- **Аннотация:**
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SECRETS OF NIKOLA TESLA

POTENTIAL ENERGY, CHARGES SEPARATION, GROUNDING AND PULSE EXCITATION

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INTRODUCTION

The technology called by Nikola Tesla "Charge pump" or "Charge Funnel " is described. In this technology, the voltage (potential) is taken from the "Free Energy " device. And, the current (charges) is taken from the surrounding space (grounding). At the same time, the concept of "Potential energy" plays important role.

No "proprietary theories" are used when writing an article. Only what is taught at school and university. Classical electromagnetism and electrostatics. However, the presentation of the material itself may seem "unusual" to someone. To" smooth out " this impression, the simplest practical experiments are given at the end of the article.

Although the article itself is devoted to the behavior of charges in conductors, it is possible to explain the concept of potential energy on the basis of gravitational interaction, where this concept actually came from. To do this, we will illustrate the "curvature of space" that occurs when a certain load is placed on a flexible and thin horizontally located membrane. As a result, the membrane deforms and sages - Fig.1.

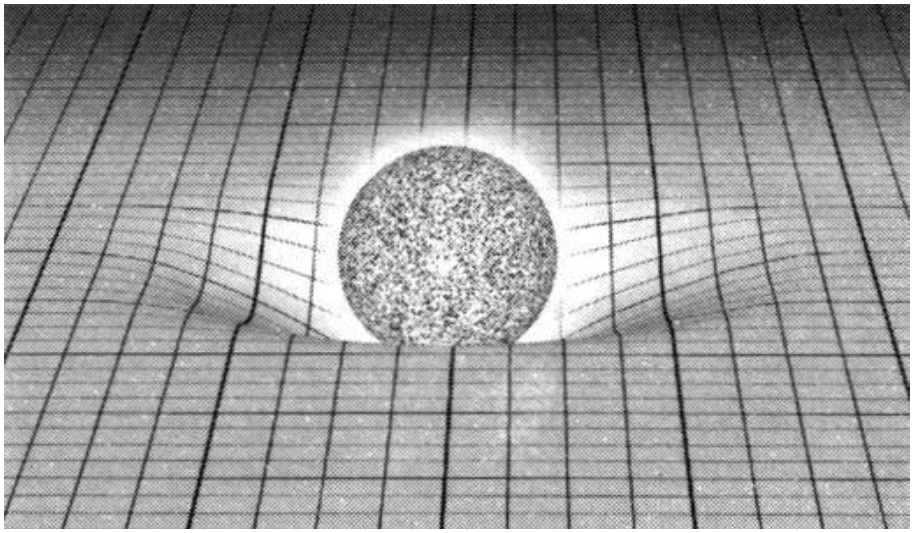


Fig. 1 Illustration of the curvature of space

Such a figurative representation allows us to explain the emergence of two types of energy: the energy of the gravitational field and potential energy. If the deformed membrane is represented as a compressed spring, then the energy stored by the compressed spring can be interpreted as the energy of the gravitational field. If a deformed membrane is considered as a "dug hole", then the depth of this hole can be interpreted as the potential energy for the body located on its edge. If the second body is not restrained, it will slide into a potential pit. At the same time, since the second body also deforms the membrane, there will be a mutual convergence of the bodies. This is the essence of potential energy, and the work it does in the gravitational interaction. It follows from this that during the gravitational interaction of two bodies and the performance of work, the mass of the bodies does not change. Their potential energy changes only. What is shown in Fig. 2.

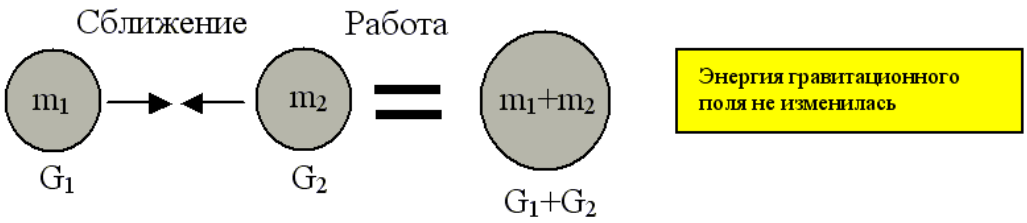


Fig. 2. Two masses separated in space can perform work due to mutual potential energy.

There is nothing surprising in this. The same situation will be with two magnets spaced apart in space. They can also perform mechanical work due to mutual potential energy - Fig. 3. At the same time, the energy of the magnetic field will not change, since the substance of the magnets is in saturation. They will not demagnetize and will not magnetize anymore.

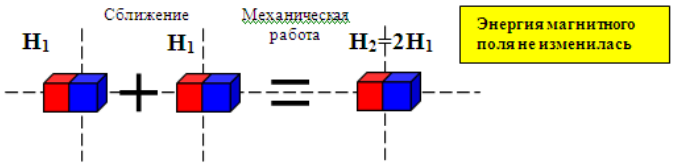


Fig. 3. Two magnets spaced apart in space can perform work due to mutual potential energy.

All this is clear and understandable. However, if you look more closely, you can notice one interesting feature of potential energy. If you are the Creator of everything and you can create two masses at different "remote" points in the space of the created World, then you will not spend any effort on creating potential energy. You will spend energy on creating a mass $E=mc^2/2$. The potential energy will arise as if by itself, due to the" sagging of the membrane", as an integral part of the World you are creating, where two masses are separated in space. Here is such an interesting feature. However, we are all too far from the Creator. But, let's say you are an Engineer and you can magnetize two magnets at different "remote" points in space, then again, you will also not spend any effort on creating potential energy! You will spend energy on magnetizing the magnets. The potential energy will arise as if by itself, as part of the created World, simply due to the fact that two magnets are separated in space. Hence the conclusion: potential energy is energy, the creation of which does not require additional costs. Whether you are the Creator of everything or a simple Engineer. But, after performing the work with potential energy, the objects find themselves in a "potential pit", to get out of which, again, you need to spend energy. This is the situation. However, it would be great if, after performing the work with potential energy, the magnets themselves would demagnetize, giving their energy to the original source. Then the process could be repeated indefinitely. An interesting idea, but that's not what this is about... If we look even more closely at the process of the emergence of potential energy, we can notice the following. Potential energy arises for objects separated in space when they appear in this world. Before their appearance, there could be no potential energy in this World. Whether it's masses or magnets. At the same time, for magnets, this was due to the creation of ordered domains from chaos (magnetization). That is, initially there were domains, but they did not show a single magnetic field due to an arbitrary orientation in space. When the domains were ordered, a single magnet was born. And his magnetic field appeared in this World. Now we will show how the same can be done with charges. After all, the objects around us, including conductors, consist of positive and negative charges. However, the external electric field from them does not manifest itself in any way. Since the fields from negative and positive charges are mutually compensated. We will arrange these charges and separate them in space, so that a prerequisite for potential energy appears. Let's use a transformer for this.

CHARGE SEPARATION: "ZERO-TRANSFORMER"

Many radio amateurs and Engineers used transformers in their activities. At the same time, they had to measure the voltage on the secondary windings. But, almost no one thought about the subtleties of the processes taking place in the transformer. For example, why is there a voltage on the secondary winding? Why think - after all, the answer is in the textbooks! That's right, but this is not about textbooks, everything is correct there.

We are interested in the fact that when the transformer is idling, charges are separated in the secondary winding under the influence of the electromagnetic field of the primary winding. There is one charge at one end of the secondary winding wire, and the opposite charge at the other end. After half a period, the charges will change places (with harmonic excitation). We record this periodic separation of charges (potential difference) with the help of devices. At the same time, the transformer does not consume energy from the source! Which is already similar to the situation with potential energy, which also does not require additional energy to create.

At the same time, the thickness of the conductor of the secondary winding of the transformer does not matter. The devices will show the same value of the potential difference, both for a thin and for a thick conductor. Although the number of separated charges for a thick conductor will be greater. This again resembles the situation with potential energy, when large masses lead to large amounts of potential energy. Although additional energy is not spent on this.

Fig. 4. Charge separation in the secondary winding of a conventional transformer at idle without energy consumption from the source.

Figure 4 shows the situation for one half-period. For another half-period, the charges will be reversed. All this is well known, so almost no one pays attention to it. But, we will pay attention to this! Having emphasized that in the secondary winding of the transformer, when working at idle, charges separated in space (and potential energy, respectively) periodically arise. But, how to use these separated charges? How to "drive" potential energy into the load? If a load is connected to the output winding, a current will appear in it and the transformer will begin to consume energy from the source. All arguments about the potential energy when connecting the load will collapse!!! We will not see any potential energy in the load. The energy will be consumed from the source. We realize that we are facing an ordinary transformer. What to do? What should I do so that the energy from the source does not enter the load? To solve this problem, we wind the secondary winding from two equal parts, making the winding of the parts in opposite directions, and we get the so - called "zero-transformer". The meaning of which is to create a zero potential difference, with non-zero charges at the ends-Fig. 5, where the situation is displayed for one half-period of harmonic oscillations (for another half-period, the charges will change places).

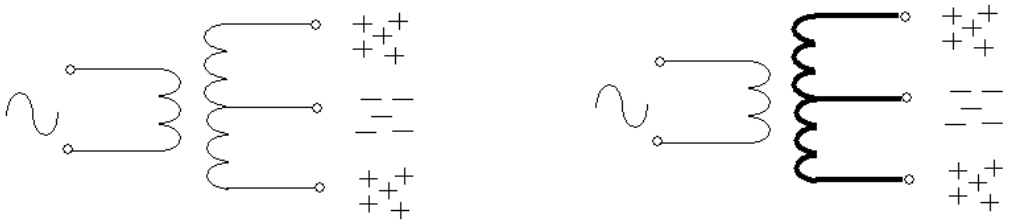


Fig. 5. "Zero-transformer": the output voltage is zero, but there are charges at the ends of the winding.

If you now connect a load to the output winding, then there will be no current in it and there will be no energy consumption from the source either. The problem is solved! But, at what a price! There is also no potential energy in the load!!! A useless thing, you will say. There is ZERO sense from such a transformer - in accordance with its name. And here it is not. The thing is useful, just something else is not enough to "drive" the potential energy into the load. And there is not enough grounding!

GROUNDING

Let's connect the ground to one of the extreme terminals of the "zero transformer" and look at the voltage and the distribution of charges on them - Fig.6. Where, as always, the situation for one half-cycle is shown.

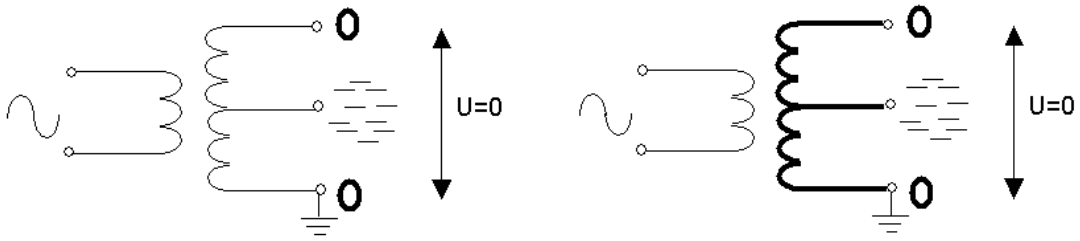


Fig. 6. "Zero-transformer" with grounding at harmonic excitation - the output voltage is zero.

As can be seen from Fig. 6, the situation is again "deplorable"!!! The voltage between the output terminals of the "zero-transformer " with harmonic excitation is zero even if there is a ground connection. We will not see any potential energy in it when connecting the load. And what did you want, zero is zero! It's sad! But, we wanted a completely different result.

When connecting the ground to one of the terminals of the "zero-transformer", a" skew" of potentials should have been formed.

Due to the fact that one terminal is connected to the ground with zero potential, and the second one is not - there are charges on it. We were going to see this skew, but we didn't see it. What's the matter?

The thing is that an additional charge was "sucked" from the ground into the output coil and compensated for the " skew " of the potentials. The potential on the ungrounded pin also became zero, as well as on the ground. This happens VERY quickly, so we did not see the potential difference with the harmonic effect.

But, there is a way out of the situation! It is necessary to carry out the separation of charges very quickly, so that during the separation the compensating charges from the grounding do not have time to "suck up". That is, to separate charges using a very short pulse, or a meander with very steep fronts, or other signals with very steep fronts.

PULSE EXCITATION

The "zero-transformer" when excited by very short pulses or signals with very steep edges is shown in Fig. 7 when the ground is connected.

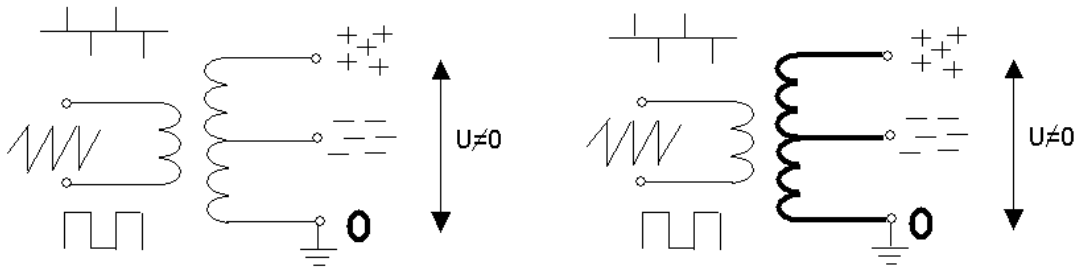


Fig. 7. "Zero-transformer" when excited by short pulses or signals with steep edges, the output voltage is not equal to zero.

