Series: **PHYSICS and ASTRONOMY**

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To the Theory of Perpetual Motion Holder

Annotation

The discussed experiment demonstrates the preservation of integrity in a prefabricated construction in the absence of visible fastening forces. It is shown that the experiment can be explained by the fact that a flow of electromagnetic energy appears within the construction. We are considering the conditions in which such flow of electromagnetic energy is maintained for an indefinite length of time.

Contents

1. Introduction

In [1] the following experiment is described – see Fig. 1. Two bars of magneto soft iron with a recess in the middle along all the bar are taken. These bars are put together so that a common canal is formed. A wire is put in it and a current impulse is passed. After this the bars seem to be fastened by a certain force. The force disappears if another impulse is passed though the wire, equal to the previous by its magnitude but opposite by direction. A compulsory condition must be kept – the bars must be tightly adjacent to each other, without any air between them.

The effect cannot be explained by diffusion (as the bars are put together without any pressure and "come off" when the reverse impulse), or by magnetic attraction (as the bars material is magneto soft and does not save the magnetization).

Fig. 1.

The described construction is called in [1] A Perpetual Motion Holder. And I think that such name is very appropriate. Further we shall show that in this construction the thing that is moving – is the flow of electromagnetic energy. Such flow can exist in a stationary system – Feynman in [2] gives an example of energy flow in a system consisting only of an electric charge and a permanent magnet resting side by side.

Рис. 2.

Рис. 3.

There exist other experiments demonstrating the same effect [1]. Fig. 2 shows an electromagnet that keeps the attraction force after the current is disconnected. It is assumed that such electromagnets were used by Ed Leedskalnin when building the famous Coral Castle – see Fig. 3 [1].

In all these constructions at the moment of current disconnection the electromagnetic energy has a certain magnitude. This energy may be dissoluted by radiation and heat losses. But if these factors are insignificant (at least in the initial period), then the electromagnetic energy should last. In the presence of electromagnetic oscillations a flow of electromagnetic energy must emerge and spread WITHIN the construction. This flow can be interrupted by breaking the construction Then according to the energy conservation law an amount of work equivalent to electromagnetic energy that disappears with the construction destruction, should be expended. It means that the "destroyer" must overcome a certain force. And this is demonstrated in the described experiments.

Below we shall consider the conditions under which the electromagnetic energy can be preserved for an infinite time period.

2. Mathematical Model

2.1. Ferrite Cube

Let us consider a cube, consisting of magneto soft and dielectric material with determined absolute μ and absolute permittivity ε. Let us assume that due to a certain impact in the cube had appeared an electromagnetic wave with the energy W_o. There is no thermal losses in the , and its radiations (including thermal) are negligible. After some time the wave's parameters will assume stationary values, determined by the values of μ, ε, W_o and the cube's size. These parameters are the electric field strength and the magnetic field strength as functions of Cartesian coordinates and time, i.e. $E(x,y,z,t)$ and $H(x,y,z,t)$. Naturally, they satisfy the Maxwell equations system of the form:

1.	$\frac{\partial H_z}{\partial y} - \frac{\partial H_y}{\partial z} - \varepsilon \frac{\partial E_x}{\partial t} = 0$	
2.	$\frac{\partial H_x}{\partial z} - \frac{\partial H_z}{\partial x} - \varepsilon \frac{\partial E_y}{\partial t} = 0$	
3.	$\frac{\partial H_y}{\partial x} - \frac{\partial H_x}{\partial y} - \varepsilon \frac{\partial E_z}{\partial t} = 0$	

4.	$\frac{\partial E_z}{\partial y}-\frac{\partial E_y}{\partial z}+\mu\frac{\partial H_x}{\partial t}=0$	
5.	$\frac{\partial E_x}{\partial z}-\frac{\partial E_z}{\partial x}+\mu\frac{\partial H_y}{\partial t}=0$	
6.	$\frac{\partial E_y}{\partial x}-\frac{\partial E_x}{\partial y}+\mu\frac{\partial H_z}{\partial t}=0$	
7.	$\frac{\partial E_x}{\partial x}+\frac{\partial E_y}{\partial y}+\frac{\partial E_z}{\partial z}=0$	
8.	$\frac{\partial H_x}{\partial x}+\frac{\partial H_y}{\partial y}+\frac{\partial H_z}{\partial z}=0$	

(1)

In order to the cube to have no radiation from the plane xoy, it is necessary that in all points of the plane [3]

$$E_x H_y = 0 \text{ and } E_y H_x = 0. \qquad (2)$$

So for a non-radiating cube there must exist a solution of the equation (1), satisfying the said requirement on all the faces of the cube.

Let us consider such solution. We must consider the following functions, (suggested in[4]):

$$E_x(x,y,z,t)=e_x\cos(\alpha x)\sin(\beta y)\sin(\gamma z)\sin(\omega t), \qquad (3)$$

$$E_y(x,y,z,t)=e_y\sin(\alpha x)\cos(\beta y)\sin(\gamma z)\sin(\omega t), \qquad (4)$$

$$E_z(x,y,z,t)=e_z\sin(\alpha x)\sin(\beta y)\cos(\gamma z)\sin(\omega t), \qquad (5)$$

$$H_x(x,y,z,t)=h_x\sin(\alpha x)\cos(\beta y)\cos(\gamma z)\cos(\omega t), \qquad (6)$$

$$H_y(x,y,z,t)=h_y\cos(\alpha x)\sin(\beta y)\cos(\gamma z)\cos(\omega t), \qquad (7)$$

$$H_z(x,y,z,t)=h_z\cos(\alpha x)\cos(\beta y)\sin(\gamma z)\cos(\omega t), \qquad (8)$$

where

$e_x, e_y, e_z, h_x, h_y, h_z$ - the functions amplitudes,

$\alpha,\ \beta,\ \lambda,\ \omega$ - are constants.

