New Energy Technologies

Magazine

Scientific news on advanced propulsion systems for aerospace industry and new energy technologies

Issue #4 (23) 2005

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Please note that publications in 2006 are not planned.

A role of alternative energy in the development of Russia

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Previously, many thoughts have been expressed about the special position of Russia in the world economic system, which is determined by a number of objective factors, for example, by the rough Russian climate. In the famous book "Why Russia is not America", its author, A.P. Parshev, shows in detail that there will be no foreign investments into Russian production because development of any production in Russia is not competitive, due to comparatively big costs of construction and energy carriers. It is obvious that, in the modern world, capital can be easily moved to places where production expenses are minimal and economic efficiency is maximal. For example, Parshev showed that the prime cost of oil production is less by a few times in Kuwait than in Russia, though we have oil. We have oil in Siberia, but it is easier to produce wood in area of Amazon, which is never covered with ice. Coal is produced by open-cut method in Australia and so on. Discussing prospects of domestic economy, it is possible to suppose that, if Russia will enter the world economic system, no profitable productions will be left there and its economy will be destroyed. Parshev sees the solution in full isolation of the Russian market from the international one and in prohibition to export capital, i.e. everything, which is used for production.

Such a course of events, in my opinion, is already impossible and inadvisable, if the aim is development of Russia, i.e. strengthening of economics, defensive capacity and improvement of living standards. Let us find another solution.

Imagine that commercialization of alternative energy has been carried out and Russian producers can freely purchase no-fuel electric power stations produced commercially by factories. Let us suppose that costs of such systems will be equal to modern diesel power stations, i.e. about 500 US dollars per one kW of the startup power. Thus, a small production can buy its own electric power station with a power of 200 kW for about 100,000 US dollars. The station's resource is limited because deterioration of its mechanical parts occurs. It is possible to admit that the station will not have to be changed or thoroughly repaired for 10 years. According to the formula, we obtain a prime cost of energy produced by this station: we divide 100,000 $ by 10 years, which is operational costs of about 1 dollar per hour. With a full load of 200 kW, we obtain a prime cost of a kW/hour of this electric power station equal to 0.5 cents, without taking into account personnel expenses and other operational costs. Of course, the station can work without repairs for more than 10 years and real prime cost will be even less.

Another advantage of the use of alternative energy is its autonomy. Energy can be produced right where it is used. Transmission facilities are not necessary, which lowers its cost, too.

A question about competition on the market appears. Do workers of oil production and other companies have a reason to worry about fuel energy? They do have a ground to think seriously, but the reason is not new technologies. It is

the fact that prime cost of oil increases while its resources come to their end. In the future, oil will be used only for production of plastic and other synthetic materials, not as fuel. But demand for the products of oil processing will not decrease soon. Even after wide introduction of alternative energy, such as, for example, full change of atomic, gas, coal and other fuel electric power stations to systems of new generation, which will happen in about 50 years, owners of cars will still form a big market though growth of petrol costs makes transport developers think about alternative engines. In their initial state of introduction, new alternative energy technologies can compete only with producers of diesel power stations, because users of these products will obviously prefer independence on fuel supply, even if the cost of the new stations will be higher than the cost of diesel ones.

So, taking into account special features of national economy based on oil export, development and wide introduction of alternative energy is fundamentally, vitally important for Russia.

MY INVENTION OF THE ATOMIC HYDROGEN FURNACE

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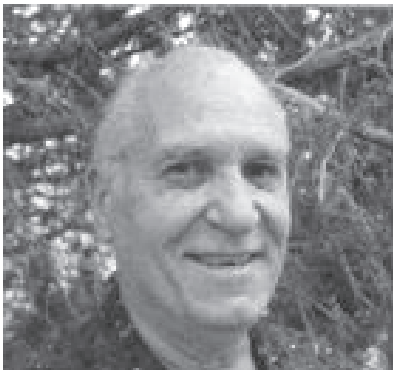
William R. Lyne

From: William Lyne
To: Alexander Frolov

Dear Alexander,

I am glad to hear from you. I think your publication is very valuable for the future of mankind. I see that there is a lot of creativity blossoming in Russia among its many talented scientists.

As I state in my last book, Occult Science Dictatorship, the plans for the Lyne Atomic Hydrogen Furnace were plagiarized and copied "verbatim" by a company called DW Energy Research, LLC, of Colorado Springs, Colorado in U.S. patent #6,113,065, called "Liquid Gasification Process", claiming an energy amplification of 1.9. This fact was published in Infinite Energy magazine, Vol. 7, Issue 38, 2001. This patent would probably be invalid since an inventor must swear an oath that they have no knowledge of the invention from anyone else prior to application. This was, like the idea of "Moller", copied from my book. The chapter from my book was also plagiarized by a Dr. Hans Petermann who lives in Palm Springs, California. He removed my name and inserted his on my furnace design and presented it to several California cities as a solution to the "energy crunch". Petermann had actually stolen a copy of my manuscript from my house prior to publication along with an original illustration which I had to do over.

The idea may be too far ahead of its time in this country. There is so much dishonesty with the oil corporations which have too much influence on the science and

development here. I fear that the same kind of bad influence may develop in Russia as the petroleum resources are exported and become more important to the economy. The oil companies do not want any serious competition for energy needs until the oil resources are reduced to the point of no longer being feasible. Here in America we have more petroleum and gas than we will ever use. The Rockefeller interests have obtained suppression of domestic production of these resources so that they can continue to exercise their monopoly in oil imports. These same interests have been the main stumbling block to Russia's exploitation of its massive petroleum resources, which are probably greater than anywhere in the world. I believe the war in Iraq was specifically initiated by George Bush to cut off the deal which Russia had with Iraq.

Moller simply expanded on the information on Langmuir, but the facts remain that Langmuir did not invent the Atomic Hydrogen Furnace, I did. Langmuir did not conceive the "circuitous" process using the same hydrogen, over and over, I did. And Langmuir did not conceive of the process as being over-unity. I did. And I made all this "public domain", not Moller, although that does not mean that Moller was entitled to plagiarize my book and design as he did. The furnace should be labeled the "Lyne Atomic Hydrogen Furnace". Moller says this is not important, so why does he not remove his name and place mine where it belongs? Does he believe in the theft of intellectual property?

I couldn't help but notice that Moller is connected to Naudin who is apparently connected to Jacques Valee. Valee has a motive for creating problems for me. He threatened to sue me for calling him a CIA asset and the truth is, there is no way he could not be a CIA asset since the UFO project he worked for - Project Blue Book - was a CIA project.

My anger with Moller aside, I would like to see the article from 2001 on the Russian Academy of Science discovery which was announced in July, 2001. This announcement seemed to be eclipsed by the 9/11 attack a little over a month later. I have wondered even if the attack was not for the purpose of obliterating this discovery. I have also expected the petroleum interests in Russia to suppress the discovery so I don't expect to hear about it ever again. I had a similar design which was stolen from my house in 1978, along with the plans for a patent application for a new type industrial process and solarvoltaic cell, the application of patent application being filed 10 days after the theft. They did not patent the part of my design which involved the use of pure silica sand, mixed with dopants, sprinkled on an electrically conductive surface and sintered with microwaves, but the patent did include the addition of dopants with hydrofluoric acid vapor in a microwave chamber in a vacuum. The process worked very well, increased the efficiency of solarvoltaic cells from about 12-14% to 25%. The patent was purchased by ARCO and is a leading technology in solarvoltaics.

The invention announced by the Russian Academy of Sciences, Volgograd, was very similar so maybe I was really onto something. At that time, I had some mining claims which had silica sand which is 97% pure, the 3% "impurities" being grains of precious metal which could be removed by merely washing the sand with water. I disposed of those claims because there were too many criminals coming from all directions who believed that I had a "gold mine". I was afraid that the criminals would murder me and they actually tried.

I may get further interested in the AH process and develop something. There are several alternate ways to produce the AH as I listed in my book.

I'm looking forward to receiving your CD. The one copy of New Energy Technologies which I have is full of interesting possibilities although it has usually been my method to pursue things which occurred to my own mind. Naturally, there are many cross-over technologies which are very

interesting. I usually get my ideas by reading about certain processes and the ideas of new applications naturally are suggested in my mind. I often see free energy processes hidden in certain chemical processes, for example, which seem to have evaded those who have written about them.

All the best,
William Lyne

I first learned of the atomic hydrogen welding process in a 1963 industrial processes class at Sam Houston State University, Huntsville, Texas. The process was based on the 1912 discovery by Irving Langmuir of atomic hydrogen dissociation and recombination, followed by his invention of the atomic hydrogen blowtorch. This welding process was already considered obsolete by 1963. It struck me that this valuable process had become neglected for no good reason and I immediately considered its feasibility for a type of furnace.

Around 1976 I found that the blowtorch had been used by German precious metals refiners to reduce platinum metals compounds to the metallic state using a copper crucible which was cooled with water from the bottom. While this kept the copper crucible from melting (ca. 3500K), it also occurred to me that a lot of water was being heated, reinforcing my furnace idea. I also conceived of using the same hydrogen "circuitously"—over and over—since it was unnecessary to combust the hydrogen to produce the heat. In fact, the complete exclusion of oxygen is ideal for the dissociation process. Water or other heat exchange fluid could prevent melting of the reaction chamber and carry the heat away as produced and used to perform useful work, especially heating.

Contrary to what Irving Langmuir and the relativists said, I intuitively sensed that more energy was produced by the process than was required to dissociate the hydrogen. Langmuir believed that all heat produced was absorbed by the hydrogen during dissociation, while I believe that most of the heat is converted from radiant energy in space.

My conception was based partly on the fact that the total wattage required to run an atomic hydrogen welder appeared to be less than that required to run a comparable arc welder for similar jobs. While some of this reduction in electrical consumption could be attributed to the heat being more concentrated, I didn't believe that this was enough to account for such a significant drop in electrical consumption. After all, a conventional welding arc is not widely dispersed either. The same kind of reduction is found with related plasma arc welders.

I also reasoned that, if it is true that the energy from combusted hydrogen produced by electrolysis is equal to the energy required to electrolyze it—as Langmuir and the relativists insisted—then the heat of recombined atomic hydrogen produced directly by hydrolysis is 100% "free energy", especially since the hydrogen can subsequently be combusted in air to recover the energy of hydrolysis.

Information obtained in my research (OCCULT ETHER PHYSICS, Chapter VI, Free Energy Massacre: The Atomic Hydrogen Process, 1996, Wm. Lyne, Creatopia Productions) indicated that the heat produced (109 kcal/gram mole) was 1058 times as great as the heat required to dissociate diatomic hydrogen (103 cal/gram mole) as stated in the Norton Encyclopedia of Science, 1976, 5th Ed.

In 1981, I built and tested an atomic hydrogen blowtorch. Initially I produced hydrogen from hydrolysis but later rented a cylinder of compressed hydrogen to test my torch and to perform some metallurgical experiments.

In 1996, I completed the design for the Lyne Atomic Hydrogen Furnace. In 1997, the first edition of Occult Ether Physics was issued. Some mathematical errors in the first edition were corrected with an inserted "errata" page and in 1998 the second edition corrected these errors.

In 1999, I received an order from a Greek Address for a copy of Occult Ether Physics from a Nikolas Moller who resided in Cyprus. I was astounded in 2001 to discover that Moller had plagiarized and looted my furnace design and Chapter VI and claimed it was "his". He called it the "Moller Atomic Hydrogen Generator" using my original design verbatim. He had merely removed my name and expanded on what I had said about Langmuir—without any significant difference—yet deleted many important points that I had made, yet in many places used my words verbatim. Langmuir did not invent the atomic hydrogen furnace, I did. I was also first to conceive of the process as "over unity" and to use the hydrogen "circuitously".

While there are many instances in this world where dishonest people steal the ideas of others and claim them as their own, to build themselves up to be something they are not, I was amazed that Moller actually believed that he could get away with it without being exposed as the fraud he is. He apparently has succeeded in fooling a number of unsuspecting and gullible people and in depriving me of the credit which is all mine. Moller is the kind of criminal which we here in America call a "con-artist".

I am both an inventor and a creatologist. It is my belief that the most important attributes of a creative inventor are courage, independence, originality, stubbornness and an inclination to challenge existing standard accepted theories. An idea thief inherently lacks these attributes and cannot invent anything but mayhem. As we may view Nikolas Moller's future, it is probable that anything else he may claim to have "invented" has been stolen from others. In Occult Ether Physics I placed my atomic hydrogen furnace design directly into the public domain for free use and development, but nowhere did I give permission for others to claim credit for originating my ideas, concepts, writings, discoveries or inventions. Improvements, if any, on my furnace should have such titles as "Improvements on the Lyne Atomic Hydrogen Furnace".

U.S. patent laws are to carry out the purpose stated in our constitution to transfer technology from inventors to the public. A patent protection is extended to induce this process. I sidestepped the patent process and gave my work directly to the world to speed up the process. That was nine years ago.

I believe my furnace has the capability to generate power to drive steam turbines, heat buildings, generate electricity and to power vehicles of all kinds.

Editor: Further to this, we would like to introduce some quotes from William Lyne's book "Occult Ether Physics" to our readers.

William R. LYNE

Part of Chapter VI: FREE ENERGY MASSACRE; The Atomic Hydrogen Process. 1996

Realistically, the atomic hydrogen reaction can only he satisfactorily explained by reference to, construction of, or re construction of, an ether theory. While it may be arguable that the "binding energy" between the two atoms of the molecule somehow 'includes' this energy in some undefined and mysterious way, this argument actually supports an ether theory, because the binding energy must somehow be exchanged with the energy which is released when the molecule forms, consistent with the equal and opposite reaction rule.

The atomic hydrogen reaction first came to my attention in 1964, when I was studying industrial processes at Sam Houston State University, in Huntsville, Texas, the year after taking an introductory course in college physics. While reviewing various welding processes in a textbook, my eyes fixed on an older process called "atomic hydrogen welding". By that time, the process was already

considered "obsolete". To me, the process seemed valuable, not only because it produces such high temperatures above 3400' F. enough to melt tungsten the highest temperatures producible by man but is also "self shielding", and can be used to weld diverse metals, often without flux, with a concentrated flame producing little heat distortion, when welding thin metal. In the process, 'normal' diatomic H_2, is shot through an electric arc which dissociates it into "atomic" hydrogen, H_1. This atomic hydrogen recombines at the (welded) metal surface, producing the very high heat. Though the process interested me then, and always has, I have never seen an atomic hydrogen welding unit for sale, for the 31 years hence. Industry's obvious excuse for laying the valuable process aside was that it had been 'replaced' by 'better' processes, such as MIG welding, though they rarely mention "plasma arc welding", which has also almost disappeared from the market. Since plasma arc welding is merely an extension of the atomic hydrogen process, using a specially redesigned torch, the 'mysterious' reasons are undoubtedly the same.

The process simmered in the inner recesses of my mind for a few years until 1976, when I rekindled my interest in the process for possible use in welding stainless steel and reducing and fusing platinum metal compounds, because hydrogen reduces such compounds (which must also be shielded from oxygen) to metals. The atomic hydrogen process does not rely upon the combustion of hydrogen with oxygen in the air, but, upon the "atomic" energy released when atomic hydrogen recombines to form the 'normal', diatomic hydrogen. I still had some unanswered questions, since the various welding data at my disposal failed to mention sufficient specific details. If Nikola Tesla was right, then I am right, that the energy comes from the ether.

In the atomic hydrogen process, hydrogen is not really a "fuel", but rather a "medium" used in the extraction of and conversion of energy from the ether, by

transforming invisible radiation and electrical energy into infrared (heat) radiation. The energy required to pump the recombined hydrogen to a holding tank, before being recycled and shot back across the arc and into the reaction chamber once again, is not considered in this computation. This energy should be negligible, since the dissociation energy is barely more than a thousandth of the gross output, and there is probably a way to make the process work without a pump anyway.

If hydrogen atoms exothermically release energy when they combine to form molecules, the potential energy has been lost by the molecules, yet they attribute the "potential energy" to the hydrogen molecules - backwards to evade their duty to draw the logical conclusion.

How does the atomic hydrogen obtain its energy, if not from the "ether"? No wonder establishment science doesn't want you to know there is an ether. If we are to believe the "law of conservation of energy", as interpreted by establishment (relativistic, ether excluding) 'science', this process is impossible, yet using data available from 'standard' texts, I have shown that the input energy of 103 cal./gram molecule is somehow either 'magnified' to 109,000 cal./gram molecule of hydrogen a multiplication of over 1,058 times or that, by use of hydrogen as a "medium", that the 103 calories is 'seed' energy (called the "activation energy"), triggering the atomic hydrogen's apprehension of a net 108,897 cal./gram molecule, from the "ether".

You can forget what the relativists said. The equilibrium of the ZPR can be upset by disturbances created in the Omni Matter which I divide into Omnions (ultra fine, positive "subprotonic" particles) and Omnitrons ("sub electronic" charges carried by the Ominions) all of which the ZPR interpenetrates. Unidirectional vibrations (disturbances) in the O Matter cause it to accumulate transferred force from the ZPR, throwing Omni Matter out of equilibrium, and

restoring equilibrium to the ZPR. The Omni Matter's excess force is then transferred through the atomic hydrogen atoms (or other temporarily excited, enlarged atoms encompassing it) into the atomic mass frequencies, during disturbance, thus restoring equilibrium to the Omni Matter. This transferred force is not "energy created from nothing", but only represents a change in the "form" of some of the infinite energy (force over time), already existing in 'space' in other forms (such as the ZPR, or as sub electronic" charges).

Whenever H_2 is dissociated to 2H (H_1), and the single electron clouds enlarge to encompass more Omni Matter I affected, by a greater ZPR), there is a reaction with and transfer of force from exothermic atomic sources, through the molecules, into stripped Omnions which were entrapped to bind the atoms together. This exothermic energy is sufficient to throw the Omnions within the electron clouds, and concentrated in the space between the atoms, beyond their electronic quantum boundaries, so that the additional energy needed to dissociate the atoms is regained from the surrounding Omni Matter and ZPR, restoring the equilibrium of the Omni Matter. With the recombination of the atomic hydrogen to form H_2, the converted ZPR radiant energy, and sub electronic charges   which I call Omnitrons   is ejected (squeezed out) from the atoms, as heat or other interconverted radiant energy of lower frequency, as the electron clouds shrink with the addition of positive charge carried by the Omnions. The reason the electron cloud density of the hydrogen molecule is more concentrated in the area around the space between the atoms, is because of the entrained Omnions' presence there. Otherwise, the two negative charges carried by the two atoms would cause mutual repulsion. Actually, since heat is infrared spectrum radiation,

Fig. 1

Lyne Atomic Hydrogen Furnace

cool fluid IN

(additional heat extracted from gas here)

← hot fluid

recombined H₂

Appropriate Heat Application
(heat extracted from fluid)

high temperature alloy heat exchange coil

hot fluid OUT

H₂ gas PUMP

Reaction Chamber (mirrored inner surface)

Heat exchange fluid PUMP

Pressurized H₂ holding TANK

cool fluid →

'Activation energy' device
(spark plug, catalytic metal, etc.)

c. 3500°K

ALTERNATE H₁ SUPPLY
(produces atomic hydrogen directly from hydrolysis using lead amalgam cathode (Langmuir).

