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MAGNETIC DC MOTOR WITH PARTIALLY SUPPLIED BY ENERGY FROM VACUUM

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Abstract- There are some novel ideas and construction on DC magnetic motors, which in addition of conventional energy from grid uses some energy from vacuum [1-4]. In specific we may cite the paper, which tries to explain electromagnetic processes taking place in such motors, there part of supplied energy is provided by asymmetrical re-gauging [1, 2]. In this paper we also make a simplified attempt to explain this novel idea. We began from COP coefficient [5], which is reflected energy transfer by those new motor-generators. Some attention is paid to the re-gauge theory and specifically to Lorenz re-gauging and asymmetrical re-gauging and terminology are introduced.

Keywords: Vacuum Energy, Magnetic DC Motor, Back EMF, Lorenz Gauge, Coefficient of Performance (COP).

I. INTRODUCTION

Efficiency of any electrical unit is defined is defined by the ratio of its output power and input power from all sources which can be measured and visualized. It is known as

$$\eta = \frac{P_{out}}{P_{inp}} \quad (1)$$

The definition of coefficient of performance is the ratio between total intended works performed compared to the work only provided by the operator. So *COP* is more wide term which may be more than 1 and usually used for electrical units which in addition of input power from operator taking in account energy from environment freely entering to the circuit.

$$COP = \frac{P_{out}}{P_{inp.operator}} \quad (2)$$

At known DC magnetic motors rotors pole is attracted to stator pole and as a result there occur mechanical energy transferred from magnets to rotor and stored as a kinetic energy in accelerating rotor. Rotors pole leave stator pole creating condition at which stored by rotor and flywheel energy has to be transferred again to magnets to overcome the deceleration.

Without additional energy from the outside motors magnetic field could not perform the resulting work because half of the time magnetic field is delivering energy to load (rotor, flywheel), but at the rest of half time it takes power back (from the rotor, flywheel).

So output power of such a system without feeding it with additional power is always equal to zero. Therefore to use conventional DC motors it is necessary to feed them with additional energy to overcome slowing-down and supply motor and its load. Usually *COP* for such motors is in the 0.4-0.85 band.

It was considered above that there are two energy flows in a motor: from magnets to rotor/flywheel and back from rotor/flywheel to magnets. Both power flows are equal but has opposite direction. Each phase of power flow may be counted as asymmetric, i.e. we can watch:
- energy flow to the rotor (flywheel);
- energy flow back from rotor/flywheel to magnets.

So considering magnets we can talk about power flow to outside and power flow inside.

For power outside phase the source of energy is EMF (electromagnetic force) which takes place between stator pole and approaching rotors pole. At this phase of rotors rotation its angle momentum and kinetic energy are increasing. That is power is added to the rotor and thus to the load from rotor and stator fields.

In phase "inside" power must to transfer back from rotor/flywheel (load) to overcome braking forces, which take place between stators pole and moving away rotors pole. At this phase energy goes back to the internal magnetic system from rotating rotor/flywheel (with angular momentum equal to rotating energy multiplied by time).

In most of modern motors methods of overcoming and partial reverse of back EMF are used. Back EMF may be introduced as a back pulse of electromagnetic coil which is in opposite phase and occur due to transformation, as in the case of magnetic polarity change North-South and vice versa. Then back EMF is shorted and rotor pole again is attracted to the stator pole, over-helming the resistance.

This may be achieved to supply more energy to the input, and this action helps to overcome back EMF and vice versa to produce direct EMF in that part of circuitry. The mentioned above energy is provided by operator. It is also known that changing only potential (voltage) could create back EMF without doing any work. It has taken place because during change of potential the form of potential energy does not change but only the magnitude. But work is done only then form of energy is changed. In the cited DC motor [3, 4] back EMF is created by means of asymmetrical Regaugment, only by changing the volume of used potential energy.