Well, here is the result that we were trying to achieve: a potential difference was formed at the output of the "zero - transformer" for a short time. That is, there are short pulses, the duration of which is determined by the time of "pumping" charges from the ground. This time is usually measured in nanoseconds. And the time of charge separation is almost instantaneous. If these times were comparable, then the "trick" would not have succeeded.

Now you can connect a load to the output of the " zero transformer" and consume potential energy in the form of short pulses! At the same time, the transformer itself will operate in idle mode and will not consume energy, since the input and output coils are orthogonal (based on the design) and there is no electromagnetic interaction in the classical sense.

The current in the load will be determined exclusively by the process of charge separation in the secondary winding of the transformer, that is, the potential energy. Our goal has been achieved! Although not immediately...

At the same time, we note that Figure 7 shows the situation on the output coil of the "zero - transformer" for only one pulse polarity. For a different polarity of the pulses, the charges will change places. That is, the polarity of the output pulses will depend on the polarity of the input pulses.

To generalize, we can say the following.

"Zero-transformer" is a pulse transformer that shows its operability only when the output coil is grounded. The energy of the input pulses does not enter the load. The transformer always runs at idle - even if there is current in the load.

An important sign of the correct operation of the "zero-transformer" can be considered the appearance of a secondary electromagnetic field of the output coil perpendicular to the field of the exciting coil (based on the design). And, as a result, the absence of electromagnetic interaction between them in the classical sense.

CONNECTION AND EXCITATION OPTIONS

In addition to the connection of the "zero transformer" to the load indicated in Fig.7, a slightly different connection is allowed, in which it is possible to change the value of the output voltage due to an additional transformer-Fig.8.

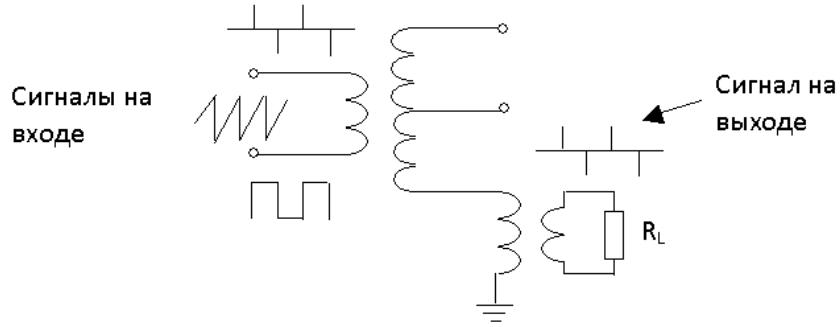


Fig. 8. Connecting the "zero-transformer" to the load using a step-down (matching) transformer.

At the same time, if we take into account that the polarity of the output pulses depends on the polarity of the input pulses, then it is possible to generate a signal of the desired frequency at the output by changing the polarity of the exciting pulses with this frequency, for example, 50 - 60 Hz. However, at the output you will have to put a low-frequency filter that removes high-frequency ripples-Fig.9.

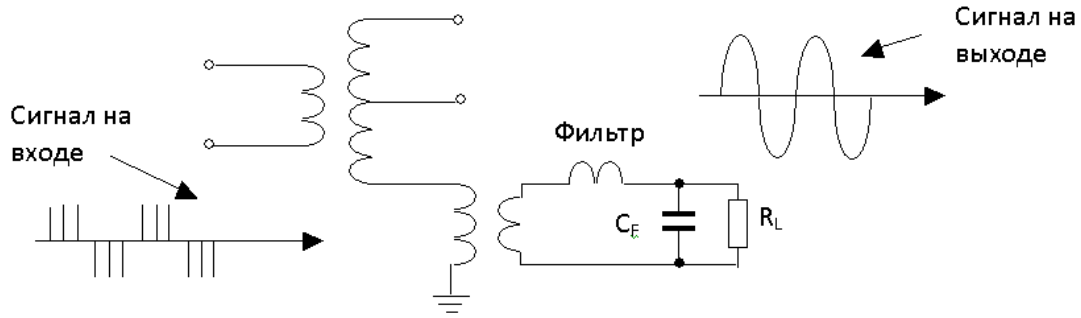


Fig. 9. The formation of a signal at the output of a given frequency, for example, 50-60 Hz.

By adjusting the location of the pulses in the bundle, it is possible to more accurately reproduce the signal of the desired shape, for example, sinusoids. Nevertheless, the simplest scheme for generating exciting pulses will consist of a small - capacity capacitor and a charging circuit from a high-voltage source-Fig.10. A skipping spark will form an exciting pulse.

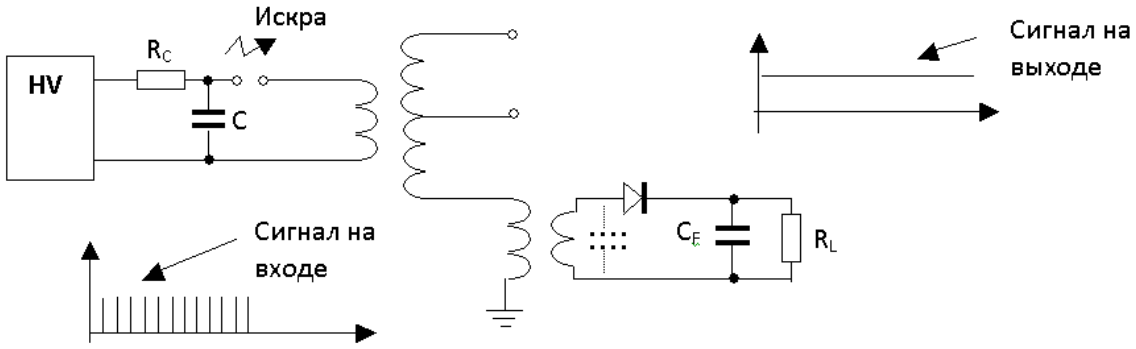


Fig. 10. The formation of the exciting pulses the simplest scheme.

The value of the capacitance C of about 10 Pf and the value of the charging resistor R of about 100 kOhm can be considered close to the truth. At the same time, the excitation circuit will consume little energy and provide a high pulse frequency of about 1 MHz, which is important from the point of view of the energy released in the load.

The diode will have to be used ultra-fast, since the pulse duration at the output of the "zero - transformer" is very small. Or to smooth out these pulses somewhat by putting a small-capacity capacitor or an RC circuit parallel to the secondary winding of the transformer. The role of a smoothing filter can also be performed by the inter-turn capacitance of the secondary winding.

REVERSIBILITY "ZERO-TRANSFORMER"

The "zero transformer" is reversible, just like a normal transformer. That is, if the primary and secondary windings are reversed, then the ability to separate charges will not be disturbed in most cases. As well as, the basic performance of a conventional transformer. In addition, if there are harmonic oscillations on the primary winding, then there are none in the secondary winding. And vice versa, which is clear from the device of the transformer itself.

THE PROBLEM OF VOLTAGE STABILIZATION

Since the signals at the output of the "zero transformer" are short pulses with a certain duty cycle, the average output voltage will strongly depend on the load value. Without a load, the voltage can be very large, and when the load is connected, it can "fail " very much. Methods of combating this phenomenon are well known in electronics when creating pulsed current sources. All these methods can be used here as well. Starting from complex ones with pulse frequency adjustment. And, ending with the simplest methods. Such as: adding a load resistor or varistor to the output - so that there is no idling.

GROUNDING OF THE SECONDARY WINDING THROUGH A SPARK

Those who carefully read this material could guess that the "zero-transformer" can be grounded along the secondary winding through a spark, and not permanently. At the same time, the primary winding can be kept in resonance to separate charges in the secondary winding - Fig.11.

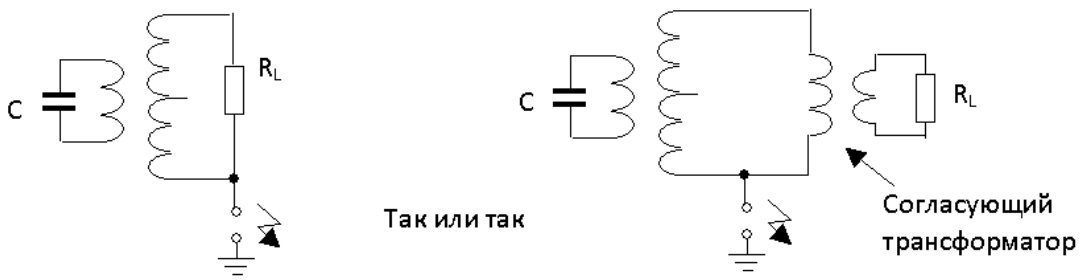


Fig.11. Excitation of the "zero transformer" along the secondary winding.

However, this is not all the variety of approaches to the implementation of the "zero-transformer". Let's consider another one.

”ZERO-TRANSFORMER” ON SHORT-CIRCUITED COILS

If we take a toroidal core and wind a coil on it along the entire length, the ends of which are closed at a meeting, we will get the basis for a” zero - transformer” based on a short-circuited coil. If you make bends in this coil after 90 degrees, then the ”zero-transformer ”will be almost ready - Fig.12.

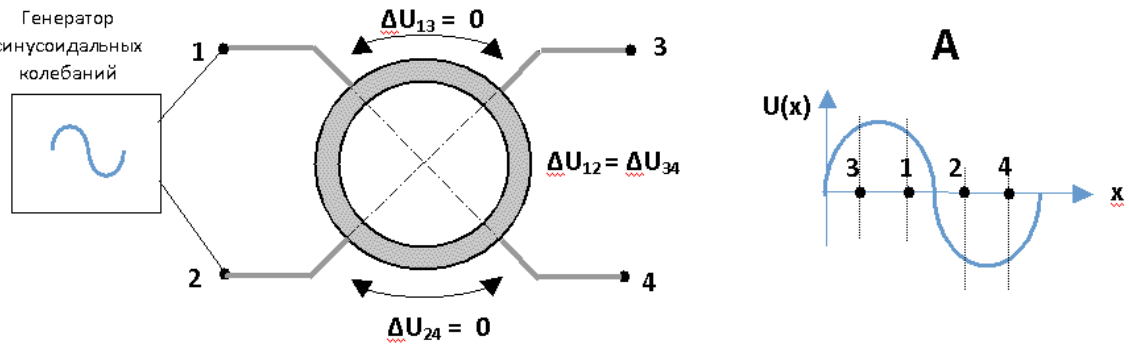


Fig.12. ”Zero - transformer” based on a short-circuited coil with harmonic excitation.

This is possible because the voltage distribution in such a coil along its length is cyclic in nature-Fig. 12A. If the taps 12 or 34 are considered primary, then 13 and 24 will be secondary. And vice versa, due to reversibility. Next, as usual, pulsed excitation and grounding, we connect the load - Fig. 13.

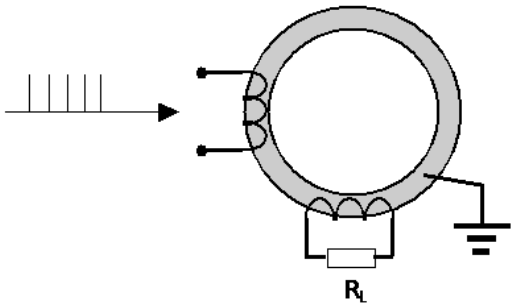


Fig. 13. ”Zero - transformer” with pulsed excitation based on a short-circuited coil.

Now let’s consider the option with a short-circuited cylindrical long coil. We will wind a long cylindrical coil and close its ends, and in the middle we will place the excitation coil. The basis for the” zero - transformer ”is ready - Fig. 14.

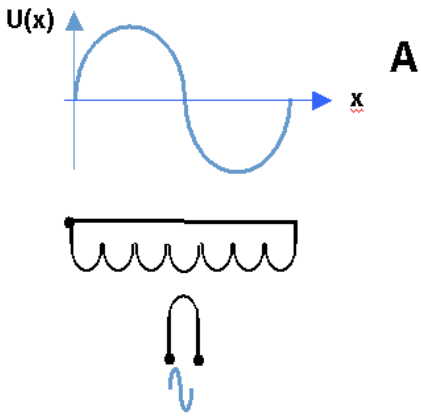


Fig. 14.” Zero-transformer” based on a short-circuited coil with harmonic excitation.

As you can see, there is also a cyclic voltage distribution along the coil here-Fig. 14A. If we place the output coil in the location of the ”hump or depression” of this distribution, organizing pulsed excitation and grounding, then the” zero-transformer ”is ready-Fig. 15.