Dissociation Chamber (possibly porcelain) tungsten electrodes

O₂

D.C. Power Cables

Arc Power source

Control valve

H₂O →

← H₂ ←

Combustible H₂ for use in engines, heating, etc.

electrolyte

lead amalgam cathode

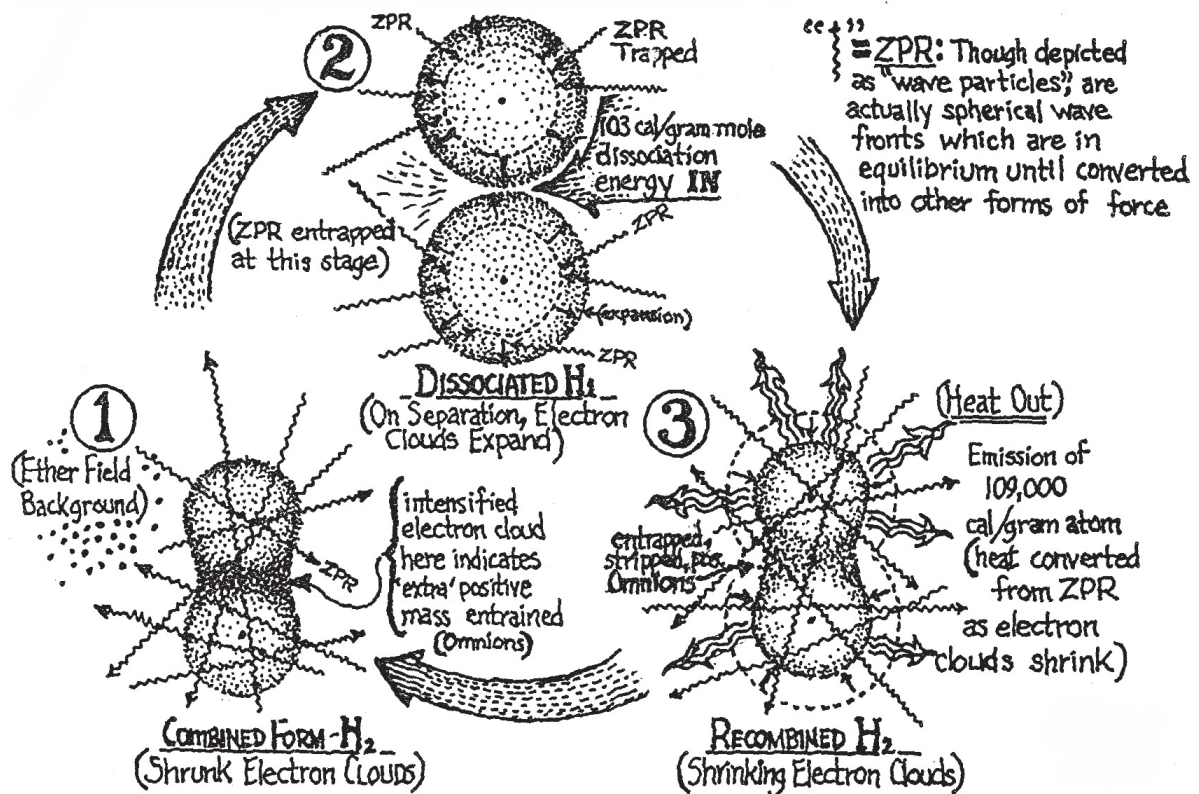Use of Alternate H₁ Supply eliminates gas tank & pump, dissociation chamber & arc transformer
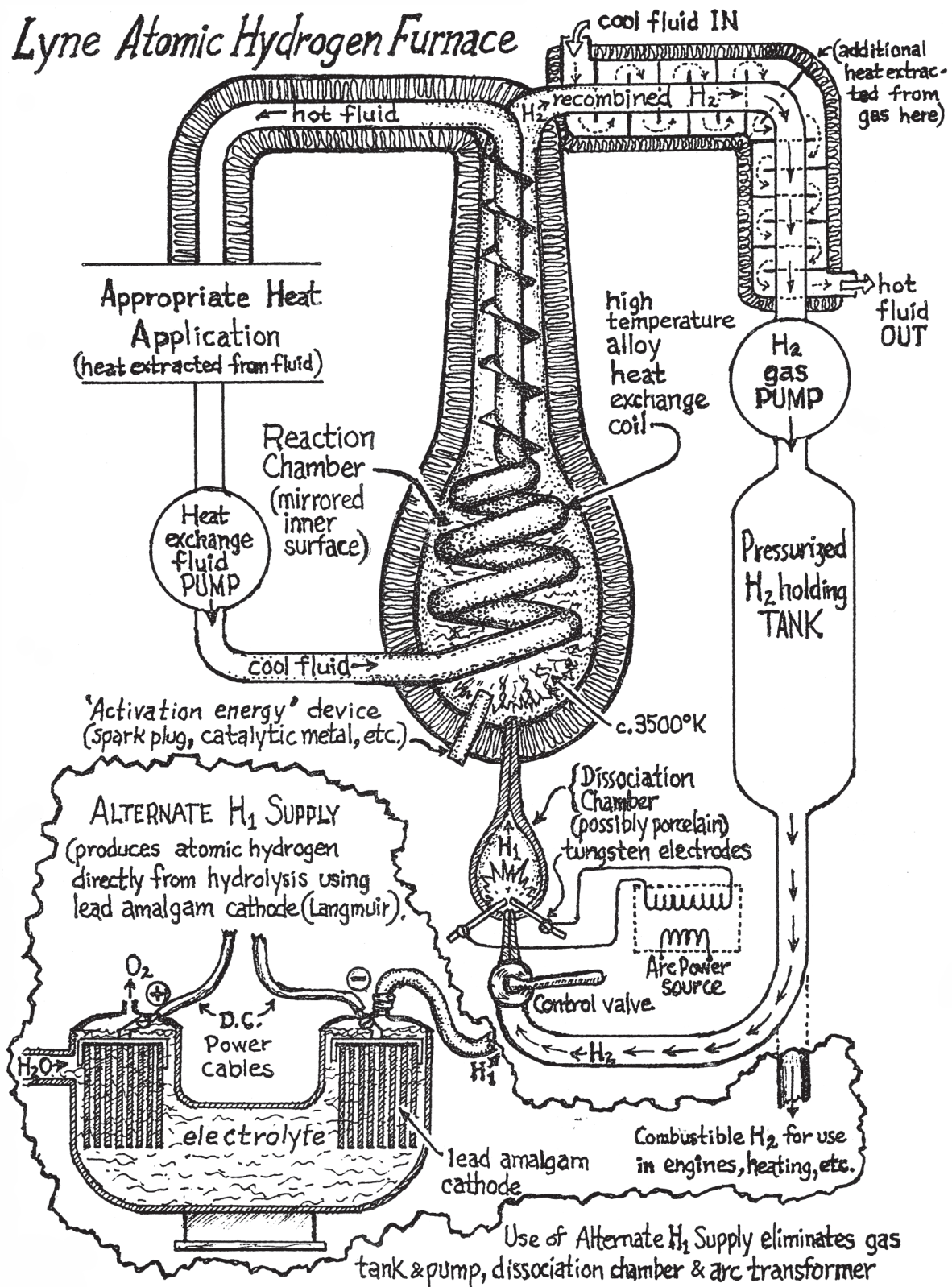
Fig. 2

the process can be conceived as a means of converting the ZPR from an ultra penetrating positive ('cold') spectrum radiation, to a mass reactive infrared (heat) spectrum radiation, and that is the proximate "source" of the so called "free energy", in the form of exothermic heat radiation. The ZPR is an analogue to sunshine, except it penetrates all matter all the time and is not affected by day or night, so it can be converted to usable energy all the time with the appropriate technology, such as the atomic hydrogen process.

Incidentally, this same atomic hydrogen process, as first published here and now, is also the apparent source of the anomalous exothermic heat produced in aqueous cavitation, as well as in the so called "cold fusion" process, which are two other free energy processes which are based on the atomic hydrogen process.

The atomic hydrogen atoms have single, unpaired electrons in enlarged shells. These atoms are in Mendeleev's Group I a, and all the atoms in that group have unpaired outer electrons, and are photoreactive to and transmute when exposed to ultraviolet light, as do all the atoms of elements below atomic number 19. Some of these elements transmute in visible and infrared light, and all of them can be used to transmute ZPR into usable free energy. This photo reactivity creates temporary, artificial radioactivity producing isotopes of short half life, with the emission of photon energy restoring equilibrium to the atoms as they return to their ground states. The energy for these radioactive emissions comes from the ether, not from the atoms themselves. The atoms can be analogized by certain crystals, described by the Raman Effect, in which light passing through the crystals is "stepped down" to lower frequencies. The infrared spectrum light produced by the atomic hydrogen process is thermically reactive with normal atomic and molecular matter, because of its longer wavelengths. The transfer of force from the ZPR, via the Omni Matter, through the dissociated H, atoms, is apparently the kind of thing

somewhat cryptically spoken of by Tesla, when he stated: "There is no energy in matter other than that received from the environment."

Editor: We recommend this book to our readers. You can order it from

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VORTEX TUBES
IN THE INNOVATION PROCESS

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A.I. Azarov (b.1937) graduated from Nikolaev Shipbuilding Institute in 1960. Ph.D. (eng.), head of Laboratory of vortex technique (Author's Laboratory) in St. Petersburg State Polytechnic University since 1983. Merited inventor of Latvia, corresponding member of St.-Petersburg Engineering Academy, academic of Russian Academy of Natural Sciences. Author of more than 160 inventions and 140 publications in the field of industrial application of vortex effect and refrigeration, energetic and transport machinery.

Introduction

The vortex effect is a surprising discovery of the XX century: a "tornado" is obtained in a tube and its heat transfers "itself" from the axis to the periphery of the vortex flow. A simple refrigerating machine is a vortex tube (as a "point" source of cold and heat). It allows solving numerous technological problems during climatic tests of electronics and fuel equipment, during ground tests of aero-space equipment and others. First, hundreds of inventions directed at industrial and commercial use of the vortex effect appeared. Some of them will be a basis for advanced kinds of industrial products.

Let us name the three inventors, whose creative contribution (the "intellectual labour" of a developer) is already embodied in products produced serially during a few decades:

G.J. Ranque (France, 1931) invented the first vortex tube in the world;
Charles Fulton (USA, 1965) suggested the simplest cylinder non-chilled vortex tube which still stays in production in the USA and Western Europe without any considerable changes;
Anatoly Azarov (USSR, Russia, 1967...2005) has developed, patented, and organized a long-term serial production of a few generations of vortex tubes of different designs, for example:
• miniature vortex tubes with D=4mm and 5mm for two generations of portable transport refrigerators;
• vortex tubes with an inner ribbing of a chilled vortex chamber, for test equipment;
• multi-chamber vortex tubes of multiple use with 2, 4, 6, 8, 16, and 20 flows of different temperature and many others.

Only four of Azarov's projects developed for plants-producers are presented in the article. The publication's aim is to show how, along with expansion of vortex tubes' use, their constructional appearance changed and to present technology of the newest level: modular vortex tubes for the beginning of the XXI century (Project 4). They open new opportunities for the producers and allow multiple uses for the users.

Editor's note: We publish Anatoly Azarov's article on vortex devices in order to develop the technology of autonomous fuel less electro generators, which have been described earlier in our magazine. It is the vortex tube that allows taking heat energy from a monothermal source (air), according to this technology. Please, read the article in this issue, page 38. A.V. Frolov.

Part 1. Development of the vortex technology in Russia

Annotation

The vortex tube (VT) is interesting for new energy and refrigerating engineering as an experimental object with high development potential and as industry product with a quickly widening, unique combination of technological and operation properties.

FROM EXPERIMENTAL RESEARCH TO VORTEX TECHNOLOGY

A jet of the compressed medium in the field of centrifugal forces "spontaneously" divides into a chilled nucleus and heated peripheral layers – transfer of heat from axis to periphery of a turbulent rotating flow is called the vortex effect. A cooling machine, which uses it, is a vortex tube (VT in Fig. 1). It is compact, has no wearable parts, inertialess and trouble-free during operation [1]. In the development of VT driving force is an experiment; according to its results, hypotheses are checked, different kinds of influence on vortex flow are compared, where:

• the radial pressure gradient 0.003-1.0 MPascal/mm (up to 5 MPascal/mm) with the vortex rotation frequency from $3 \times 10^3 c^{-1}$ to $1 \times 10^5 c^{-1}$ (the rotation frequency can be multiply increased in the experimental device for fundamental researches);
• distribution of speeds, pressures and temperatures according to the section and length of vortex chamber is complicated (sometimes non-stationary) in the presence of secondary vortex flows and precession of the vortex flow nucleus;
• acoustic energy is generated and redistributed in the acoustically non-uniform environment: temperature, density, acoustic impedance of the moving medium differ by the section and length of the vortex chamber, which has the form of axisymmetric channel, and a level of acoustic pressure corresponds with the area of a non-linear acoustic, i.e. considerably exceeds 170 decibel;
• vorticity has anisotropic nature. In the paraxial area (to a half of the vortex flow radius) vorticity intensity is E=25-35% while, at the distance exceeding the radius' half, the value of vorticity intensity decreases to E=5% and lower;
• a relative value of turbulent energy is maximal in the paraxial area and can reach 0.04-0.06 (which is considerably more than during non-swirled flow);
• in spectral characteristic of VT noise, there are "peculiarities". Their interpretation (parts 3, 4) will lead to a deeper understanding of the vortex effect's nature, show ways to increase VT efficiency;
• during operation using dry air, glow of the vortex's nucleus and other "anomalies" are observed.

According to the amount of registered and realized inventions in this field, Russia remains the leader. Transformation of VT from an experimental object into a product of multiple uses began almost simultaneously in the USSR and USA [3] in the 1960s. For example, at that time, in the USSR:
• adiabatic VT for natural gas industry were tested and economical nonadiabatic VT with a chamber intensively chilled during air barbotage through liquid were prepared to long-term serial production (in Table #1 [2, 4, 5]), i.e. they are more perfect energetically than the adiabatic ones;

• growth of the "invention chain" began. These inventions defined the level of some following generations of VT showed in the Table by Projects 1-4 (the USSR and Russian invention numeration: ## 300726, 300727, 337621, 435419, 456118, 470684, 556285, 585376, 606044, 630964, 641245, 769233, 892146, 1255825, 2067266, 2177590);

• research and use of the invention group related to "pulse" intensification of the process in VT began (## 334449, 334450, 336473, 337620, 347435, 390337, 735877 and others).

(Note: VTs of foreign production presented today are almost similar (Fig. 2) to the simplest experimental models of the 1950s – 1960s. It seems paradoxical taking into account quickly changing generations of electronics, lasers, and rockets).

As a source of compressed air for the simplest VT, a pneumatic net of an enterprise is usually used. A cold flow with a temperature from +20C to -120C and,

Fig. 1a. Formation of a tornado – a self-organizing process of transformation and concentration of energy diffused in different nonequilibriums (of temperature, moisture etc.).

occasionally, a hot one with a temperature from 40C to 120C are obtained this way. In more complicated vortex devices, a flow of air, helium, oxygen, and natural gas could be chilled to cryogenic temperatures or heated by hundreds of degrees. VTs have been used during land tests of aerospace equipment [7], tests of electronics, fuel machinery, chemical and oil-gas engineering equipment. VT maintain necessary temperature locally (by points)
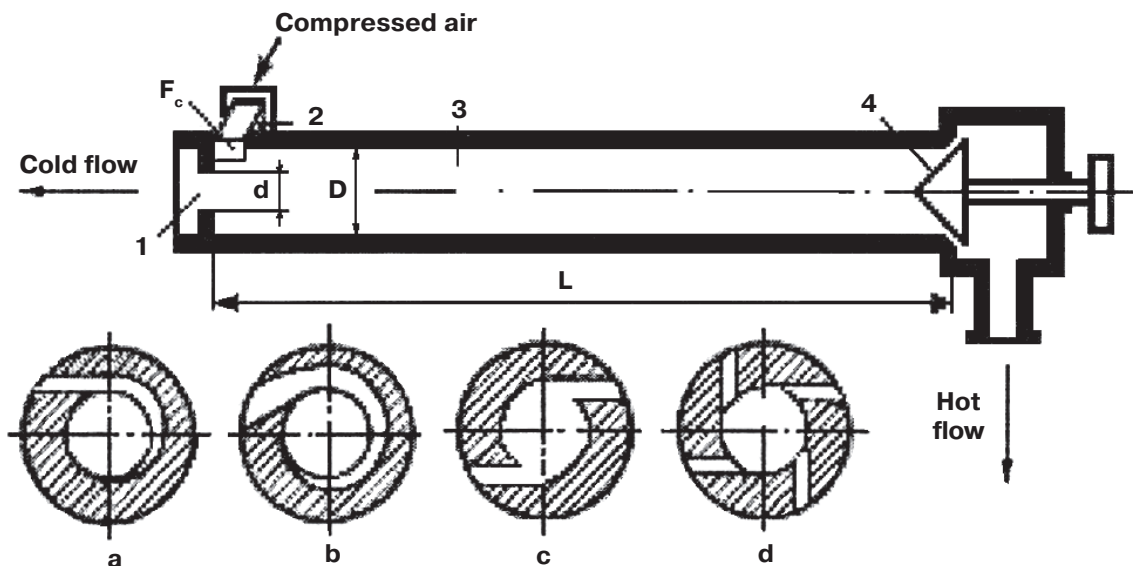

Fig. 1b. VT design [2]:
1 – a hole d of the diaphragm for discharge of the cold vortex flow's nucleus; d= (0.40–0.65)D; 2 – jet inlet; 3 – vortex energy division chamber; L= (3-25)D; 4 – throttle for discharge of the hot flow (from 15% to 75% of air consumed by the adiabatic VT); a – tray rectilinear single-jet inlet of VT according to Fig. 2a; b – spiral inlet with the critical section F_c = (0.04-0.12)D^2 and preliminary whirling of VT flow according to Fig. 3-8 and Fig. 2b; c and d – double-jet and multiple-jet tangential inlet of Vt, according to Fig. 2c.

in technological and/or working zones: during work near open flame, strong vibrations at a chilled object, dustiness, gassy environmental air, absence of a place for freon air-conditioners or impossibility of their maintenance. In such conditions, VTs are a simple and trouble-free tool of energy saving excluding the need for power-consuming total air conditioning in a large production area [8].