In conventional power supply system the potential (voltage) is changed in expense of additional energy on the input of the system to do work on internal charges of generator or a battery. Potential energy spent inside the generator/battery for division of internal charges for dipole formation. Further outside closed loop circuit is pumping used electrons through back wire and back EMF of the dipole, dividing charges chaotically and destroying the dipole.

So energy flow from the source (dipole) to the outside circuit is ceased. That is the working condition of conventional power supply system is feeding an input with additional energy to constantly restore dipole. Discussed principle is true for most of the used traditional electrical energy generators.

II. MAXWELL-HEAVISIDE EQUATIONS AND LORENTZ GAUGE

To understand how to use energy from the vacuum at the stage of designing and constructing dc motor with $COP>1$ let us take Maxwell-Heaviside equations and their transformation to simplified form done by Lorentz. These simplified equations a long period of time are used in designing DC motors.

As it is known system of Maxwell equations is formed with Equations (3)-(6) [6-10].

1. Coulomb's law

$$\nabla\vec{E}=\rho/\varepsilon_a \quad \text{or} \quad \operatorname{div}\vec{E}=\rho/\varepsilon_a \tag{3}$$

2. Ampere's law

$$\operatorname{rot}\vec{H}=\vec{\delta}+\frac{\partial\vec{D}}{\partial t} \tag{4}$$

3. Faraday's law

$$\operatorname{rot}\vec{E}=-\frac{\partial\vec{D}}{\partial t} \tag{5}$$

4. Absence of free magnetic poles is expressed as

$$\nabla\vec{B}=0 \tag{6}$$

These four equations may be simplified following symmetrical gauge done by Lorentz to the set of two equations as

$$\nabla^2 V+\frac{\partial}{\partial t}\operatorname{div}\vec{A}=\frac{1}{\varepsilon_a}\rho \tag{7}$$

$$\left(\nabla^2\vec{A}-\mu_a\varepsilon_a\frac{\partial^2\vec{A}}{\partial t^2}\right)-\nabla(\operatorname{div}\vec{A}+\mu_{a_a}\varepsilon_a\frac{\partial V}{\partial t})=-\mu_a\delta \tag{8}$$

where, V is electrical potential.

And then we can write

$$V(t,x)\Rightarrow V'(t,x)=V(t,x)-\frac{\partial\Gamma(t,x)}{\partial t} \tag{9}$$

$$\vec{A}(t,x)\Rightarrow\vec{A}'(t,x)=A(t,x)-\nabla\vec{A}(t,x) \tag{10}$$

where, Γ is the scalar function.

While applying Lorentz transformation [11, 12] parameters V and A must be chosen so to satisfy

$$\nabla\vec{A}=-\mu_a\varepsilon_a\frac{\partial V}{\partial t}, \quad \text{i.e.} \quad \operatorname{div}\vec{V}=-\mu_a\varepsilon_a\frac{\partial V}{\partial t} \tag{11}$$

So finally we get

$$\nabla^2 V-\mu_a\varepsilon_a\frac{\partial^2 V}{\partial t^2}=-\frac{1}{\varepsilon_a}\rho \tag{12}$$

$$\nabla^2 A-\mu_a\varepsilon_a\frac{\partial^2\vec{A}}{\partial t^2}=-\mu_a\delta \tag{13}$$

Equation (13) differs from (8) by absence of (14) which was discarded by Lorentz [13].

$$-\nabla(\nabla\vec{A}+\mu_a\varepsilon_a\frac{\partial V}{\partial t}) \tag{14}$$

At the same time according [13-15] discarded by Lorentz part of equation takes in consideration the impact of the vacuum.

$$-\nabla(\nabla\vec{A}+\mu_a\varepsilon_a\frac{\partial V}{\partial t})=\mu_a\vec{\delta_a}, \quad \text{where} \quad \delta_a=\sigma\vec{E_a} \tag{15}$$

where, σ is conductance at the vacuum and δ_a is current density in the vacuum-similar to Maxwell displacement current.