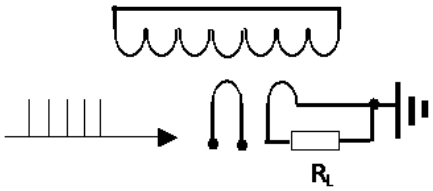


Fig. 15.” Zero-transformer” based on a short-circuited coil with pulsed excitation.

Note that an output coil can be used as an input coil (due to reversibility), then a voltage distribution will occur on a long short-circuited coil, shown in Fig.16A.

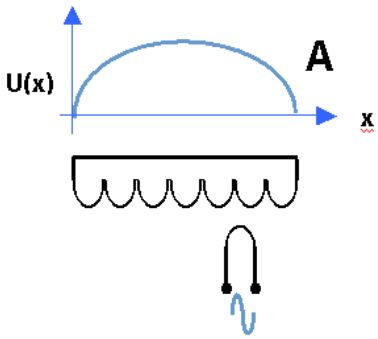


Fig. 16. ”Zero-transformer” with harmonic excitation, on basis on a short - circuited coil.

And in the end, let’s consider a long short-circuited coil with a tap offset relative to the center, and an excitation coil slightly offset relative to the tap. In this case, a cyclic voltage distribution will occur on a long short-circuited coil with harmonic excitation, as shown in Fig. 17A. If it remains cyclical, it will shift to the side. That is, there will be no potential difference between the tap and the shunt, but the potential on them will be different from zero. Exactly what you need for a ”zero-transformer”.

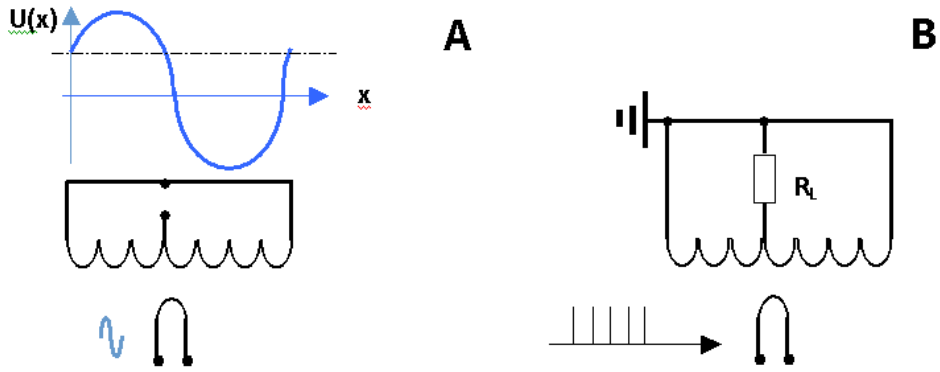


Fig.17. ”Zero - transformer” on the basis of a short-circuited coil with a tap, under harmonic (A) and pulsed excitation (B).

If you add a pulse excitation and the ground, the "zero - transformer" ready - Fig.17(B). This concludes the consideration of options for the manufacture of "zero - transformers" in the short-circuited coils. The principle is the same everywhere. Although, their diversity is not limited to this. Let's consider a different type of "zero-transformers".

"ZERO-TRANSFORMER" ON A CLOSED MAGNETIC CIRCUIT

This is probably the simplest type of "zero-transformer". Its varieties when winding on a toroidal core and when winding on an E - type core are shown in Fig. 17. 1 (A) and (B). From the drawing, everything is clear without explanation.

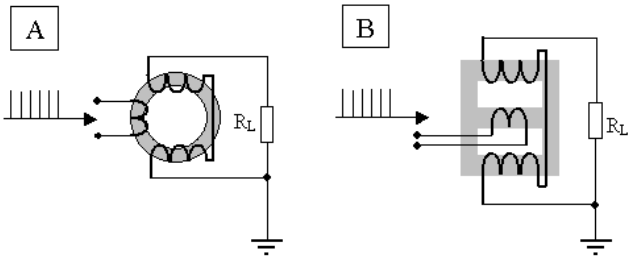


Fig. 17.1. "Zero-transformer" on a closed magnetic circuit. (A) - on the toroidal, (B) - on the E-shaped.

The only thing that can be added is that the variety of "zero - transformers" with a closed magnetic circuit is wider than indicated here. But, we will not go through everything, but let's move on to the" zero - transformer " based on a different principle.

"ZERO-TRANSFORMER" WITH A COMPENSATING PART

If you start to wind the cylindrical coil in one direction, and then change the winding direction and wind the compensating part. So that when the first half of the coil is excited, the total voltage drop across the entire coil is zero. Then, we get a potential at the ends of the coil that differs from zero. Despite the zero voltage drop between its ends. Therefore, we get exactly what is needed for the "zero-transformer" - Fig. 18 (A). If we add pulse excitation and grounding, then the "zero-transformer" is ready - Fig. 18 (B).

Fig.18. "Zero - transformer" with compensating part with harmonic excitation (A) and pulse excitation and the ground (B).

A similar result can be obtained if to wrap the preceding part of the coil on the U - shaped cores (or half rings), leaving between them a gap - Fig.19.(A) under harmonic excitation. And Fig. 19 (B) with pulsed excitation and grounding.

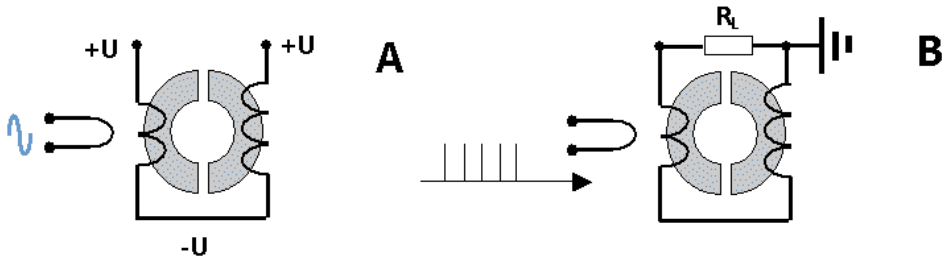


Fig. 19. ”Zero-transformer” with a compensating part when using U-shaped cores or semi-rings with a gap.

The number of turns in the windings and the gap between the cores will have to be selected. Usually the gap is equal to 2-3 notebook sheets, and the number of turns in the windings differs by a dozen percent. But, you can also use other values. The larger the gap, the more the number of turns in the windings will differ.

BIFILAR AS A ” ZERO-TRANSFORMER”

If you wind a cylindrical coil with two wires at the same time, then the same charges are formed at the ends of the wires during excitation, other than zero - Fig.20 (A). This is already a prerequisite for the ”zero - transformer”. If we organize pulse excitation and grounding, we will get another version of the ”zero-transformer” - Fig. 20 (B).

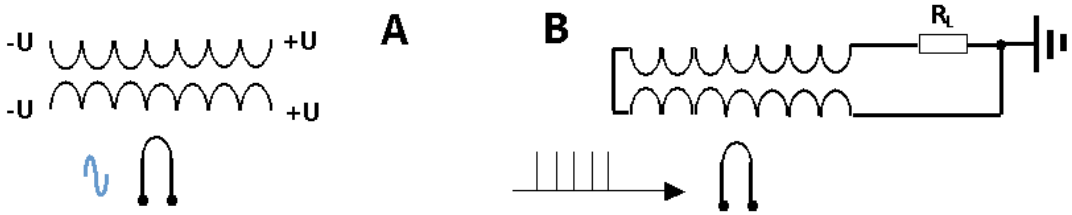


Fig. 20. ”Zero-transformer” based on bifilar winding with harmonic excitation (A), and pulsed excitation and grounding (B).

For such a ”zero - transformer”, the principle of reversibility also applies, which can be used to create various ”twists” on permanent magnets. The design options may be different.

WHAT DOES THE ENERGY IN THE LOAD DEPEND ON?

Since the signal at the output of the ”zero transformer” should be very short pulses, the energy in the load will depend on the frequency of these pulses. The more frequent the pulses, the more energy there is in the load. In addition, the energy will depend on the amplitude of the output pulses, and they, in turn, on the amplitude of the exciting pulses. The higher the amplitude of the exciting pulses, the higher the energy in the load. And of course, it depends on the size of the ”zero-transformer” and the thickness of the wire. The larger the dimensions, the more charges will be separated when exposed to the primary winding. And as a result, there is a lot of energy in the load. Thus, starting with the illustration of the concept of ”potential energy”, we came to the dependence of the power in the load on various parameters.

THE LAW OF CONSERVATION OF ENERGY

As can be seen from the description of the use of potential energy, the law of conservation of energy behaves in a ”strange way”. For the separation of charges, almost no source energy is consumed, but at the same time, potential

energy is added to the load, which depends on the voltage, frequency and size of the "zero transformer". For an"unprepared " reader, this is very unusual. But, what can you do, this is how this World works: potential energy arises simultaneously with the appearance of objects in this world. For example, two magnets or two charges separated in space. This is what the Creator did: the curvature of space generates potential energy without additional costs. That is, the energy comes from "nowhere", and we can say that the energy comes from the surrounding space, or we can say that the energy arises due to a violation of the symmetry of the interaction of the input with the output. One thing is clear, the law of conservation of energy in its modern form does not reflect the entire complexity of the picture of the Universe. Someone will have to refine it. The basis of the modern understanding of conservation laws is the theorems of Emma Noether for different types of symmetry. Where different symmetries are indicated as the reason. And as a consequence of different symmetries, different conservation laws: conservation of momentum, energy, etc. The cause is symmetry, the effect is conservation laws.

THE WORKS OF DONALD SMITH

Donald Smith (now deceased) worked for a long time in the field of using potential energy in electrical devices. At the same time, he said that he was only developing the ideas put forward by Nikola Tesla. Here, for example, is how he described the "zero-transformer" - Fig. 21.

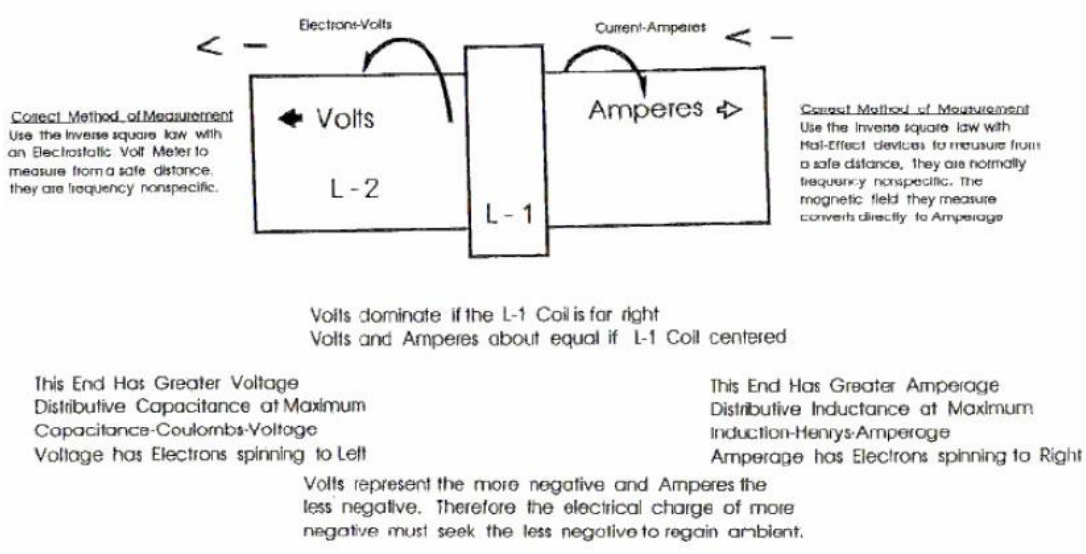


Fig. 21. The description of the "zero - transformer" according to Donald Smith.

"The electrons rotate to the right and create a current. The electrons rotate to the left and create a voltage" - Donald Smith. Here is the explanation! There is not a word about the fact that the winding for the secondary coil is conducted by a wire from the center in different directions. And there is not even a hint that one end of the secondary winding should be grounded!!! But without grounding and pulse excitation (about which there is also no word), there is simply nothing to" catch " here. Therefore, almost no one understands anything. You can understand only in one case: if you already know everything! Or here is another statement by Donald Smith: "An electric coil has zero resistance at resonance". Or in other words: "The voltage drop on the coil at resonance is zero"" That is, it is the coil itself that has zero resistance, and not together with the capacitor, as with sequential resonance. In this case, the ohmic resistance of the coil does not just decrease - it becomes equal to zero. The coil seems to acquire superconducting properties. If you do not know that we are talking about a "zero transformer" and its varieties, then the plausibility of such a statement at first glance seems "very doubtful". And this is an understatement. However, if we introduce the secondary coil of the "zero transformer" into the resonance, then the voltage drop from this resonance on the primary coil will really be zero. And this is quite clear and understandable. But, Donald Smith invents a very specific "zero-transformer" that looks like a Tesla coil and shows that it can be used to multiply energy - Fig.22. The scheme of such a transformer at first glance has nothing to do with a "zero - transformer". It consists of a coil wound in one direction and a tap with a capacitor connected to it. The resistor closes the

coil. That's it! Do you think that you have overlooked the excitation inductor? No, it just doesn't matter for understanding the device.