We will show how, during change to multiple uses, the constructional and technological get-up of some generations of VT (made for many factories-users, not for single research-industrial experiments) has been changing and how the VT set-up will change soon. We will consider only four projects – stages of technology development. All of them are an initiative of one inventor-developer. No funds of
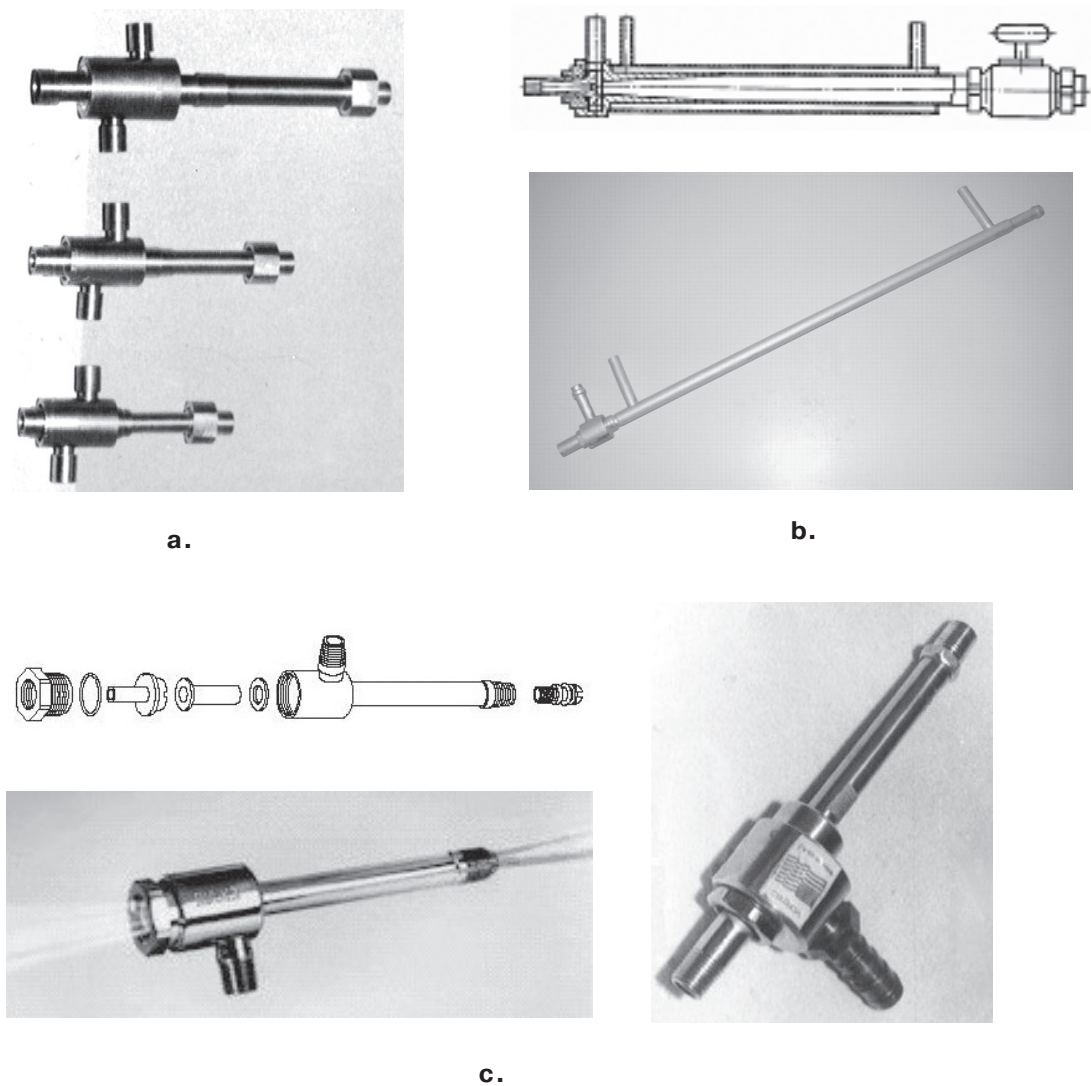

a.

b.

c.

Fig. 2. Experimental and industrial VT of different years, compared

a. 1950s [6]. Experimental adiabatic VT with two tray inlets, according to Fig. 1a.

b. 1960s [4]. Experimental nonadiabatic VT with a water cooling jacket on the chamber and a spiral inlet, according to Fig. 1b: D=5mm, L=30D (up) and L= 80D (down). Industrial variant of VT L=30D see in Table: p. #1 (1969 [2, 5]).

c. 2005. Present-time adiabatic VT of foreign production with the multiply-nozzle inlet, according to Fig. 1c, d.

the state budget or investors have been spent on their development.

The first project is a creative response to the need of transport mechanical engineering, which prepared diesel locomotives for export to countries with hot climate; the other two ones are responses to the need for "point" VT for engineering tools, mechanical engineering equipped with electronics; the fourth project is a qualitatively new technological level for the beginning of XXI century.

We will show VT made of metal and plastics, which work using compressed air: nonadiabatic VT with a chilled finned chamber; adiabatic (non-chilled) ones with minimal amount of parts and a heated diaphragm; portable vortex refrigerators for pneumo-provided transport objects. The newest technology oriented at minimization of expenses is presented by modular VT: there are from 2 to 20 interacting vortex chambers and from 1 to 5 multi-chamber "vortex modules" in them.

The main results of the projects' realization are expressed in the final chapter; characteristics of four generations of VT are presented in the Table. The experience of innovation VT development has to be summarized taking into account a situation in science intensive kind of products on the internal and external markets. An attempt of such a summary is presented in the article.

### VORTEX TUBES FOR TRANSPORT REFRIGERATORS AND TEST EQUIPMENT (PROJECTS 1, 2)

For the first time in the world, nonadiabatic VT were used [2, 5] in the first generation of transport vortex refrigerators: since 1969, - on a model-production scale and, since 1971, - for serial production (Fig. 3). A temperature in a 14-liter refrigerator TVH-14 is from 0C to +7C with a temperature in a chamber, which is not provided with an air conditioner, is from 20C to 50C. The refrigerator became an additional consumer of compressed air from a board pneumo-system supplied by a "brake" compressor of the diesel locomotive, which is engaged cyclically. Connection of the refrigerator increased the relative "duration of engagement" of the PV compressor only by 0.5% (from 32.0% to 32.5%). This did not worsen the pneumo-system's performance and allowed better use of the board compressor of high efficiency. With unessential expenses for the refrigerator, a level of comfort in the chamber and export price of the diesel locomotive increased.

(Note: The alternative decision to use absorption-diffusion refrigerators, called "Morozko", gave no results: in the event of transport vibrations and a temperature in the chamber higher than 35C, these refrigerators do not work).

A simplified adiabatic VT of the minimal size was used for the second generation of vortex refrigerators [9]. In order to decrease production costs, the amount of parts in this VT was decreased by some times: three outwardly similar modifications of VT differ only by an inner diameter of the vortex chamber and sizes of the spiral inlet (for refrigerators with capacities of 5, 15 and 50l; Fig. 3). The refrigerators have been produced for more than two decades and are used today because VTs are problem-free in operation [10].

Test departments and climatic chambers need a reliable and inertialess source of cold air with a temperature from 220K to 280K for casual testing of integrated products. Many plants used a decision, simple in use and cheap in production: compact adiabatic VTs with single-stage or double-stage expansion of compressed air or more economical nonadiabatic VTs of higher cooling efficiency. Prototypes of the VTs were preliminarily checked as tools of individual and collective heat protection of workers in energy engineering and metallurgy [11]. Designs of the VT have been presented to some industry fields for development of a test base (Fig. 4); the very first lots of VT were produced by the largest enterprises of engineering tools and
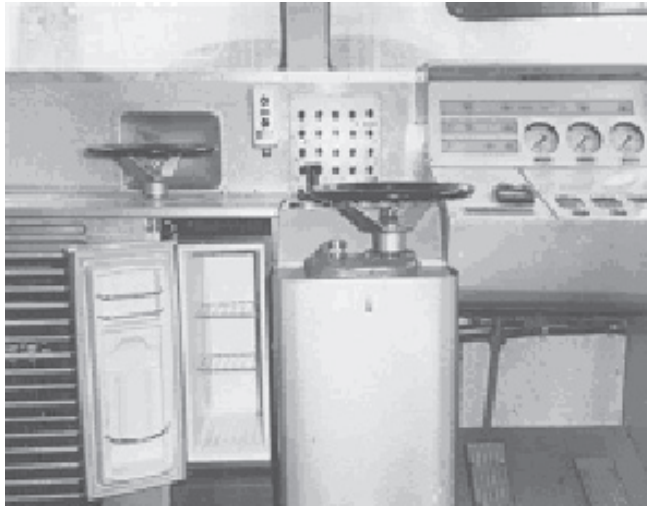
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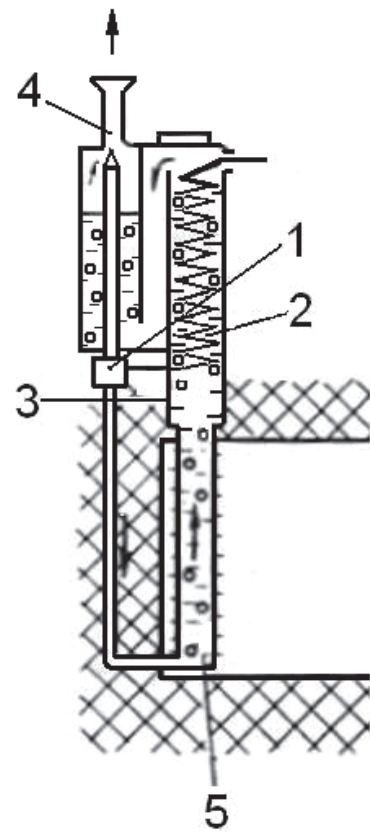
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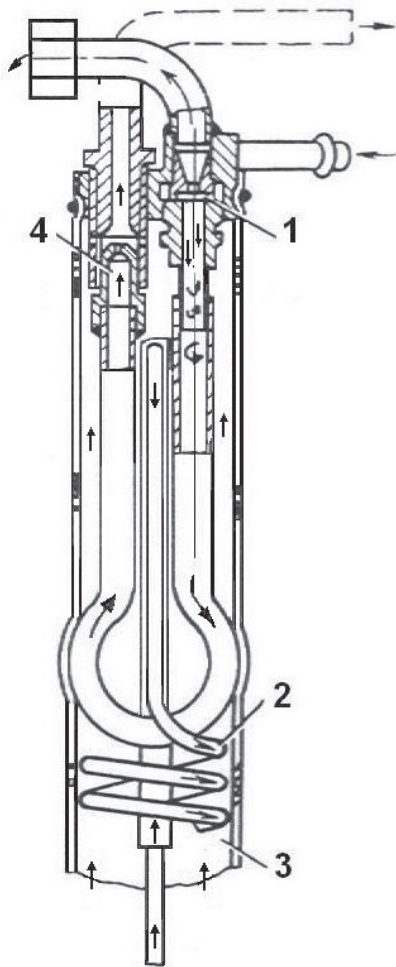
c.

Fig. 3a-c. Project 1. Transport vortex refrigerators of the first generation

a. TVH-14 in a cab of an export diesel locomotive 2TE114 (1969)

b. Design of a vortex refrigerating unit with a refrigerating accumulator (water, brine) in the refrigerator chamber: 1 − nonadiabatic VT D=5mm with barbotage cooling of the chamber (in Table #1); 2 − coil for preliminary cooling of compressed air before VT; 3 − channel of air-water mixture, cooling coil 2 and the VT chamber 1; 4 − ejector supplied by a hot flow from VT (15% of total air consumption by VT); 5 − liquid refrigerating accumulator with barbotage inlet of cold air from the VT 1.

c. Design of nonadiabatic VT with a U-shaped bent chamber and elements of the refrigerating unit for TVH-14 (positions are the same)

the electronics industry in Leningrad (Saint Petersburg).

### ONE-CHAMBER AMD MULTI-CHAMBER VORTEX TUBES OF MULTIPLE USE (Project 3)

In order to initiate the appearance of competitive productions and selection of the best VTs under industrial conditions, 12 models of the items for "running-in" in tool production, auto production, electronic industry and others were suggested: for air curtains at working places in hot departments; for cooling of solutions in galvanic baths; for "multi-point" cooling of program machines' cabinets etc. The working designs, start marketing information, production prototypes, VT manuals [12] have been given for free to 60 plants (in response to hundreds of requests): metal and plastic VTs, fixed to a cooling object and embedded into it VTs, one-chamber and multi-chamber ones (Fig. 5, 6).

It was expected that the plants will produce and use lots of the industrial prototypes of all 12 models themselves, for their own needs, and, then, the best prototypes will stay in production – these VTs, which will indicate industrial "preferences" and directions of further improvement. For example, in order to chill 17 control cabinets at a big automated line "Renault-2" for processing of 52 auto
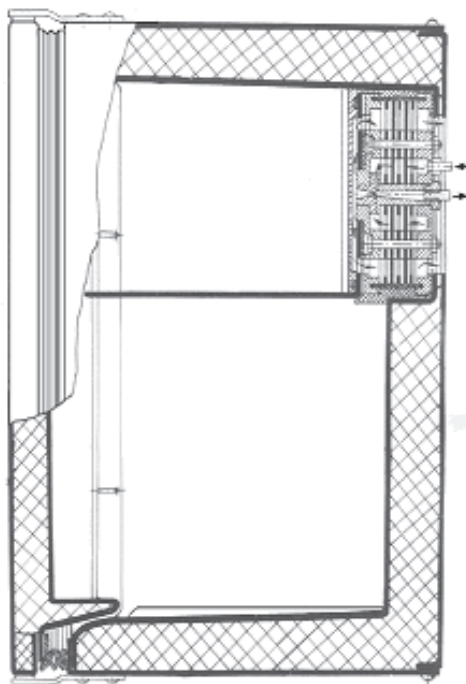
d.
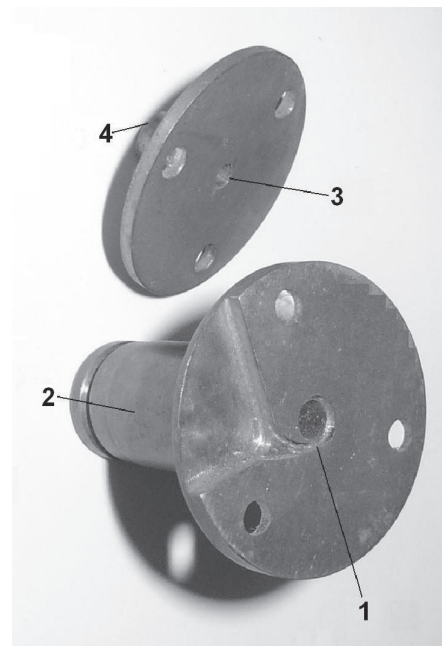
e.

Fig. 3d-e. Project 1. Transport vortex refrigerators of the second generation

d. TVH-15 with a refrigerating unit designed for conveyor assembling: VT D=4(6)mm (for TVH-50, TVH-15, TVH-5 − produced until 1991; see below and in Tables # 2-4) is located along an axis of a sectional counterflow heat exchanger for preliminary cooling of compressed air to +5C...+15C.

e. A miniature VT D=4mm with "non-frosting" diaphragm heated by the chamber heat: 1 − critical section; 2 − chamber; 3 − a hole of the diaphragm; 4 − diffuser of the cold flow made as a whole with the diaphragm.

a.
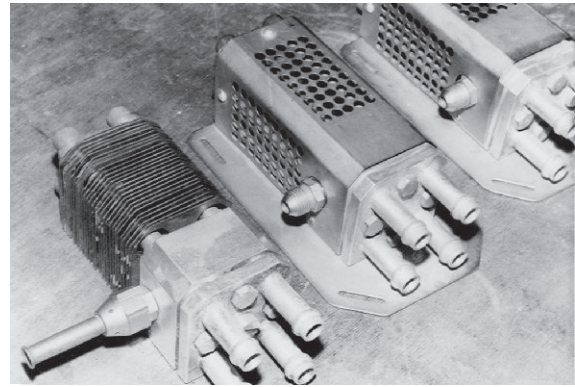
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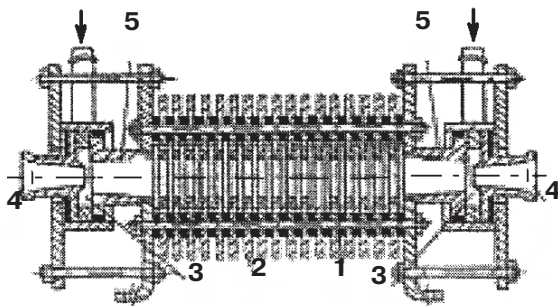
c.

Fig. 4. Project 2. Vortex equipment for test departments and climatic chambers

a. a source of cold and hot flows containing an embedded VT D=20 mm (in Table: #5) – a "Working place of a toolsetter-investigator of radio equipment RMNR-20T", gold medal of the exhibition of USSR national economy achievements.

b. Two-stage 5-chambers VT D=10 mm with maximal temperature decrease of four "resulting" cold flows (in Table: #6).

c. Nonadiabatic two-chambers "laminar Azarov's VT" D=38mm (in Table: #7) cut: 1 and 2 – ring gaskets and plates-ribs; 3 – a spiral section of the helix; 4 – cold flow diffuser; 5 – the first cone section of the chamber.

cylinder head models, during no-man production, which needs only problem-free electronics (see Part 2). Zavolzhsky motor plant used a lot of VTs, according to Fig. 5, at the left above. Users produced first thousands of VTs in dozens of cities: Vyborg, Vilnius, Ulan-Ude, Novosibirsk and others [13].

Then the main result was defined: from 6 to 9 plants became long-term suppliers of VTs (in Table: # 13, 15, 16, 18, 19, 20); for instance, in Rostov-on-Don, VT production was begun by competing plants in two industries – machine-tool building and auto-making (Fig. 5, at the right below).

For the first time, embedded intensifiers of the vortex temperature division process were used [4, 5, 14]. Since competing suppliers appeared, users and producers began to prefer plastic VTs with one (Fig. 5) or a few (Fig. 6) vortex chambers to all-metal ones, i.e. industrial "preferences" have been defined. One and multi-chamber VTs began to compete with each other. Use of polymeric materials led to a new production level with attraction of highly effective equipment. Production costs decreased.

For example, at the High-energy Physics Institute (Protvino town of Moscow region) lots of two-chamber VTs (Fig. 6, at the left) having the unique "flat" form and minimal overall size were used in main and badly accessible zones of big experimental devices for cooling extra-high-speed electronic blocks.

