magnetic fields can unravel and the size and number of the conflagration would then increase.

But, like all nuances, these flames, or virtual particles would eventually expend the force of that earlier separation from the field, that state of imbalance, only to decay back into the greater primary or secondary magnetic fields, either as zipons, from the cooler body of the flame, or as photons, transmuted from the hot boundary of each flame, or indeed in some ratio of both depending on the nature of the environment juxtaposed to that flame. The unravelling of these fields would result in a degradation of the bound state of the amalgam. But the integrity of the now liberated atom, would remain intact. As this is consistent with the fact, it argues in favour of these binding magnetic fields in amalgams, remaining extraneous to the atomic structure. They would then have emanated from the magnetic fields of the earth or from those fields transmuted into binding fields, from the source of the amalgam's manufacture, in the first instance. If this is correct, it speaks to a remarkably exact level of the conservation of mass and energy. Yet in defiance of these same laws is the simple fact that a single spark can create a really big fire. Very little energy is required to produce that spark which, in turn can produce a disproportionately large conflagration in a chain reaction. Notwithstanding which there is a liberation of the stored energy resulting from the prior manufacture of that amalgam in the first instance.

BLACK HOLES

The significance of this model may be far reaching. Regarding the strong nuclear force, it suggests that the only method to dismantle the proton structure would be to increase the velocity of a field of zipons in order to 'shrink' them to the same mass/velocity of the quarks. The point is that the field of zipons would need to be within the boundary constraints of each truant's quark. This may

enable an interaction, but I have no idea how one can increase the velocity and density of a magnetic field. Nor would I recommend it as it would possibly result in some considerable disruption to that primary binding magnetic fabric.

I suspect that such fast moving magnetic fields may be the source of black holes in space. If so, then black holes can exponentially increase their influence through space, decaying the structures of matter as easily as unravelling a piece of knitting. These, black holes may be those areas in space where there were, initially, no magnetic fields whatsoever. If so then these would also be the only true vacuums in space. And it may then be that structured matter gradually unravels back into highly structured fields of zipons thereby filling the black hole, or that true vacuum, with newly arranged zipons. Again, this speaks to a remarkable level of conservation, not only of energy but of mass itself.

THE ELECTROMAGNETIC FORCE

Regarding the electromagnetic force as this applies to the generation of electric current flow, this application has been described as the movement of potential difference through circuit components in order to change the justification of those zipons that bind and separate imbalanced atoms into abodes. Here there is a radical departure to conventional thinking as this relates to the transfer of energy. The proposal is that these fields return to their amalgam without forfeiture of their initial quantum. By moving from one terminal to another, they simply alter their spin to diminish the voltage imbalance. By removing the initial imbalance, the molecular state of the atoms at the source amalgam, may be varied. But the question remains as to whether these fields separate from atomic energy levels or from extraneous fields that bind atomic abodes.

Whichever way, the result suggests that the conservation of energy in an electromagnetic interaction is total albeit that, in the transfer of its fields through

the circuitry, secondary interactions would enable kinetic or radiant energy to be dissipated from circuit components. As this test experiment was well within my budget it was both tested and proven. This too is useable energy. It also implies that electric energy can potentially, be a nearly closed system thereby becoming a clean energy source.

BROKEN SYMMETRY

All this may obviate the need to search for that elusive magnetic monopole that has been the Holy Grail of research. This is the point. The broken symmetry of a magnetic field may have the same potential as a magnetic monopole as it always has the property of voltage imbalance or potential difference. Unless it is exposed to another 'broken symmetry' or voltage source, it will always find a rest state. Two such opposing, or even complementary charges, should result in an interaction that cannot find that rest state. An example of this may be evident in the relation to the spin of an energy level from the sun and the Earth's axial spin. This interaction would then be a macrocosmic development of the same principle of magnetic fields in the atom's energy levels, moving the electron. The orbiting magnetic fields around an energy level from the sun would have a single justification. If the earth was trapped between two such fields it would allow a continual interaction with the earth's single exposed charge from its own exterior magnetic field, thereby resulting in both a smaller axial spin and a larger orbit. Correspondingly, planets that do not have an axial spin, such as our moon or mars, may have induced magnetic fields from various energy levels, that trap them in an orbit consistent with the macrocosmic energy levels, but without expressing that axial spin.

STEADY STATE SYSTEMS AND BIG BANGS

The broad principles of the magnetic field model and its applications are described in this exercise. The object is to explain that the source of energy, be it strong or weak nuclear forces, electromagnetic or gravitational, may all emanate from a single source being the magnetic field. While it may be possible to tease out their fundamental properties and use them through the manipulation of broken symmetry, as described, it is impossible to create or destroy the zipons that make them. This inclines me to think that the universe is a closed or steady state system as it is conventionally described. But this conclusion in no way conflicts with the Big Bang theory as the initial creation of matter that separated from these fields, may have been related to a singular event. The puzzle is that we can see the creation of stars from nebulae in space, and I wonder if those newly generated stars become star systems formulating their own singularity – which, again, suggests that singularities may manifest within other singularities. This then suggests that the matter in our visible universe was somehow 'first born' and that many such singularities may follow.

CONCLUSION

This exercise presumes to resolve many outstanding questions in science, but has done so with the proposal of the existence of a tachyon that, by definition, remains outside our measurable dimensions and therefore, at best, is merely a theoretical probability. The object of this exercise was to show that by postulating its existence at all, and by equating its manifestations to physically measurable evidence, speaks to a correspondence that justifies the first postulates. In effect this model is merely based a pattern that has grown from the particulate to a multidimensional general field effect, sustaining a consistency that it is hoped, is logically coherent.

Of necessity the development of this field model required the input from an outsider as it is based on contentious proposals . Much of science is resolved by consensus. That consensus is usually indicative of the philosophical bias in the

general mind set relating to the time of each new development in science. So it is, for instance, that early evidence of our earth's orbit around the sun conflicted with the Church's dictates that required man to be the object of all creation. Time and conflicting evidence gradually eroded this assumption. So it was that, when Darwinian proposals of evolution were first introduced they were immediately accepted, although only proven with a subsequent and growing science of genetics. It is hoped that, in some small but similar way, this exercise will appeal to a newly emergent mind set that seeks to preserve our fragile future within a growing movement towards non-pollutant uses of energy. This model concludes that energy can be expended with far greater efficiency. But in so doing, it challenges conventional understandings regarding, not only the transfer of energy but to the very structure of matter, describing, as mentioned, the fabric behind the tapestry, so to speak. Certainly it speaks to an interconnectedness between all that is manifest, that may encourage a renewed sense of accountability. But it is argued that there is a total conservation of all mass which may also indicate that the universe itself operates as a closed system. This could possibly reawaken a sense of the eternal that is largely contradicted by the perceived fragility of matter.

REFERENCES

Dancing Wu Li Masters Gary Zukov

Conceptual physics Dyson

ACKNOWLEDGMENT

Donovan Martin with his contribution to a first stage in a geometric presentation of the composite particle as a critical first stage to its preferred expression through the use of fractal geometry.

COUNTER ELECTROMOTIVE FORCE ENABLES OVERUNITY RESULTS IN ELECTRIC SYSTEMS

ROSEMARY AINSLIE

DONOVAN MARTIN

02. February 2009

ABSTRACT

Conventional models of electric energy determine that it is depleted as it transfers its energy to various loads connected to a supply. Therefore efficiency is constrained to unity or less. A non-classical magnetic field model refutes classical assumption by predicting that electric energy, dissipated at a load, can indeed exceed the energy delivered by the supply. While the model is not the subject of this application a broad overview is appended. Over unity results are achieved by generating counter electromotive force within inductive components in a switching circuit. These components enable this returning energy, manifest as a negative transient voltage across a resistor. At critical levels, it also results in a partial recharge of the battery. Results confound constraints required by conventional models of electric energy transfer and may prove the proposals of that field model.

INTRODUCTION

The fundamental laws of physics, as they relate to the transfer of electric energy, have been effectively used. Applications of these have pioneered our most advanced technologies and these are, indeed considerable. Because of the remarkable success in this field, it is widely understood that everything that can be known about electric energy transfer and application, is known. Therefore there has been no need to revisit those principles established by the

Laws of Induction. And, consequently also there has been no need to question the Second Law of Thermodynamics. As a result, there are no engineering publications available for citation. It is hoped that this lack will obviate the need for references in this submission.

Essentially this paper raises questions that relate to the laws of physics. But the evaluation of the experiment described hereunder, requires the expertise of electrical engineers for evaluation of the measurement protocols. However, as engineers use the concept of current flow it is considered appropriate to give a brief description of this flow in terms of the model that is more fully described in the appendix to this document.

This field model concludes that electric current flow comprises the movement of magnetic fields that use circuit components to alter their spin or justification. The fields are imbalanced as their justification, or charge, reflects the ionised condition of the source amalgam. It is proposed that it is the quantum of these imbalanced fields that is measured as potential difference. And re-justification at the terminals of the supply, diminishes this difference without varying that quantum. As it is also proposed that all magnetic fields comprise particles then, properly, the electromagnetic interaction may not be constrained to the principles governing the Second Law of Thermodynamics. Therefore the model predicted that unity could indeed, be breached on electric circuit apparatus

As science is progressed through experimental evidence it is expected that theory will give way to fact. The test described hereunder shows gains that far exceed the constraints determined by classical theory. These results are repeatable and depend on the generation of counter electromotive force.

The circuit designed and used in the test is well known and commonly referred to as a shunt circuit. Here the second path of current is generated from the transient voltage induced across the resistor itself, which is designed to be

highly inductive. A MOSFET is used as a switching device as this has an intrinsic or parasitic diode. This allows a path for the reverse flow of current resulting from this induced transient voltage. Depending on the applied frequency and duty cycle it is possible to greatly enhance the level of counter electromotive force. This in turn, results in enhanced efficiency as the amount of energy dissipated at the load then exceeds the energy supplied by the source.

Various tests have been conducted that apply these principles of the shunt circuit that are not described in this exercise. They include the use of a variety of resistors in series with single and double wound inductors as well as a variety of power supplies including battery and utility supply sources. And all these experiments have resulted in gains where energy dissipated is greater than energy delivered. The level of gain is largely dependent on the frequency applied to the switch, to the duty cycles and to the level of inductance in the circuitry. All the tests are repeatable.

It is not surprising that an increasing number of inventors claim to have results in excess of unity. The use of the principles of the shunt circuit is increasing and energy measurements are ever more critically determined. This is precisely because the need for energy efficiency is becoming paramount. Inevitably the gains that are enabled by this application will conflict with predicted results. But all such claimants remain on the fringe of experimental science precisely because their results exceed classical presumption and are widely considered to be anomalous.

Therefore the object of this application is to engage in a systematic evaluation of the experiment that is detailed herein. It is hoped that publication will enable a wide dissemination of this so that results can be replicated. The results and conclusions can then be analysed by a broad range of experts in the art who are better qualified to comment than the authors.

To this end the paper details the experiment that was chosen precisely because it results in a level of over unity that far exceeds margins of error in measurement analysis. It is presented with a detailed description of the components to the circuit apparatus to enable replication. This is followed by an overview of the measurements and a discussion of this and similar work. The brief conclusion points to the potential in developing this technology that may encourage more research, investigation and development. Appended is a synopsis of current flow as proposed by a non-classical magnetic field model that may account for breach of unity.

EXPERIMENT

The following test was published in Quantum Magazine October edition, 2002.

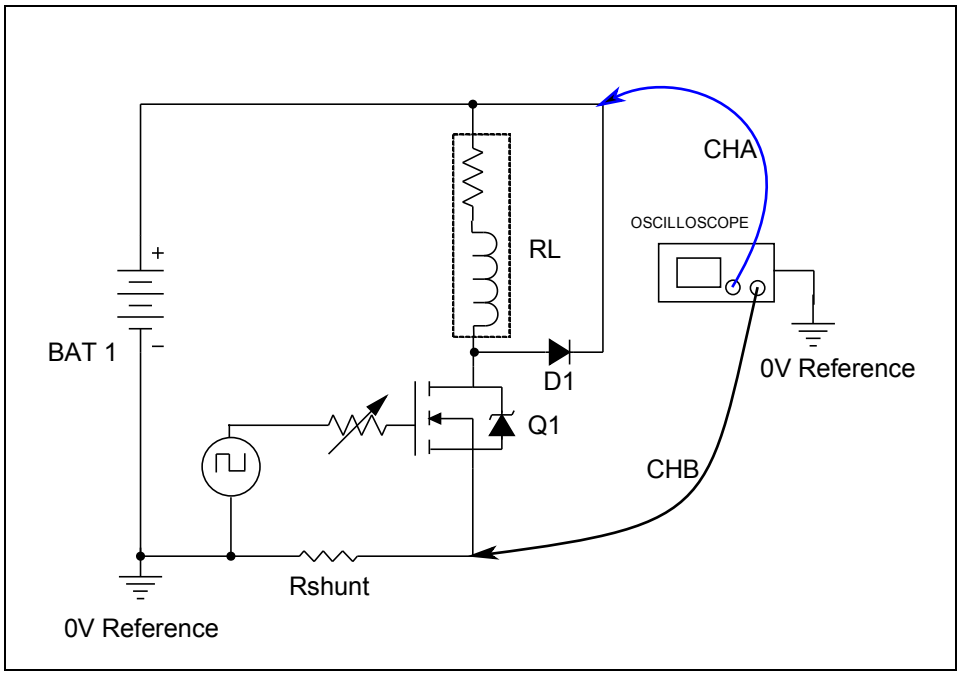


Figure 1 Circuit schematic diagram

A 24 volt battery, (BAT 1) is applied in series with a 10 Ohm wire wound

resistive load (RL). A flyback diode, (D1) is placed in parallel with (RL) thus connecting it back to the positive terminal of the battery. At the junction of the diode and the inductor is an N Channel power MOSFET, (Q1), connected, in turn, to a 555 switching circuit with variable duty cycles and frequency adjustment. A 0.25 Ohm shunt resistor is placed in series with the negative terminal of the battery.