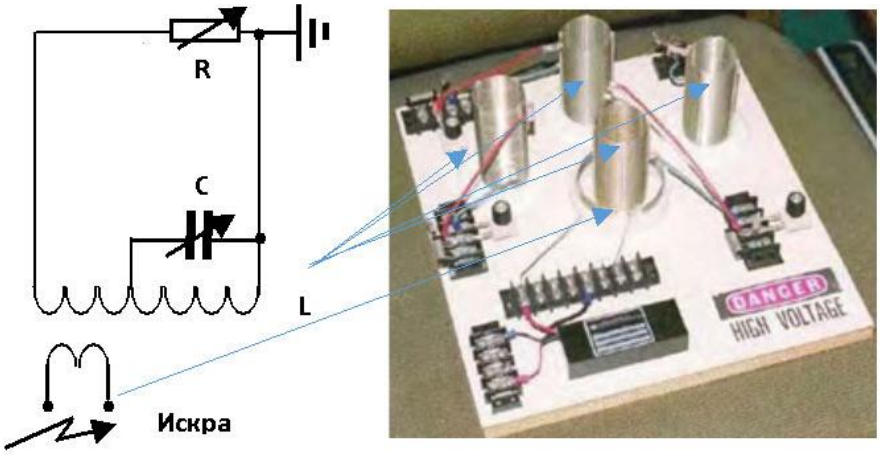


Fig.22. "Zero - transformer" with "superconductivity" according to Donald Smith and his scheme.

The whole point of such a device is to compensate for the EMF induced by the primary coil in the secondary coil with a voltage of the opposite polarity coming from the signal source. Making, thus, the voltage drop at the ends of the secondary coil equal to zero-Fig. 23. This is achieved by selecting the reactance L1 or simply the resistance R, as in the original design.

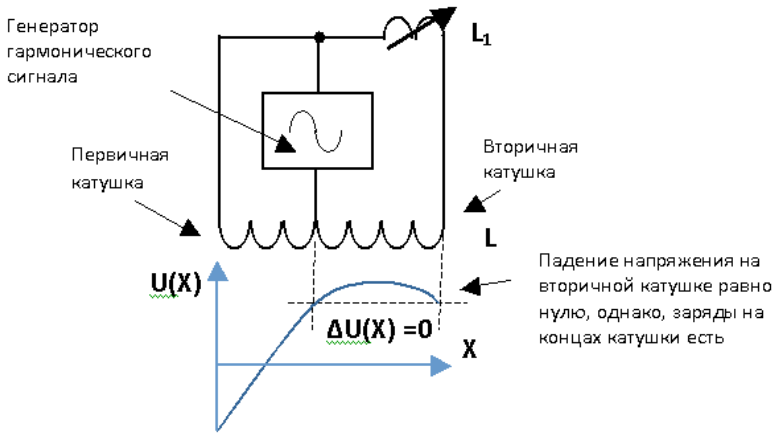


Fig.23. The distribution of the voltage on the Donald Smith coil under harmonic excitation.

At the same time, the charges are separated in the secondary coil with a zero potential difference at the ends. Do you recognize the "zero-transformer"? This is it! If one end of the secondary coil is now grounded and the load is connected, then potential energy can be obtained with pulsed excitation. Everything is as usual. A common inductor for several such coils allows you to "multiply" energy, and the presence of a capacitor and resonance suggests that such a coil is "superconducting" at resonance - Fig.24.

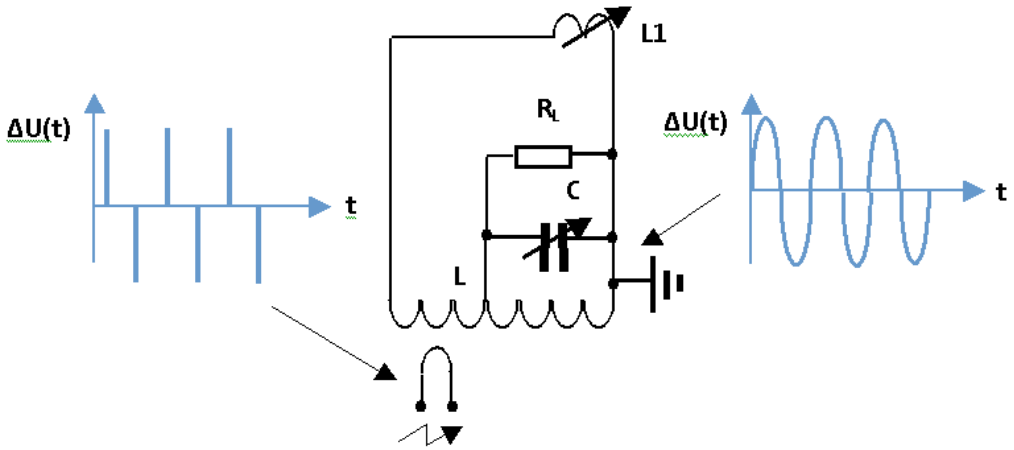


Fig.24. The scheme of the Donald Smith coil with pulsed excitation and grounding.

For concreteness, we can mention that when withdrawing from the middle L, the inductance of the reactance L1=0.61 L, when withdrawing from the quarter L1=0.41 L. However, more accurate values are determined experimentally, as well as for the active resistance as in the original. Any part of the L coil can be used as the primary coil. Both left and right. It is not necessary to re-select the compensating resistance-due to the reversibility of the "zero - transformer". However, if you read the explanations of Donald Smith, then again almost no one understands anything. This is also characteristic of his "explanation" of the use of very short pulses or pulses with steep fronts. "Energy is contained in short pulses or in steep pulse fronts" - Donald Smith. And many people believed it! But short pulses are only needed in order to quickly separate the charges in the conductor - then the compensating charges will not have time to" suck " from the ground and a potential difference will appear at the ends of the secondary winding (for a short time). That's it - there is no energy in short pulses and steep fronts. But, let's leave the " explanations" Donald Smith, who are both about the length of the conductor and about gravity and about something else. They are all on the same level. It is important to note here that the "zero-transformer" can have different implementations. And we'll see what other options Donald Smith tried to implement. The implementations of the "zero transformer" behind a closed magnetic circuit are shown in Fig. 25 and Fig. 26. In Fig. 25, the primary coil is external, and the secondary coil is inside the primary coil. The simplest excitation along the primary winding by discharges of a high-voltage capacitor is used. The variant of Fig. 26 differs only in that the primary coil is wound in the same place as the secondary one. It is difficult to understand from the photo which is primary and which is secondary, due to the reversibility of the "zero - transformer".

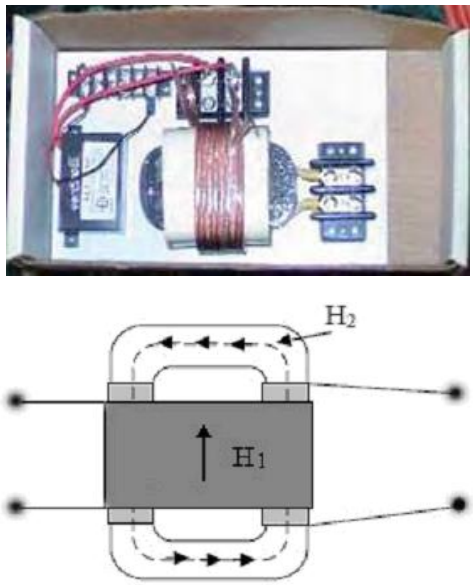


Fig. 25. Implementation of the "zero-transformer" on a closed magnetic circuit.

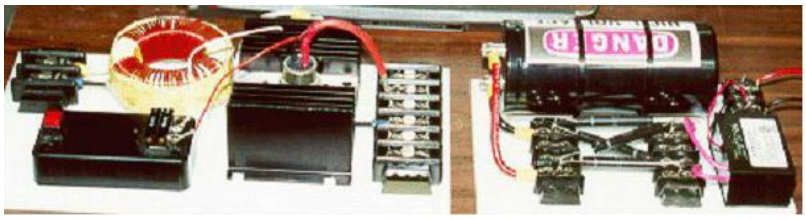


Fig. 26. Implementation of the "zero-transformer" on a closed magnetic circuit.

Figure 27 shows the scheme of Donald Smith's patent based on a short - circuited coil with a tap (7), considered earlier-Figure 17, with the simplest excitation from a capacitor. It is important to note that the tap is not made from the middle of the coil. If if you make a tap from the middle, then the potential on the tap and shunt will be zero. The coil will not suck charges from the grounding-it will not work. The capacitor for excitation is taken of the minimum capacity, so that the excitation pulses go as often as possible. Point (9) shows a smoothing RC circuit so that slow high-voltage diodes "cope" with short pulses of potential energy. There is no chain in the picture, although it is present in the description. I had to add it to the drawing myself. This is not a fundamental point if ultra-fast high-voltage diodes are used in the implementation. There are no special features in this patent yet.

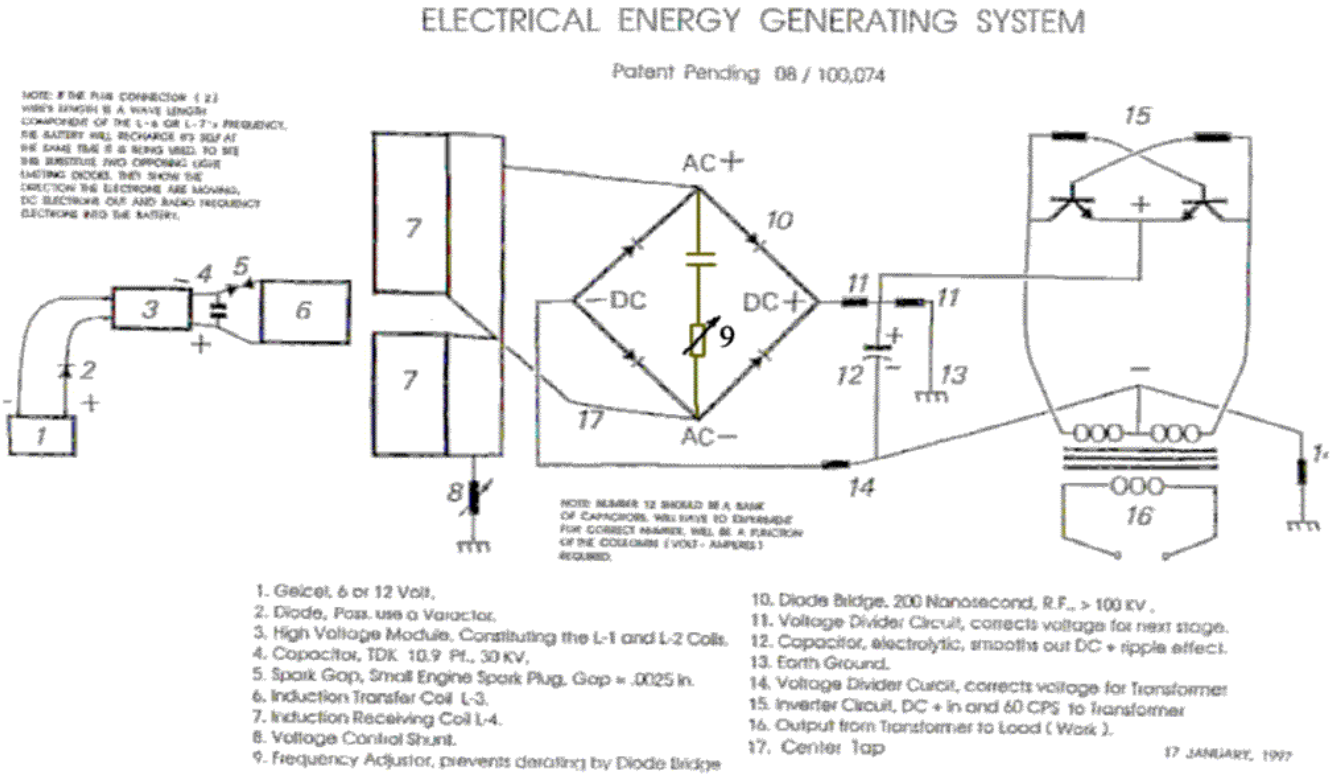


Fig. 27. Scheme of Donald Smith's patent based on a cylindrical short-circuited coil with a tap.

Configure the scheme in Fig. 27 as follows. A sinusoidal voltage is applied to the coil (6) - Fig. 27, controlling the voltage at the input of the diode bridge - it must be equal to zero. To achieve zero, smoothly move the coil (6). At zero, the setting is finished. Then, as usual, pulse excitation and grounding. Figure 28 shows a patent with the same short-circuited coil with a tap Fig.17. But there is no tap itself, it is not used. And the coil is shunted not by a wire, but by a capacitor. But, the basis is still the same idea with a "zero-transformer" based on a short-circuited coil with a tap-Fig. 17. The output signal is removed from an additional coil (6A), placed in the place of the maximum voltage distribution on the coil (7). This coil

(6A) plays the role of a step-down transformer. It is important to note that the excitation coil (6) is not placed in the middle of the short-circuited coil. If it is placed in the middle of the coil (7), then the potential on the shunt will be zero. Therefore, the coil will not "suck" charges from the grounding-it will not work.