The competitive ability of the multi-chamber VTs have been confirmed by long-term practice and their further development is a task solved in Project 4.
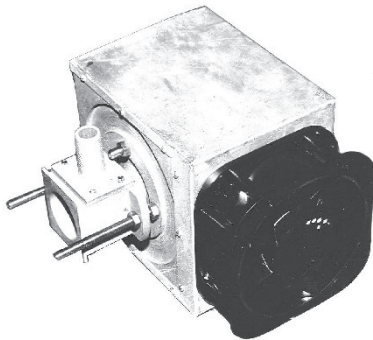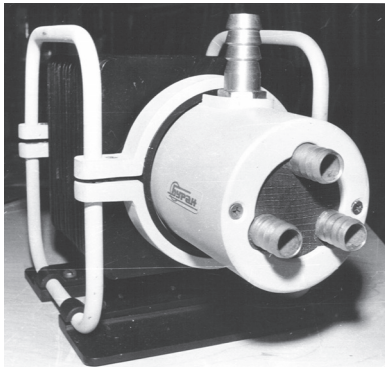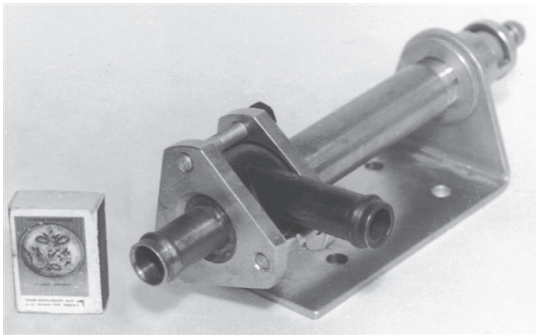
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a.
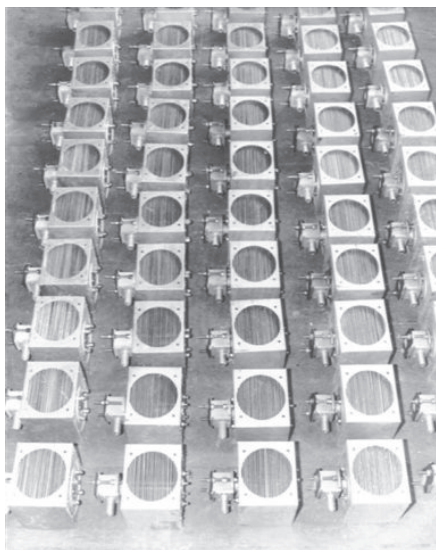
b.

**Fig. 5. Project 3. One-chamber all-metal
and plastic VTs**

a. Above. A simplest adiabatic VT D=20mm
(in Table, #14). Below. A design project of
the prototype # 31749 for the nonadiabatic
"laminar Azarov's VT" Below. RVTK-16/1
device assembled with a fan (in Table, #13)
- nonadiabatic "laminar Azarov's VT"
D=16mm of highest efficiency with cooling
of the rib chamber and 100% share of the
cold flow.

b. At an assembling department of RVTK 16/
1: before assembling the fan to a jacket of
the plate-rib chamber.

c. Above. A design project of the prototype
31750. Below: Industrial modifications of
adiabatic VTs D=20mm of multiple uses
used at hundreds plants from 1983-1993
(from left to right, in Table: # 16, 20, 17
and 15).
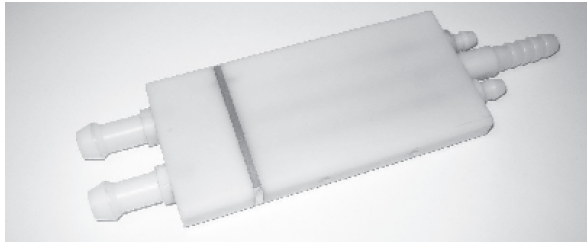
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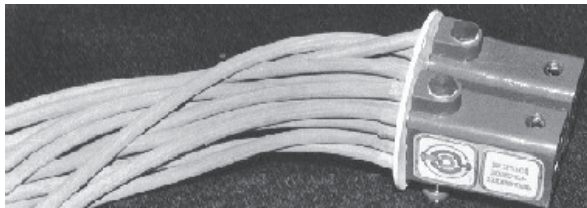
c.

Fig. 6. Project 3. Miniature multi-chamber VTs without extensions embedded into powerful computer equipment

a. The simplest 2-chamber VT (D=10mm) with a "thickness" of 18 mm with minimal amount of parts supplied to users in the same constructive get-up for more than 15 years (in Table: #18).

b. VT with drum arrangement of 6 vortex chambers (D=5 mm), with axial supply of compressed air and mufflers of cold and hot flows' noise embedded into the ends of the drum ("MIkrofon" d42x100mm; in Table: #9).

c. 2-body VT (D=5mm) with individual temperature control of 16 cold flows, tubular flexible "cold" airways and a flange for fixing in a cooling object (in Table, # 11).

According to incomplete data of only one industrial field (Ministry of electric industry) for 1990, the number of plants-users of VT of Project 3 exceeded 200: VTs became a "product for any plant". In the end of 1990, Leningrad regional council and Council of Leningrad Polytechnic Institute nominated developer A.I. Azarov, awarding him the honorary title of an honoured inventor of the USSR. By 2005, the number of plants-users increased by a few times. Many enterprises purchased lots of VTs many times. In order to define the main industries-users, hundreds of plants were considered: from 30% to 50% of the actual number of the VT users, according to Project 3 [15]. For instance, in Saint Petersburg, 44 plants were taken into account; in Moscow – 48; both in Rostov-on-Don and in Nizhniy Novgorod – 18; in Yekaterinburg, Cheliabinsk, Samara – 5 plants in each city and so on. This amount of sampling was considered 100%.

The distribution of the plants is the following:

35% - engineering tools and electronic industry, chemical and oil-gas mechanical engineering;

18% - mining equipment, compressors and engineering of tools, bearing engineering, transport;

18% - shipbuilding, metallurgy, aluminum industry, hydraulic engineering, hydraulic machinery, plastic processing, polygraphy, glass production;

14% - aerospace industry, mechanical energy engineering, helicopter production, electric mechanical engineering;

15% - confectionary industry, bread-making plants and others.

MODULAR MULTI-CHAMBER VORTEX TUBES (Project 4)

First devices for point "non-machine" cooling using vortex or thermoelectric effect appeared almost at the same time, but the technology of thermoelectric (semiconductor) cooling developed quicker. In order to decrease development and production costs and save time,

**Fig. 7. Project 4. A new development stage of the technology:
A group of modular VTs of universal and specialized use (in Table: # 21-25 and 26-30),
Using 1 or 2 modules «052», or 1, 2 or 5 modules «102/104».**

**An example for comparison: A number of parts, labour-output ratio, material intensity, mass
and acoustic pressure of the modular VT M104, which has higher cooling productivity, are
less by 3-4 times than the ones of three modifications of VT V201 of the Project 3 working at
hundred plants since 1983-1993 (in Table: # 15, 16 and 20; Fig. 6c).**

standard micro-modules with a relatively small amount of semiconductor elements are used for a lot long time. Project 4 began to change to modular VT designs for the first time (Fig. 7 – 9). Material intensity of a product decreases by 2 times and more, if the one-chamber VT is changed to a module with 2 or 4 vortex chambers.

Aims of Project 4. To abate costs using the simplest elements – modules with a decreased number of parts and labour-output ratio (comparing with VTs of the past). To suggest unified VTs with a different number of modules and chill production efficiency, properties and use.

To present any patterns of a multi-modular VT, which would exclude a need for single projects for numerous new tasks, to producers and users. To give an impulse to expanding of use of the newest VTs. **Modular demands.** It must be simple in production and have flow tracing with considerable noise clipping. The modules must be assembled in a complete product with a screwdriver.

For the first time, modular VTs were created (in Table: # 21-23) for a range of cooling productivity from dozens of Watts to 4.5-7.5 kW. They are based on two types of multi-chamber vortex modules: a small module «052»: dimension is d44x75 mm,
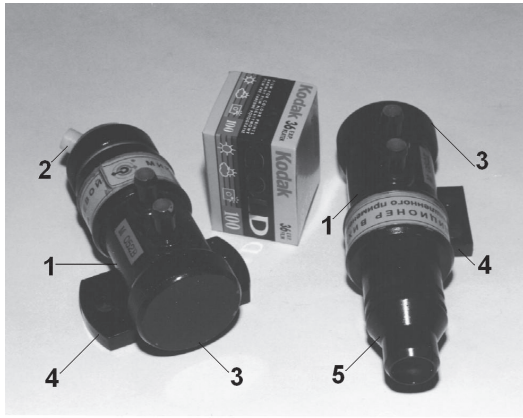
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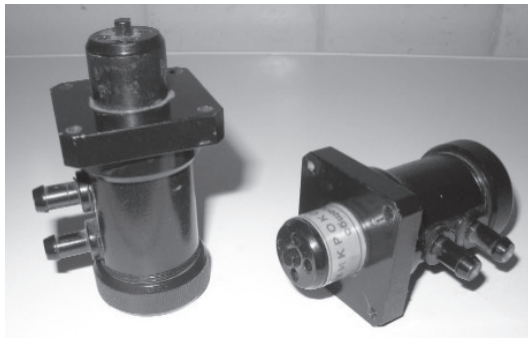
b.

c.

Fig. 8. Project 4. Miniature VTs with 1 or 2 two-chamber vortex modules «052» (from left to right):

a. VT on the support (in Table, # 22 and 24): 1 − module «052»; 2 − vectorable nozzle of cold flow; 3 − temperature regulator; 4 − support; 5 − ejector capping.

b. VT with controlled outflow velocity of cold flow and bonding flange (in Table, # 21).

c. 2-modular VT with vectorable nozzles of cold flow (in Table, # 26).
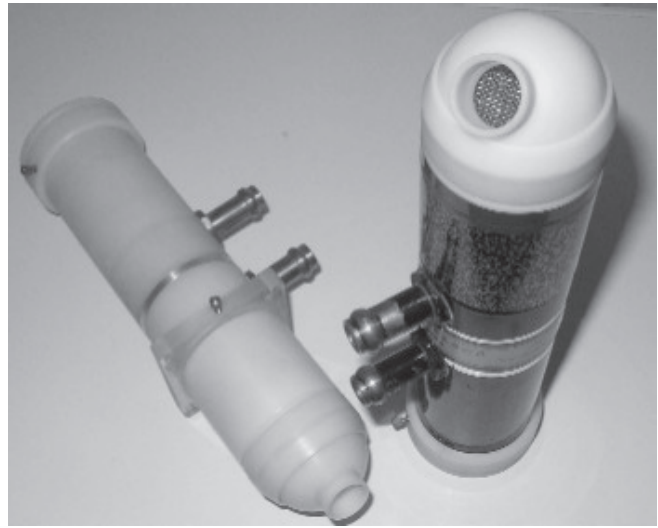
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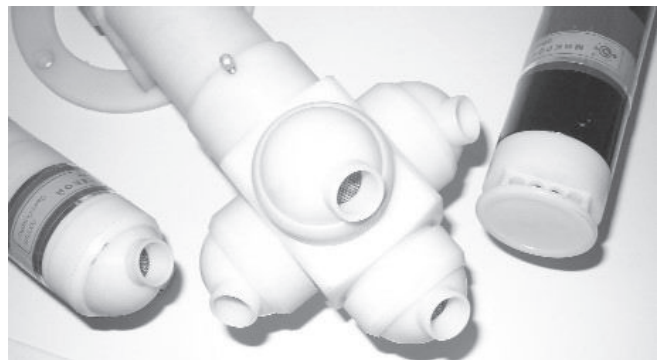
c.

Fig. 9. Project 4. VTs of universal use on the basis of module «102/104» (from left to right):

a. VT during assembling (in Table: # 25).

b. The same, assembling is almost finished.

c. Wear capping of cold flow for module «102/104».

two vortex chambers D=5 mm (Fig. 7, 8) and a big module «102/104»: dimension is d52x144 mm, 2 or 4 vortex chambers D=10 mm (Fig.7, 9).

With minimal production costs, users obtain from 10 to 14 models and modifications (Fig. 7):

• VT of universal use (in Table, # 21-25) - for long-term serial production. It began from the VT using the "small" and "big" modules (at the left, Fig. 8 and 9). "Natural selection" will define which VT modules will be preferred, as it happened during Project 3 promotion.
• VTs of specialized use (in Table, # 26-30) – for production in small amounts as orders for them will be obtained.

DEVELOPMENT DIRECTIONS

1. Development went from the one-chamber and multi-chamber VTs to the modular devices. VTs were used:
• first (Project 1) – in transport and agricultural machine engineering: in refrigerators for the operator's cab in export diesel locomotives 2TE 114, passenger diesel trains DR-1, DR-1A, DR-1P and in KamAZ cars, grain combines, tractors, buses;
• then (Project 2) – in chemical and oil-gas machine engineering, radio electronics and tool engineering, motor industry: during temperature-climatic testing of new products;
• and, finally, (Projects 3, 4) – in main industrial fields: for solution of production-technological problems of hundreds of plants-users.

2. Russian industry, as it is shown above, used several generations of VTs, not one generation (the one suggested by Fulton [3]) as foreign industry did. The construction get-up of these several generations was determined by a single invention-developer – the article's author.

3. Nonadiabatic VTs for "point" cooling of objects must be made more compact. It is necessary to change from VTs of D=38mm and D=16mm (Projects 2, 3) to the miniature VTs of D=2.5-10mm (experiments with VTs up to D=1mm).

4. Keeping a simple and trouble-free design, it is necessary to use only simple technological methods in VT development. Compact VTs with a minimal amount of parts and a quantity of vortex chambers, which is more than two [7, 8], are preferable. Russian plants have been using the advantages of multi-chamber VTs for more than 15 years (Fig. 6).

5. Instead of developing many future devices, the multi-chamber modules are suggested (Fig. 7 – 9) for different types of VTs. Multi-point cooling by some miniature VTs, according to the heat emission "topography" at the object is more efficient than total cooling of the object. This is why big production of constructionally perfect VTs with a cooling productivity of less than 0.2 – 0.4 kW has better economic prospects than production of VTs with a cooling productivity of more than 1 kW.

6. For many future applications, a change from "non-autonomous" VTs to autonomous ones which do not depend on the presence of a pneumo-net with an excessive resource near a chilled object. The processes of air compression, cooling and expansion are to be combined in a single "vortex block" along with high efficiency and compact size of a device. Creation of such a device is the most important inventive aim.

GENERAL RESULTS

Project 1: For the first time in the USSR, the long-term serial production of miniature VTS is realized: nonadiabatic (D=5mm) and adiabatic (D=4 mm) ones. It is confirmed that VTs stably work without deterioration for more than 30 years using untreated and non-dried compressed air from the board pneumo-net. The successful use of VTs was an impulse to develop new Projects.

Azarov's Vortex Tubes

#	Marking of vortex tubes	Figure	Maximal chilling productivity, kW		Fields of use (see the notes)	Dimension mm	VORTEX TUBES (VT)			
			Pc=0.41 Mpascal	Pc=0.69 Mpascal			Diameter of VT, mm	Amount of VTs	VT form	VT material
Project 1: Vortex tubes embedded into a regenerative cooling device of a transport vortex refrigerator										
1	VT-05	2, 3	-	0.07	10	16x40x170	5	1	Cone-Cylinder	M
2	VT-04	3	-	0.06	10	52xD36	4	1	Cone	M
3	VT-06	3	-	0.12	10	52xD36	6	1	Cone	M
4	VT-04A	3	-	0.03	10	52xD36	4	1	Cone	M
Project 2: Vortex tubes embedded into devices for temperature-climatic testing of equipment										
5	VV-0,5/ 1.5-4K	4	0.5	0.9	9	280x110x110	20	1	Cylinder	M
6	VV-0,5/ 1.5-25K	4	-	0.9*	9	150x70x90	10	1+4	Cylinder	M
7	RVTK-38/2	4	3.0	6.0	9	800x300x500	38	2	Cone-Cylinder	M
8	RVTK-38/4	4	6.0	12.0	9	800x600x500	38	4	Cone-Cylinder	M
Project 3: Vortex tubes of multiple use, 1-chamber and multi-chamber										
9	S056	6	0.15	0.3	1, 2, 8	100xD42	5	6	Cylinder	M
10	V058	-	0.2	0.4	1, 5	100x60x35	5	8	Cone-Cylinder	M
11	V058.2	6	0.35	0.7	1, 4	100x60x75	5	16	Cone-Cylinder	M
12	V072	-	0.1	0.2	8	130x50x18	7	2	Cylinder	P
13	RVTK-16/1	5	0.6	0.9	1	260x180x160	16	1	Cone-Cylinder	M
14	VV-0.5/A 1.5-4	5	0.5	0.9	1, 3, 4, 9	280x110x80	20	1	Cylinder	M
15	VVP-20	5	0.5	0.8	1, 2	350x80x70	20	1	Cone-Cylinder	P
16	VVP-20/1	5	0.5	0.9	1, 2	360x80x70	20	1	Cone-Cylinder	P
17	VVP-20A	5	0.6	1.1	6	310x60x60	20	1	Cone	P
18	VVP-10/2	6	0.3	0.5	1	270x80x18	10	2	Cone-Cylinder	P
19	V102	6	0.3	0.5	1, 2, 5	275x80x20	10	2	Cone-Cylinder	P
20	V201	5	0.7	1.1	1, 2, 5, 6	390x80x70	20	1	Cone-Cylinder	P
NEWEST LEVEL OF THE VORTEX TECHNOLOGY										
PROJECT 4: Multi-chamber modular vortex tubes of multiple use										
a) Vortex tubes of "universal" use containing a vortex module «052» or «102»										
21	M052A	7, 8	0.1	0.2	1-8	92x56x48	5	2	Cylinder	P
22	M052B	7, 8	0.1	0.2	1-8	115x56x42	5	2	Cylinder	P
23	M052C	7	0.1	0.2	1-8	105x56x42	5	2	Cylinder	P
24	M052D	7, 8	0.1	0.2	1-8	125x56x42	5	2	Cylinder	P
25	M102	7, 9	0.45	0.75	1-8	220x60x60	10	2	Cone-Cylinder	P
b) Vortex tubes of the "specialized" use containing 1, 2 or 5 vortex modules										
26	M052.2	7, 8	0.2	0.4	5, 8	150x115x70	5	4	Cylinder	P
27	M102.2	7	0.9	1.5	2, 3, 7	505x150x140	10	4	Cone-Cylinder	P
28	M104	7	0.9	1.5	3, 5, 6	290x60x60	10	4	Cone-Cylinder	P
29	M104.2	7	1.8	3.0	2, 3, 7	530x150x140	10	8	Cone-Cylinder	P
30	M104.5	7	4.5	7.5	2, 3	370x70x170	10	20	Cone-Cylinder	P

Notes:

• Allowed excessive pressure of compressed air at the VT's inlet P_c = (0.1-1.0) MPascal; recommended (working) pressure P_c = (0.2-0.7) MPascal; "economical" pressure P_c = (0.1-0.5) MPascal. A temperature of cold flow out of VT is from 290K to 250-230 (220)K depending on the position of the VT operation mode regulator and compressed air pressure. * – under pressure of compressed air P_c = 2.5 MPascal at the inlet to two-stage VT. M is metal, P is polymeric material.