That is asymmetrical re-gauging is equivalent to discarding of Lorentz transformation and it opens door for taking in consideration impact of the vacuum. Besides, asymmetrical re-gauging is the process, which resulted in a change of systems potential energy.

In using energy from surrounding us vacuum it is important to understand what is it vacuum and polarization. According to T.D. Lee the particle physics assumes that vacuum stage is a stage of minimal energy for environment. Some time it is called zero point energy state.

For vacuum state, considering $\rho=0$ and $\delta=0$ Maxwell equations would be represented as:

$$\operatorname{div}\vec{E}=0$$

$$\operatorname{rot}\vec{B}=\mu_a\varepsilon_a\frac{\partial\vec{E}}{\partial t}, \quad \text{where} \quad \vec{D}=\varepsilon_a\vec{E}+\vec{P_a} \tag{16}$$

$$\vec{H}=\frac{1}{\mu_a}\vec{B}+\vec{M} \tag{17}$$

$$\frac{\partial\vec{P_a}}{\partial t}=\vec{\delta_a} \tag{18}$$

where, $\vec{M}$ is the magnetization.

So after discarding Lorentz gauge, we get Maxwell equations which include effect of the vacuum. One of schematics which use vacuum as a source of energy introduced below.

III. BEDINI MOTOR-GENERATOR

From particle physics [16-19] it is followed that any dipolarity, including any scalar potential is a broken symmetry in virtual vacuum flow, despite of the fact that interaction with vacuum is not considered in classical electrodynamics at the stage of electrical systems design.

Dipoles asymmetry means that it is collecting disordered energy from the vacuum, ordering part of it and send it in observable form to all directions. It follows that any dipole and potential in essence is negative resistor and that may be used in real circuits. Earlier [20] it was shown that scalar potential is a composition, consisting of pairs of longitudinal electromagnetic waves propagating in opposite directions.

So potential is ordered reorganization of vacuum energy to the determinate system of bidirectional energy flows. To attach increased potential to negative resistance in battery for example [21] and using bidirectional property of potential it is possible to overexcite heavy ions charging battery and also overexcite electrons which may feed load at the external circuit.

The system becomes open, the thermodynamic principle of equilibrium between electrical system and surrounding vacuum is violated and possibility to work with *COP*>1 becomes available.

A simple DC Bedini motor-generator shown in Figure 1, which using a little amount of energy for controlling purposes, stores energy from vacuum in rotor/flywheel and charging battery or sets of battery in nontraditional way. Such device is working with *COP*>1.

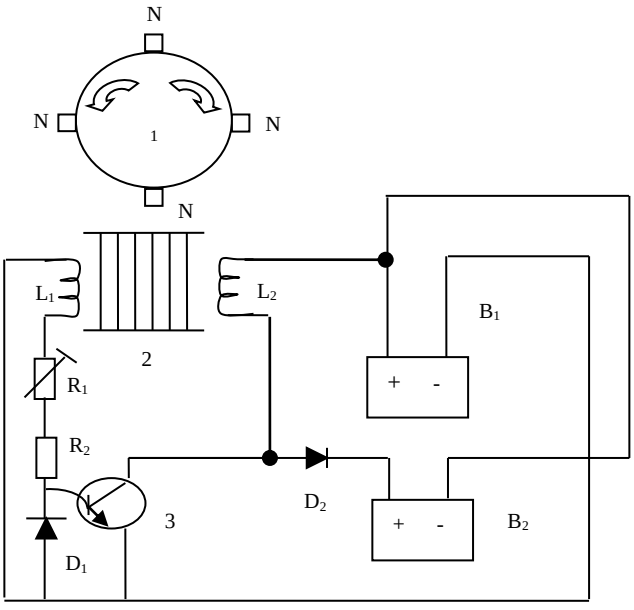

Figure 1. Bedini motor-generator

As rotors N-pole 1 moves to the core of a bobbin 2 it is magnetizing core of electromagnet in polarity of S because rotors pole has N-polarity. This magnetizing is followed by creation of magnetic flow in windings L_1 and L_2 of the stator. As a result N-pole of the rotor would be attracted by the coils core with increased force and rotor gains speed.