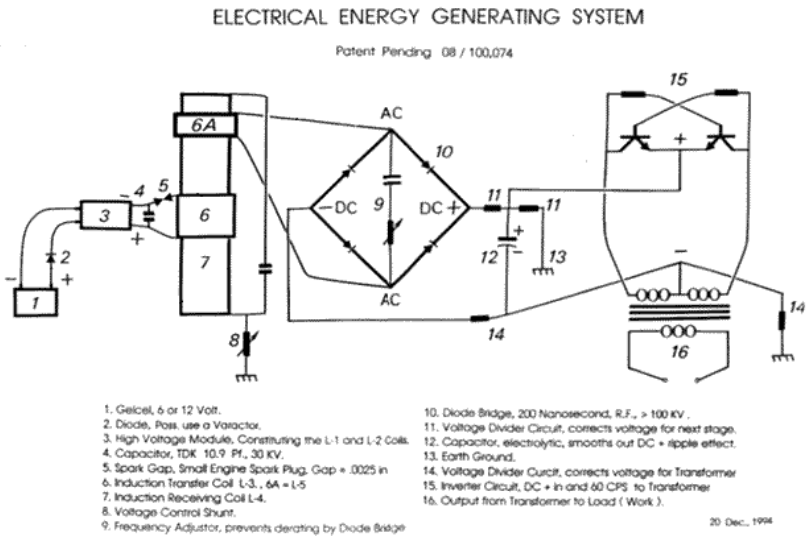


Figure 28. The scheme of Donald Smith's patent based on a short-circuited coil with a tap.

Configure the scheme in Fig. 28 as follows. A sinusoidal voltage is applied to the excitation coil (6) - Fig. 28, controlling the voltage at the output of the coil (6A) - it must be equal to zero. To achieve zero, the coil (6) and (6A) are smoothly moved. At zero, the setup is finished. Then, as usual, pulse excitation and grounding. Here we must pay tribute to Donald Smith, in the drawings for the patents, he observed all the proportions in the arrangement of the coils, as they can be in practice. Everything is as it should be, almost no need to configure it. In addition to various patent schemes based on asymmetric short-circuited cylindrical coils, Donald Smith can find a device based on a short-circuited toroidal coil, discussed earlier in Fig.13. The device itself is shown in Fig.29, where in addition to the previously mentioned coils there is an additional coil. It is possible to create a resonance along the input circuits in order to reduce energy consumption, or to increase the asymmetry between the input and output. Donald Smith also has other devices that readers can find on their own on the Internet. And try to explain their principle of operation on the basis of the knowledge obtained from this work.

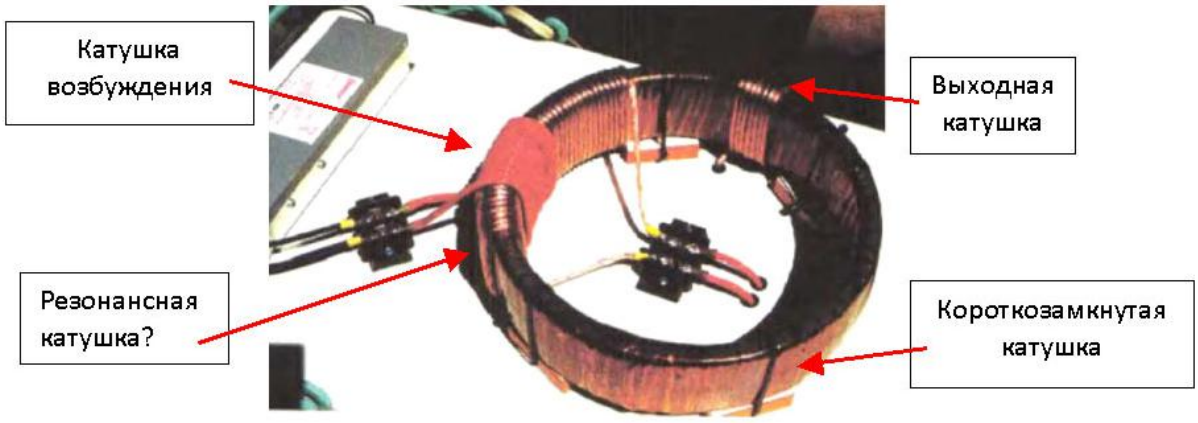


Fig.29. Donald Smith's device based on a short-circuited toroidal coil.

WORKS BY TARIEL KAPANADZE

Tariel Kapanadze is the next generation of researchers following Donald Smith in the use of potential energy (whatever they call this energy). Kapanadze said that the energy in his devices comes from the environment, and not from short pulses or short fronts. This is more accurate than what Donald Smith said. As for grounding, he said that it is a support or a lever that allows this energy to be extracted from the environment. Which, in general, is also more correct compared to Donald Smith, who actually "trolled" interested people. He showed maps of the area where there are a lot of electrons, and he was going to pump these electrons out of the ground, creating his devices. This is not true. As a grounding, you can use any solitary capacitor (a piece of metal) of suitable dimensions. The higher the frequency, the lower the grounding requirements. The task of grounding is to "kill" the potential at one of the terminals of the "zero transformer", in which charges are separated to create potential energy.

Fig. 30." Twister "by Tariel Kapanadze using a three-phase "zero-transformer".

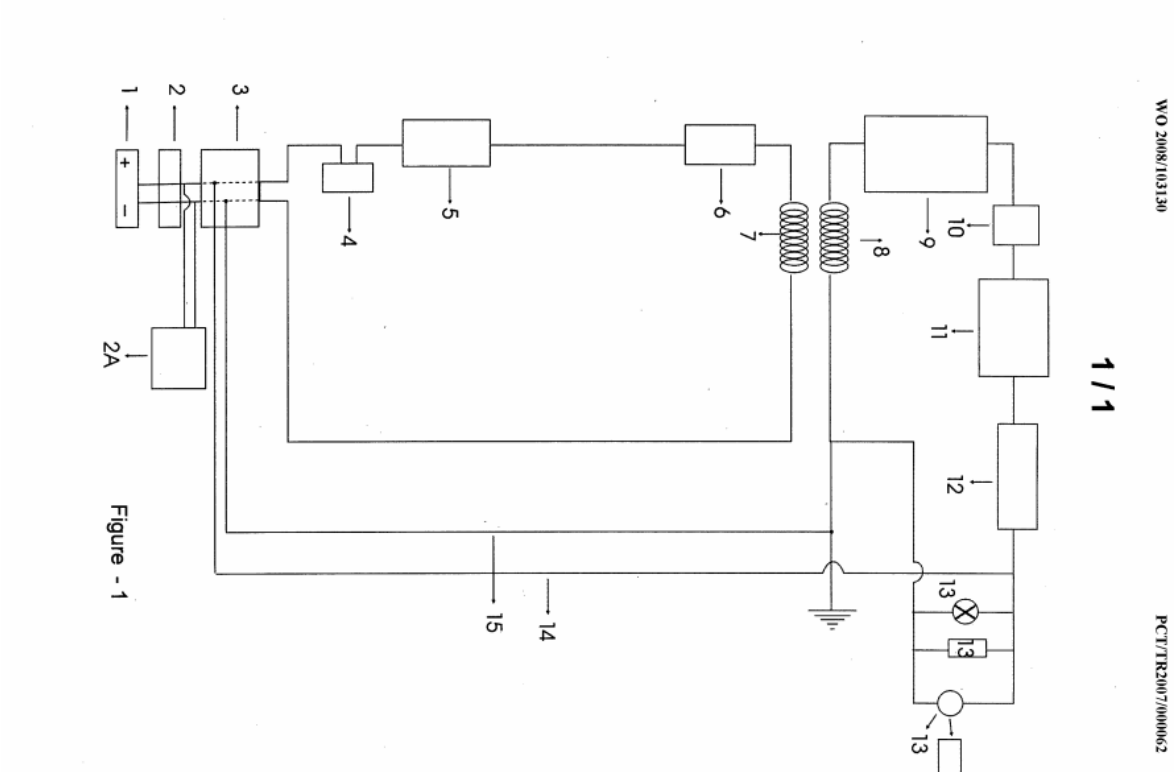


Fig. 31 Patent of Tariel Kapanadze.

THE SIMPLEST EXPERIMENTS

"ZERO TRANSFORMER" WITH A COMPENSATING PART BASED ON FIG.18

Take a polyethylene pipe with an external diameter of 50 mm and wind 20 turns on it with a high-voltage wire. Then we will change the winding direction and wind another 33 turns. The foundation is ready. Let's take a plastic bottle with a slightly larger diameter than the pipe. We will cut it off and wind 11 turns - this is an inductor. The transformer is ready - Fig. 32.

Fig. 32 "Zero-transformer" with a compensating part.

Let's take a signal generator of a special form GSSF G6-27, a two-beam digital oscilloscope (any) and assemble the simplest scheme for experiments - Fig.33.

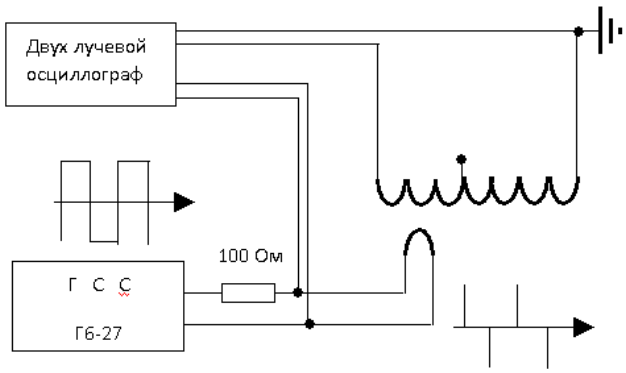


Fig. 33. The scheme of the installation for conducting experiments with a "zero - transformer" with a compensating part.

We will send a sinusoidal signal from the GSS to the inductor. Smoothly moving the inductor, we achieve curves close to zero on the oscilloscope screen from the output of the "zero - transformer". We have achieved curves close to zero - the setup is finished. We switch the GPS to the mode of generating rectangular pulses, for example, the frequency of 100 kHz. And, lo and behold! There were also pulses at the output of the "zero-transformer" - Fig. 34.

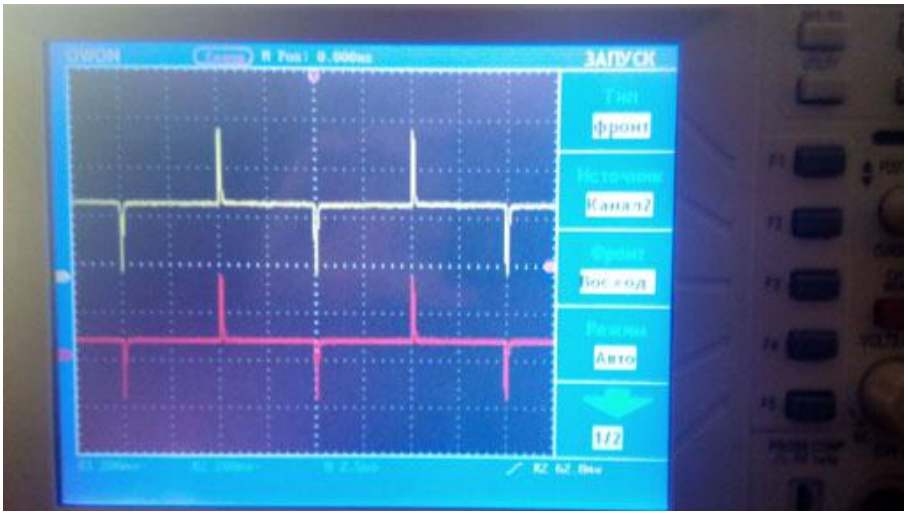


Fig. 34. Pulses on the inductor (yellow) and pulses at the output of the "zero-transformer" (red).

At the same time, the 100 ohm resistor and the inductor inductance performed the role of a differentiating chain. The inductor received not rectangular, but short pulses. It seems that everything worked. Let's move on. We close the ends of the "zero-transformer" and look at the oscillograms - Fig. 35.