• Fields of use: 1 – mechanical engineering technologies, tools engineering, industrial electronics: creation of "cold zones" on the surface or in the volume of a tool and/or material; cooling of control units of program machines, automatic lines, robotized units, no-man productions; 2 – hot and noxious productions: air curtains in working zones of painting chambers, forges, galvanic and metallurgy productions; deep mines: ventilation of dead-ends; 3 – foundry: cooling

of sand in devices with quickly hardening mixtures: storage of agricultural products: cooling of grain and dispersed products in temporary storehouses: 4 – furniture industry: blowing of cold air in a milling zone during facing slab production and in a zone of lacquer loading in lacquer-loading machines; 5 - self-propelled equipment for hot climate: cooling of working zones in crane cabins, in drillers' vans etc.; 6 – production of sheet materials: inflating of polyethylene film by cold flow; cooling of sheet rubber; glass production: inertialess creation of "cold zones"; 7 – transportation and storage of fruits and vegetables; 8 – food productions; transport, mining engineering; 9 – test devices; 10 – portable transport refrigerators, chillers of drinking water and many others.

Project 2: For the first time, adiabatic VTs with one-stage (D=20mm) and two-stage (D=10mm) expansion of compressed air are used for production testing. They effectively substituted ammonia refrigerating systems of foreign production. Nonadiabatic multi-chamber VTs of the new kind are used: with the rib chamber (D=38mm) in the form of a package of plates alternating with the ring gaskets.

Project 3: Appearance of competing suppliers of VTs for hundreds of plants-users was initiated; the largest plants (GAZ, KamAZ) bought VT lots for many times. Statistically important information on VT users was obtained [15]: "point"

cooling without use of the standard refrigeration equipment is used in many fields. In order to change to the new technological level (Project 4), the industrial "preferences" are defined.

Project 4: The first in the world multi-chamber VTs are used by food industry plants. They have a better combination of properties and will take a leading position pressing the "classical" VT (part 2). Production of VTs using the "small" and "big" modules has begun. Along with the growth of a suppliers' amount, a contest environment will be formed.

Note: VTs of single-purpose use were not considered in the article [7, 16-18].

Part 2. Industrial use

Vortex tubes do not use greenhouse gases and can replace standard refrigerating equipment in well grounded cases: in cases when its use is impossible due to operational, dimensional, cost or ecological limitations. VTs are used in industry (see the Table in Part 1) but are not presented in the literature as devices of quickly widening use yet.

Meeting this lack, we will consider some examples of VTs use when:
• appearance of a "point" vortex cooling generator gives obvious advantages, which do not require additional basing, to a refrigerating system of an object;
• advantages of VT introduction into the refrigerating system are not obvious and it is necessary to compare competing

technological solutions (for instance, in new application fields opened by development of the newest technological devices) to discover them.

First, we will introduce a simple method [1] of choice of a preferable refrigerating generator (among numerous available ones) based on a so called qualimetric evaluation of a technological solution [2]. It can be used at any stage:

• during development of a refrigerating system of an object taking into account specified operational conditions;
• during development of the industrial production;
• during processing of the long-tern use results.

Choice of a VORTEX TUBE according to a combination of technological and performance characteristics

Setting operational conditions and a field of use, it is necessary to quickly evaluate applicability or impropriety of VT (air chiller) in comparison with standard equipment for objects' cooling. Choosing a preferable solution, the characteristics which are important for a producer and a user will be taken into account in their totality [1]. An objective choice is possible, according to a value of an "integral index of quality" K of a refrigerating system. In a general case, K is a ratio of a whole obtained result R to all costs S.

We will take that the whole result (R) for the air-cooling system (technological conditioning) is a used part of its exergy cooling productivity and all costs (S) is a value of production and operational costs of the system. This approach allows showing an influence of the technological and operational factors on the result R and on the costs S (per year or a device's life): discovering a dependency of the "integral index of quality" K's value upon them. K's dimensionality is kWhour/rouble (or kWhour/US dollar):

$$K = \frac{R}{S} = \frac{(a \times h \times Q) \times A \times b \times (1 - \frac{n}{m})}{U \times f(t) \times p + (W \times A \times b) \times c} \ ,$$

where $\quad f(t) = \dfrac{E \times (1+E)^{t-1}}{(1-E)^{t} - 1} \ ,$

here: f(t) is a function of the reducing of the costs to a united time point; E is a normative coefficient of capital investments' efficiency (E ≈ 0,2); t is VT's life, years; A is a year time reserve; A = 8640 hours; b is a working time coefficient; h is a temperature dynamic coefficient, i.e. a part of working time without a time when a cooling system is reaching the operational temperature; a is an effective (actual) part

of cooling productivity used for taking away heat from a product, a cooled object; Q is exergy cooling productivity of a cooling generator, a cooling system, an air conditioning system, kW; U is costs for the industrial production of a cooling system, roubles, US dollars; c is electric energy cost, roubles/kWhour (USD/kW×h); W is energy costs per pour, kW/hour; m is average error-free running time, hour; n is average loss of a cooling system's working time per a repair, hour; p is a coefficient of the U costs' increase due to repairs.

A cooling generator (refrigerating system) with the highest K is preferable for the specified conditions. Choosing the best refrigerating system, thus, a combination of the characteristics is used, not single characteristics of competing technological solutions. All important characteristics are included into this combination: the operational (a, b, m, n, t, h, Q, W...) and technological (U, p ...) ones. The method was first used for basing, development and production mastering of the first serial vortex refrigerators and vortex tubes for them.

An example of choosing by the qualimetric evaluation method: let us change a vapor compression air conditioner to a vortex air cooler (VT) in a refrigerating system of a processor cabinet used under the environmental air temperature from 35C to 42C for a long time. If there is a pneumo system with an excessive resource near the VT, such a change leads to an increase of the integral quality index of the refrigerating system by 1.2 – 2.9 times. Hence, the change is advisable under the mentioned conditions.

Cooling of industrial electronics

As a duty of the refrigerating system, VT supplements an embedded ventilation system and turns on automatically or manually, when overheat can occur in electronic control units under high temperatures of the environmental air (due to a lack of a regular ventilation heating of cabinets under high air temperatures). VT

is used for this in different fields. Let us consider some examples (Fig. 1, 2):

Example 1. An automatic line "Renault-2" (210 equipment units united in a no-man technological chain for processing of 54 cylinder head models for automobile engines) was installed at Zavolzhsky Motor Plant. During the summer months, stoppages, spoilages, tool breakages began – time losses due to overheats in cabinets of the line's electronic control. Summer indoor temperature exceeds 35-40C; there is no central conditioning system.

Unstable operation of the automatic line during the hot season caused a threat of the year production plans' wrecking in adjacent enterprises of the industry. In December 1984, television of Gorky city (and television of other regions) showed a film about production use of the invention group – "Azarov's vortex tubes" for test equipment, transport refrigerators, heat protection equipment etc.

The USSR Ministry of automobile production immediately sent a petition for emergency scientific and technological help to the plant, according to a community agreement. The same day, the developer gave representatives of the plant a VT prototype, its working drafts and a user instruction.

(Note: VT has been developed for heat-protection clothing used during repair of energy and metallurgy objects. They were use only in this field. Its availability for cooling of electronic control cabinets had to be defined but the emergency petition of the Ministry gave no time to search or develop an alternative solution).

ZMP produced first dozens of VTs (p.1, in Table: #14) for its needs (and need of other similar plants which faced the same problem of "summer" overheats of their electronics). In January 1985, 17 VTs were installed in all control cabinets of the line. Due to remoteness of the plant and emergency of the work, production and launching of the VTs in this case (unlike many others, see below) was carried out by the plant's forces only, without help of the developer.

But it only made the result obtained by the plant, which knew about the industrial use of VT from the television film, more convincing: the line's operation became stable, stoppages and spoilages caused by overheat of the electronics disappeared; annual capacity of "Renault-2" increased by 12.6% that was equal to additional operation of the line during 1.5 months a year. (There were no losses due to spoilage and change of chip cards).

In this case, complete use of cold produced by VTs was practically 100%. The air conditioning system in a huge shop (with a square of 0.2 hectares) would have been more power-consuming by hundreds times and more expensive by thousands times, according to the amount of initial capital investments.

In order to compensate the sum of all heat emissions in the shop (from electric motors, insolation etc.), cooling productivity of the air conditioning system must be hundreds times more than the one which 17 VTs can create for point cooling of the electronic units. Thus, VTs solve the problem of maintenance of a complicated technological system's stable operation and, during hot periods, they act as a "multi-point" duty cooling system supplementing the regular cabinets' ventilation cooling system.

Example 2. The use of VT consistently widens at baker and confectioner factories (in Table: # 15, 16, 20; Fig. 2) for cooling of processors which control factories' compression refrigerating machines. Processor cabinets operate in rooms with high temperature, where a system of total air conditioning is unavailable due to energy and economical limitations. Specialists of these factories consider VTs as reliable and the most available solution of the problem of trouble-free electronics' operation maintenance.
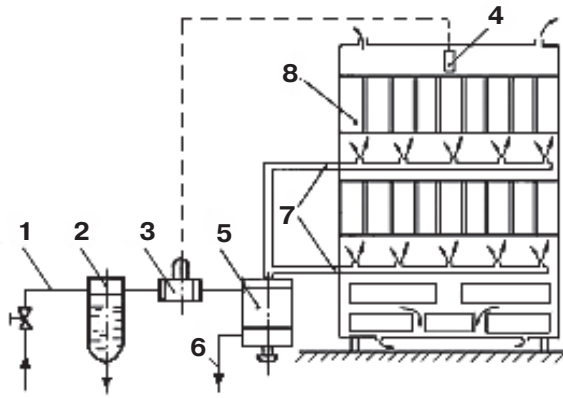
Fig. 1. A scheme of electronic cabinet cooling with VT(regular cabinet ventilators are not shown)

1 – a pneumo net of the plant, 2 – a collector- entrainment separator, 3 – an electric pneumatic valve («open-close»), 4 – a temperature sensor, 5 – V201, M102 VT models; 6 – drainage of hot flow out of the shop's, 7 – «cold perforated airways» in heat-intensive cabinet zones, 8 – chip cards – zones of local microclimate.

a.

b.

Fig. 2. Industrial electronics cooling at food industry enterprises

a. Vortex air cooler V201 (project 3) in a microprocessor cabinet of a big refrigerating device for a chamber of low-temperature storage of semi-prepared foods.

b. A vortex air cooling system of a microprocessor cabinet is introduced to a foreign guest.

Example 3. A big automatic line for cardboard production made by specialists of the USA, Germany and the USSR in Leningrad region.

Air moisture is up to 90% and process ammonia concentration is high in a shop. Due to the overheating of electronic control units, the line's operation was unstable: regular compression air conditioners "Mesurex", USA, (embedded into processor cabinets) stopped working. Heat failures of this complex technological system were impossible more than 15 years ago by a simple change of freon conditioners to the same amount of VTs (in Table: #13). The change has been carried out by the factory after getting consultation of the VT developer.

The users expressed a desire to introduce VTs into the system of cabinets' cooling as a main or additional tool for cooling of electronics at the following lines.

Example 4. Electronic control units at main production lines of KamAZ motor plant were supplemented by coolers (in Table: #19) and, in 2 months, 9 KamAZ plants stated their need for 3,162 vortex coolers.

Example 5. At a Moscow plant AZLK, in 1980s, some VTs were installed into processor cabinets of program machines (in Table: # 15, 16) in order to exclude overheating. According to the obtained result, the plant evaluated its need as a need for 3,000 VTs of this type (after modernization of the plant's pneumo net).

Example 6. An abstract from a letter of "Energomekhanichesky zavod" plant's chief engineer, E.N. Turchin (# 726 from

17.06.2003): "Vortex coolers VVP-20/1 are installed at posts of CNC machines and also at industrial electronic units "FANUK" (produced in Japan) and have been used continuously since 1995 to the present time providing for the necessary cooling of the mentioned objects. We have no claims concerning the use of the vortex coolers".

VORTEX TUBES in food industry

The food industry is a large-scale user of different air coolers and heaters. The VT use continuously widens here for cooling of electronic control units (Fig. 1, 2). They are also directly used in food products production methods (Fig. 3 and 4).

Example 7. Blowing of cold air flow from a VT to the drum's technological zone decreases duration of the icing application process (Fig. 3). This was practically confirmed by specialists of some Saint Petersburg and Moscow confectioneries.

Example 8. Caramel, which was preliminarily cooled on a production line (by a stationary cooling machine), is additionally cooled during hot seasons by VTs (Fig. 4). This makes it easier to divide caramel and improves the product's quality.

VORTEX TUBES at self-powered equipment

Example 9. In cabins of excavators at complex ore mines, a "pack" of VTs is used. They cool the operator's working zone. At the same time, cabin pressurization preventing harmful complex ore dust into the cabin is carried out (Fig. 6).

Examples considered above show that determinative criteria during the choosing of a cold air source are particular performance attributes of VT: compactness and inertialess operation (Fig. 1-4); a wide range of cold flow temperatures (Fig. 5); an ability to create excessive pressure in a relatively close volume along with its cooling – the so called cabin pressurization (Fig. 6).

There are a lot of fields where VT can be used if only an oil-free compressor with a small reduction degree and the necessary efficiency is used for its supply (Fig. 7, 8).

Advantages of the cooling system with VTs are not obvious: it is necessary to carry out an analysis taking into account the most important (or all) technological or performance characteristics, for example, on the basis of the method of qualimetric comparison of competing technological solutions, which has been shown in the beginning in the article.

The VT use in cooling systems, according to Fig. 7 and 8, under experimental-industrial conditions, are not examined but their competitive ability mainly depends not only on VT but also on characteristics of other important cooling system elements: pos. 1-3 (Fig. 7) and pos. 1-4 (Fig. 8). In these cases, introduction of VT into air cooling system of an object can be easily substantiated for especially stringent terms of the system use which condition:

• nonoperability of the "alternative" vapor compression refrigerating equipment under extremely high temperatures and vibrations at an object, for instance, when search teams work in deserts (Fig. 7);
• complete absence of maintenance of the vapor compression refrigerating equipment and impossibility to refill it by freon, for example, during episodic transfer of agricultural products by farmers from under-populated mountain regions to cities (Fig. 8).

VORTEX DEVICES for machine engineering technology

Example 10. We will consider only one VT use in the machine engineering technology [3] though different uses are available (Fig. 9).

If a chamber for low-temperature influence on a material or a product is used rarely, it makes no sense to buy an expensive low-

a.

Fig. 4. During hot summer, caramel is preliminarily cooled at the confectionery before its division:

1 and 5 – pneumo net elements, 2 – a vortex cooler (M052V, M052C, M102,V201), 3 – a hot air flow tap, 4 – a jacket-airway with a notched outlet above the production line (after a "regular" refrigerating machine-air cooler).
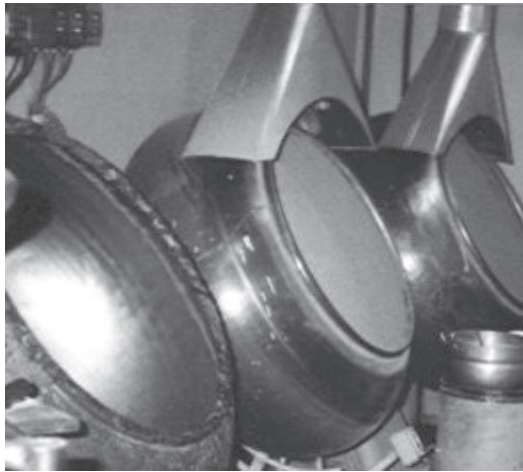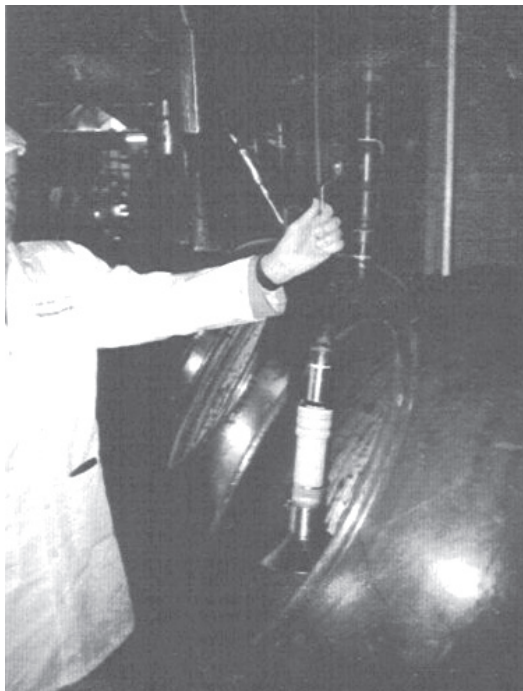
b.

Fig. 3. At confectioneries, VTs increase the process of icing application on nuts, raisins and other dispersed stuff in rotating drums by 3-4 times

a. Drums at icing application shop.

b. In order to cool a product locally, an operator inserts a VT (M102, M104) fixed on a turning post and connected to a source of compressed air – a factory's pneumo net. There is a cone perforated flared end for cooling flow supply onto a product in the drum at the cold air outlet of the VT.

temperature cooling machine with exacting maintenance requirements. In this case, it is enough to use VTs assembled according to a scheme, which allows utilizing a part of cooling productivity which was not used directly in the low-temperature chamber.

Micro-coolers for tool engineering industry

According to a thoroughly discussed strategy of machine engineering development to 2010, tool engineering plays the leading role: development of its export oriented potential was planned; possibilities to increase program machines supply to India, Africa's countries and other regions with hot climate and strict requirements to efficiency of cooling ventilation system for control micro-processors (and a "niche" for VT use during multi-point cooling of the most important cabinet zones) was evaluated. VT gives heat reliability to mechanical processing equipment with minimal costs, makes operation of a machine (line, unit) independent on the environmental temperature changes, and improves
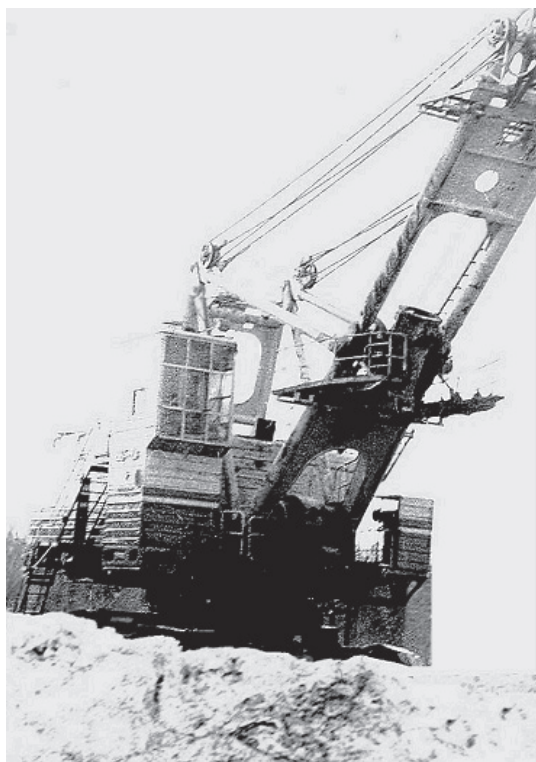
Fig. 6. In order to improve working conditions in cabins of power and pneumo provided excavators at complex ore mines, a unit from two or four VTs of VVP-20/1 model is used. They carry out cabin pressurization and air cooling-heating in the working zone: a powerful excavator at Ust-Talovka mine.
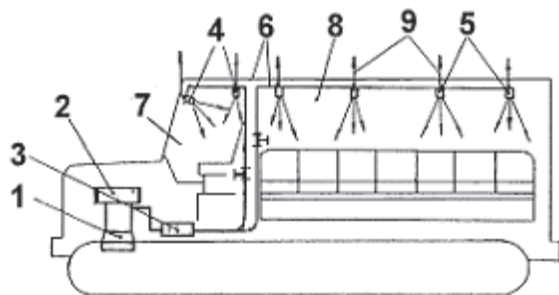
Fig. 7. "Multi-point" cooling of cabin 7 or cabin 8 of a self-powered object used under extreme temperature conditions (in deserts and other hot regions):

1, 2, 3 − a system of compressed air preparation, 4, 5 − VTs in the cabins (M052A, V, C, D or M102), 6 − routing of compressed air, 9 − hot air drainage.

performance attributes of complex technological systems.