CIRCUIT COMPONENT	DESCRIPTION
BAT1	Battery 24V, 2x12V 20 Amp hour in series
RL	10 Ohm ceramic hollow core wire wound
Rshunt	1R 2W 5% Carbon resistors x 4 placed in parallel
D1	Rectifier diode, 1N4007
Q1	N-Channel MOSFET, IRFPG50

Table 1. Circuit component values

SPECIAL PARAMETERS

The load resistor was made by Specific Heat CC (SA). It comprises a 10 ohm hollow core wire wound ceramic structure with a length of 150 mm. and a diameter of 32 mm. 48 turns of resistance wire are spaced at 1 mm. It was chosen for its inductance (8.64 micro Henries).

The MOSFET was chosen to have a parasitic diode that enables conventional reverse current flow during the off period of the duty cycle.

The oscillator is adjusted to output a frequency of 2.4KHz at a 3.7% duty cycle on time. Adjusting the variable resistor in series with the gate of the MOSFET reduces the gate current and results in random oscillation that

overrides the predetermined frequency and duty cycle.

MEASUREMENT OF ENERGY DELIVERED BY THE BATTERY

The positioning of the probes A and B is detailed in the circuit diagram. As mentioned, the voltage waveforms that result from such a high oscillating frequency vary greatly from one cycle to another. The transient voltage spikes that are deliberately generated, then compound this variation. In order to evaluate a reasonable average of the energy delivered a time base of 1us/div was chosen.

Current flow to and from the battery was determined from the voltage waveform across the 0.25ohm shunt resistor divided by its resistance. Batteries are not, typically, able to deliver a negative current flow. Therefore, it was determined that current delivered by the battery would be the product of instantaneous voltage measured across the shunt divided by the resistance of the shunt measured above zero. Correspondingly, any current delivered back to the battery would be determined from the instantaneous voltage across the shunt divided by the shunt's resistance, measured below zero. The actual flow of current from the battery would be the difference between these two values.

The oscilloscope's coupling was set to DC to determine instantaneous direct current voltage measurements. Multiple waveforms were stored and downloaded to a spreadsheet for analysis. The equation applied to obtain the sample values was

$$\frac{\sum_{n=1}^{x} VI}{x}$$

where x = Number of samples taken, V = Battery voltage, I = Current, $I = \frac{Vshunt}{Rshunt}$

The instantaneous product of each sample (V x I) was determined and the sum of all the samples was then computed. In order to establish the average power delivered during each cycle the sum of all the samples was then divided by that sample range number. Results indicated that the average power delivered by the battery was 1.13 watts.

MEASUREMENT OF ENERGY DISSIPATED AT THE LOAD RESISTOR

The load resistor was wound to deliberately yield a high level of inductance. This, in turn, generates high voltage spikes during the off period of each switching cycle. Also, the reactance and impedance vary with each oscillating waveform. This makes it difficult to determine the accurate instantaneous impedance of the load resistor at any given moment.

These conditions caused protracted discussion on the accuracy of measurement related to current phase lag within the inductive component of the load. To obviate any further discussion it was decided to confine the measurement of power dissipated to caloric values.

Measurement of the rate of temperature rise was enabled through the use of a platinum-based temperature probe fixed to the hollow wall of the resistor. The probe was chosen because it is not affected by the applied high frequency. The probe in turn, was linked to a digital device that displayed instantaneous readings of temperature change in degrees Celsius.

Tests were conducted in a draft free environment. Ambient room temperature was recorded on the digital display linked to a second identical type platinum based probe positioned inside a similar resistor. The test was allowed to run for a period of about an hour until the temperature of the load resistor stabilized. The difference between ambient room temperature and the rate of temperature rise on the load resistor was assumed to represent the actual rate of

temperature rise under test conditions.

The temperature rose to 52 degrees Celsius above ambient after a little over an hour. At this point it stabilized and then remained roughly consistent within the fluctuations of ambient room temperature.

CALORIC CONTROL TEST

The same load resistor was allowed to cool and then placed across a variable power supply source as a means to measure comparative temperature rise against an applied DC power in the same draft-free environment. The applied DC voltage was adjusted until the same temperature above ambient was obtained.

RESULTS

The temperature rise above ambient stabilized at 52 degrees Celsius when the applied dc voltage from the variable power supply was set at 13.32 volts. This represents $\frac{V^2}{R}$, 13.32 x 13.32/10 = 17.74 watts. Results indicated that an average of 17.74 watts was dissipated at the start of the test period.

The following schedule of results as indicated in Table 2 was taken from an experiment that was conducted over a 16.5 hour test period to determine the rate at which 2 x 12 volt batteries in series discharged their energy.

MEAUREMENT OF BATTERY DISCHARGE RATE OVER 16.5 HOURS

Time	Minutes	Load Temp	Ambient Temp	Above Ambient	Battery Volts	Joules	Control Watts
17:31		69.5	21.4	48.1	24.8		16.41
18:00	29	69.5	18.4	51.1	24.8	30333.37	17.43
19:00	89	69.7	17.7	52	24.8	94731.64	17.74
20:00	149	69.5	17.6	51.9	25.1	158290.68	17.71
21:02	211	68.5	17.4	51.1	24.8	220701.39	17.43
22.01	270	68.9	17.5	51.4	24.7	284072.11	17.54
23:02	332	68.10	17.3	50.8	24.6	345226.01	17.33
24:00	390	67.6	17.3	50.3	24.6	401545.08	17.16
8:08	878	65.10	16.6	48.5	24.3	871641.65	16.55
9:30	960	64.8	16.1	48.7	24.7	956977.91	16.61
9:53	983	71.1	16.8	54.3	25.1	1092584.58	18.52
10:07	997	76.5	16.6	59.9	24.3	1222429.15	20.44

Table 2. Measurement of battery discharge over time

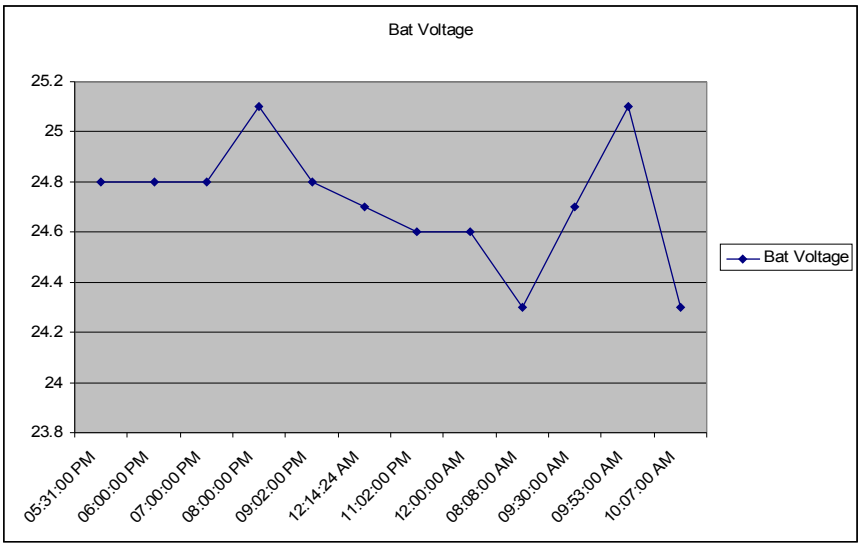


Figure 2. Battery voltage over period of measurement

During this time, measurements were taken of both the temperature rise above ambient of the load resistor and the voltage drop across the batteries.

The average rate of temperature rise was 51.37 degrees Celsius above ambient. The average wattage as it related to temperature rise (Caloric Control Test) was 17.53 watts.

This, in turn resulted in a total of 1.22 Mega joules dissipated over the entire test period. The wattage measured to have been delivered by the battery was 1.13 watts x 997 minutes x 60 seconds being 67 596 joules. The voltage measured across the battery fluctuated during the test period. But there was no evidence of any significant battery voltage reduction that could be reasonably ascertained. Note that the battery voltage remained above 24 volts.

This extended test period had the added advantage of testing the experimental results over a more significant duration of time to determine that neither the energy dissipated at the load resistor nor the energy delivered by the battery was a purely transitory phenomenon. The evaluation of the performance of the batteries, in terms of their rated capacities, was omitted as the performance of these lead acid batteries typically varies from their watt-hour ratings. Such evaluations are widely considered to be subject to too many vagaries to represent dependable results.

Table Column Heading description

Time - Computer clock – not calibrated
Minutes - Test period in minutes
Temperature on load - Measured on the digital display device linked to
The temperature probed coupled to the load resistor on the circuit.
Temperature - Difference between the test and ambient temperature
Battery Volts – Instantaneous battery voltage read from the digital display of the Fluke oscilloscope with the probes placed directly across the battery.
Joules - Watts per control Watts x time
Control watts - The caloric control test determined that 17,74 watts represents

a temperature rise of 52 degrees Celsius over ambient. Therefore, 17.74/52 = 0.34 watts as a factor, per degree Celsius over ambient. Power, (watts) was therefore determined as the difference between test and ambient temperature multiplied by this factor, to give a broad indication of power (watts) dissipated at the load resistor.

RESULTS

Energy dissipated at the load = 1.22 Mega joules
Energy delivered by the battery = 67.6 Kilo joules

OVERVIEW OF RESULTS

The need to involve independent entities and authorities was proposed as a supplementary method to review the experimental results. It was determined that this process was required because of the anomalous and contentious nature of the claims that are associated with this proposed technology. The companies listed below approved the inclusion of their name in publication of these results and, together with the authors of this article recommend a wider forum for systematic and statistical consideration of the experiment and its results.

The Cape Hope Metrology Laboratory confirmed that the test equipment had been calibrated at Tallumant's Metrology Laboratory

Spescom as distributors of Fluke instruments who attended demonstrations

ABB Electric Systems Technology Institute in North Carolina who conducted independent tests. Here tests were confined to the evaluation of instantaneous power delivered simultaneously by the battery supply source and dissipated in the load. Measurements were enabled through the use of four channel oscilloscopes.

Johnathan Green of BP (SA) who applied tests to measure the effect of the energy gains on battery duration

SASOL representatives who are offering a bursary award to encourage further research

J De Bruto of Power Engineers

Error margins

It would be reasonable to assume a maximum of 10% error on all temperature measurements as the caloric test conditions were crude. Error margin ratings applied to the Fluke 199 C oscilloscope, as this relates to the voltage measurements across the shunt and the load are 10% and 1.5% respectively at the highest frequencies applied to these tests. Even if all negative voltage sample measurements are discounted by these values results still indicate a coefficient in excess of 16 over the energy delivered.

Calibration Certificates

10 ohm resistor	1563/JN21 November 2001
025 ohm resistor	1562/JN20 November 2001
Fluke oscilloscope	19.12.2001

DISCUSSION

Conventional engineering largely discounts the benefit of transient voltage as this is assumed to be out of phase with current flow. This, in turn, compromises the efficient transfer of its energy. However, for purposes of dissipating radiant energy, as detailed in this and many other tests, this

assumption may need to be revisited.

Many circuits have been evaluated with varying levels of benefit but all circuits have measured gains that exceed unity. These circuits include, for example, the use of single and double wound inductors to induce counter electromotive force. N FETS or P FETS can be applied. The flyback diode has also been variously applied to the same battery or to alternate batteries connected to the supply by a common negative rail. This, in turn results in a recharge of that battery without compromising the energy delivered to the resistor in series with the supply. Tests have also been conducted from alternating current supply sources using step down transformers. Frequencies can be varied but it is evident that the faster the frequency the better the return.

The only limitation to wider applications of this technology, appear to be the restrictions of the MOSFET itself. This solid state switching device is a critical component because, as mentioned, its intrinsic diode retains the circuit integrity during the off period of the duty cycle. Its voltage tolerance also restricts the range of applications that could otherwise be immediately applied. It is hoped that shunt circuit applications will encourage an advance in this technology. If so, it may then be possible to apply this directly to higher voltage supply sources to generate a higher wattage output.

CONCLUSION

There is very evidently a breach of unity resulting in all these applications. But nowhere is there a claim to have a closed system. The experiments presented herein, rely on input of energy from a supply source. Thus far, this has always resulted in a loss to the supply albeit that it is disproportionately less than the energy dissipated at the load. However these results point to the fact that it may be possible to develop a nearly closed system where losses are only evident in the load resistive material itself. That system is yet to be developed.

Albeit that tests have only been conducted at relatively low wattages, the principle has been proven that unity as applied to electric energy transfer, can and indeed has been breached. It now remains to be disproved.

ACKNOWLEDGEMENTS

[1] The Cape Metrology Laboratory.

[2] Spescom.

[3] ABB Electric Systems Technology Institute .

[4] Johnathan Green of BP (SOUTH AFRICA)

[5] J DE Bruto of Power Engineers

APPENDIX

A BRIEF OVERVIEW OF ELECTRIC CURRENT FLOW IN TERMS OF THE MAGNETIC FIELD MODEL

The magnetic field model, referenced in the abstract, represents an axiomatic departure from classical models of energy and energy transfer. It is stressed that no part of that model has been developed mathematically. However, it was through the direct application of its principles to conventional electrical circuitry that over unity was both required and achieved. While this does not conclusively prove that model it may suggest that its fundamental concepts are consistent with the fact.

A full description of the model is not appropriate to this exercise except in as far as it relates to properties of an electric current. As mentioned this has not been sanctioned by mathematical proof and is described hereunder in the modest hope that it may explain the concepts of current flow both in line with the field model and as evident from the results on the experimental apparatus.