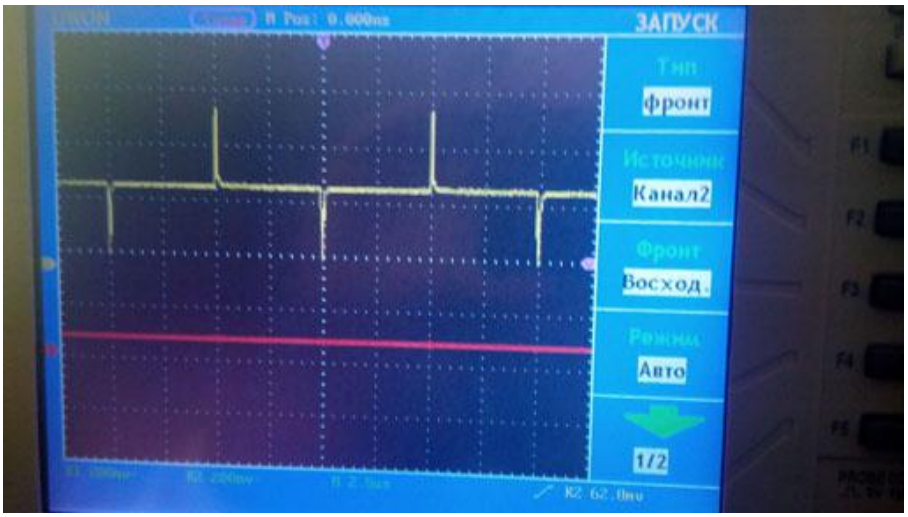


Fig. 35. Oscillograms when the "zero - transformer " is closed, yellow is the inductor, red is the "zero-transformer".

The output of the "zero - transformer" is completely zero, and there were pulses on the inductor, and they remained. It seems that everything worked again. Let's move on. We take a ferrite core made up of rings - Fig. 36, the length corresponding to the entire winding, and insert it inside the winding - Fig. 32.

Fig. 36. A ferrite core made up of rings.

Repeat the setting to zero (if necessary), switch to the pulse mode and look at the waveforms - Fig. 37.

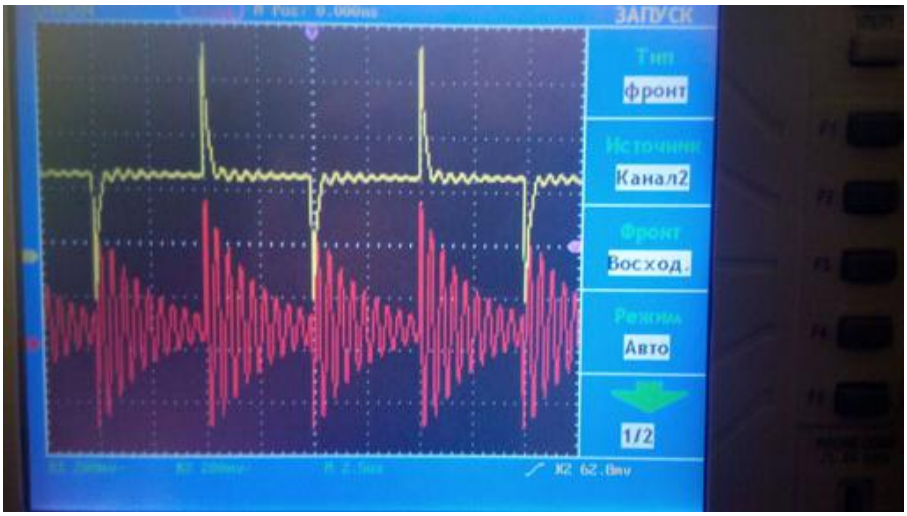


Fig. 37. Waveforms in the presence of a ferrite core.

As we can see, a "ringing" appeared at the output of the "zero - transformer", but it almost does not appear on the inductor. It seems that everything is as it should be again. Let's move on. We close the "zero-transformer", look at the waveforms - Fig. 38.

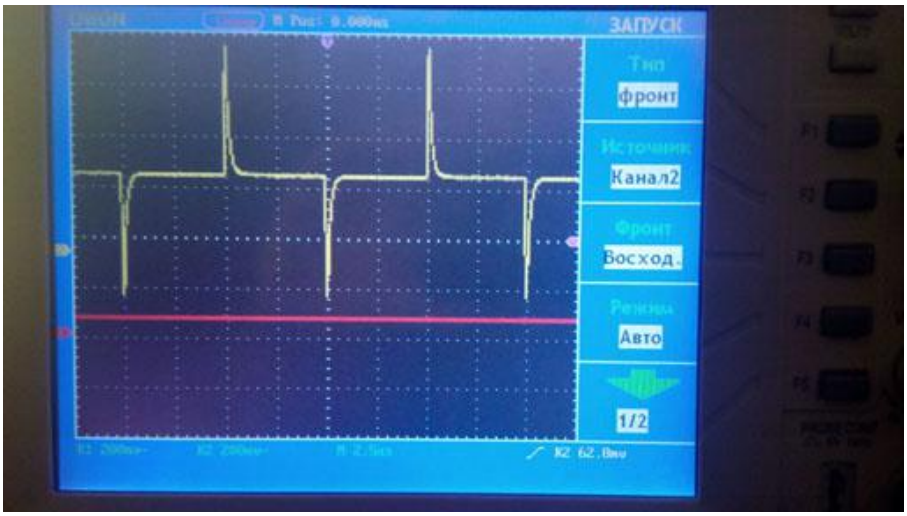


Fig. 38. Waveforms when the "zero - transformer "is closed, yellow-inductor, red - "zero-transformer".

The output of the "zero - transformer" is completely zero, and there were pulses on the inductor, and they remained. It seems that everything worked again. The ferrite core has not made any fundamental changes. Let's move on. We manufacture an inductor of the "like Tesla " type on a polyethylene pipe with a diameter of 110 mm, consisting of 13 turns (not fundamentally). And we get what is shown in Fig. 39.

Fig. 39 "Zero-transformer" with a large-diameter inductor.

We repeat all the settings without ferrite and see what happened - Fig. 40.

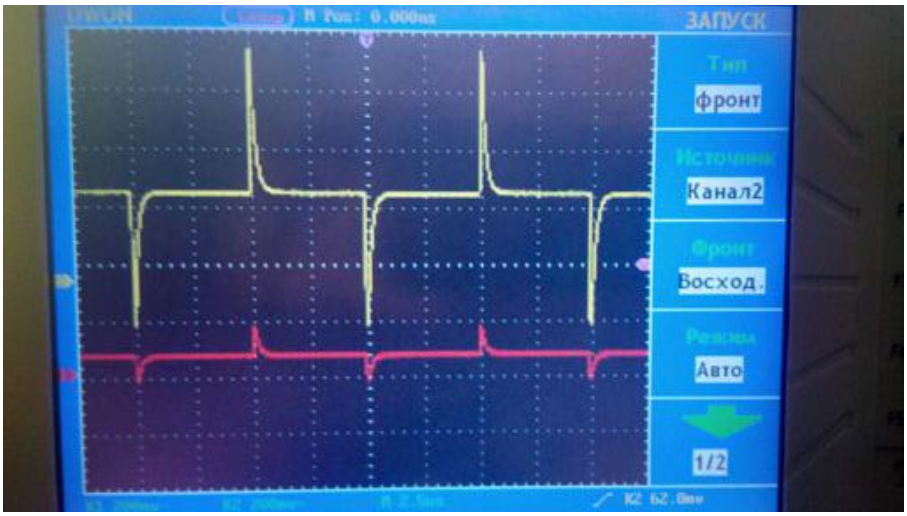


Fig. 40. Waveforms with a large-diameter inductor without ferrite, yellow - inductor, red "zero-transformer".

We insert the ferrite, repeat the settings and see what happened - Fig. 41.

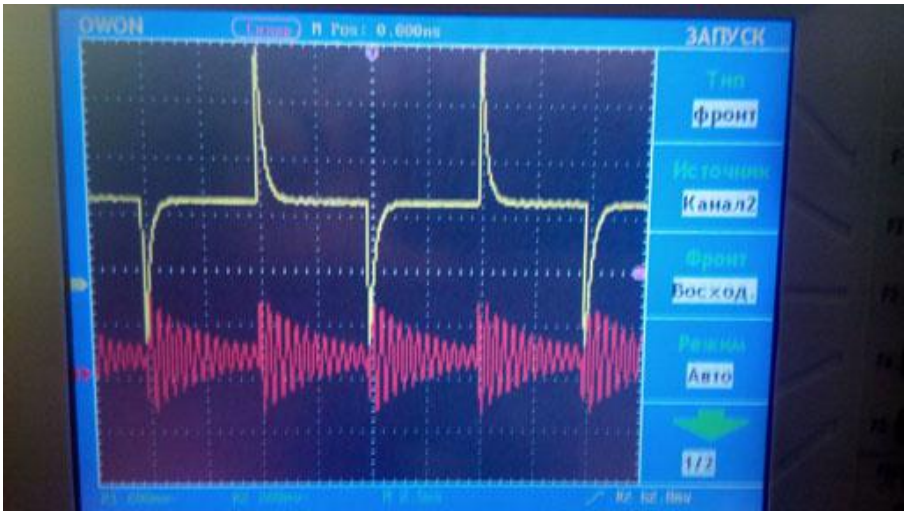


Fig.41. Waveforms with a large - diameter inductor and ferrite, yellow - inductor, red "zero-transformer".

As can be seen from Fig. 40 and Fig. 41, nothing has changed fundamentally. However, due to the worse flow coupling, the amplitude of the pulses at the output fell. Which is to be expected. Next, we close the exit and look. Everything is as before. The output does not affect the input. Even the waveforms are not interesting to give.

GETTING THE FREQUENCY OF 50-60 HZ AT THE OUTPUT.

We will conduct experiments with the same "zero-transformer" shown in Fig. 32. We will assemble the circuit shown in Fig. 42.

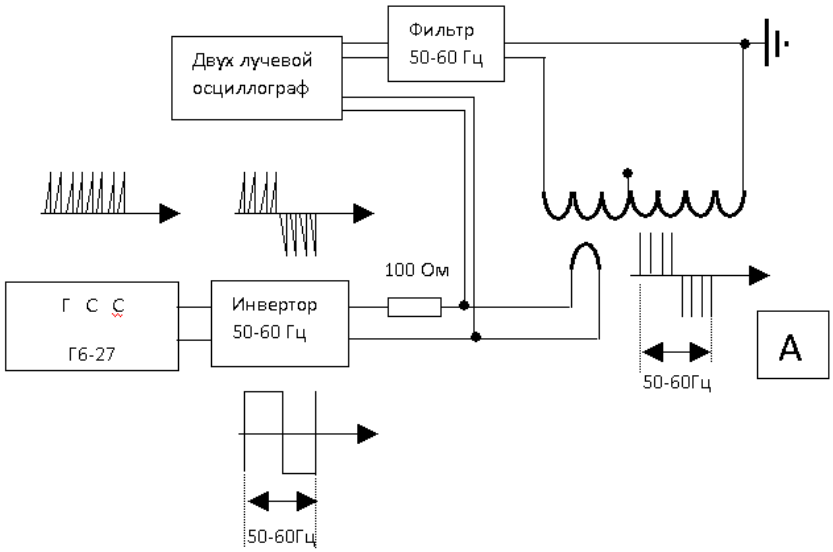


Fig. 42. The circuit for obtaining a frequency of 50-60 Hz at the output.

Its main difference from the scheme of Fig. 33 is the presence of an inverter. The task of the inverter is to change the polarity of the signal with a frequency of 50-60 Hz. In addition,the fundamental difference is the form of the signals used from the GPS. These are no longer rectangular pulses, but triangular pulses with a steep trailing edge. As a result, the pulses shown in Fig. 42 (A) are fed to the inductor winding. There is a low-frequency filter at the output of the circuit, its task is to remove high-frequency pulsations. However, until I soldered the inverter, let's just look at the signals at the output of the GSS and at the output of the "zero-transformer " - Fig.43.

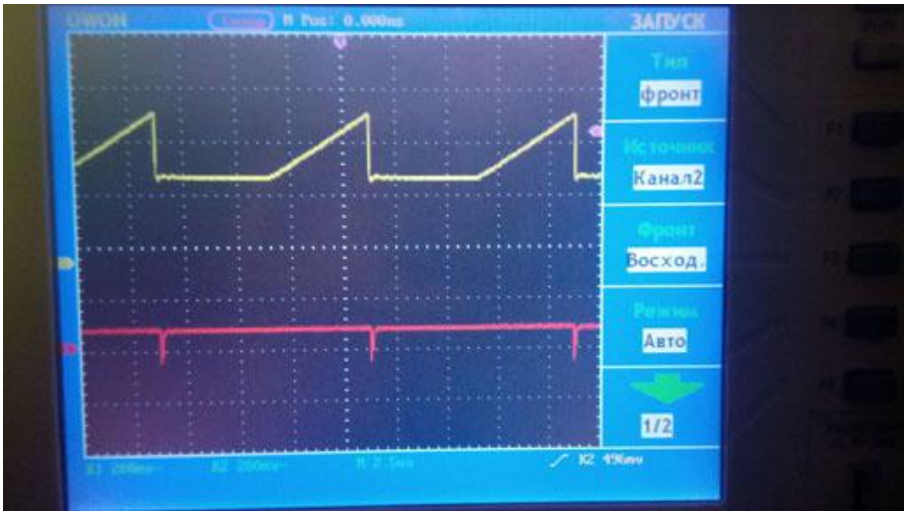


Fig.43. Signals at the output of the GSS (yellow) and at the output of the" zero-transformer" (red).

And also look at the signals on the inductor and again at the output of the "zero-transformer - Fig. 44.