Vortex coolers, thus, would widen export possibilities of expensive equipment without raising its price. A cooling ventilation system supplemented by one or a few vortex micro-coolers in heat-intensive zones of the processor cabinet is useful not only as an export product. Summer becomes hotter in a considerable part of Russia (while there are no air conditioning systems in most production shops). A need for micro-coolers for tool engineering (in the country and for export), according to the considered developments strategy, by a minimal evaluation, is about 20,000 items a year and it can greatly increase to 2010.

A big machine-tool plant or a supplier of micro-processor cabinets can be a producer: an enterprise with wide production connections in its field and established export connections. First lots of the modular VTs (M052A, V, C, D) can be used by the producer in its shops and then supplied by the producer to the users in adjusting fields. The following lots of VTs will be embedded into products; for example, into the micro-processor cabinets supplied to the users in the frame of the established production connections to Russia, Byelorussia, Kazakhstan, and Ukraine (all these countries have

Fig. 8. Cooling of automobile fruit carrier's chamber to +12C...+3C:

1, 2, 3, 4 − a diesel-generator, an electric compressor, a radiator, a compressed air dryer, 5 − hot air drainage, 6 − VTs of M102, M104, M102.2, or M104.2 models.

developed tool engineering). Then all models of the modular VTs of universal use will be used for widening export. At that time, the plants-producers will also have orders for the modular VTs of particular use.

Other uses

Fig. 10 shows a possibility to use VTs for cooling of:
• agricultural products temporarily stored in boxes (when a specialized cooling equipment is absent but there is a pneumo net around);
• dead-ends in mines and tunnels during drifting in hot regions;
• working zones of repairmen, welders, painters, during fitting-out of a ship; during works in tank ship's tanks (where tank shell temperature can exceed 60C).

Conclusion

1. The Russian industry has long-term experience of successful VT use in different fields:
• in air curtains at fixed working places

in metallurgy, galvanic and tanning industries, painting chambers;
• in electronic units cooling systems in control systems;
• during icing application onto confectionery products in drums and during caramel division (split);
• in portable transport refrigerators for a cabin;
• in chambers for temperature-climatic testing of products;
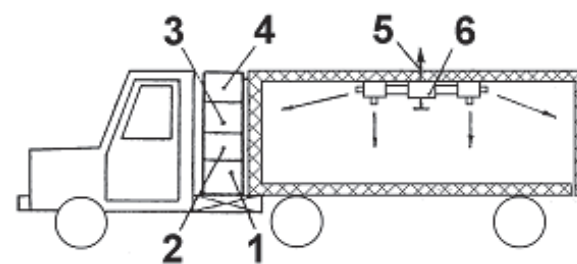• in the furniture industry, during high-speed application of a glue strip and lacquer-loading machines' operation;
• in cabins of a mountain combine; a self-powered object used under extreme conditions; a charging crane in metallurgy; an excavator;
• in shipbuilding and dockyards for improvement of working conditions in a small room;
• in rooms for short-term storage of agricultural products, in boxes and others.

2. With minimal time and costs, the use of VTs gives large-scale economical and ecological results. Reducing atmospheric emissions of greenhouse gases from the standard refrigerating equipment, it is necessary to consider VT as a device with high development potential which is not discovered yet. For example:
• multi-point vortex cooling of heat-intensive objects in well grounded cases makes it unnecessary to build an expensive

Fig. 9. A regenerative-cascade scheme of the low-temperature chamber's air cooling 10 for cold detail hardening rarely used in the machine engineering technology

1, 2, 3, 4, 7 − a system of compressed air preparation; 5, 6 − VT models M102, V201 (first and second cascades); 8, 9 − counterflow recuperative heat-exchangers.

Fig. 10. Cold air ventilation of tunnels and dead-ends in deep mines and also temporary store houses, in case there is no standard refrigerating equipment:

1 − VTs of model M102, M104, M104A, M102.2, M104.2, and M104.5; 2 − a mine's (or store house's) pneumo net; 3 − hot air drainage.

central conditioning system at a plant;
• if an object needs local cooling for operation without maintenance under extremely high temperatures, vibrations, dustiness, gassiness, the use of VT has no alternatives because the standard refrigerating equipment is of little avail under these conditions.

3. I began the comprehensive experimental research of my first VTs (which were already industrially produced and used; see part 1, Project 1) guided by the first vortex technology specialists of the country: Professors Vladimir Sergeevitch Martynovsky and Valentin Petrovitch Alekseev [4, 5]. They and Alexander Petrovitch Merkulov [6, 7], vortex technology specialists of the first generation, created a scientific basis for us, researchers of the second generation. Thanks to this basis, both theory and practice of VT developed successfully. Today growth and modernization of the production economic sector would help accelerated promotion of miniature VTs. Production of the modular VTs will widen when Russian economics will be re-oriented from raw materials export to effective commercialization of the newest technologies.

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ARTIFICIAL TORNADO

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Do you want to get an artificial tornado? Fix a diaphragm in a tube, fix a jet next to it, at a tangent to the internal tube's surface, connect the jet to a factory pneumo net and... miracles will begin: one end of the tube burns your hands while hoar-frost forms on the surface of another. Are these miracles?

Cyclone dust separators have been operating at thousands of metallurgy, cement, and woodworking enterprises for a long time: clean air emitted to the atmosphere from technological zones. As everyone thought, there was a high-speed tornado in the cyclone, nothing else. But French engineer-metallurgist, J. Ranque, did not believe it and investigated. It turned out to be that, in a turbulent tornado, a spontaneous heat flow from the axis to the periphery occurs: a flow's nucleus is always colder than the periphery.

The first vortex tube patented by J. Ranque is the same cyclone but it was reconstructed in order to obtain maximal cold in the axial part of the vortex flow and, accordingly, in the periphery one. The temperature difference between the hottest and the coldest layers in the vortex tube can be considerable higher than 100C. It is amazing that these layers co-exist near each other in the centrifugal force's field – at a distance of some millimeters from each other!

Temperature division of a tornado (the "vortex effect") is the "cheapest" discovery of the XX century which did not require thousands of people and billions of funds. It is cheap, with various constructive realizations, with inexhaustible industrial applications. The forest realization is a vortex tube as an ecologically clean refrigerating machine without moving wearable parts which does not use greenhouse and ozone-destructive gases (freons) [1, 4].

Today there are hundreds of inventions in the world concerning the vortex tubes and more than a half of them were made in Russia (the USSR). Scientific and technical trend is "expansive". I can judge by my practice as a researcher, developer of new kinds of production. I have 160 inventions: traditional and new refrigerating equipment which is ecologically clean; transport machine engineering; technical acoustics and testing equipment; micro-chargers with a minimal number of moving parts or without any moving parts for operation in zero gravity and others. More than a half of the inventions and projects are related to multi-purpose refrigerating equipment – inertialess and trouble-free in operation, cheap in production, non-maintained in use vortex tubes: air coolers for all fields of machine engineering, food industry and agriculture, transport and testing equipment. This is not only a refrigerating machine of the multi-purpose use.

The vortex tube can be reconstructed and turned into an elementary vacuum device (up to 0.01 – 0.1 atm) for non-ferrous metallurgy; a component separator for gas industry and ammonia production; a drop separator and a dryer for compressed air lines; a source of strong (up to 162 decibels) acoustic irradiation for testing equipment and intensification of technological processes; a source of a tornado nucleus' glow and also a source of X-ray emission, gravitation anomalies and many other effects – for the pleasure of physicists carrying out fundamental researches.

A tornado in the atmosphere, an artificial tornado in a tube is a multi-factor miracle which put many question for researchers for many years. But we already use it. Let us mark out a "temperature" component only – Ranque's effect: even the simplest vortex tube supplied by compressed air from a factory pneumo net (as an additional consumer who requires purchasing and installing an air compressor) allows producing a cold air flow with a temperature from 20C to -120C and/or a hot one with a temperature from 50C to 120C. Many factory technological problems can be solved by different kinds of vortex tubes. It was necessary only to prove it by practice. An impulse was needed in order to begin a self-organizing process of vortex equipment expansion [5, 8].

Sixty plants got free design drawings of original air coolers-heaters – 12 models of vortex tubes of different construction. More than 20 years ago, the first thousands of vortex tubes for plants-users' needs were produced in Vyborg, Leningrad ("Leninets", Leningrad engineering plant and many others), Zavolzhye, Vilnius, Minsk, Ulan-Ude, Novosibirsk **and dozens of other cities**. At the same time, from 6 to 9 enterprises launched **long-term serial production** of multi-purpose "Azarov's micro air conditioners": in Kaluga and Rostov-on-Don (two plants in each city), Kirishi, Saint Petersburg and others. One of the first famous uses was at Zavolzhsky plant called "Avtodvigatel". My vortex tubes have been fixed at all 17 micro-processor control cabinets of a huge automatic line "Renault-2" (210

Today producing companies can industrially develop
PRODUCTS OF THE NEWEST LEVEL OF THE VORTEX TECHNOLOGY
The first in the world
MODULAR MULTI-CHAMBER VORTEX TUBES

Modular vortex tubes with 1, 2 or 5 modules «052» or «102/104»	Maximal chilling productivity, kW		Fields of use (see the addendixes)	Overall dimensions, mm	VORTEX CHAMBERS (VC)		
	P_c=0,41 Mpascal	P_c=0,69 Mpascal			Dia-meter, mm	Amount of VTs	Form

a) Vortex tubes of "universal" use containing a vortex module «052» or «102»

M052A	0.1	0.2	1-8, др.	92x56x48	5	2	Cylinder
M052B	0.1	0.2	1-8, др.	115x56x42	5	2	Cylinder
M052C	0.1	0.2	1-8, др.	105x56x42	5	2	Cylinder
M052D	0.1	0.2	1-8, др.	125x56x42	5	2	Cylinder
M102	0.45	0.75	1-8, др.	220x60x60	10	2	Cone-Cylinder

b) Vortex tubes of the "specialized" use containing 1, 2 or 5 vortex modules

M052.2	0.2	0.4	5, 8	150x115x70	5	4	Cylinder
M102.2	0.9	1.5	2, 3, 7	505x150x140	10	4	Cone-Cylinder
M104	0.9	1.5	3, 5, 6	290x60x60	10	4	Cone-Cylinder
M104.2	1.8	3.0	2, 3, 7	530x150x140	10	8	Cone-Cylinder
M104.5	4.5	7.5	2, 3	370x70x170	10	20	Cone-Cylinder

Notes:

Allowed excessive pressure of compressed air at the VT's inlet P_c = (0.1-1.0) MPascal; recommended (working) pressure P_c = (0.2-0.7) MPascal; "economical" pressure P_c = (0.1-0.5) MPascal. A cold flow temperature out of VT is from 290K to 250-230 (220)K depending on the position of the VT operation mode regulator and compressed air pressure.

equipment units connected in a people-less technological chain) there. And production of cylinder heads became really people-less: despite summer heat in a shop, overheats of electronics, false commands of electronics, spoilages, stoppages and line's repairs stopped. Costs of the vortex tubes were very small but annual productivity of the line increased by 12.6% which is equal to its additional operation during 1.5 months per year (without the mentioned losses). By the end of 1990, there already were more than 200 plants-users of the vortex tubes (according to the data of Ministry of electronic industry of the USSR): the devices became available for any plant. In the end of 1990, Leningrad regional council and Council of Leningrad Polytechnic Institute nominated developer A.I. Azarov for awarding him by the honorary title of an honoured inventor of the USSR. According to incomplete data, there are more than 800 plants-users in 160 cities now: in Saint Petersburg 44 plants were taking into account; in Moscow – 48; in Volgograd – 16; both in Rostov-on-Don and Nizhniy Novgorod – 18; in Voronezh – 7; in Yekaterinburg, Cheliabinsk, and Samara – 5 plants in each city and so on. Among Russian users, 42% of the plants are of electronic industry, engineering tools industry, chemical and oil-gas mechanical engineering; 10 % are plants of polygraphy and plastic processing; 10 % are enterprises of confectionary industry, dairy industry, bread-making plants, farms and others. First, plants of all machine engineering industry used the vortex tubes. Now new users are food and similar productions: for example, "Neva" company in Saint Petersburg, bread-making plants # 5 and # 11 in Nizhniy Novgorod: a biscuits factory in Volgograd and so on. This is a continuation of the process started in aerospace industry [9-11].

The vortex tubes are irreplaceable where it is impossible to install a big freon air conditioned which required special maintenance: in painting chambers and galvanic units; in hot shops of metallurgical and cement industry; in a bread-making zone and many others. Appearance of new technologies with strong point heat emission requires "point" non-maintained cooling generators. The miniature vortex tubes find no match under extreme service conditions [12 – 14].

Fields of use (some examples)

1 – mechanical engineering technologies, engineering of tools, industrial electronics: creation of "cold zones" on the surface or in the volume of a tool and/or material; cooling of control units of program machines, automatic lines, robotized units, no-man productions;
2 – hot and noxious productions: air curtains in working zones of painting chambers, forges, galvanic and metallurgy productions; deep mines: ventilation of dead-ends;
3 – foundry: cooling of sand in devices with quickly hardening mixtures: storage of agricultural products: cooling of grain and dispersed products in temporary storehouses;
4 – furniture industry: blowing of cold air in a milling zone during facing slab production and in a zone of lacquer loading in lacquer-loading machines;
5 - self-propelled equipment for hot climate: cooling of working zones in crane cabins, in drillers' vans etc.;
6 – production of sheet materials: inflating of polyethylene film by cold flow; cooling of sheet rubber; glass production: inertialess creation of "cold zones" for stuff during setting of a continuous technological process;
7 – transportation and storage of fruits and vegetables: motor fruit carriers and fruit storehouses of small ships;
8 – food productions; transport, mining engineering

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Companies interested in production and use of vortex tubes in production process for point cooling can contact the author:

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Vortex Fuel Less Power Engineering

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In 2004 our company ordered from Degtiarev's factory, which is placed in Kovrov city, Russia, a new experimental electro generator. This contact was recommended by Yu. S.Potapov. The setup was made of an air compressor, helicopter turbine, reductor and standard 3-phase 60KW electro generator. The factory was not in force to produce the designed device, which was planned to be operable in autonomous fuel-less mode. We agreed with the producer delivery of all parts to our laboratory, and for several months we tried to develop the system. Fig.1 is a photo of the testing. The device was quite workable under 3KW load. It was not autonomous mode of operation but we found technical methods to increase power output by vortex processes. Then, due to some organizing and technical problems we sold this device to another company.

Fig. 1

This project was planned as joint research work with Yu.S.Potapov but our collaboration on this project failed. Now we have our own theoretical basis for this work and this conception is presented here for the first time. The goal of this publication is to assign the priorities for our company, Faraday Lab Ltd.

It is known that Ranque vortex tube allows to separate incoming air flow to hot and cold flows. Let's assume that it is a process with a factor 0.5, i.e. half of the incoming mass is separated to cold flow and another half of mass is to get the hot flow.

The velocity of molecules depends on the temperature and we can calculate it, formula F.1 (for example, for 300 K):

$$V = ((3 \times 1.38 \times 10^{-23} \times 300 \times 6.02 \times 10^{23})/29 \times 10^{-3})^{1/2}$$
$$V = 507 \ (m/s) \qquad\qquad F.1$$

Kinetic energy of working body (air of 300K) can be calculated by formula F.2

$$E_{K1} = (mV_1^2)/2 = (m\ 507^2)/2 = 128524m \qquad F.2$$

We assumed that hot flow mass is 2 times less than incoming mass of air. Hence we can use formula F.3 to calculate kinetic energy of the hot air mass:

$$E_{K2} = (mV_2^2)/4 \qquad\qquad F.3$$

We set a problem to get kinetic energy of the hot mass of air to be more than kinetic energy of the incoming air mass, F.4

$$K = (E_{K2}/E_{K1}) > 1 \qquad\qquad F.4$$

The temperature dependence of energy is linear, and if the mass is decreased twice, then to keep formula F.4 in force, we must increase the temperature more than twice, F.5.

$$(T_2/T_1) > 2 \qquad\qquad F.5$$

For example, critical temperature for 300K incoming air flow is 600K, i.e. total
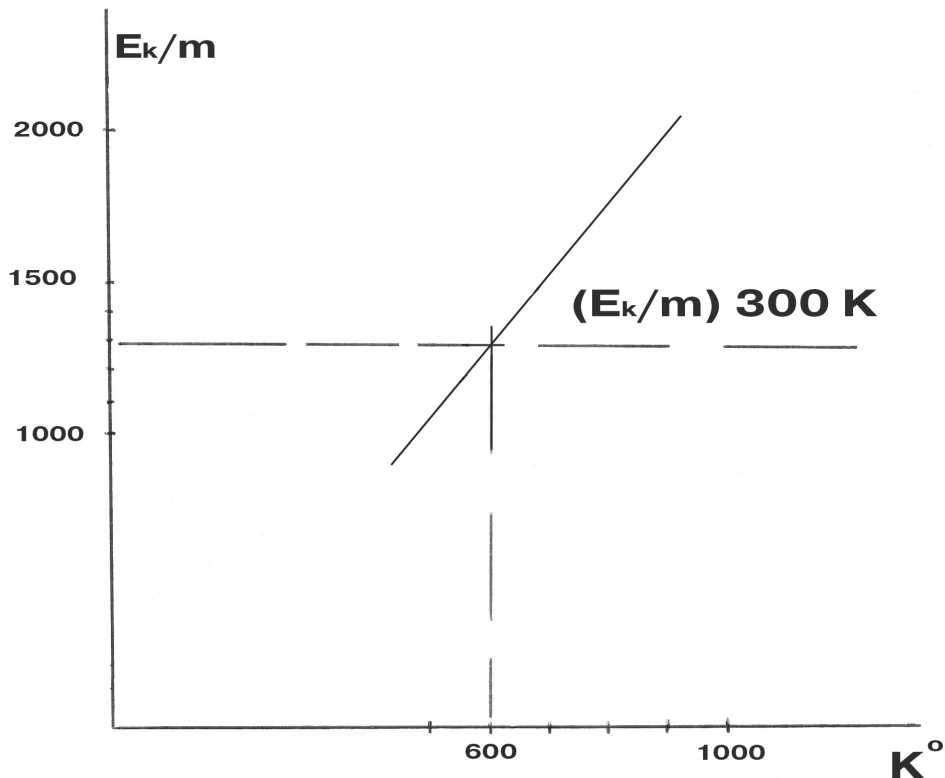
Fig. 2. Critical temperature for 300K incoming air flow is 600 K.

kinetic energy of more than 600K the hot half of the flow is more than the total kinetic energy of the incoming 300K flow. It is clear that for other factors of separation the critical temperature is another.