The fundamental departure of the field model from classical physics is the proposal that a magnetic force may be a primary force. It proposes that electromagnetic interactions are secondary phenomena. A deduction of the properties of a magnetic field led to the conclusion that all such fields obey an immutable imperative to move towards a state of zero net charge. And they can only interact with other magnetic fields.

From this standpoint, deductions were made that led to the proposal that all amalgams of gross solid and liquid matter, may be shaped by magnetic fields. These fields are extraneous to the atoms within their amalgams. They form the atomic abodes that bind gross amalgams into crystalline alignments. As the model also proposes that energy levels comprise magnetic fields, it may be that these fields are somehow extended beyond the immediate range of the atom's nuclear influence. However, it may also be that they originate from the earth's magnetic fields and that they are transferred to the amalgam during the process of manufacture.

The alignment of these atoms within their abodes establishes a relative state of balance within that amalgam. This balance is reflected in the spin or justification of those extraneous fields. In effect, the fields orbit from right to left, so to speak, or from left to right, or indeed in both directions, depending on the ionised state of the atoms.

So it is that the justification of these extraneous fields reflects the valence condition of the atoms. If the atoms in any amalgam are balanced then their extraneous fields have equal numbers of left and right justified fields that bind and separate atomic abodes. And correspondingly, if the atoms are imbalanced, such as in ionised atoms, then the binding magnetic fields only have one justification.

So, if any liquid amalgam comprises predominantly ionised atoms, the

extraneous magnetic fields have a like spin that induces an agitated state within the amalgam. By this is meant that the fields are continually moving away from each other. An example of this amalgam is battery acid and the sum of that imbalance in battery cells is measured as potential difference.

Correspondingly if a solid amalgam also comprises predominantly ionised atoms, such as in resistive wire, those extraneous magnetic fields are fixed within the structure of the amalgam. But their atomic abodes are arranged in an apparently random crystalline pattern to minimize the exposure of like charge, or spin, or justification.

Therefore it is proposed that current flow in fact comprises these magnetic fields. They induce a path through circuit components in order to change their justification at the terminals. This diminishes potential difference, thereby neutralising the imbalance at the source.

Circuit components also have these extraneous magnetic fields located within their atomic abodes. And interaction of these fields with current flow enables the transfer of the primary magnetic fields through the circuit.

As mentioned the material of a resistive load is essentially imbalanced. Having a predominance of ionised atoms indicates that it also has a predominance of imbalanced magnetic fields. In transition through resistive material, therefore, these primary fields interact with the resistor's binding magnetic fields to induce a secondary imbalance within the resistor's amalgam. This too, is measured as potential difference. The resistor's magnetic fields are then induced to alter their justification. These compromises the proximity of ionised atoms previously arranged and separated by these fields. And this, in turn, agitates the resistor's amalgam, which, depending on the intention of the circuit, may be evident in the temperature rise. Under extreme conditions of imbalance, the resistor's binding fields peel off as photons, thereby degrading the

bound condition of its material and resulting in fatigue.

So it is that this model proposes that current flow is simply imbalanced magnetic fields that can be induced to move away from or back to the terminals of a supply source. Always conserved is the quantum of those fields albeit that potential difference at the source is varied through these transitions.

This limits the amount of dissipated energy, not to the amount of fields transferred from the primary source, but to the number of transitions through that resistive amalgam. So it is proposed that the greater the number of transitions, or the greater their frequency, then, correspondingly, the greater is the amount of energy dissipated. The object of the circuit configuration is to increase the number of transitions of current flow through the resistive material.

To this end a switch is applied to inductive components to enable counter electromotive force to induce an opposing or reverse current flow of the primary source. Depending on the number of transitions and as evident in this test, the energy that is then dissipated at the resistor can, in fact, be greater than the loss of energy or potential difference at the supply source. In short, the energy delivered by the battery goes back to the battery. And the energy dissipated at the load comes from the load.

QUANTUM

The Journal for the Electronics Professional

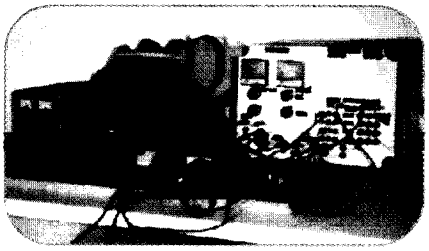
October 2002

www.crown.co.za

Transient energy enhances energy co-efficients

by R A Ainslie and B C Buckley

A new technology is proposed that exploits transient energy. Readers are urged to duplicate the experiment and determine the measurements independently.



The experimental apparatus

A switching circuit is applied in an electric system that is intended to dissipate heat in a load. It is widely accepted that it is possible to induce a level of transient voltage that exceeds the voltage potential at the supply source. Therefore, during the 'on' period of a switching cycle, some energy can be delivered and stored in inductive components in a circuit. During the 'off' period this energy can then be delivered back to the energy supply source. The total energy delivered by that supply source would then be the sum of, or difference between, the two cycles. But, if the load is in series with the energy supply source, it would also provide a path of the flow of current.

Energy dissipated in the load is measured as the product of the instantaneous voltage and current applied during both cycles. In effect, energy can be dissipated during both the 'on' and 'off' periods of the switching cycle.

With the following two provisos, experimental results indicate that energy dissipation in a load may be increased by means of the circuit design rather than by increasing the input energy supplied:

The transient voltage must be greater than the potential difference at the supply source.

The switching circuit must provide a path to enable a current flow during both the 'on' and 'off' periods of each switching cycle.

Circuit diagram

This article describes the precise circuit, as depicted in Figure 1, that is used to expose this benefit in transient energy. This is to enable and urge others to duplicate the experiment and determine the measurements independently.

Special components and parameters applied to the circuit

Frequency

There is a variety of settings that can be applied to the duty cycle (note variable resistors) that results in 'over unity' coefficients. But the repeatability of such results depends on the precise components used in that circuit. To ensure that results are repeatable when tested independently, it was decided to apply an oscillating frequency. This setting results in a very high level of energy efficiency where the amount of energy that is dissipated at the load, appears to exceed the amount of energy delivered by the energy supply source. But high frequency voltage waveform analysis requires the use of more sophisticated measuring equipment.

Oscillation, in this application, is intended to describe a switching cycle that is unable to stabilize. The required level of oscillation is achieved by setting the duty cycle at 3.7% 'on' at a frequecy of 2.4 kHz. Reducing the gate

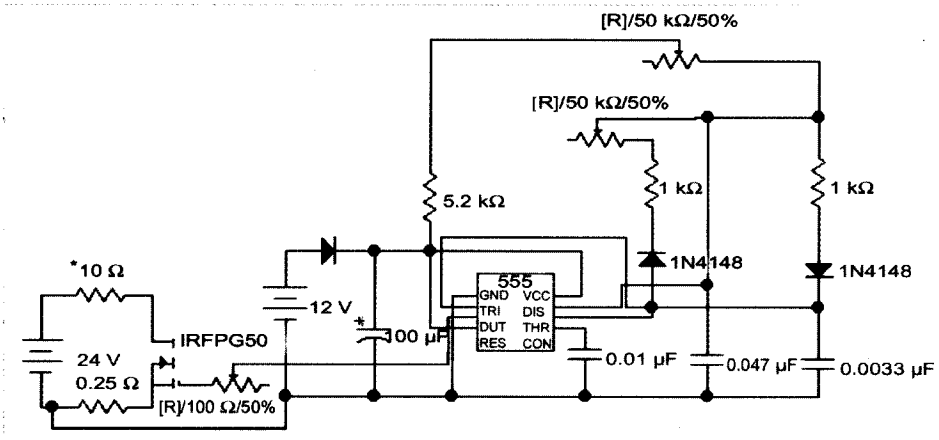


Figure 1: Circuit diagram

current of the mosfet results in an oscillation that overrides the predetermined frequency and duty cycle. The frequency oscillates between 143 kHz and 200 kHz and the duty cycle defaults to approximately 1.3% on.

Measurement apparatus

All voltage measurements were taken using a Fluke 199C (200 MHz, dual channel) storage oscilloscope. The instrument's storage facility allows for about 1 200 simultaneous real time samples.

Intrinsic or parasitic diodes

The solid state switching device used is a mosfet. This is because it has an intrinsic (or parasitic) diode. The diode establishes a path through which current can flow during the 'off' period of the switching cycle. Analysis of the waveform across Shunt 1 indicates that this, in fact, occurs during each oscillating cycle

Schedule of components

Parts list for experiment

	Value	Farnell code
R1	50K Pot 10 turn	351-817
R2	50K Pot 10 turn	351-817
R3	1 K.25w	509-164
R4	1 K.25w	509-164
R5	5K1 .25W	509-164
Preset	100R	614-622
Load	10R	*As per description
Shunt	1R 2W x4	Connected in parallel
Caps		
C1	100µF/16V	228-503
C2	10nF	579-129
C3	33nF	579-154
C4	47nF	579-166
Semiconductors		
D1	1N4007	365-282
D2	1N4148	368-118
D3	1N4148	368-118
U1	NE555	409-364
Q1	IRFPG50	355-744
Batteries		
B1	12V	174-804
B2	24V 2x12V 20ah	Battery Centre

Farnell can be contacted at 086 111 00055
Email: info@automation.co.za
UK +44 870 1200 208
Email: export@farnell.com www.farnell.com

The load resistor was made up by Specific Heat CC
Tel: +27 21 674 2566 Fax: +27 21 674 3759

* RESISTOR: 10 Ohm ceramic, hollow core, wire wound resistor. Length is 150 mm. Diameter 32 mm. 48 turns of resistance wire spaced 1mm.

Schedule of calibration certificates

10 Ohm resistor	1563/JN 21 November 2001
0.25 Ohm resistor	1562/JN 20 November 2001
Fluke oscilloscope	19.12.2001

Measurement of energy dissipated in the load resistor

The load resistor was wound to deliberately yield an inductance. This inductance measures 8.64 µH and generates high voltage spikes during the 'off' period of each switching cycle. However, because the load resistor has such a high relative inductive property (considering the frequency of oscillation) the reactance and impedance of the load resistor varies with each oscillating waveform. These variations make it difficult to determine the accurate instantaneous impedance of the load resistor. Therefore, in order to determine a realistic measure of the energy dissipated in the load it was decided to reference caloric measurements.

Measurement of the rate of temperature rise was enabled through the use of a platinum-based temperature probe fixed to the hollow wall of the resistor, as shown in Figure 2 and Figure 3. This instrument was chosen because it is not affected by the applied high frequency. The probe, in turn, was linked to a digital device that displayed instantaneous readings of temperature change (in degrees Celsius). The test was conducted in a draft-free environment. Ambient room temperature was recorded on the digital display linked to a second identical type platinum-based probe positioned inside a similar resistor.

Figure 2: Temperature probe and load resistor

Figure 3: The temperature probe and coupling in the resistor

The test was allowed to run for a period of about an hour until the temperature stabilized. The difference between ambient room temperature and the rate of temperature rise on the load resistor was assumed to represent the actual rate of temperature rise under test conditions.

The temperature rose to about 52 degrees centigrade above ambient after a little over an hour. At this point it stabilized and remained roughly consistent within the fluctuations of ambient room temperature.

Caloric control test

The same load resistor was allowed to cool and then placed across a variable power supply source as a means to measure comparative temperature rise against an applied DC power in the same draft-free environment. The applied DC voltage was varied until the same temperature above ambient was obtained.

The temperature rise over ambient stabilized at 52 degrees centigrade, when the applied DC voltage from the variable power supply was set at 13.32 volts. This represents 13.32 * 13.32 / 10 = 17.74 watts (v squared over r). Results indicated that an average of 17.74 watts was dissipated at the start of the test period.

Measurement of energy delivered by the battery energy supply source

As stated previously, the voltage waveforms resulting from such an oscillating frequency vary greatly from one

cycle to another. The transient voltage spikes that are (deliberately) generated to enhance energy efficiency compound this variation. In order to evaluate a reasonable average of the energy delivered, a sample range was chosen spanning 1.2 micro seconds.

The probes from channel A and B of the oscilloscope were positioned as detailed in Figure 4.

Current flow to and from the battery was determined from the voltage waveform across the 0.25 ohm shunt resistor, divided by its resistance. Batteries are not typically able to deliver a negative current flow. Therefore, it was assumed that any current delivered by the battery would be determined by the instantaneous voltage across the shunt divided by the resistance of the shunt, measured above ground. Correspondingly any current delivered back to the battery would be determined from the instantaneous voltage across the shunt divided by shunt's resistance, measured 'below ground'. The oscilloscope's coupling was set to determine instantaneous direct current voltage measurements.

Multiple waveforms were stored and downloaded to a spreadsheet for analysis. The equation applied to each of those samples was Sigma V × I × Delta T where V equals battery voltage and current (I) is determined from the voltage waveform across Shunt 1 divided by the resistance of Shunt 1. The instantaneous product of each sample (V × I) was determined and the sum of all the samples was then computed. In order to establish the average power delivered during each cycle the sum of all the samples was divided by that sample number. Results indicated that the average power delivered was 1.13 watts.

Measurement of battery discharge rate over 16.5 hours

The following schedule of results as indicated in Table 1 was taken from an experiment that was conducted over a 16.5 hour period to determine the rate at which 2 × 12 volt batteries discharged their energy. During this time, measurements were taken of the temperature rise over ambient from the load resistor—and the voltage drop across the batteries. The average rate of temperature rise was 51.37 degrees centigrade above ambient. The average wattage, as it related to temperature rise (Caloric Control test) was 17.53 watts.

This, in turn resulted in a total of 1.22 Mega joules dissipated over the entire test period. The wattage measured to have been delivered by the battery energy supply source was 1.13 watts * 997 minutes * 60 seconds being 67 596 joules. The voltage measured across the battery fluctuated during the test period. But there was no evidence of any significant battery voltage reduction that could be reasonably ascertained. Note that the battery voltage remained above 24 V.