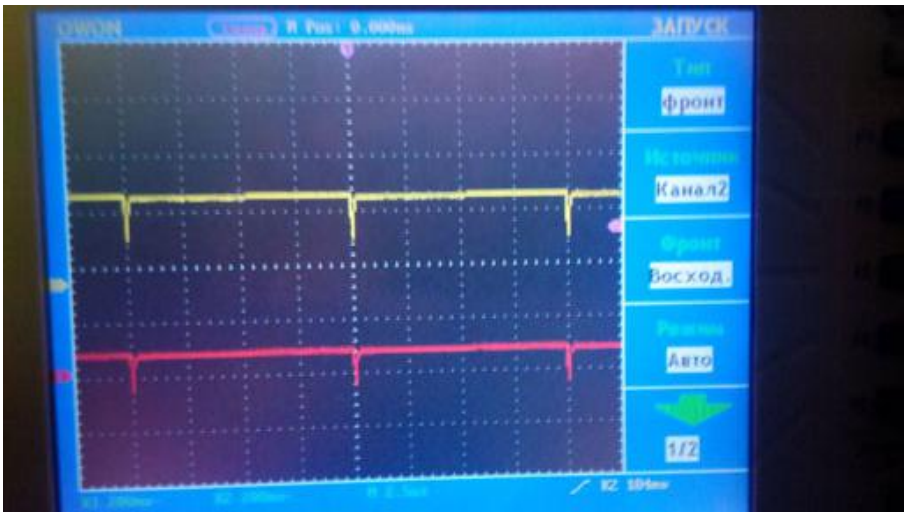


Fig. 44. Signals on the inductor (yellow) and at the output of the "zero-transformer" (red).

As expected, the signals at the output of the "zero-transformer" became in the form of unipolar short pulses. If you solder the inverter, then the output will be packets of pulses with a frequency of 50-60 Hz. Even soldering is not interesting. But the decrease in the amplitude of the pulses is worth noting. This is the fault of the "old man" G6-27. When generating triangular pulses, it generates twice as flat fronts as when generating rectangular pulses. For rectangular pulses, the fronts are about 50 ns, and for triangular ones about 100 ns. Hence the difference after differentiation. Nevertheless, when conducting the simplest experiments, it is possible to do without high voltages and super-short pulses. Pulses with a duration of 50-100 ns and amplitudes from the generator output in the range of 5-10 V are enough to understand and feel the technology described above. Then only an increase in power.

RESONANCE

Using the installation of Fig. 33, we will introduce the output coil of the same "zero - transformer" shown in Fig.32 into resonance.We do not use a ferrite core. We connect a capacitor with a capacity of 750 pf to the coil. We adjust the transformer to resonance. It turns out to be at a frequency of 940 kHz. We look at the waveforms, they are shown in Fig. 45 at a resonant frequency of about 940 kHz, for idling and short circuit.

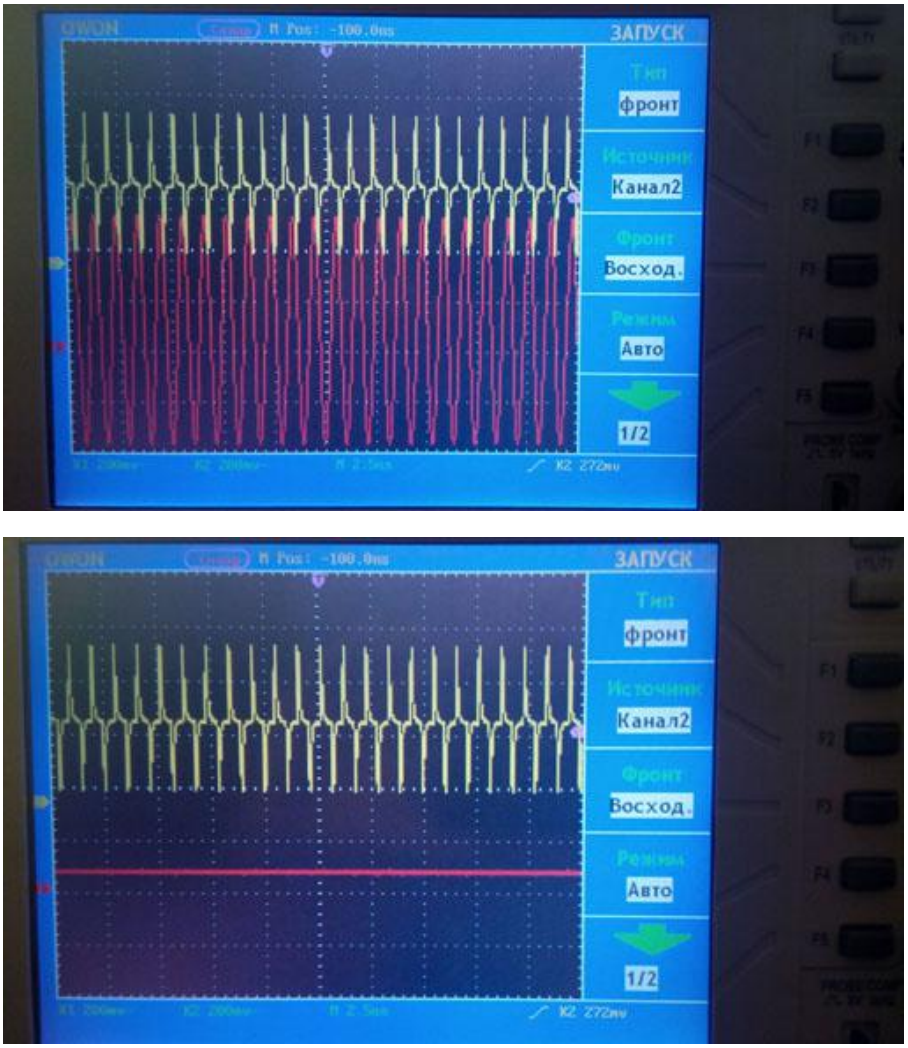
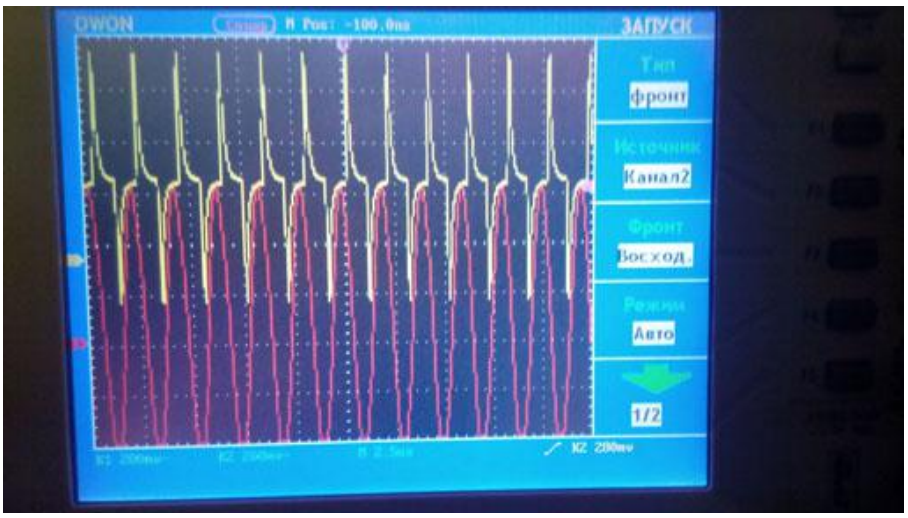


Fig. 45. The resonance of the "zero-transformer" without a ferrite core. When working at idle and short circuit. Yellow-inductor, red "zero-transformer".

As can be seen from Fig.45, harmonic oscillations in the output coil of the "zero-transformer" do not affect the inductor. That is, there are pulses on the inductor, and harmonic oscillations at the output of the transformer. Exactly what it should be. Let's complicate the experiment. Let's add a ferrite core. We do not change the capacitor. We are tuning in to the resonance again. We see that the resonant frequency has dropped to 500 kHz due to the core. It is ok. We look at the waveforms. They are shown in Fig. 46. at idle and at a short circuit of the "zero-transformer".



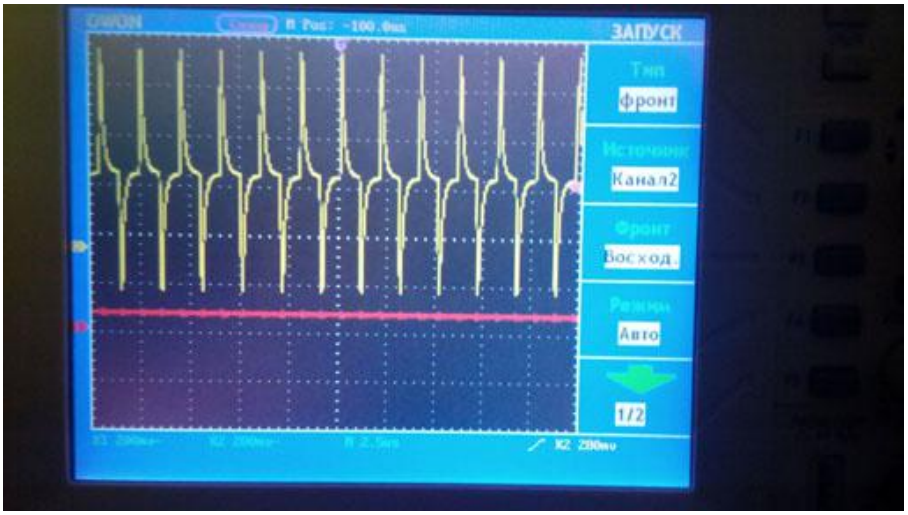


Fig.46. The resonance of the ”zero-transformer” with a ferrite core. When working at idle and short circuit. Yellow-inductor, red ”zero-transformer”.

As can be seen from Fig.46, harmonic oscillations in the output coil of the ”zero-transformer” and in the presence of a ferrite core also do not affect the inductor. As Donald Smith would say, this is the ”superconductivity ” mode. When the voltage drop from harmonic oscillations at the output is not observed at the input. Following this logic, we can take four identical ”zero-transformers” and a large-diameter inductor and repeat Donald Smith’s experiment on energy reproduction-Fig. 22. But we will not do this. The result is predictable - everything will work out. Although the ”zero-transformer” will be used of a different design than that of Donald Smith.

CHECKING THE ORTHOGONALITY OF FIELDS

The very design of various ”zero-transformers” implies that the electromagnetic fields of the input and output coils must be orthogonal (perpendicular). All previous experiments indirectly confirmed this - the output coil does not affect the input coil. However, it would be interesting to put a separate experiment on this topic. To do this, we will assemble the installation shown in Fig. 47. As a” zero - transformer”, we use a variant with a closed magnetic circuit. The inductor of such a transformer is located directly on the magnetic circuit and creates an electromagnetic field located entirely inside the magnetic circuit (as in a conventional transformer). For this reason, the field from the inductor cannot induce an EMF in the detecting coil located outside the transformer. The purpose of the experiment will be to observe the appearance of a signal in the detecting coil when the output coil is grounded. As we know, without grounding the output coil, there should be no signal. We’ll check it out.

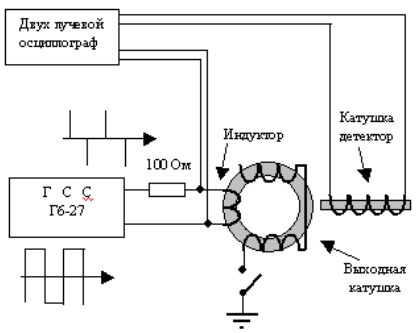


Fig. 47. Installation diagram for checking the orthogonality of fields.

Structurally, the components involved in the experiment are shown in Fig. 48. An inductor of 10 turns, an output coil of

2x50 turns (the winding of the halves is counter), a detecting coil of 18 turns, a ferrite ring of 100x60x14 600NN (all parameters are not fundamental).

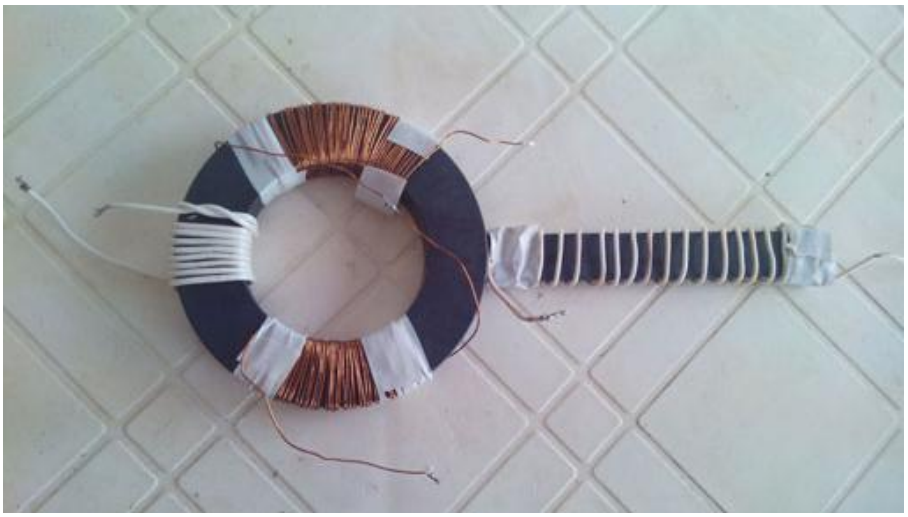


Fig. 48. Constructive execution of the experiment.