Fig. 2 is diagram of kinetic energy. Estimated effect for 1000K hot half of an air mass is an over-unity mode of operation with efficiency 167%.

Conclusions: The method is published here as physical background of a possibility of practical application of the vortex processes to get separation of air molecules (or other gases) to hot and cold flows, and in this way, to get useful work in a load, for example in a turbine, with equivalent cooling of environmental air. Premises of this method were made by Maxwell, who mentioned a possibility of sorting gas molecules to hot and cold molecules. This sorting is possible also due to laminarization of the air flow (you can find detalization of this approach in Volodko's articles published in our magazine).

Our company is interested to develop research on the topic. We need business contacts with producers of microturbines. Also we are interested to establish contacts with producers of high RPM electro generators (9,000 rpm or more).

This technology is not a perpetuum mobile idea, and it is in full accordance with the conservation of energy law since we can see that the turbine output power is equivalent of cold-productivity of this system. Practical application of the technology is depend on designing of the vortex tubes for extremely high hot temperatures. There are no fundamental prohibitions for this technology to develop fuel-less power generators.

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Gravity-inertial engine (GIE)

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Due to the use of traditional energy sources of organic origin, mankind is threatened by ecological disaster now. This is why the search of renewable, ecologically clean alternative energy sources is intensified now.

One of these sources is the Earth's gravity field, which is used by mankind for production of mechanical and electrical energy in hydropower engineering for a lot time. Due to the energy of the gravity field, falling water rotates turbines at hydroelectric power stations, wheels of water lifters and water-mills.

Construction of hydroelectric power stations in their classical form is a very long-term and expensive action damaging the environment due to flooding of huge areas of dry land, which could be used for the production of agricultural products or for other kinds of economic activity. Besides, artificial seas influence local climatic conditions and violate ecological balance in nature. This leads to unpredictable results.

Actually, there are no examples of the real use of gravity field's energy for practical need of mankind today.

The best scientists tried to use gravity field as a source of endless energy for many centuries. They created skilful devices, which were mostly called "perpetual motion machines". But they could not solve the problems connected with the unidirectionality of the gravity field. Withing the limits of classical views on Newton's mechanics, "perpetual motion machines" are impossible because they violate the law of energy conservation. After Paris Academy of Sciences had decided to stop considering designs of "perpetual motion machines" as they contradict physical laws, engineers stopped working on these problems. Due to this, the tasks of getting the inexhaustible energy of the gravity field were given to amateurs, who had no necessary knowledge. As a result, useful solutions embodied in

devices, which could use the unidirectional energy of Earth, were not suggested.

As time goes by, more problems appeared which could not be explained by classical Newton's mechanics. For example, we see demonstrations of inertia forces' action everywhere, but the classical mechanics cannot explain what their nature is. Within the limits of the classical mechanics, it is impossible to design mechanisms and devices, which could move in space due to their internal forces. But such mechanisms have been designed and showed their practical working capacity. The founders of the research and creation of the so called "inertia engines" are Soviet scientists. A certain contribution to the creation of the theory of "inertia engines" and obtaining practical results was made by the author of the given invention.

According to the statement of Doctor of Technical Sciences Lev Sapogin, present-day quantum (wave) mechanics change everything completely. Other correlations and rules act here. Within the limits of the so called unitary quantum theory, the law of energy conservation, which is a barrier on the path to designing of the "perpetual motion machine", does not work.

The greatest victory of the human mind over the energy problems could be a design of stationery or mobile devices with a power from a few kW to hundreds of thousands kW, which will be able to convert the energy of gravity field into handy kinds of energy (for instance, mechanical, electrical or heat energy) used by people for practical purposes.

As a result of the almost 50-years research, the author created an idea of such devices' design. In the end of the last century, theoretical prerequisites for creation of two-stroke and three-stroke power packs of gravity-inertial engines. Today a two-stroke power pack with a mass of 70 kg and a pilot unit for setting up and test of the engine have been built. In connection with absence of practical financing, they have been built using anything available. The

building protracted for 6 years instead of real 6 months.

Tests of the two-stroke power pack carried out in the end of 2000 – the beginning of 2003 have showed its capacity for work and confirmed the theoretical prerequisites, which were its foundation. This opened prospects for the building of some types of GIEs as early as in this year. The invention is pioneer, unique and has no analogues in the world.

The tests of the two-stroke power pack gave real evidence of the fact that the Earth's gravity field (as well as gravity field of other planets) is really a powerful energy source. Its energy must be used for production of cheap electric energy by GIE as soon as possible.

The two (three)-stroke power pack is a reactor located in a solid steel body of the according design without any radioactive components. There are mechanisms of control of the reactor's work, mechanisms of mechanical energy transfer on the reactor.

GIE includes the two or three-stroke power packs connected with highly effective energy recuperators.

The principle of GIE's operation is unique. It is based on new solutions, which are necessary to know in order to reproduce the device, so unauthorized persons cannot do it now.

The gravity-inertial engines built on the basis of the two or three-stroke power packs will be the most ecologically clean engines, which will rotate electric generators using no fuel. Their energy sources will be huge, inexhaustible energy of the Earth's gravity field. A single electric power station with a power of 5 – 15 kW will be able to completely supple an apartment house in any place where a man can live. There are almost no fundamental limitations for building GIEs of more power.

News

Diagravitic Effect

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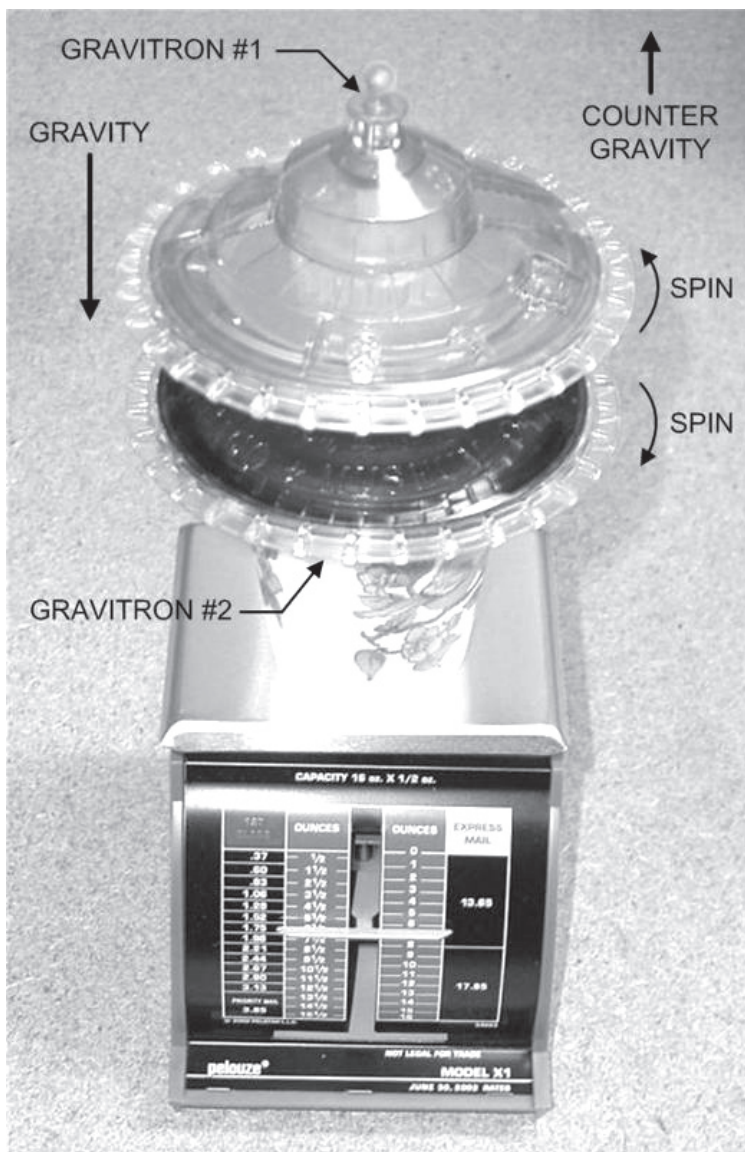Inspired by Tim Ventura's of American Antivravity information about the NAZI Bell Experiment, I decided to try a simple experiment. I managed to capture by photo what I call a "Diagravitic Effect" (Fig. 1)

Shown on this photo are two Gravitrons glued together and placed on a spring scale. These Gravitrons are available at the Museum of Science and Industry (http://www.roboticsonline.com/public/articles/archivedetails.cfm?id=1521)

What I discovered is an effect similar to diamagnetism. In diamagnetism, two spinning/counter-spinning magnetic fields cancel each other such that the element has NO net magnetic fiald. However, applying an external magnetic field to the spinning system causes the element to produce a "counter-magnetic field". The element Bismuth has this property. I observed a similar gravitational effect, which I call "diagravitic" simply by spinning/counter-spinning "non-magnetic" discs. The difference I observed, though tiny, is shown on http://www.intalek.com/Pictures/DiagraviticComparison.jpg.

The theory is that two spinning/counter-spinning discs produce a temporal effect, which generates a counter-gravitic force against gravity. This ISN'T antigravitational, but a counteracting or opposing gravitational force.

Fig.1

Kure Tekko Motor

On Fig. 1 is a diagram of a pulse motor announced by the Japanese engineering firm, Kure Tekko, in the June 1979 Popular Science. Its unique design requires only a pulse of energy when the permanent magnet rotor is in proximity to the electromagnet. The motor has been tested and had the potential to substantially reduce the need for batteries in electric cars. Let's note that this principle was used in many high efficient electro generators. The gradient of pressure from stator to rotor is made due to the changing gap between stator and rotor. It is the reason of additional acceleration of the rotor.
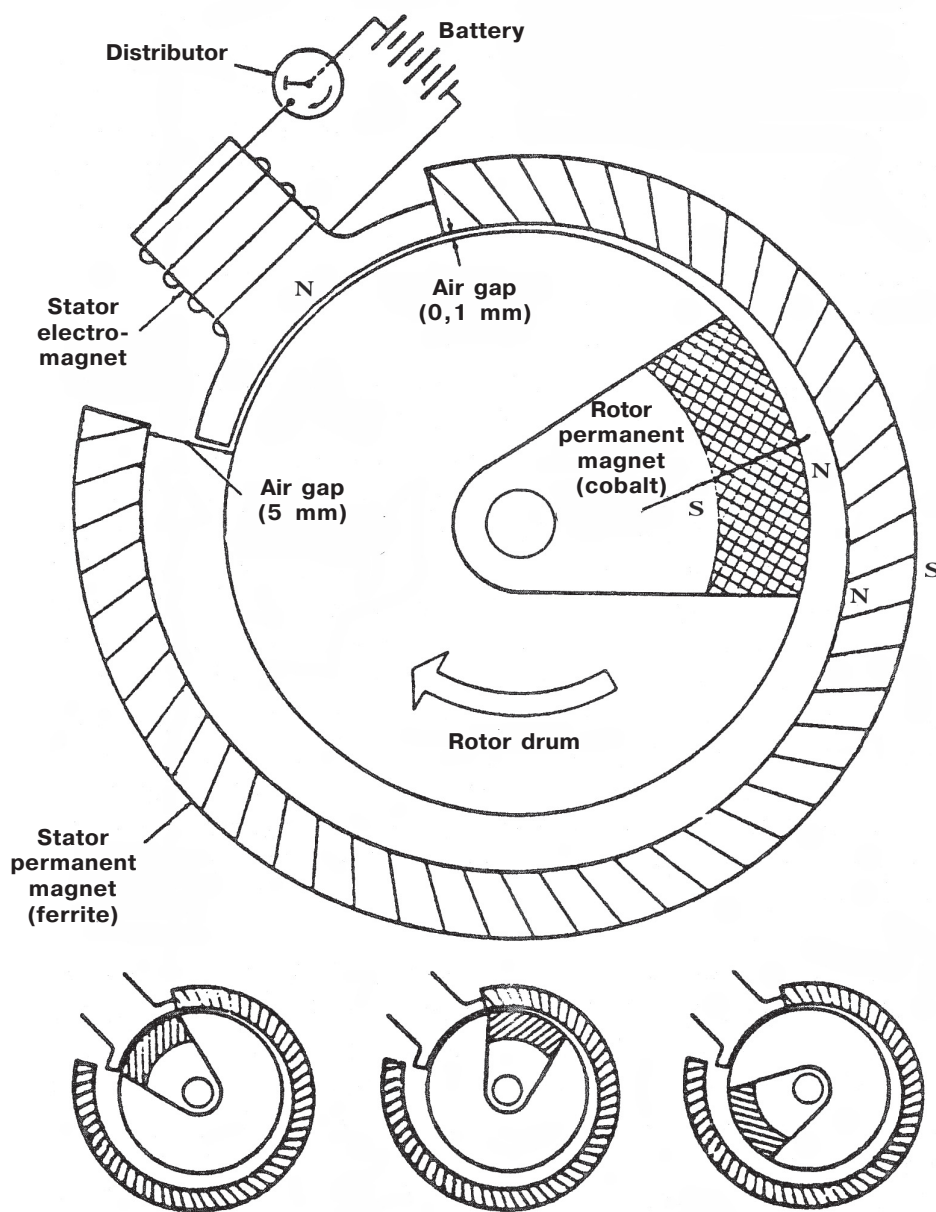

Fig. 1

The lessons of history of the second law of thermodynamics

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I have read a recently published book by Evgeny Grogorievich Oparin [1] with great interest. In my opinion, the book is both a full scientific work devoted to one of the global problems of thermodynamics and a work devoted to history of scientific development of this problem. Such an analysis of historical development of a big scientific field, which has a determinative importance for this field, for all sciences and technology and also for philosophy, is not so often in scientific and popular scientific literature.

The author did not use a standard method of retelling and analysis of prominent scientists' biographies; instead, he could express and show readers something more important: a drama of ideas, which has been secretly carried out for more than 1.5 hundred years in thermodynamics. Most people do not understand and are not interested in this science considering it boring and abstract. Not many people understand that a cost of mistakes committed by the participants of this drama is very high for all mankind. Possibly, it is higher than a cost of mistakes caused, for example, Chernobyl disaster.

The author told and analyzed the main historical stages of this drama. He could also logically express the main idea of his book: that nature does not prohibit heat transformation into work (and, therefore, into any other kind of energy) "by a strictly equal ratio", according to P.K. Oschepkov's expression, i.e. completely. The prohibition is invented, protected and propagandized by people. E.G. Oparin managed not to fall into fiction never violating logic and austerity of the narration.

It is necessary to mention that there are consistent and strict logic in Oparin's book. This is the first work on the law of energy degradation and the possibility of creation of the second kind's perpetual motion machine – a no-fuel mono-thermal engine. It consists not only of description of such an engine's projects and thoughts concerning the reasons why the engines cannot be built using these projects (or, on the contrary, why they can be built).

E.G. Oparin shows a logic of historical development of scientific ideas, which, probably, led to the global mistake causing innumerable harm to nature and also to mankind's prosperity and health. Using works of J. Loshmidt, K.E. Tsiolkovsky, P.K. Oschepkov and others, he consistently and logically lead a reader to an idea that it is possible and inevitable to overcome this mistake. This is why Oparin's book exceeds the bounds of "a good and useful exercise for students learning fundamentals of theoretical physics, as it is said in the book's introduction by its editor L.V. Jakovenko. Oparin convincingly summed up the discussion taking place for over 120 years and finally stated that the law of energy degradation is not an absolute law of nature but a particular law, which is right only within the limits of its applicability. In his book, Oparin determined these limits and stated, for example, following Tsiolkovsky that this law is unacceptable for all effects, which depend on presence of gravity fields.

Why publication of Oparin's book is necessary now? At present, a number of effects are already discovered, experimentally researched and described, which confirm a fundamental possibility to create the no-fuel mono-thermal engine in

the form of devices operating using different principles. For instance, it is discovered that, during discharge of condensers with some kinds of dielectrics, en electrical energy produced on load considerably (up to 4 times) exceeds energy necessary for the condensers' charge. Similarly to this, energy of a magnetic field in some magnetics exceeds energy necessary for creation of this field by many times [2]. **During streamline motion of compressed air, a mechanical energy of a flowing stream is 2 – 4 times more than energy necessary for its compression [3]. Excess of the mechanical (or electrical) energy in these cases can appear only from the environment (during this process, the environment is cooled), where it is not in the form of the mechanical energy but in the form of a diffused heat energy.** Hence, a condenser's dielectric, a magnetic and a flowing stream of air compressed air are a direct transformer of the internal heat energy of the environment into the mechanical (or electrical) energy. In order to carry out this transformation, only one level of the environmental temperature, which is independent on the transformer's operation, is needed. In all three cases, obviously, a so called "capture" of the diffused environmental heat energy occurs.

The no-fuel mono-thermal engines can be designed, which operation is based on theses effects. For example, a hypothetical electric power installation for production of the mechanical (or electrical) energy without use of any fuel, only due to cooling of atmospheric air by 50C during its flowing through the installation. Such a cooling, as it is known, always occurs during compressed air's exit (under moderate compression degrees) in atmosphere. Calculations show that such an installation with overall size (according to a compressor and an expansion engine) 1,300 x 750 x 750 mm allows producing an output mechanical power of about 800 kW [3].

Other effects, which could underlie designing of the no-fuel mono-thermal engines, are known. The scientific and technical community knows the results of the mentioned researches rather good. The problem of limitation of the energy degradation law has been frequently discussed during various seminars, conferences and readings (including parliament ones). Oparin's book sums up all this material and describes the whole primary stage of knowledge accumulation in the filed of operation principles of the no-fuel mono-thermal engines. One of Oparin's book's advantages is a big reference list consisting of works devoted to the given problem. It includes 239 names. The problem was investigated from many sides using literary sources.

I am grateful to E.G. Oparin for that he gave in his book a successful interpretation of the streamline motion of compressed air through a nozzle as a process of ordering of air molecules' motion, which is carried out in a narrow canal by a purely mechanical method, with decrease of a number of possible freedom degrees. This process of the molecules' motion ordering naturally leads to decrease of flowing air's entropy and, therefore, to transformation of a part of its internal heat energy into the mechanical energy.