This extended test period had the added advantage of testing the experimental results over a more significant duration of time to determine that neither the energy dissipated in the load resistor nor the energy delivered by the battery was a purely transitory phenomenon. The evaluation of the performance of the batteries, in terms of their rated capacities, was omitted as the performance of these lead acid batteries typically vary from their watt-hour ratings. Such evaluations are widely considered to be subject to too many vagaries to represent dependable results.

Time	Computer clock—not calibrated
Minutes	Test period in minutes
Temp on load	Measured on the digital display device linked to the temperature probe coupled to the load resistor on the test circuit
Temp over ambient	Measured on the digital display device coupled to a similar load
Over ambient	Difference between the test and ambient temperature
Battery voltage	Instantaneous battery voltage read from the digital display of the Fluke oscilloscope with probes placed directly across the battery energy supply source

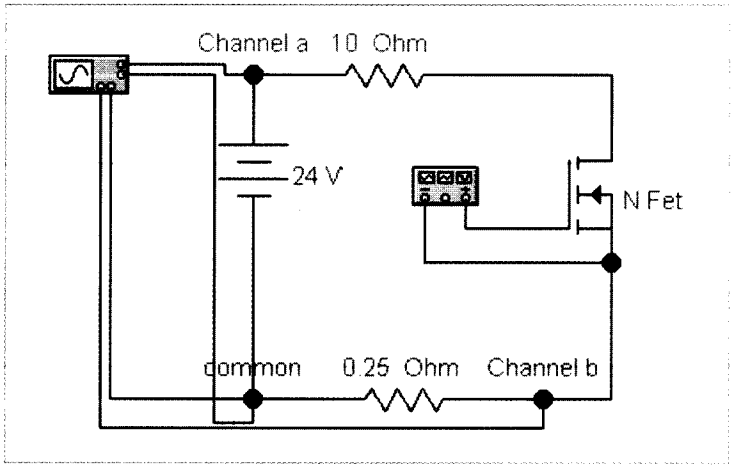


Figure 4: Oscilloscope probes positioning

Time	Minutes	Temp Load	Temp Ambient	Over Ambient	Battery Volts	Joules	Control Watts
17.31		69.50	21.40	48.10	24.80		16.41
18.00	29	69.50	18.40	51.10	24.80	30333.37	17.43
19.00	89	69.70	17.70	52.00	24.80	94731.64	17.74
20.00	149	69.50	17.60	51.90	25.10	158290.68	17.71
21.02	211	68.50	17.40	51.10	24.80	220701.39	17.43
22.01	270	68.90	17.50	51.40	24.70	284072.11	17.54
23.02	332	68.10	17.30	50.80	24.60	345226.01	17.33
24.00	390	67.60	17.30	50.30	24.60	401545.08	17.16
8.08	878	65.10	16.60	48.50	24.30	871641.65	16.55
9.30	960	64.80	16.10	48.70	24.70	956977.91	16.61
9.53	983	71.10	16.80	54.30	25.10	1092584.58	18.52
10.07	997	76.50	16.60	59.90	24.30	1222429.15	20.44
Results	997			51.37	24.76	1222429.15	17.53

Table 1: Schedule of results over 16.5 hours test period

Joules	Watts per Control Watts × time
Control Watts	Calorific Control test determined that 17.74 watts represents a temperature rise of 52 degrees centigrade over ambient. (See paragraphs *Measurement of Energy Dissipated* in Load Resistor and Caloric Control Test). Therefore, 17.74/52=0.34 watts as a factor per degree centigrade over ambient. Power (Watts) is therefore determined as the difference between test and ambient temperature times this factor, to give a broad indication of power (watts) dissipated at the load resistor.

Results

Energy dissipated at load resistor	1.22 Mega joules
Energy delivered by the 2 × 12 volt batteries	67.6 Kilo joules

Review of experimental results

The method to involve independent entities and authori-

ties was proposed as a supplementary method to review the experimental results. It was determined that this process was required because of the anomalous and contentious nature of the claims that are associated with this proposed technology.

The companies listed below have approved the inclusion of their name in this article and, together with the authors of this article, recommend a wider forum for systematic and statistical consideration of this experiment and its results:

- The Cape Hope Metrology Laboratory confirmed that test equipment had been calibrated at Tellumat's Metrology Laboratory
- Spescom, as distributors of Fluke instruments, who attended demonstrations
- ABB Electric Systems Technology Institute in North Carolina who conducted independent tests. Here tests were confined to the evaluation of instantaneous power delivered simultaneously by the battery supply source and dissipated in the load—measurements enabled through the use of four channel oscilloscopes
- Jonathan Green of BP (Africa) who applied tests to measure the effect of the energy gains on battery duration.
- Sasol representatives who are offering a bursary award to encourage further research.
- J De Bruto of Power Engineers.

Conclusions

It would be reasonable to assume a maximum of 10% error on all temperature measurements as the caloric test conditions were crude.

Error margin ratings applied to the Fluke 199 C oscilloscope, as this relates to the voltage measurements across the Shunt 1 and the battery, are 10% and 1.5% respectively, at the highest frequencies applied to these tests. By discounting all the negative voltage sample measurements by 10%, results still indicate a coefficient in excess of 16 over the energy delivered.

Because of the approximations related to the measurement of energy—based on the rate of temperature rise—it was necessary to reference values that were significantly greater than ambient. To this end, a 24 volt (2 × 12 volt) battery was used to supply energy to the test circuit.

However, the switching circuit could not be energized directly from this battery because its fluctuating voltage reached voltage levels that were incompatible with components used for the switching circuitry. Therefore a separate 12 volt, dry cell, 4 ampere hour battery supply source was used to supply energy to the switching circuit. This battery was fully charged and measured 12.45 volts prior to being connected to the switching circuit.

At the conclusion to the 16.5 hour testing period, its open-terminal voltage was measured to be 12.04 volts. This voltage reduction was consistent with the small current flow (0.039 A) required to drive the switching circuit over the 16.5 hour test period. Therefore the apparent additional energy that was introduced to the experimental system could not have emanated from this source.

The experimental circuit and results are easily repeatable. Classical models of energy transfer preclude any advantage to using a switching system to enhance efficiency for purposes of dissipating heat. It would, therefore, have been an extraordinary undertaking to test classical hypotheses, unless there was also some reason to question classical models of energy transfer.

Although a great deal of investigation of the phenomenon is still required to develop the mathematical constructs for application of this technology, preliminary investigations and reports reveal findings that may be consistent with claims of this technology. Q

PCT WORLD INTELLECTUAL PROPERTY ORGANIZATION
International Bureau

INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification 6 :		(11) International Publication Number:	WO 99/38247
H02M 3/155	A1	(43) International Publication Date:	29 July 1999 (29.07.99)

(21) International Application Number: PCT/IE99/00005

(22) International Filing Date: 22 January 1999 (22.01.99)

(30) Priority Data:

98/00541	22 January 1998 (22.01.98)	ZA
09/084,566	26 May 1998 (26.05.98)	US
98/00541	26 June 1998 (26.06.98)	ZA

(71) Applicant *(for all designated States except US)*: ASHBY, Kevin, Peter [IE/ZA]; 30 Batavia Street, Somerset West 7130 (ZA).

(72) Inventor; and

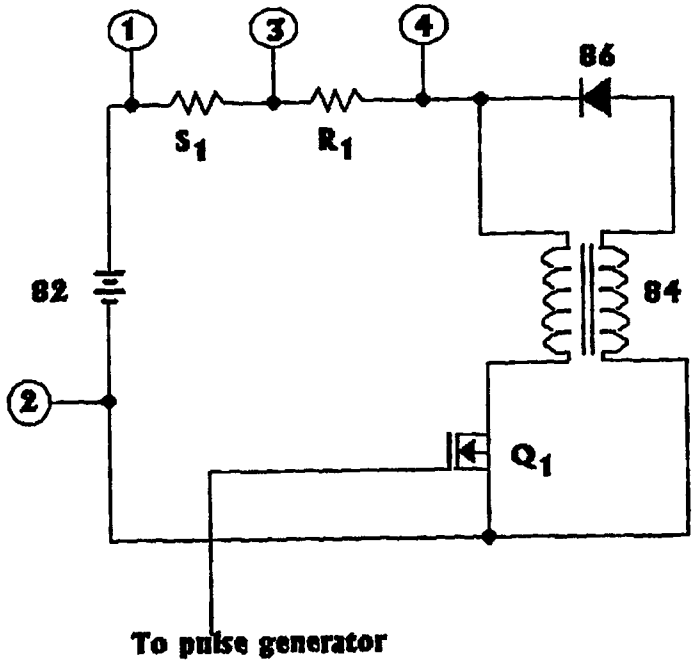
(75) Inventor/Applicant *(for US only)*: AINSLIE, Rosemary, Ann [ZA/ZA]; 10 Springer Close, Marina da Gama, Muizenberg, Western Cape (ZA).

(74) Agents: SHORTT, Peter, Bernard et al.; Tomkins & Co., 5 Dartmouth Road, Dublin 6 (IE).

(81) Designated States: AL, AM, AT, AT (Utility model), AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, CZ (Utility model), DE, DE (Utility model), DK, DK (Utility model), EE, EE (Utility model), ES, FI, FI (Utility model), GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SK (Utility model), SL, TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).

Published
With international search report.

(54) Title: HARNESSING A BACK EMF



(57) Abstract

A method of achieving high efficiency of energy usage includes passing current through an inductor, causing the current to be repeatedly interrupted, thereby generating a back emf in the inductor and thereafter harnessing the back emf so generated to supply energy to an energy receiving or processing device. The frequency of interruptions should be 40 Hz or more and is achievable by applying rectifying means to the current. The invention extends to apparatus for harnessing such back-emf and energy generating means comprising an inductor and current interruption means connectable to an energy receiving device.

FOR THE PURPOSES OF INFORMATION ONLY

Codes used to identify States party to the PCT on the front pages of pamphlets publishing international applications under the PCT.

AL	Albania
AM	Armenia
AT	Austria
AU	Australia
AZ	Azerbaijan
BA	Bosnia and Herzegovina
BB	Barbados
BE	Belgium
BF	Burkina Faso
BG	Bulgaria
BJ	Benin
BR	Brazil
BY	Belarus
CA	Canada
CF	Central African Republic
CG	Congo
CH	Switzerland
CI	Côte d'Ivoire
CM	Cameroon
CN	China
CU	Cuba
CZ	Czech Republic
DE	Germany
DK	Denmark
EE	Estonia
ES	Spain
FI	Finland
FR	France
GA	Gabon
GB	United Kingdom
GE	Georgia
GH	Ghana
GN	Guinea
GR	Greece
HU	Hungary
IE	Ireland
IL	Israel
IS	Iceland
IT	Italy
JP	Japan
KE	Kenya
KG	Kyrgyzstan
KP	Democratic People's Republic of Korea
KR	Republic of Korea
KZ	Kazakstan
LC	Saint Lucia
LI	Liechtenstein
LK	Sri Lanka
LR	Liberia
LS	Lesotho
LT	Lithuania
LU	Luxembourg
LV	Latvia
MC	Monaco
MD	Republic of Moldova
MG	Madagascar
MK	The former Yugoslav Republic of Macedonia
ML	Mali
MN	Mongolia
MR	Mauritania
MW	Malawi
MX	Mexico
NE	Niger
NL	Netherlands
NO	Norway
NZ	New Zealand
PL	Poland
PT	Portugal
RO	Romania
RU	Russian Federation
SD	Sudan
SE	Sweden
SG	Singapore
SI	Slovenia
SK	Slovakia
SN	Senegal
SZ	Swaziland
TD	Chad
TG	Togo
TJ	Tajikistan
TM	Turkmenistan
TR	Turkey
TT	Trinidad and Tobago
UA	Ukraine
UG	Uganda
US	United States of America
UZ	Uzbekistan
VN	Viet Nam
YU	Yugoslavia
ZW	Zimbabwe

HARNESSING A BACK EMF

FIELD OF THE INVENTION

The invention relates to a method of harnessing back-emf for use in powering a load or replenishing a depletable energy source and extends to apparatus used in performing the method.

BACKGROUND OF THE INVENTION

Conventional switching circuits are well known in electrical energy conversion technology and switch mode systems have been employed to enhance energy utilization efficiencies. The concept of absorbing electrical energy released by the collapse of autoelectronic emissions from a discharge tube is disclosed in US5449989. This document discloses a circuit that includes an output port connected to a current sink, which is effective to absorb at least a substantial portion of such emissions. The current sink may be an electric motor or a secondary battery.

The concept of applying a back-emf in electrical circuitry is also known. For example, in US 5 521 476 is disclosed a control circuit for a disk drive motor

in which back-emf blocking circuitry is employed to prevent dissipation of a back-emf through the power supply. By contrast Patent Co-operation Treaty patent publication WO9613892 discloses the use of a back-emf to trigger a response in a control system for a mechanical system so that driving pulses are generated to accomplish a desired displacement motion.

In the present invention, to achieve high energy efficiencies, greater than unity in relation to a conventional test circuit, a back-emf generated in an inductor is harnessed, so as to return energy associated with such emf to a depletable energy source supplying such circuit, or to a load included in the same primary circuit as the energy source. It is envisaged that a wide range of electrical power supply sources will derive benefit from the invention disclosed hereunder.

According to a first aspect of the invention, a method of harnessing back-emf on to an electrical circuit to increase the efficiency of energy usage to a factor of 90% or more in comparison with a Resistor Temperature Versus Wattage Calibration Circuit, comprises the steps of providing a circuit, said circuit including an inductor and an energy receiving device and being configured to operate the device, providing a source of electrical energy capable of supplying an electrical current to the circuit, connecting the source in operative configuration in series with the inductor, causing current to pass from the source through the inductor, causing a back -emf to be generated in the inductor, such back-emf having electrical energy

associated with it, thereby providing an additional source of potential difference to the circuit, said source of additional potential difference being sufficient to supply energy to such circuit and supplying the energy associated with the back-emf to the receiving device.