Let functions $\sin$ be equal to zero on the cube faces. Let us consider the face xoy for z=a (where a is the length of half-edge of the cube). Then $E_x(x,y,z=a)\cdot H_y(x,y,z=a)=0$ and $E_y(x,y,z=a)\cdot H_x(x,y,z=a)=0$, which follows from (2, 3, 5, 6). It means that this face of the cube does not radiate. Similarly we can show that all faces of the cube do not radiate.

Differentiating and substituting (3-8) into (1); after reducing by common factors, we get:

1.	$h_z\beta-h_y\gamma+e_x\varepsilon\omega=0$	
2.	$h_x\gamma-h_z\alpha+e_y\varepsilon\omega=0$	
3.	$h_y\alpha-h_x\beta+e_z\varepsilon\omega=0$	
4.	$e_z\beta-e_y\gamma-h_x\mu\omega=0$	(9)
5.	$e_x\gamma-e_z\alpha-h_y\mu\omega=0$	
6.	$e_y\alpha-e_x\beta-h_z\mu\omega=0$	
7.	$e_x\alpha+e_y\beta+e_z\gamma=0$	
8.	$h_x\alpha+h_y\beta+h_z\gamma=0$	

If $\alpha=\beta=\lambda$, then the equation system (9) takes the form:

1.	$h_z-h_y+e_x\varepsilon\omega/\alpha=0$	
2.	$h_x-h_z+e_y\varepsilon\omega/\alpha=0$	
3.	$h_y-h_x+e_z\varepsilon\omega/\alpha=0$	
4.	$e_z-e_y-h_x\mu\omega/\alpha=0$	(10)
5.	$e_x-e_z-h_y\mu\omega/\alpha=0$	
6.	$e_y-e_x-h_z\mu\omega/\alpha=0$	
7.	$e_x+e_y+e_z=0$	
8.	$h_x+h_y+h_z=0$	

In the system (10) equations (10.7, 10.8) follow directly from the previous ones. The first six equations are independent and from equations (10.1-10.6) can be found amplitude functions. We shall seek the solution of system (10.1-10.6) for $h_z = 0$. Then this system will become as follows:

1.	$e_x \varepsilon\omega / \alpha - h_y = 0$		(11)
2.	$e_y \varepsilon\omega / \alpha + h_x = 0$		
3.	$e_z \varepsilon\omega / \alpha - h_x + h_y = 0$		
4.	$-e_y + e_z - h_x \mu\omega / \alpha = 0$		
5.	$e_x - e_z - h_y \mu\omega / \alpha = 0$		
6.	$-e_x + e_y = 0$		

The solution is:

$$h_y = -h_x, \tag{12}$$

$$e_x = -\frac{h_x \alpha}{\varepsilon\omega} = 0, \tag{13}$$

$$e_y = e_x, \tag{14}$$

$$e_z = -2e_x. \tag{15}$$

An additional condition for this is the amount of the initial (and stored in the future) energy W_o.

Thus, for a ferrite cube there exists a solution that transforms it into a perpetual motion holder.

2.2. An Iron Cube

Let us consider a cube made from magneto soft iron. In this case it possesses (beside μ and ε) conductivity σ and within it electrical currents of a certain density J may flow. This density should be included into the Maxwell equations – to be more exact, into the first three of (1). Then the Maxwell equations system will become:

1.	$\frac{\partial H_z}{\partial y} - \frac{\partial H_y}{\partial z} - \varepsilon \frac{\partial E_x}{\partial t} + \frac{\partial J}{\partial x} = 0$	

2.	$\frac{\partial H_x}{\partial z} - \frac{\partial H_z}{\partial x} - \varepsilon \frac{\partial E_y}{\partial t} + \frac{\partial J}{\partial y} = 0$	(16)
3.	$\frac{\partial H_y}{\partial x} - \frac{\partial H_x}{\partial y} - \varepsilon \frac{\partial E_z}{\partial t} + \frac{\partial J}{\partial z} = 0$	
4-8.	the same as (4-8) from (1)	

The dielectric constant in this case also should have a finite value (as otherwise the electromagnetic wave could not exist). Evidently, the solution satisfying the system (1) will also satisfy the system (16) for $J = 0$. Thus, for a iron cube there exists a solution – an electromagnetic wave without electric current. Of several possible solutions just such solution has to be realized, as for it the electromagnetic wave commits a minimum of work (more precisely – there is no work). So the iron cube turns into a perpetual motion holder.

Conclusion

From the above said it follows that in ferrite and iron cube such electromagnetic wave may be spreading, for which the cube's face do not radiate, and thermal losses are absent (as electric currents are absent even in the iron cube). In these conditions the electromagnetic wave may exist indefinitely –and the cube turns to be a perpetual motion holder. Such cube preserves

- The value of electromagnetic energy,
- The integrity of construction,
- And, possibly, the signal form; in this case we may say that such construction records and stores information.

Apparently, such holder can be made from any magneto soft material and have another, not cubical, form.

References

1. Leedskalnin "Perpetual Motion Holder" (PMH) Bond Effect http://peswiki.com/index.php/Directory:Leedskalnin_%22Perpetual_Motion_Holder%22_(PMH)_Bond_Effect
2. R.P. Feynman, R.B. Leighton, M. Sands. The Feynman Lectures on Physics, volume 2, 1964.

3. V.I. Beloded. Electrodynamics. Moscow-Minsk, 2011 (in Russian).
4. S.I. Khmelnik. Variational Principle of Extremum in electromechanical and electrodynamic Systems. Publisher by "MiC", printed in USA, Lulu Inc., ID 1142842, Israel, 2008, ISBN 978-0-557-08231-5.