At the beginning, we check without grounding. And we see that there is no signal at the output of the detecting coil - the oscillogram is close to zero. We turn on the grounding. And, lo and behold! A signal appeared at the output of the detecting coil. There is an oscillogram! An electromagnetic field appeared outside the closed magnetic circuit. Everything worked exactly as it should. However, let's continue. We know that the "zero-transformer" has the property of reversibility. That is, the inductor and the output coil can in principle be swapped. Therefore, we will conduct the reverse experiment - we will excite a closed electromagnetic field from an inductor located outside the magnetic circuit. To do this, we will assemble the installation shown in Fig.49.

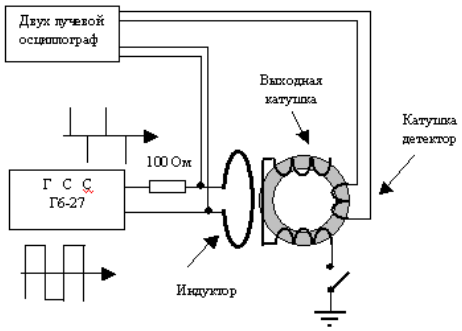


Fig. 49. Installation diagram for checking the orthogonality of fields.

Structurally, the components involved in the experiment are shown in Fig. 50. The inductor is 4 turns, the output coil is 2x50 turns (the winding of the halves is sequential), the detecting coil is 7 turns, the ferrite ring is 80x50x10 600NN (all parameters are not fundamental).

Fig. 50. Constructive execution of the experiment.

Before starting the experiment, we carefully install the inductor relative to the magnetic circuit. So that the oscillogram from the detecting coil is close to zero (without grounding). Next, we turn on the grounding. And, again, a miracle! A signal appeared at the output of the detecting coil. There is an oscillogram! An electromagnetic field appeared inside the closed magnetic circuit. Everything worked out exactly as it should be again. The inductor can not be shielded, I was reinsured in case of capacitive coupling. We will not give the oscillograms of the experiments themselves. Because they are not of interest. I just wanted to give an answer like "yes - no". As a result of experiments, we can say "yes".

The experiments themselves will be interesting in the case of creating various " twists" with the use of magnets, when it is important that the rotation of the magnets does not lead to the induction of EMF in the exciting coil. At the same time, the rotation itself will occur not from the energy of the source, but from the potential energy. This is what Tariel Kapanadze probably used. And before him, Donald Smith said " " I observed this field...". Well, now we have "observed".

LIKE DONALD SMITH

We will make a "zero-transformer" based on the idea of Donald Smith on the reproduction of energy-Fig. 22. However, we will not repeat everything completely. We will make an original "zero-transformer" on a toroidal core. We will wind the single-layer winding on the ferrite ring until it is filled and make a tap in the middle. Between the beginning and the end of the winding, we will connect a compensating inductance wound on a separate ring. We get what is shown in Fig. 51.

Fig. 51. The design of a "zero-transformer" similar to the Donald Smith version when wound on an annular core. Two

side branches are auxiliary.

To conduct the experiment, we will assemble the installation based on Fig. 52.

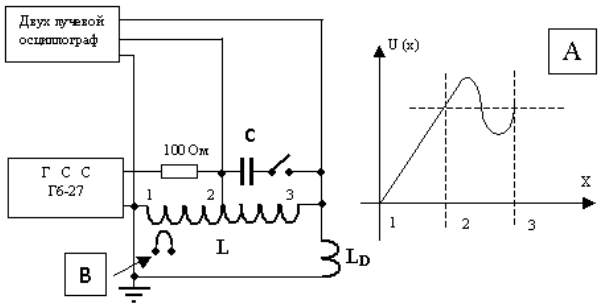


Fig. 52. Scheme of the installation for conducting the experiment.

We will apply a harmonic voltage to the coil L without switching on the resonant capacitor C. We will select the value of the compensating inductance LD, so that the voltage drop on the output half is zero-Fig. 53.

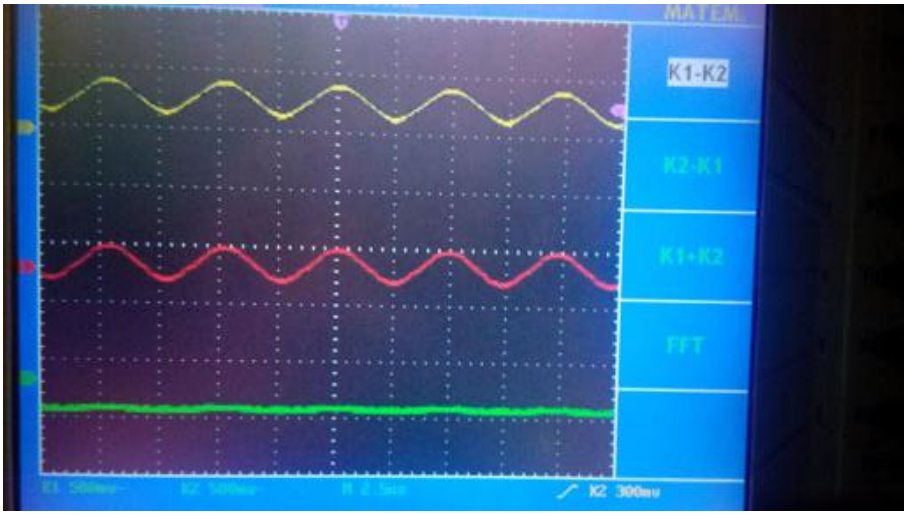


Fig. 53. The voltage drop on the input half is yellow, on the entire coil - red, the voltage difference is green (the second half).

After selection, it turned out that for the inductance of the coil of 14.41 MH, the compensating inductance is 93 MH. Well, what happened, it happened. The only thing worth noting is that this LD/L ratio is only 0.0064. Which is much less than for cylindrical coils.

We go further, we feed a meander from the generator, we look at the oscillogram. A voltage appeared on the output half of the coil-Fig. 54.

Fig. 54. An oscillogram with pulsed excitation without resonance. Yellow is the input half, red is the entire coil, green is the second half.

However, instead of short pulses, small pulsations appeared on the entire coil. As a result, they appeared on the second half. This is the effect of parasitic capacitances, in particular the input capacitance of the oscilloscope. But, interestingly, the pulsations almost did not show up on the input half in any way. This is how the "zero - transformer " should behave. We turn to the resonance.

We connect a resonant capacitor of 0.01 uf, and at a resonance frequency of 200 kHz we look at the resulting oscillograms Fig. 55.

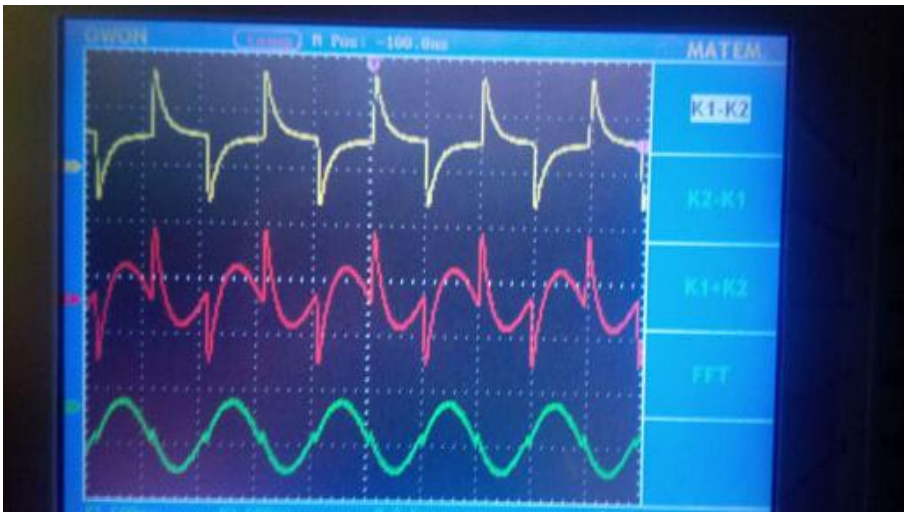


Fig. 55. Waveforms with pulsed excitation and resonance. Yellow - the input half, red - the entire coil, green - the second half.

The result is expected. Despite the fact that harmonic oscillations appeared on the output half, the same pulses appeared on the input half of the coil. This is exactly how the "zero-transformer" should work. Everything was confirmed. Let's move on. We short-circuit the second half of the coil and look at the oscillograms-Fig. 56.

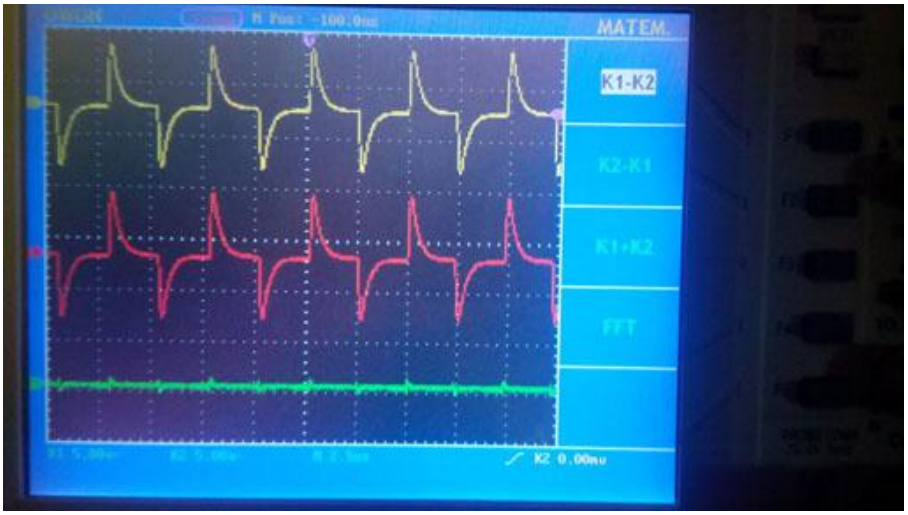


Fig. 56. Waveforms with pulsed excitation and short-circuited second half. Yellow - the input half, red - the entire coil, green - the second half.

The result is again expected. The input pulses remained the same as they were, despite the shorted second half. This is to be expected from the "zero-transformer".

Everything works. However, there is a feature. This zero transformer has a voltage distribution along the coil different from the Donald Smith voltage distribution shown earlier in Fig. 23. Here the voltage distribution will correspond to Fig. 52 (A).

To make sure of this, two side "service" taps were made on the coil for experiments. There is such a difference because the electromagnetic field from the first half affects the second half from both sides (the ring core). Unlike the version of Donald Smith, where the impact on the second half is only from one side. This was clear before the experiments, but I wanted to check it out.

Thus, the considered "zero-transformer" is not a copy of the version used by Donald Smith. It is original. But, you can say "like Donald Smith". Note also that an inductor was not used in the experiments, since its use is not fundamental. If it is used, then its place on the input half of the coil will not be in the middle of the half, but at a quarter of the length - Fig. 51(B) and Fig.52(B). This position is determined by the voltage distribution shown in Fig. 52 (A) and the reversibility property. But, this is true only when the tap is made from the middle.

If a non-median tap is used to create a transformer, then the position of the inductor will be different - in accordance with the resulting voltage distribution on the coil. So that the harmonic oscillations of the output create a zero potential difference at the input.

CONCLUSION

The basis for obtaining potential energy in the load is the separation of charges in the secondary winding of the transformer when it is idling. At the same time, energy from the source is practically not consumed. The potential difference at the ends of such a transformer should be equal to zero, and the potential value itself is different from zero. Such transformers are called "zero-transformers". It is pointless to use them in ordinary electrical engineering - the result is zero. In order for the potential energy to be in the load, it is necessary to pulse excitation and ground the output winding of the "zero-transformer". The "skew" of the potentials in the output winding that occurs due to grounding leads to the fact that the potential energy is in the load.

The signals at the output of the "zero-transformer" are very short pulses. The frequency of these pulses, the amplitude and the size of the "zero-transformer" will determine the energy in the load. The more - the more.

At the moment, there are many patented and non-patented designs of "zero-transformers". But, they all use the above principle.

Potential energy appears in space at the moment of the appearance of objects separated in this space: masses, magnets, charges. Before the appearance of spaced objects in this World, there is no potential energy. Therefore, it is impossible to say that there is "full of" energy around us. There is no energy, it is zero. In the "zero-transformer", it appears only at the moment of charge separation. No energy is required from the source to separate the charges, the transformer is idling.

The law of conservation, in the form that exists at the moment, does not reflect the fact that energy costs are not required to create (arise) potential energy. Therefore, the consideration of the results of the operation of devices similar to those indicated in this work may cause "bewilderment" from the point of view of academic science.