In a preferred form of the method, the step of causing the back-emf to be generated includes the step of interrupting the current. Preferably, the method includes interrupting and restoring the current repeatedly. Further, the interrupting and restoring of the current includes the step of applying rectifying means to the current. The frequency of interruptions is preferably 40Hz or more and more preferably should be at least 50Hz. The duty cycle of the interrupting means should preferably be 50% or more and further preferably be at least 60%.

In a further preferred form of the invention, the method includes generating a back-emf of sufficient magnitude to cause the comparative energy usage efficiency to be at least unity. This may be achieved by setting and controlling a suitable value for a variable selected from one or more of the frequency of interruptions from the wave rectifier, the duty cycle, the thickness of the wiring in the circuit and efficiency of the core of the inductor, the value being set in accordance with operational requirements of a desired end application.

In a yet further preferred form of the invention, the receiving device in the circuit is at least one of an energy consuming load and an energy storage

means. Preferably, the energy storage means is a replenishable source of electrical energy. Such energy source may be of alternating or direct current.

The method further preferably includes providing at least one inductive load, the or each inductive load being operatively associated with the or each receiving device.

The inductor may be a transformer or other suitable inductive device.

According to a second aspect of the invention, a method of restoring electrical energy to a source comprises the steps of providing a closed circuit including a source of electrical energy and an inductor configured to operate therein and receive electrical energy from the source; causing electric current to pass from the source to the inductor; causing the establishment of an extruded magnetic field associated with the inductor; causing a change in the orbital bias of the extruded magnetic field so that the magnetic field collapses and a back-emf is generated, the back-emf having electrical energy associated with it; providing bias changing means, repeatedly changing the bias by such means, so that electrical energy associated with the back-emf is made available in the circuit; providing a receiving device capable of receiving such energy for utilization; and operatively connecting the receiving device to receive the said energy.

In a preferred form of the invention according to this aspect, the method includes applying the energy associated with the back-emf to the source, thereby .to enhance energy usage efficiency in the circuit to a factor of 1 or more in comparison with a 'Resistor Temperature Versus Wattage Calibration Circuit.

The device may be an energy consuming load or a replenishable energy source.

In a further preferred form, the bias changing means comprises wave rectifier means and the method includes applying the wave rectifier means to interrupt the electric current.

Further preferably, the inductor used in performing the method has a core capable of inducing a magnetic moment associated with a collapsing magnetic field. In a preferred form of the method, the core is a solid core.

The inventive method preferably further includes the steps of selecting a value for a variable selected from the frequency of interruptions from the wave rectifier, the duty cycle, the thickness of the wiring in the circuit and efficiency of the core of the inductor so that the magnitude of the back-emf generated when the magnetic field collapses is in a predetermined range according to operational requirements of the receiving device, the value being set in accordance with operational requirements of a desired end application.

In a preferred form of the invention the inductor is a transformer means. The transformer has primary winding means of sufficient size to cause a voltage pressure to be established in use between it and the circuit, so that energy associated with the back-emf generated is supplied to the circuit.

In a further preferred form of the invention, the interruption means comprises a current rectifier means. The rectifier means may be a diode or triac in the case of alternating current.

According to a further aspect of the invention, there is provided apparatus for utilizing a back-emf, such apparatus comprising an inductor having a core suitable for generation of back-emf from collapsing magnetic fields, and an electrical circuit including said inductor, a replenishable energy source, an energy receiving device and means for changing orbital bias of a magnetic field set up in use and associated with said inductor, both such source and such means being configured to operate the inductor, and variable selection means operable to set a variable, selected from the frequency of interruptions from the interruption means and duty cycle, so that, in use, by operation of the orbital bias changing means, such magnetic field associated with the inductor is caused repeatedly to collapse and be restored, thereby generating electrical energy, the circuit being capable of conducting such energy so as to make it available to be used at said receiving device.

In a preferred form of the apparatus, the destination device is selected from at least one of a load to be powered and a replenishable energy source.

In a further preferred form, the orbital bias changing means comprises current interruption means, such a diode or a triac or similar suitable rectification means such as a wave rectifier.

In a yet further preferred form of the invention, the inductor has a core that is capable of inducing a magnetic moment associated with a collapsing magnetic field or back emf.

The invention extends to the use of apparatus as defined above for utilizing a back emf and making available to the destination device energy generated in use in the inductor of the apparatus.

BRIEF DESCRIPTION OF DRAWINGS

Figure 1 illustrates schematically a circuit according to which the invention may be applied.

Figure 2 illustrates an embodiment of an electrical generator apparatus that may be used in exercising the invention.

Figure 3 illustrates in A a control circuit described in Example 1 and in B a test circuit the performance of which was compared with the circuit in A.

Figure 4 illustrates a test circuit referred to in Example 2 below.

Figure 5 illustrates a circuit referred to in Example 3 below.

DETAILED DESCRIPTION OF INVENTION

By connecting an inductor means with a load-bearing circuit and causing a back-emf to be established through the inductor, a voltage pressure may be created sufficient to restore energy to the source and reduce its rate of depletion, or the rate of consumption of energy therefrom. The voltage pressure is represented by an additional potential difference provided through the establishment of the back-emf. It is not contemplated that the load itself should consume less energy than it would otherwise do, but that a back-emf induced by means of the inductor is harnessed so as to cause electrical charge to be directed from the inductor to wherever required, be it source, load or other device.

The circuit may be supplied with electrical energy from either a direct or alternating current source.

The inductor means may be any suitable such means known in the art. Preferably it is a transformer. However, it may alternatively be a winding or choke and should preferably have an inductive load associated with it. The inductor preferably comprises a core capable of inducing a magnetic moment associated with a collapsing magnetic field. The inductive load is

commonly an iron core located co-axially within the inductive device. However, it may alternatively be a suitable liquid or gaseous medium, or combinations thereof, including with solid material.

To generate a back-emf, the circuit is caused to be repeatedly closed and opened, thus disrupting or interrupting electrical current flow through the inductor. This can be accomplished by use of any suitable interruption means. A preferred such means is a variable duty cycle chopper.

In the case where the energy source delivers alternating current, the interrupter means may comprise a wave rectifier means, preferably a diode, triac or such like.

In the case of a direct current source, wave rectification and current interruption are achieved through the use of a current rectifying device such as an oscillator or a mos-fet or suitable equivalent wave rectifier means, such as would set up a fluctuating magnetic field in relation to the inductor.

The method of restoring, returning or recycling electrical energy to a device - be it a source, a means of storage or a processor, such as a consumer of such energy - that forms the substance of this invention, thus alternatively includes steps of (1) setting up an extruded magnetic field associated with an inductor that is configured to operate in a circuit that is itself operatively configured to enable electrical energy to be passed to and from such inductor and (2) changing the orbital bias of the extruded magnetic field. By

"extruded magnetic field" is meant a magnetic field that is associated with an inductor, such as a solenoid, or is induced with the aid thereof and is in a state of distortion or imbalance.

It is believed that the changing orbit bias that is associated with the disruption of electrical current leads to the collapse of the magnetic fields and the change in current that is manifested in the back-emf. The changing bias recycles the current to render it reusable in the circuit at whichever point it is operationally required. During the period when the energy supply source is disrupted or disconnected due to the operation of an interruption device, an alternative circuit is used to promote the recylcling of this back-emf current. The use of an inductive load in the core of the solenoid enhances the efficiency of the apparatus. This load may be any substance or material, be it gaseous liquid or solid or a combination of one or more thereof, or even a vacuum. Such load should have properties rendering it capable of facilitating creation of a magnetic field of sufficient strength to enable a useful back emf to be generated. By "useful" is meant a back-emf that is suitable for supplying energy for a particular application or operational requirement. Preferred core materials are iron and other ferrous materials.

Thus, by repeatedly changing the bias, a disruptive or switching effect is achieved and resultant energy, detectable as an electric current is made available for use as desired by the operator or designer of the circuit.

Suitable bias changing means include wave rectifiers and other devices that interrupt current flow or change current direction. In this context, the word interrupt includes such changes. It has been found that interrupting or bias changing means should advantageously have a duty cycle of from 50% to 99% – i.e the "on" time when current is flowing should be in the range from 50% to 99% of the total "on" time plus "off" time. In a preferred embodiment of the invention, the duty cycle is in the range from 60% to 95%. Further preferably, the duty cycle should be in the range 75% to 95%.

The circuit need not be complex. It should, however, include means for disrupting or reversing the current to the inductor, as described above.

The invention will be described further with reference to accompanying Figure 1, illustrating generally at 10 a portion of an electrical circuit in which the invention is applied.

Connected by means of suitable wiring in series with a primary inductor 12, is a wave rectifying diode 14, serving as an interrupter means for electrical current supplied to the circuit from a source (not shown).

When a full-wave AC or full square wave rectified DC waveform is applied to input 16, a wave rectified- or pulsing DC waveform is created in the primary winding of the inductor 12. On interruption of each waveform cycle, the current change in the winding of the inductor 12 induces a magnetic field in the iron core 20 associated with it.

When the magnetic field collapses, it is thought that, due to the "blocking effect" of the interruption caused by the wave rectifier, a back-emf results. This induces a corresponding reverse waveform in the inductor, so that the waveform associated with the winding across the core 20 is a full sine wave in the case of an alternating current source, and a full square wave in the case of a direct current source.

The inductor 12 may be connected with a load (not shown) in series or in parallel at any of the points 18.

Depending on the frequency of interruptions from the wave rectifier, the duty cycle, the thickness of the wiring and efficiency of the core, the voltage across the inductor 12 may be conducted through a closed circuit to be used in powering the load and/or be returned to the power source according to requirements. Desirably, but not essentially, the frequency of interruptions should not be less than 40Hz. Preferably it should be 50Hz or more and more preferably 500Hz or more, but this will be largely dependent on the application.

A switch mode system may be utilised in performing the method of the invention. An example of a suitable closed circuit employing such a system includes a battery as DC energy source to power a lamp. A transformer may be connected in series with the lamp and in turn connected with a variable duty cycle chopper.

In addition, the output from the transformer is preferably shunted through a diode to a suitably high value resistor and capacitor connected in series. When the circuit is closed by means of the chopper, current passes through the load and transformer. Repeated opening and closing of the circuit by means of the chopper causes a back-emf and current to be induced in the inductor. A voltage pressure is established between the inductor and the low potential terminal of the source, so that the charge induced in the inductor is fed to the source, replenishing its drawn down energy. The net effect is that the workload exceeds the depletion rate of the source.

A further embodiment of a circuit used in the invention appears illustrated in figure 2, where a primary winding 30 having, for example 220 turns around a cylindrical core 32 of a ferrous metal such as iron or an iron alloy, is associated with a secondary winding 34 of a like number of turns. The secondary winding is wound round the core adjacent to or around the primary winding 30. This configuration results in electromagnetic coupling between the windings via core 32.

The circuit input 36 is connected to an AC power source 38. This would be typically a 220V mains supply at 50Hz. The circuit output is taken at 40 from the secondary winding.

A diode 42 or other half-wave rectifier is connected in series with primary winding 30. On applying a full-wave AC waveform to the circuit input 36, a

half-wave rectified or pulsing direct current comes to exist in the primary winding 30.

On each positive-going half-cycle, the primary winding induces a corresponding current in the secondary winding 34. But, when due to the diode's blocking effect, the magnetic field resulting from the current in the primary winding collapses, the back-emf that results in the primary winding induces a corresponding negative-going waveform in the secondary winding 34. Hence the output 40 from the secondary winding is a full-wave AC waveform.

Although the invention has been described above with reference to one inductor being employed at a time, it will be appreciated by those in the art that further inductors may be connected in operative configuration so as to achieve further enhancements of system performance. For example, two or more primary windings may be connected in parallel, each having and independent magnetically susceptible core associated with it, with a rectifier connected in series with the parallel windings. In another example, respective primary and secondary windings may be coupled with a single core, with a rectifier connected in series with the primary winding.

The primary and secondary windings may be positioned end to end coaxially around the core or may overlap in annular fashion with the secondary, having greater diameter, being wound around the primary.

In an alternative configuration, two primary windings, having associated secondary windings, are connected in parallel, but placed around a common core. Wave rectifiers are connected in series with each primary winding.

The use in the method of the invention of the back-emf-generating apparatus above provides net energy savings opportunities to an energy consuming system in that the energy associated with the generated back-emf may be supplied to the energy processing device – be it an energy consumer or an energy source.

Applications of the back-emf generating apparatus of the invention include, without necessarily being limited to, switch mode systems, boost converters, battery operated systems, recharging of batteries, household electrical equipment, hybrid engines and heavy and light duty industrial equipment.

Other variations on and embodiments of circuits used in performing the method of the invention will be apparent. The non-limiting example that follows shows how the inventive method may be used in achieving an efficiency factor that reaches at least 90% and even exceeds unity.

EXAMPLE 1

Two tests were conducted on Phillips wire wound 10 watt resistors. The resistors had identical surface areas. The thermally coupled device used was a standard PC Platinum based probe linked to a thermal digital display device. Care was taken to ensure that the thermal coupling of the thermometer probe to the resistor was identical in both tests. The object of the test was to compare the rate at which amperage was drawn by a standard 'Resistor Temperature Versus Wattage Calibration Circuit' test, hereinafter referred to as the control test, indicated in Figure 3A, and from a test using a switching device and an inductor, indicated in Figure 3B. If the control test indicated that a greater current was being supplied by the battery than was evident through the test which used the device and yet the actual heating efficiency of the device was the same as that of the control then the condition would be that the use of the device could enhance heating efficiencies. The same battery was used in both tests. The amperage draw down rate was deduced by an analysis of the voltage measured with an oscilloscope probe placed across a low value resistor and the same sense resistor was used in both tests in order to obviate any erroneous comparative measurements. The positioning of the sense resistor is indicated on the circuit drawings.