Magnetic flow at the windings L_1 and L_2 will create electric potential on the ends of windings and values of voltage on the ends of the bobbin are proportional to the speed of flux change and therefore proportional to the rotors N-pole rotation speed. At some moment voltage on the ends of winding L_1 reaches the triggering level to open transistor 3. Opening of the transistor is defined also by series connected resistor R_2 and potentiometer R_1.

At the conduction state of the transistor at the windings of electromagnetic coil back magnetic flux is generated. At this moment transistor consumes some energy from source battery B_1. This current raised and magnetic flux opposite to flux generated by approaching N-pole is created. Then it would overcome primary flux created by N-pole of the magnet it will speed up the rotors 1 rotation. At the same moment electromagnets core is magnetized so that there occur N-pole on the end of core which sees rotors N-pole.

Therefore bobbins N-pole pushes away rotors N-pole and therefore add some force to it. Further transistor 3 would close before the opposing flux would work against spinning rotor.

Because of control winding, then opposite flux becomes more than flux created by winding L_1 and L_2 the polarity of voltage on the ends of L_1 would change and began to decrease in value until the moment, then transistor 3 switched off. As a result of commutation and ceased current in winding L_2 on the ends of this winding we can get the voltage with amplitude of several hundred volts. This energy is used for charging a battery. Short pulse of high gradient from the output of circuitry enters to the battery B_2 to be charged. This pulse momentarily excites electrons and they speed up and put in motion heavy and slow moving lead ions.

At the first moment ions act like sitting, but then gradually move in direction of charging battery. At this period of ions delay electrons rush and gathered on plates forming clusters. As a result we have sharp potential growth at the cluster. This delay in ions move may be controlled to force vacuum to add energy to ions and electrons. That is the delay at the end facilitate to free transformation of the system and changes in its potential energy.

Manipulating by hysteresis (delay of ions current), pulse period and by interval between pulses it is possible to broke Lorentz symmetry in conventional closed current network, which include dipole in battery and external circuit with load. This effect realized in Bedini circuit, which forcibly opens closed loop giving possibility to energy from Vacuum to be collected on ions and electrons. And further then pulse terminated in accordance with Lenz law the additional potential increase into the battery is taking place and accordingly more energy from vacuum would feed ion current charging battery. At the end negative resistance in the battery (dipole with potential difference between their charges) increase more and that would attach more energy to ions and electrons to charge battery and supply load and losses at external circuit.

IV. CONCLUSIONS

Authors did try to check *COP* of the Bedini unit with number of magnets equal to 8. The charging battery was connected through 150 W inverter MSI 15012 to CFL with parameters 230 V, 12 W. Commutation regime was tuned so, that tube used at full light (10-12 W) and battery was under small charging, because of load in external circuit. The power consumed from the source battery was equal

12.8 V × 0.4 A = 5.12 W

Minimal *COP* of the system is 10 / 5.12 ≈ 2

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Oktay Z. Kerimov graduated from Azerbaijan Industrial Institute (Baku, Azerbaijan) as a Mechanical Engineer in Automation Control. He received the Ph.D. degree from Moscow Institute of Power, Russia in 1970. He was Senior Researcher in Azerbaijan Institute of Power (Baku, Azerbaijan) from 1962 till 1981. He was a Visiting Scholar in UC Berkeley, CA, USA from 1977 till 1978. He also was an advisor on Power Systems in Park Holding, Turkey at the period of 1993-2004. At 2005 he joined again to Azerbaijan Institute of Power as the Head of Energy Saving and Efficiency Laboratory.

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