The control test (Figure 3A) had a thermocoupled 68Ω resistor 40 and a sense resistor 42 placed in series with the battery terminals 44. All subsequent measurements were taken when the temperature across the resistor 42 had reached a maximum value. The digital thermometer indicated a heat of 95

degrees centigrade at its highest reading. At that time, the current delivered by the battery was evaluated from an analysis of voltage measured across the sense resistor. This was 0.0049 volts. In terms of Ohm's law, volts divided by the ohms value of the sense resistor, being 0.025 ohms, gives the current as 0.1960 amperes. The power delivered by the battery is calculated by multiplying the value of the loaded source battery voltage being 12.28V with the amperage value of 0.1960A, which gives a power of 2.406 watts.

The test circuit (Figure 3B) had the same thermocoupling on a 22 ohm resistor 52 placed in parallel to an inductor 54 before a switching device 56, in this example, a mos-fet. The same 0.025 ohm sense resistor 42 as was used in the control test was placed in series with the negative terminal of the battery 44 on the ground as indicated in Figure 3B . The duty cycle was adjusted until the digital thermometer (not shown) indicated a heat of 93°C on the load resistor 42 at its highest reading. All measurements were taken subsequent to this.

The amperage draw down was deduced from an analysis of the square wave voltage measured across the sense resistor 42. The wave form observed was approximately a square wave with a slope during the on time from 0.0162 to 0.0217. These voltage values were added together and then divided by 2 to establish the average peak voltage during the on period being 0.01895 volts. In order to establish the average amperage as it related to the off and on time of the switched power supply source 44, it was necessary to analyse the period during

which the switched power supply was off compared to the period during which the switched power supply was on. The period per cycle was 0.2 milliseconds. The total length of the cycle was measured in 37.5 time divisions, of which 29 divisions represented the period during which the switch was off and 8.6 divisions represented the period during which the switch was on. Therefore the average peak voltage of 0.01895 volts was divided by 37.5 and then multiplied by the one period of 8.5 to give an average of 0.043 volts. This voltage was then divided by 0.025, being the sense resistor's ohms value, which equals an average amperage of 0.1718A. In order to establish the power delivered by the battery supply source, 0.1718A was multiplied by the 1oaded source battery voltage being 12.28V, which gives a power of 2.1097W.

Ambient temperatures in both tests were stable and the tests were conducted within one hour of each other. Values across the sense resistor were standardised by the use of the same resistor in both tests, therefore obviating errors in the comparative voltage values.

Therefore the heat on the resistor in the control test was generated by a wattage dissipation of 2.406W from the source battery. Allowing for a 5 percent margin for error on all measurements, it can be said that the heat on the resistor in the test circuit was generated by a wattage dissipation of 2.1097W plus 5 percent, or 2.21519W, indicating an efficiency of 8.6 percent in excess of a factor of 1.

In other words, it was found that at least 8.6% less current was required by the test circuit to produce effectively the same sensible temperature in the resistor there as was measured in the control circuit. This standard control circuit is accepted as the most efficient arrangement hitherto possible.

5

EXAMPLE 2

The following tests were conducted to prove that subject to specific circuit configurations an inductor is able to enhance energy efficiency to levels beyond
10 the standard capabilities of an electrical power supply source. The tests also indicate that in the event that a resistor is placed in series with a power supply source and an inductor as configured in the Test Circuit Test, the correct wattage analysis of that power may be calculated as the energy source voltage multiplied by the amperage or VI, as it is known and that i squared r (I^2R) analysis appears
15 to be erroneous as a base calculation of the wattage and power generated in this particular system.

THE CONTROL TEST ESTABLISHING TEST PARAMETERS

The control used here corresponds to the Resistor Temperature Versus Wattage
20 Calibration Circuit of the previous example.

- A 100 ohm, 10 watt, Phillips wire-wound resistor was placed in series with a six volt battery supply source. The source consisted of two 6V batteries used in parallel to each other. Their composite voltage was measured from the positive terminal of the first battery to the negative terminal of the second

battery. The voltage measured was 6.12 volts. In terms of Ohm's law, therefore:

6.12 (battery voltage) ÷ 100 Ω (resistive load) = 0.0612 amps

- To determine power dissipation, the current is multiplied by the voltage, i.e.

  Power = 6.12V x 0.0612A = 0.374W.

- A PT platinum based probe was attached to the resistor which, in turn, was linked to a digital display device. Ambient room temperature was 22 degrees centigrade. The heat measured from that resistor was 30 degrees centigrade. Therefore, in terms of classical scientific analysis and based on these specified test parameters, 0.374W correlates to 30 degrees centigrade. This test, hereafter, is referred to as the Control Test.

- It follows, therefore, that if an alternative test circuit could heat a resistor to 30°C and, provided that the new test used a load resistor which had the identical surface area and wattage to that 100 Ω resistor used in the Control Test, then that alternate test circuit would, in fact, be generating 0.374 watts - irrespective of any actual measurements evident on that circuit.
- However, in the event that the second test circuit was powered by the same battery supply source, being 6.12V, and if the amperage dissipated by that battery – and deduced from a measurement of the voltage across a sense resistor – was less than 0.0612 amps – per the Control Test – and yet the

heat was 30°C ,which level was consistent with 0.374W – then one may deduce that something other than the existing power supply source had contributed energy to the circuit to enhance its efficiency beyond the standard capabilities of those 6.12V battery supply sources.

THE TEST CIRCUIT TEST

- With reference to figure 4, the Test Circuit 60 comprised a 47Ω, 10 watt, Phillips wire-wound resistor 62 placed in series with a 6 volt battery supply source comprising, as before, first and second 6V batteries, 64 and 66 respectively. An inductor 68, in turn, was placed in series with load resistor 62. A positively biased diode 72 was placed in parallel with the inductor 68 and above a switching device being an 'N' channel mos-fet 74. This wire was then taken back to the positive terminal of the second battery which was connected in parallel to the first battery. The battery voltage was 6.12V.

- Three sense resistors were used – one positioned directly behind the 47 ohm resistive load and one each on both negative terminals of the two batteries. Again, in terms of classical scientific analysis the assumption was made that the sum of both currents evident at the negative terminal would be consistent with the rate at which energy was dissipated by the batteries.

- The duty cycle of the switching device was adjusted to a 50:50 mark space ratio. Therefore the switch was off for a period consistent with the time during which the switch was on. The heat indicated on the thermocoupled digital display device was 30°C. Ambient room temperature was still 22°C.

- All wave forms for the three sense resistors SR1, SR2 and SR3 are indicated in figure 4 below the circuit 60:
  - **SR1** – the voltage wave form across the sense resistor placed in series with the load resistor 62, was roughly triangular in shape but followed an exponential rise and fall during the on and off periods of each cycle. Voltage did not cross ground. Peak voltage was positive 0.006V. In order to find an approximate rms voltage this value was divided by 2 giving 0.003 volts across the sense resistor. The amperage through the load resistor was calculated in terms of Ohm's law and was thus the sum of the 0.003 volts divided by the resistance value of the sense resistor (in ohms), being 0.05 ohms. The amperage thus equals 0.060A. In order to evaluate the power over the load resistor – also in terms of Ohm's Law, therefore:
    - I^2R = 0.060 amps x 0.060A x 47Ω

      = 0.169W

    This value was not consistent with but less than the evident wattage indicated by the heat of the load resistor, which measured 30°C.

In terms of the Control Test, 30 degrees centigrade under these test parameters corresponds to 0.375 watts. It would appear that the phenomenon is only reconcilable if the mathematical formula applied is based on the evident amperage multiplied by the battery source voltage. Therefore:

0.06A x 6.12V = 0.367W

This wattage value was precisely equivalent to the evident heat.

- **SR2** – the voltage wave form across the sense resistor placed in series with Battery 1 (64) – was roughly triangular in form with some exponential curvature as evidenced in the wave form over SR1. For the purposes of calculating average current this was assumed to be triangular and all measurements may be subject to an error not expected to exceed 10 percent. Their measurements were gauged as the sum of the off portion of the cycle added to the sum of the on portion as both portions of the cycle manifested above ground.

- In calculating the power delivered by the batteries, it was assumed that since the battery voltage was constant during each cycle, it could be calculated by taking an average of the battery current and multiplying this by the battery voltage (P=VI). The voltage wave form evident during the on portion of the cycle peaked at 0.0035 volts. Therefore: -

(0V + 0.0035V)/2 = 0.00175V

[the sum is divided by 2 - being the average of the on cycle].

- This sum is divided by 2 again - to allow for the 50% duty cycle – and this then gives a voltage value of 0.000875V. This is the average voltage, which, in terms of Ohm's Law is divided by the ohms value of the sense resistor, being 0.05Ω, to give the amperage of 0.0175A.

- The voltage wave form evident during the off period of the cycle peaked at 0.0015V. Therefore, as above

  (0V + 0.0015V)/ 2 (being the average of the off cycle) = 0.00075V

- This sum is divided by 2 to allow for the 50% duty cycle, thus giving a value of 0.000375V. This is the actual voltage, which, in terms of Ohm's Law, is divided by the ohms value of the sense resistor being 0.05Ω, thus giving an amperage of 0.0075 A.

- The sum of the amperage of both cycles therefore is :

  Amperage = 0.0075A + 0.0175A = 0.025A.

- Therefore, the actual rate of dissipation of wattage from Battery 1 is:
  - Amperage multipled by the evident battery voltage, or

    Dissipation rate = 0.025A x 6.12V = 0.153W

- **SR3** – The wave form evident from the voltage over the sense resistor placed in series with Battery 2 (66) indicated an equivalent above- and below-ground wave form. Both on and off periods of the cycle peaked at 0.0055V above and below the ground respectively. In as much as the on cycle crossed a little below ground, it is evident that no power was being lost from this battery but, in fact, there was a small margin of gain. The value is too small to represent a meaningful measurement and the entire cycle was therefore discounted as not representing any wattage loss but, in fact, some gain.

RESULTS AND CONCLUSIONS

- The wattage based on an I^2R analysis – being generated across the load resistor – is calculated at 0.169 watts. The actual wattage dissipated at the battery terminals is calculated at 0.153 watts. This only represents a 10% gain above unity – which may be evident mathematically and which, in any event is a marginal value and is consistent with the previous Resistor Temperature Versus Wattage Calibration Test. This marginal gain could, in effect, be further discounted by an adjustment to the amperage values to bring them in line with rms values, albeit that the consequent result would conflict with the evident heat apparent over the 47Ω load resistor.

- It has been very difficult to reconcile the difference between the calculated wattage and the heat dissipation of the load resistor. As mentioned the most accurate gauge appears to be if the average amperage is multiplied by the source battery voltage – although this is not in line with classical scientific circuit analysis.

- Either way, the Control Test dissipated 0.0612 amps to achieve a temperature of 30 degrees centigrade over the load resistor and the Test Circuit Test dissipated 0.025 amps to achieve an equivalent temperature over its load resistor. So, scientifically and correctly, the gain in efficiency is 100 percent greater than unity as represented in the Control Test.

- It must be noted that the two load resistors being the 100 ohm and the 47 ohm resistors used in the Control Test and the Test Circuit Tests respectively both had the same surface area and care was taken to ensure that both resistors were strapped to the temperature probe in an identical manner. However, the calorific values of both tests were not accurately ascertained. Both tests were subject to fluctuations in room temperature but, as both were exposed to the same variations then their values may be considered to be proportionate and, in any event fluctuations and variations in ambient room temperatures were not apparent. However, in the interests of conservative computations it is possibly advisable to discount the Test Circuit Test by a further 5 percent. But in view of the enormous gain in efficiency over the

Control Test this makes very little significant difference to the proof of efficiency in the Test Circuit Test results will still remain at not less than 100 percent greater than – unity being standardised by the Control Test.

The examples recorded above do not necessarily represent optimized values. Further optimization may be attained by providing two or more inductors, two or more energy sources or an energy storage means and appropriate switching circuitry and selection means to facilitate balanced and efficient drawing and replenishment.

EXAMPLE 3

A further set of tests was conducted to investigate the relationship between power supplied by the battery 82 and power dissipated by a load resistor R_1 in the circuit shown in figure 5 – i.e. efficiency of energy conversion – with variance of the duty cycle of the FET switch Q_1. The circuit also included an inductor 84 comprising equal primary and secondary windings and a 350VA core, as well as a positively biased diode 86 and further components mentioned below.

Duty cycle is expressed herein as the quotient of "on" time and "on" time plus "off" time, multiplied by 100 to express it in percentage terms.

The tests were conducted by adjusting the duty cycle from 90% to 50% in steps of 10%. At each such step value, simultaneous measurements were recorded of battery voltage V_{1-2}, rms and average voltages across sense resistor ($V_{1-3\ rms}$ and $V_{1-3\ av}$) and the rms voltage across resistor R1 ($V_{3-4\ rms}$). These measurements are presented in Table 1 below. Measuring equipment used was as follows:

- For V_{1-2}: APPA True rms meter, Model No. 105
- $V_{1-3\ rms}$, $V_{1-3\ av}$ and $V_{3-4\ rms}$: Fluke Scopemeter Model 123
- For calibration of S_1 Fluke Scopemeter Model 123 (voltage), Fluke 79 II ammeter

Care was taken to minimise interconnection resistances and inductances, so as to reduce to negligible their possible effects on results.

Power supplied by the battery 82, of nominal voltage 12V, was calculated as the product of battery voltage (V_{1-2}) and average current through switch S_1, on the assumption that battery voltage remained constant during each cycle. The resistance value of S_1 was 0.05 ohms and was assumed to have a negligible effect on results.

Power dissipated by the load resistor R_1 (6R3 50W) was calculated as the product of rms voltage across it and rms current through S_1. It was assumed here that the load resistor had negligible inductance and that as a result, the voltage across and current through it were in phase. Table 1 presents the

numerical results and the power products calculated therefrom. The final column provides the quotient of load power delivered and battery power dissipated, indicating results exceeding 0.95 and even above unity for duty cycles above 60%.

5

TABLE 1

Duty Cycle	V_{1-3} Av	Average Current I_{av}	V_{1-2} dc	Battery Power (P_{bat})	V_{1-3} rms	Rms Current I_{rms}	V_{3-4} rms	Load Power (P_{load})	(P_{load})/ (P_{bat})
%	[mV]	[A]	[V]	[W]	[mV]	[A]	[V]	[W]	
90	69.5	1.390	12.57	17.46	102.5	2.05	10.02	20.54	1.176
80	38.2	0.764	12.64	9.657	73.1	1.462	7.58	11.08	1.148
70	20.9	0.418	12.69	5.304	51.1	1.022	5.36	5.478	1.033
60	7.9	0.158	12.73	2.011	34.1	0.682	3.19	2.176	1.082
50	1.2	0.024	12.76	0.306	15.9	0.318	0.94	0.299	0.976

Claims

1 A method of harnessing back-emf on to an electrical circuit, comprising the steps of providing a circuit, said circuit including an inductor and an energy receiving device and being configured to operate the device, providing a source of electrical energy capable of supplying an electrical current to the circuit, connecting the source in operative configuration in series with the inductor, causing current to pass from the source through the inductor, generating a back -emf in the inductor, such back-emf having electrical energy associated with it and providing an additional source of potential difference to the circuit, and supplying the energy associated with the back-emf to the receiving device, so that the efficiency of energy usage in the circuit is increased to a factor of 90% or more in comparison with a Resistor Temperature Versus Wattage Calibration Circuit.

2 A method according to claim 1 wherein the step of generating the back-emf includes the step of interrupting the current.

3 A method according to claim 2 including the steps of interrupting and restoring the current repeatedly.

4 A method according to claim 3 in which the interrupting and restoring of the current includes the step of applying rectifying means to the current.

5 A method according to claim 4 including the steps of selecting a variable from one or more of the frequency of interruptions from the rectifying means, the duty cycle of such interruptions, the thickness of the wiring in the circuit and efficiency of the core of the inductor and setting a value for the variable in accordance with operational requirements of a desired end application for the circuit.

6 A method according to claim 5 including setting the frequency of interruptions to be at least 40Hz.

7 A method according to any one of claims 1 to 6 in which the receiving device is at least one of an energy consuming load and an energy storage means.

8 A method according to claim 7 wherein the energy storage means is a replenishable source of electrical energy.

9 A method according to claim 7 wherein the receiving device is a source of alternating current.

10 A method according to any one of claims 7 to 9 including the step of providing at least one inductive load, the or each inductive load being operatively associated with the or each receiving device.

11 A method according to any one of the preceding claims in which the inductor is a transformer.

12 A method of restoring electrical energy to a source comprising the steps of providing a closed circuit including a source of electrical energy and an inductor configured to operate therein and receive electrical energy from the source; causing electric current to pass from the source to the inductor; causing the establishment of an extruded magnetic field associated with the inductor; causing a change in the orbital bias of the extruded magnetic field so that the magnetic field collapses and a back-emf is generated, the back-emf having electrical energy associated with it; providing bias changing means, repeatedly changing the bias by such means, so that electrical energy associated with the back-emf is made available in the circuit; providing a receiving device capable of receiving such energy for utilization; and operatively connecting the receiving device to receive the said energy.

13 A method according to claim 12, including applying the energy associated with the back-emf to the source..

14 A method according to claim 12 or claim 13 wherein the bias changing means comprises wave rectifier means, the wave rectifier means being appliable to interrupt the electric current.

15 A method according to claim 14 including operating the bias changing means at a duty cycle in the range from 50% to 99%.

16 A method according to any one of claims 12 to 15 wherein the inductor includes a core capable of inducing a magnetic moment associated with a collapsing magnetic field.

17 A method according to any one of claims 12 to 16 further including the steps of selecting a variable from the frequency of interruptions from the wave rectifier, the duty cycle of such interruptions, the thickness of the wiring in the circuit and efficiency of the core of the inductor, and setting a value for such variable so that the magnitude of the back-emf generated when the magnetic field collapses is in a predetermined range according to operational requirements of the receiving device.

18 Apparatus for utilizing a back-emf comprising an inductor, having a core suitable for generation of back-emf from collapsing magnetic fields and an electrical circuit including said inductor, a replenishable energy source, an energy receiving device and means for changing orbital bias of a magnetic field set up in use and associated with said inductor, both such source and such means being configured to

operate the inductor, and variable selection means operable to set a variable, selected from the frequency of interruptions from the interruption means and its duty cycle, so that, in use, by operation of the orbital bias changing means, such magnetic field associated with the inductor is caused repeatedly to collapse and be restored, thereby generating electrical energy, the circuit being capable of conducting such energy so as to make it available to be used at said receiving device.

19 Apparatus according to claim 18 wherein the destination device is selected from at least one of a load to be powered and the replenishable energy source.

20 Apparatus according to claim 18 or claim 19 wherein the orbital bias changing means comprises current interruption means.

21 Apparatus according to claim 20 wherein the source is a source of alternating current and the current interruption means is a wave rectifier.

22 Apparatus according to claim 20 or claim 21 wherein the bias changing means is operable at a duty cycle in the range from 50% to 99%.

23 Electrical energy generating means comprising an inductor, bias changing means operatively connectable with the inductor and capable of acting on a current passing through it in use to generate a back-emf therein, an energy receiving device and means for directing electrical energy generated in the inductor to the receiving device.

24 Generating means according to claim 23 wherein the bias changing means is operable at a duty cycle in the range from 50% to 99%.

25 Use of apparatus according to any one of claims 18 to 22 for utilizing a back emf and making available to the destination device energy generated in use in the inductor of the apparatus.

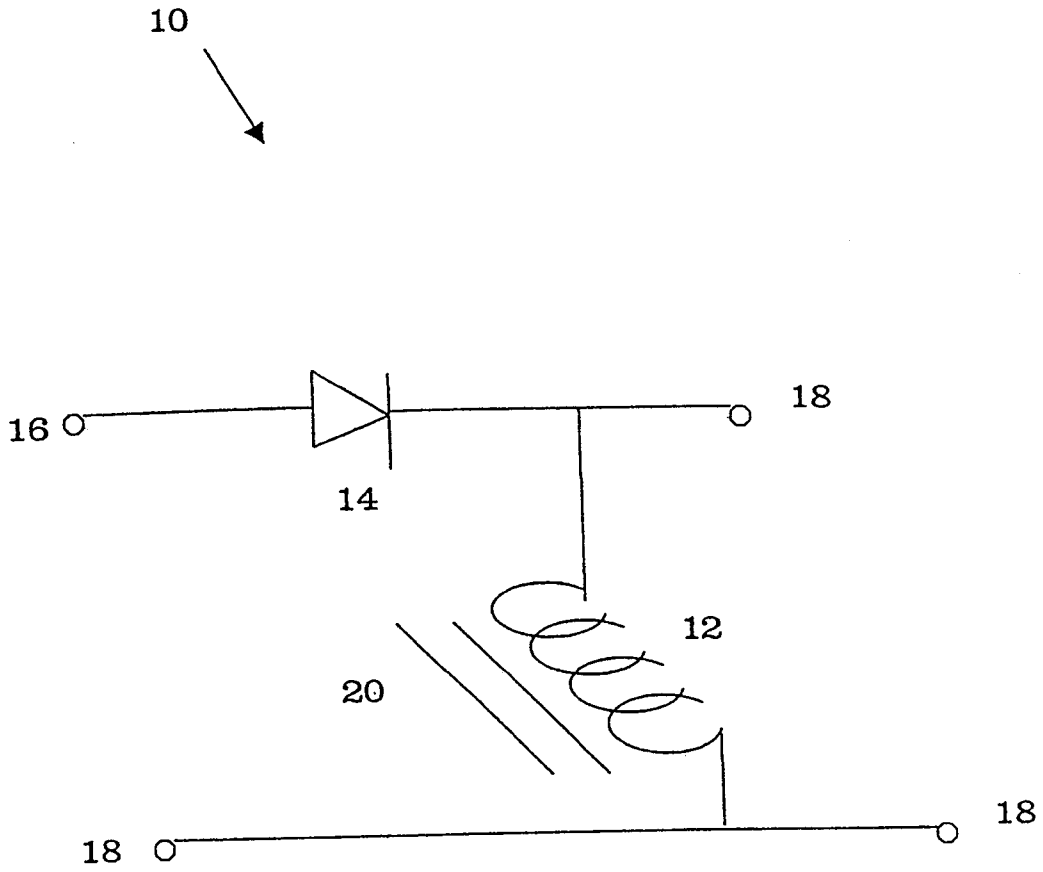


FIGURE 1

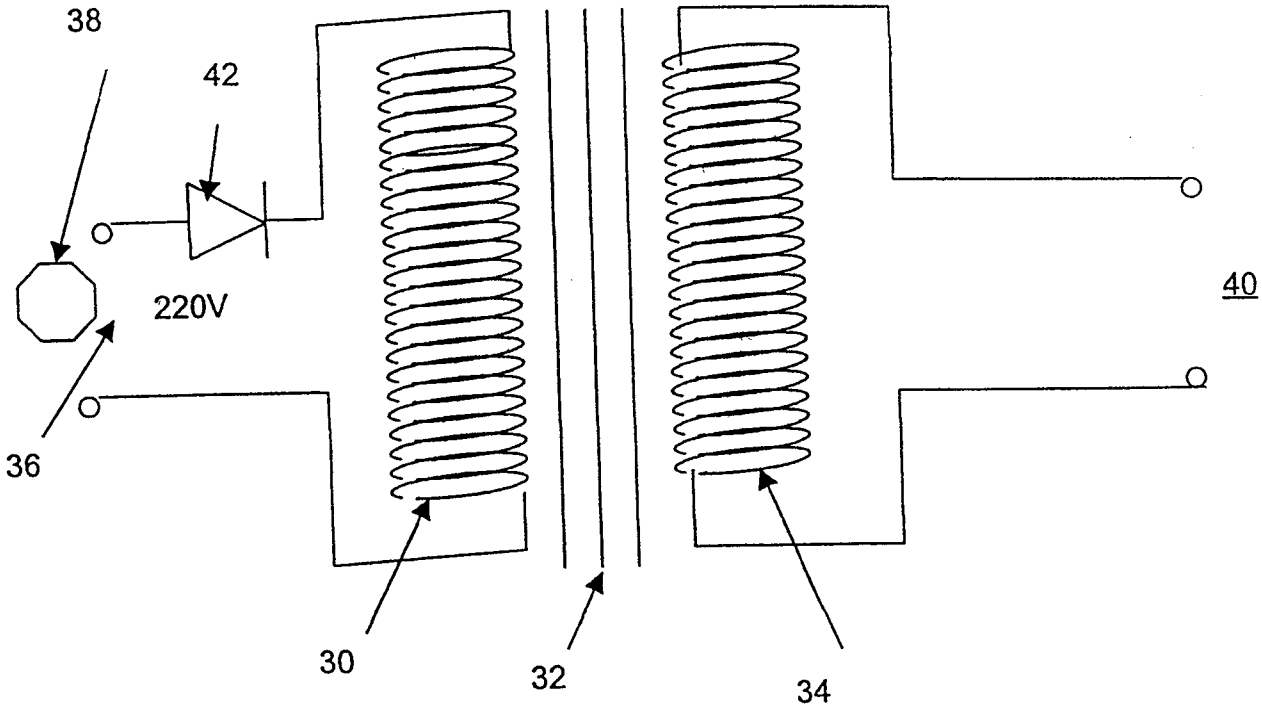
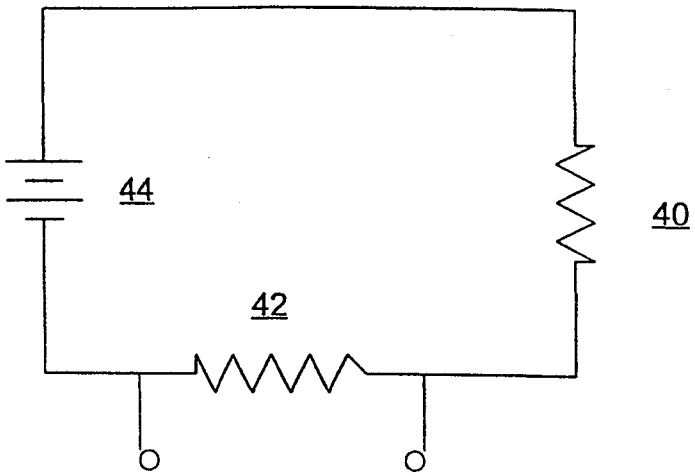


FIGURE 2

FIGURE 3

A



B

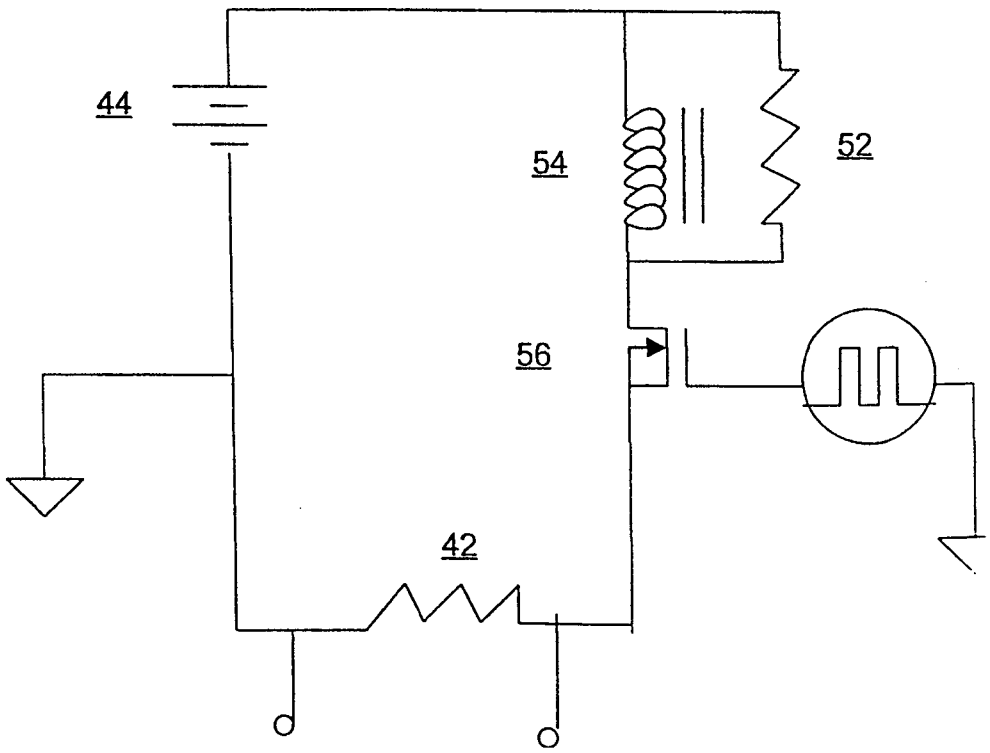
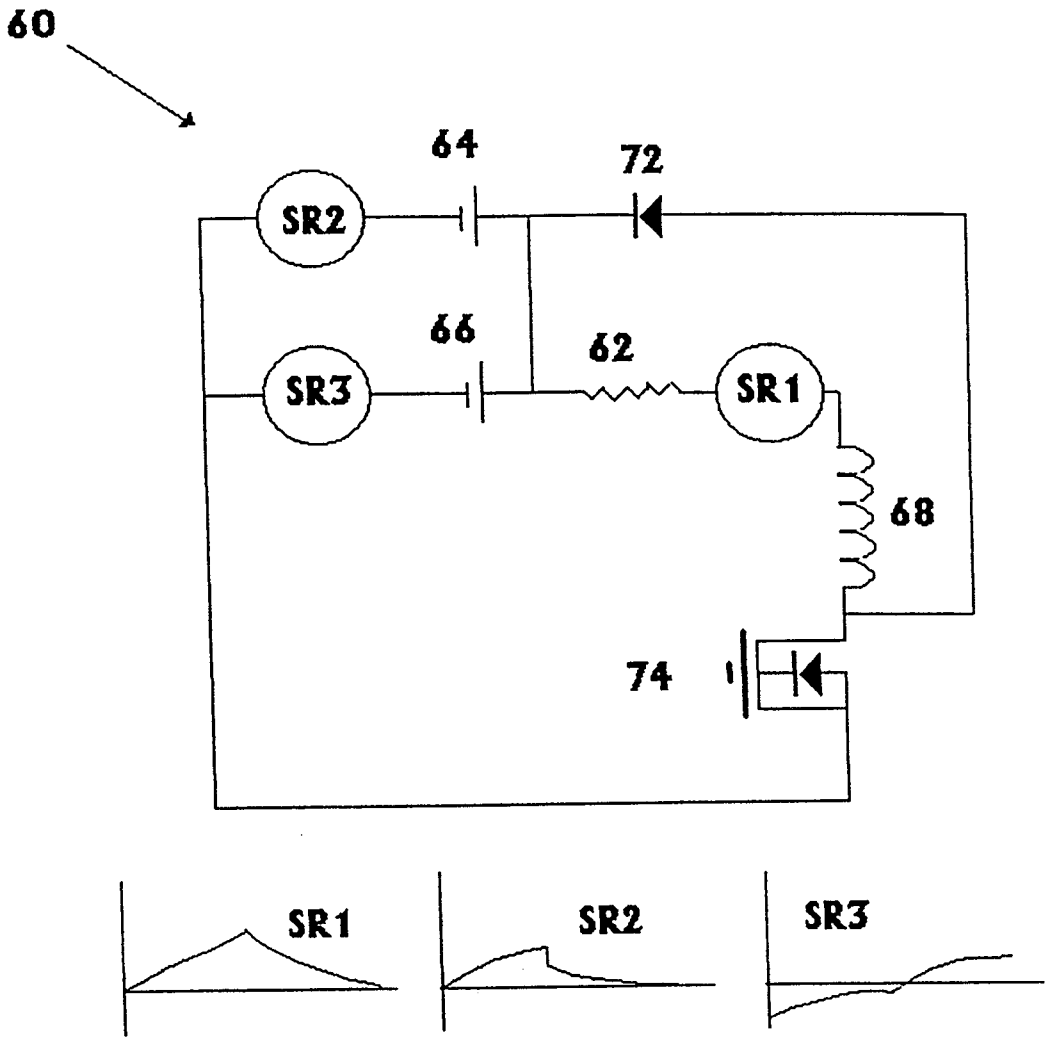


Figure 4



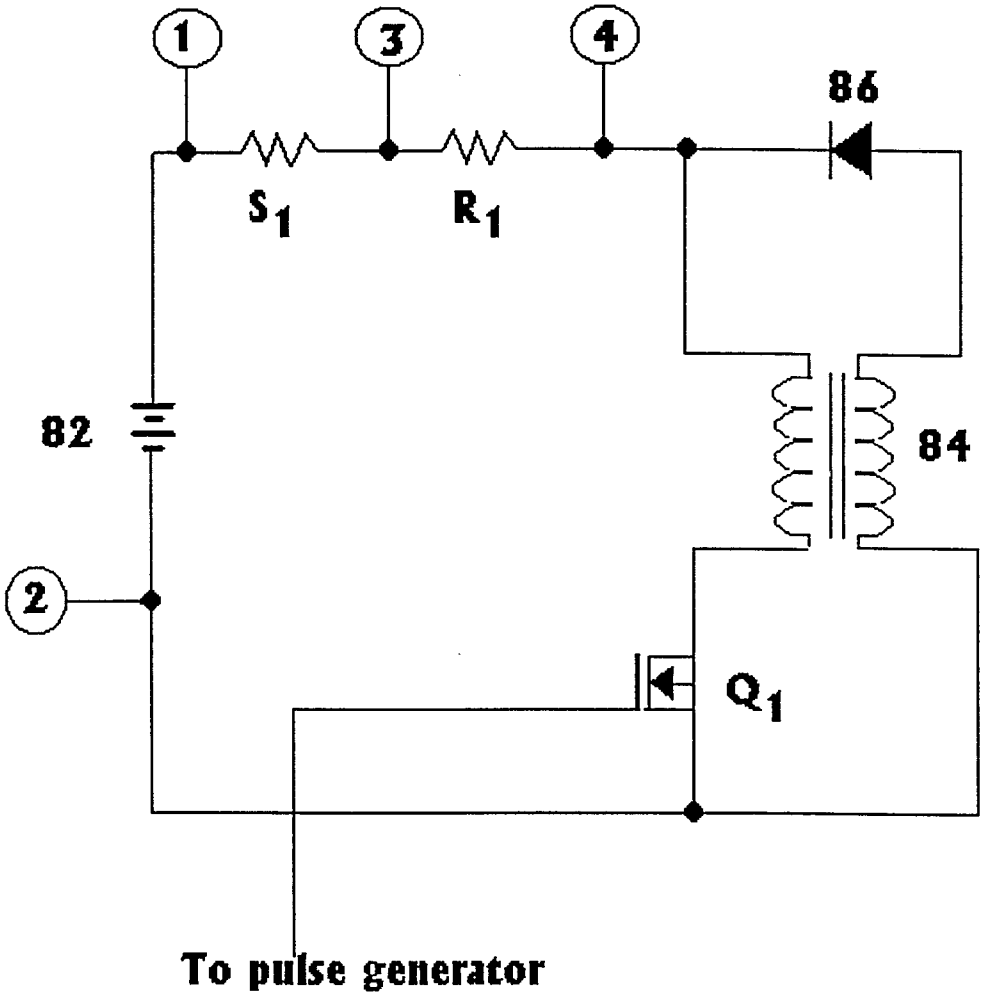


FIGURE 5

INTERNATIONAL SEARCH REPORT

Inte. ional Application No
PCT/IE 99/00005

A. CLASSIFICATION OF SUBJECT MATTER
IPC 6 H02M3/155

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 6 H02M

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 82 01627 A (UNITRON CORP) 13 May 1982 see the whole document	1-7, 11-14, 18-20, 23,25
X	EP 0 650 251 A (NICOTECH LTD) 26 April 1995 see column 3, line 52 - column 4, line 29; figure 1	1,2,12, 18,23
A	EP 0 151 199 A (ZETEX LTD) 14 August 1985 see abstract; figure 1	1,12,18, 23
A	EP 0 143 048 A (THOMSON CSF) 29 May 1985 see abstract; figure 1	1-23

☐ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

° Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
26 April 1999	03/05/1999

Name and mailing address of the ISA	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	Gentili, L

1

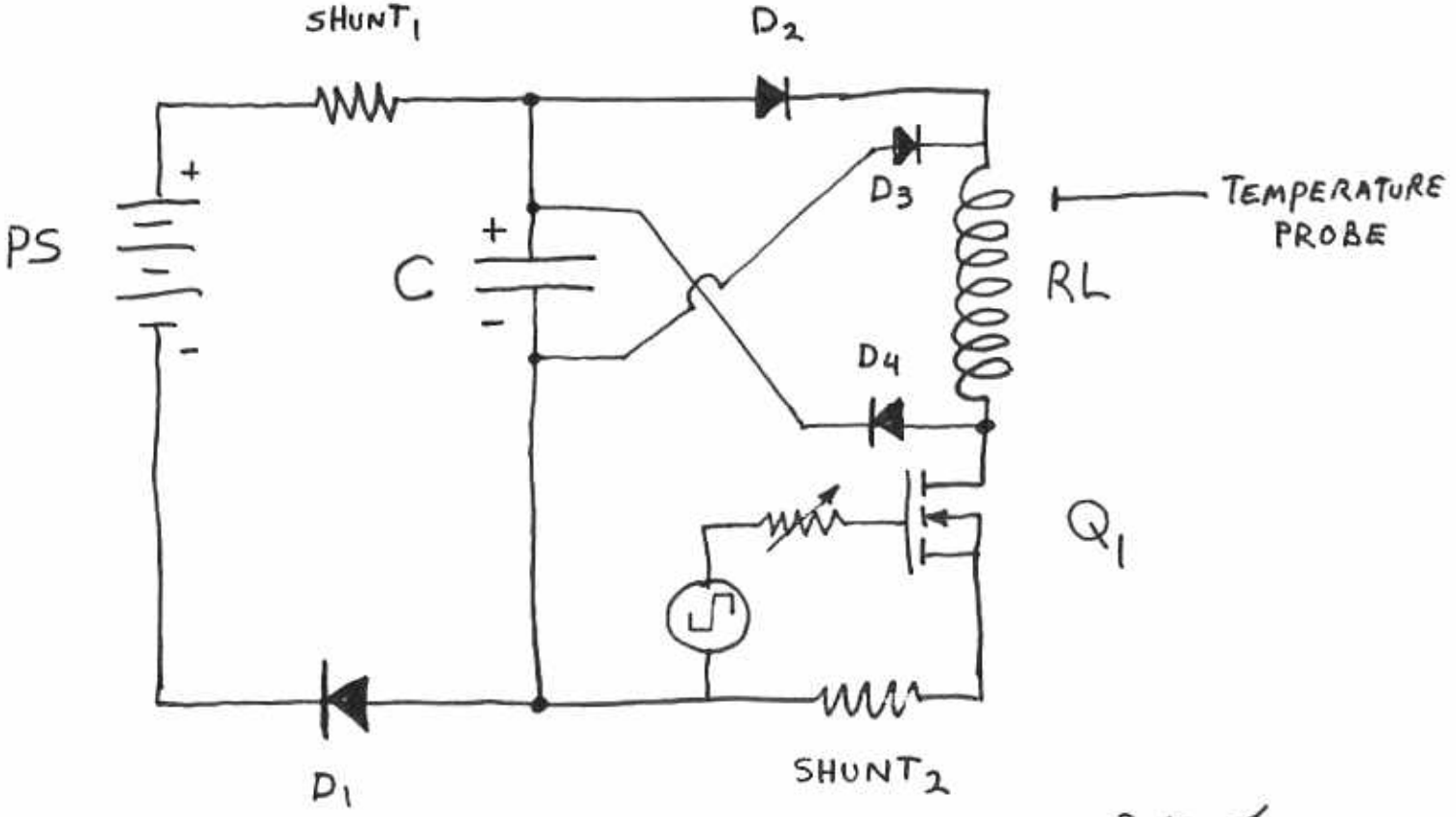
Form PCT/ISA/210 (second sheet) (July 1992)

INTERNATIONAL SEARCH REPORT

Information on patent family members

Inte ional Application No
PCT/IE 99/00005

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 8201627 A	13-05-1982	AU 7297781 A	21-05-1982
EP 0650251 A	26-04-1995	GB 2283136 A	26-04-1995
EP 0151199 A	14-08-1985	NONE	
EP 0143048 A	29-05-1985	FR 2555375 A	24-05-1985
		DE 3471410 A	23-06-1988



Peter Lindemann
2-15-09

Circuit for the efficient production of Heat
using an inductive resistor heating element and the
recapture and recycling of the inductive collapse