A chapter devoted to methodological fundamentals of thermodynamics is naturally included in the book. In the book, the author considers thermodynamics as a philosophical science (though, on the whole, thermodynamics is more a natural and exact science than a liberal and descriptive one). The author logically grounds a possibility to completely change the existing scientific views, which is necessary for obtaining new research results, particularly, in thermodynamics. This complete change of views in thermodynamics is described in the following chapter as making of a new paradigm. A comparison of the old and the new paradigms is considered using an example of formation of new views on the energy degradation law. It is shown that this comparison is determined by the accordance principle introduced by N. Bore, i.e. the new paradigm includes the old one as an extreme case. An impossibility to logically change the old paradigm to the new one is noted because the new paradigm cannot be derived using rules of logic from the

principles, ideas, and laws acknowledged by the modern science (i.e. within the limits of the old paradigm).

In his book, E.G. Oparin successfully summed up scientific researches on the problem of a vertical temperature gradient observed in the Earth's atmosphere and determined by the Earth's gravity field. J. Loshmidt, K.E. Tsiolkovsky, E.G. Oparin, V.I. Likhachev, V.F. Yakovlev and others tried to substantiate its existence and calculate it. As a result of these researches, a formula is created for calculation of the gradient. This formula includes only world constants and no empirically determined coefficient. Nevertheless, a value of the gradient calculated using the formula coincides with the results of its long-term measurements. Such a coincidence cannot be accidental. Existence of the vertical temperature gradient in the atmosphere and its dependency on the Earth's gravity field has been proved. Thus, numerous researches make far-reaching and true conclusions about the limited nature of the energy degradation low, about the possibility to design the perpetual motion machine of the second kind (the no-fuel mono-thermal engine) and also about a possibility of spontaneous flowing of heat from a less heated body to a more heated one in the presence of a gravity field.

I suppose that the last conclusion, though it is right, cannot be directly derived from the vertical temperature gradient's existence in the atmosphere. As it follows from a model of this effect developed in Oparin's book, the atmospheric heat flows down-up: from warmer areas to cooler ones. But in the counter direction – to the Earth's surface, i.e. from the cooler areas to the warmer ones, a stream of the mechanical energy moves, which, possibly, determines all relocations of air masses above the Earth's surface. Hence, the law of energy degradation is not violated here, at least, formally (and only in its formulation, which states an impossibility of the spontaneous flow of heat from a less heated body to a more heated one).

The book's disadvantage is, in my opinion, the contents of the chapter devoted to a new

science – monothermia. If a need to distinguish a new scientific direction from the whole scientific knowledge appears and this direction is important and separated from other scientific fields enough to claim to be a separate science (that must also be proven), first of all, it is necessary to determine its object, methods and limits. This must have been the contents of the mentioned chapter. Comparing to almost blameless clearness and logic of the previous chapters, the chapter about monothermia looks insipid, over-simplified and declarative.

First, it is not clear from the text what monethermia's object is and whether it coincides with the thermodynamics' object. According to the name, monothermia can be understood as a science of the no-fuel mono-thermal engines. Unlike monothermia, such an engine can be determined accurately enough as an engine, which operation requires only one level of the environmental temperature, regardless of the engine's operation. But such an understanding narrows the object of the given science. This is why, in my opinion, the name of the new science is unsuccessful. Its only advantage is its brevity. But, in this case, thermodynamics must be renamed a parathermia. A more successful name may be taken from the name of the book: "theoretical fundamentals of no-fuel energy".

Monothermia's methods are, possible, the same as thermodynamics' ones (a cycle method, a method of thermodynamic potentials). If some other methods can be considered, they must have been mentioned in this chapter. As for the limits of monothermia's applicability, they are not described enough. A question necessarily arises: is monothermia as a whole or some of theses from its axiomatic basis (for example, an analogue of the law of energy degradation) an absolute law or is it a particular law, which is true within some limits? By the way, it was necessary to formulate (and repeat from the previous text if necessary) fundamentals of the new science – its axiomatic basis. It is also not clear what is meant by an expression "a logical lock-in of monothermia". It must be explained.

Every successful and necessary book including Oparin's book causes a counter stream of thoughts from its reader, a wish to express his/her position toward the discussed problem. I considered it necessary, first, to express my opinion concerning the question why a working no-fuel mono-thermal engine is not built; and second, what are lessons of appearance and development history of the degradation energy law.

It is possible to irrefragably prove the possibility to create the no-fuel mono-thermal engines by the only method, which is to build a working prototype of such an engine. Why does not E.G. Oparin and his associates follow this obvious way? There a lot of reasons but the main three reasons are, possibly, the following.

First of all, these people cannot create such an engine because the idea of creation of the no-fuel mono-thermal engine appeared in the field of experimental and theoretical physics, which is a specialty of almost all of them while, in order to create the no-fuel mono-thermal engine, other specialists are needed (for example, material engineers of dielectrics and magnetics or designers of compressors, turbines or aviation engines).

Besides, fundamental views on the no-fuel mono-thermal engine have been created and are being created by efforts of individual researchers during their free time and at their expenses. In order to build a working prototype, a scientific and production basis and the according financing are necessary.

Finally, there undoubtedly is the existing public opinion against the mentioned engine, which has been formed during a long (about 150 years) period of time. This prejudice is fixed in minds of most Russian population and abroad including minds of scientists, which discuss a fundamental possibility to build the no-fuel mono-thermal engine, in minds of the mentioned specialists and in minds of functionaries who determine possibilities to use the scientific and production basis and to finance these works. This prejudice must be taken into account trying to create such an engine.

Fairly, authors of no-fuel engines are in a kind of vicious circle: they cannot get financing and moral support because hey cannot irrefragably prove that it is possibly to create such an engine while they are not able to obtain such proofs without financing and moral support. They have the only positive way out: to conduct a wide, urgent and convincing work explaining their ideas. Under the existing circumstances, this is a difficult task and E.G. Oparin makes a very important step in this direction. His work will not be wasted if only his book will reach the necessary specialists and functionaries and they, for their turn, must read and understand it. It must be mentioned that the author could make his book interesting though, of course, a reader must have a minimal training.

So what are the lessons of appearance and development history of the energy degradation law, which is so thorough described in the book? First of all, this history teaches us be careful in use of scientific ideas, even if they seem to be obvious and proved. It warns against making absolute any scientific laws because they all have limits of their applicability, which can be jus not discovered at present time. It shows impermissibility of wrong though fine theses and wrong analogies like, for example, the following: "like the first law of thermodynamics means an impossibility to create a perpetual motion machine of the first kind, the second one means an impossibility to create a perpetual motion machine of the second kind". As it can be seen, there really is some nice-looking symmetry.

This history teaches us that there must not be stable laws in science, particularly, in physics, which stop scientific thinking; that any scientific ideas are approximate and incomplete, able to change radically along with development of this thinking. An extreme "obstinacy" concerning some generally recognized scientific truths means stagnation in science, an endless circulation and dawdling over insignificant details. Here sense of proportion is very important because absence of reference points and corner stones is also disastrous.

This history warns us against division of science into true and false by some general features. True or false character of scientific results obtained by someone can be judged strictly individually, after research meaning, results and method are thorough understood. A direction of the research, the authors' terminology and a name of their organization must not be taken into account. Certainly, such an approach is more time-taking for a scientist who must understand the given work. It is much simpler to throw the research results away according to their belonging to the direction, which was groundlessly announced unscientific. But very important things can be lost this way.

In conclusion, it is necessary to express a sincere gratitude to "Editorial URSS" publishing house (Moscow), which carried out a risky work of preparation and publication of Oparin's book containing ideas and materials, which are, unfortunately, far from final confirmation and acknowledgement of the official science.

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Effect of needle electrodes

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The invention of N.L. Egin working at Ryazan Military Automobile Institute, Russia was described in the article of Viktor Petrenko published in "Energetika i Promyshlennost Rossii" newspaper. Special conducting carbonic materials with "very developed surfaces" are used as electrodes. Their effective area is much bigger than the visible one due to their microcellular structure. Such a material has a special needle form. The given article is interesting because it allows finding analogues with the works of the Russian scientist, Yablochkov, on the increase of electric lighting systems' efficiency. These researches led to invention of special "open electric capacitors": metal plates with a surface covered by needles for the increase of air ionization, the patent of 1877. Installing such a charge collector in a power circuit of lighting lamps considerably increases load current output by many times without the use of an additional power supply due to the "atmospheric electricity" only, as Yablochkov wrote (the patent was described in "New Energy Technologies" #1, 2001). The factor of output increase reached 200%.

The present-day use of the given effect of the electrodes' form also includes the technologies of propulsive force generation due to the electric field gradient (the patents by T.T. Brown of 1925-1965).

It is obvious that the nature of electric forces is much more interesting than we usually imagine it. The electric field gradient allows performing propulsive force and generating excessive power output of energy transformers.

Unitary Quantum Theory
and a new source of energy

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The progress of Science goes on during every historical age, not only when men meditate on the whole, but when they concentrate their thoughts on such parts of the vast field of Science wherein developments . . . are needed at the given time.
James Clerk Maxwell (1831-1879)

Mini heat and power plants

Doctor of Technical Sciences, Prof. Yu.S. Potapov
engineer I.G. Kalachev

Fig. 1. Potapov's award of 2005. Heat generator YUSMAR.

1. Ecologically clean energy resources

Almost a half of mankind has been using firewood for heating and cooking up to now. In the view of ecology, the use of firewood considerably damages the environment. The only good thing is that firewood is a renewable source of heat energy. Despite the fact that it takes a long time to grow firewood, but there is a lot of it, so the process of growth always exceeds the process of firing. Unfortunately, today forests are cut much faster than they grow.

Later people learnt to use water streams in rivers, sun and wind as energy resources. They are renewable, power energy sources.

However, development of hydraulic devices led mankind to creation of huge dams with high-power turbines and electric generators. Accumulation of big amounts of water began to influence the environment and create permanent hazard for people living below dams, downstream. At the same time, efficiency of hydraulic electric power plants is not very high. Besides, they are built far from regions which consume electric energy and, therefore, building of power transmission lines is necessary. The lines cause big electric energy losses.

Despite this, mankind began to understand that water possesses great renewable energy given by nature and generation of this energy does not influence the environment. Water resources on the Earth are sizeable and constantly filled up, particularly, from space.

Some scientists think that life on the Earth first appeared in rotating water. In the 30s, many scientists studied life birth during water rotation and were surprised to know that rotating water produces a great amount of energy. That time, they could not explain these processes of energy production. Then the atomic bomb, atomic submarines and atomic power plants appeared and, gradually, these processes were forgotten. But water was used in atomic reactions, submarines sailed in water; and scientists continued to research water. They discovered that more and more mysterious effects occurred in water or were connected with it. We are interested in the results of researches of water behavior during heat processes. Thus, according to our program, at the first stage, it was necessary to create a source of heat energy which could produce more heat energy than consume electric one. It was 1987. Works on the new

energy supply program just began. An idea to use vortex processes appeared but there were no theoretical bases. Besides, the use of Ranque-Hilsch vortex tubes during works with pure water did not give the wanted results. Only in the end of 1987, we created the first devices which showed satisfactory results and had a coefficient of electric energy conversion into heat energy not less than the coefficient of tubular electric heaters (0.95 - 0.98). Taking that into account, after water passed through a heat generator, it still had motion energy, and hope to overcome the efficiency point of 100% appeared. It was confirmed in 1988.

In the USA, at the same time, mister Griggs created a hydraulic pump which showed that its efficiency of electric energy conversion into heat energy reached up to 117%. Taking into account all heat losses, its efficiency reached 168%. Any chemical, nuclear or phase transformations in water were not registered during these tests. All participants of the tests admit that it is a mystery. But there is no mystery. In Griggs' device, a disc rotates at a high speed. It has holes through which water flows.

According to the motion theory, any rotating body produces energy. This happens in this device. Disc rotation energy and internal water energy released during rotation and cavitation are summed up. An observer cannot see this because tools show only the resulting heat energy. It must be noted that the hydrosonic pump and "YUSMAR" heat generator showed not the best result (168%). The motion theory shows that, under such conditions, the efficiency of electric energy conversion into heat energy could reach 300%. Using special liquids, it is possible to speed up the device, turn its electric motor off and the device will produce heat energy without consumption of electric one. Thus, our calculations can show efficiency close to infinity. Or, as scientists say, it would be possible to get free energy. We will describe a construction of such a quantum electric power plant which uses water and rotation energy as fuel.

Fast development of the new technology and equipment allows using profits which are given by double energy technologies. New electric power plants using two kinds of fuel, for example, black oil and natural gas appear. Produced heat and electrical energy is utilized in a few units which considerable increases efficiency of such plants and decreases total fuel consumption.

Heat power plants producing not only heat and electric energy but also hot water for supply of cities are built.

Possibilities to utilize the internal-combustion engine's heat appeared. In Germany, diesel heat and electric power plants which increase their efficiency due to heat produced by an engine and a heat generator are being built. Such plants produce up to 35% of electric energy plus 55% of heat energy. Heat is utilized using heated exhaust, heated oil, cooling liquid and different heated metal details and surfaces. Building of the diesel heat power plan required many expensive heat exchangers and also placing its engine and heat generator in a special isolated container. Only in this case, it was managed to increase total efficiency of the diesel plant. Naturally, consumers obtain less energy due to transportation losses. Consumers obtain about 87% of such diesel plants' energy.

If we compare a diesel heat power plant of the new kind with a standard one, its efficiency will be higher by 8-12%. According to diesel power plants producers' opinion, each increase of their efficiency by 10% gives up to 30% of fuel economy. Of course, such economy of combustible fuel helps decrease harmful exhaust and, therefore, improves the ecological situation in a region where the heat power plants of the new kind work.

Gas-vapor turbines became improved and more efficient. Their efficiency increased up to 58% due to multiplied heat utilization. All these achievements in the field of energy engineering require huge costs and expensive materials. It is possible to say that the classical methods of efficiency increase do not increase it much. Obviously, we reached

a limit of heat devices' efficiency which cannot be higher than 100%.

At the same time, new, not traditional methods of heat and electric energy production did not come to the energy market in production quantities yet. But they already showed themselves as high-effective devices with efficiency which can considerably exceed 100%.

After the appearance of the high-effective vortex heat generator "YUSMAR", it is much easier to produce heat and electric energy.

2. Quantum heat power plant's structure

Processes of inner substance energy (or mass) transformation into radiation energy during bodies' rotation acceleration and, then, into electric energy have quantum nature. Energy of new connections forming in a substance during its rotation is discharged by portions – quanta. Their size is minimal (<1ev) during formation of hydrogen connection and maximal (up to dozens of Mev) during connection of single nucleons into atomic nuclei. But, in all cases, these processes are quantum. This is why we called energy devices using these processes quantum devices.

In a vortex heat generator, rotating water has high kinetic energy which increases at the outlet of a vortex tube due to water heat expansion during its heating. It is not advisable to utilize this kinetic energy only by flow slowdown and produce heat due to slowdown friction. We decided to direct a flow to a turbine and, using it, rotate the heat generator which would produce additional electric energy. Thus, the idea of the new quantum heat power plant was born.

According to the scheme quantum heat power plant using water as fuel, we can see 14 processes (Fig. 2). The compression process is necessary to increase the speed of water flowing to a reaction turbine. The reaction turbine's rotation passes to an electric generator which produces electric energy. Then, water in an upper capacity is accumulated. It accelerates passing a jet and goes to the blades of the next turbine. The rotating turbine put in action the electric generator which additionally produces electric energy. After that, water is accumulated in the lower tank where it is accumulated again. Then an electric pump takes water into "YUSMAR" heat generator and the cycle repeats in a closed energy circle. Efficiency of quantum heat power plants of this kind can reach considerable values. Up to 30% of supplementary electric energy is produced without combustion of traditional fuel. Supplementary electrical energy can be used by consumers or for additional heating of water (liquid) used for heating and hot
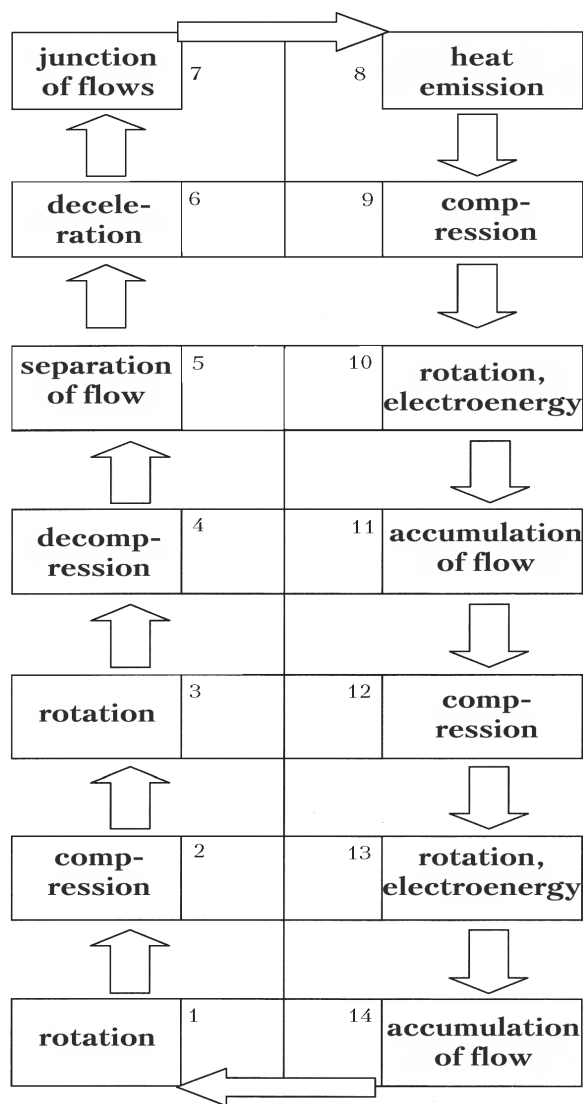

Fig. 2. An operational scheme of the quantum heat power plant using water as fuel. Patent of Moldova # 649.

water supply, with the help of "YUSMAR" heat generators.

The device consists of a heat generator with a body, liquid motion accelerator in the form of a cyclone, a brake assembly, a floor part with an outlet hole connected with an outlet fitting and also an electrical pump. It has two closed capacities located at different heights. There is a hydraulic turbine in each capacity. In the upper capacity, the outlet fitting of the generator is inserted in such a way that its nozzle is located at a tangent to the turbine's circle. In the lower capacity, a hydraulic turbine is assembled at the outlet of a fitting which connects the capacities. An exit hole of the connecting fitting has a cross-section area which is at least twice less than a cross-section area of the fitting. Each hydroturbine is kinematically connected with the electric generator fixed at an external wall of each capacity. Both capacities are supplementary connected by a drain passage with an internal diameter which is more or the same as the internal diameter of the generator's body.

In Fig. 3, a scheme of such a device in two projections is shown. In fig. 3, a scheme of a single-stage quantum heat power plant is shown.

The device shown in Fig. 3, consists of a vortex heat generator 1 including a body 2, a
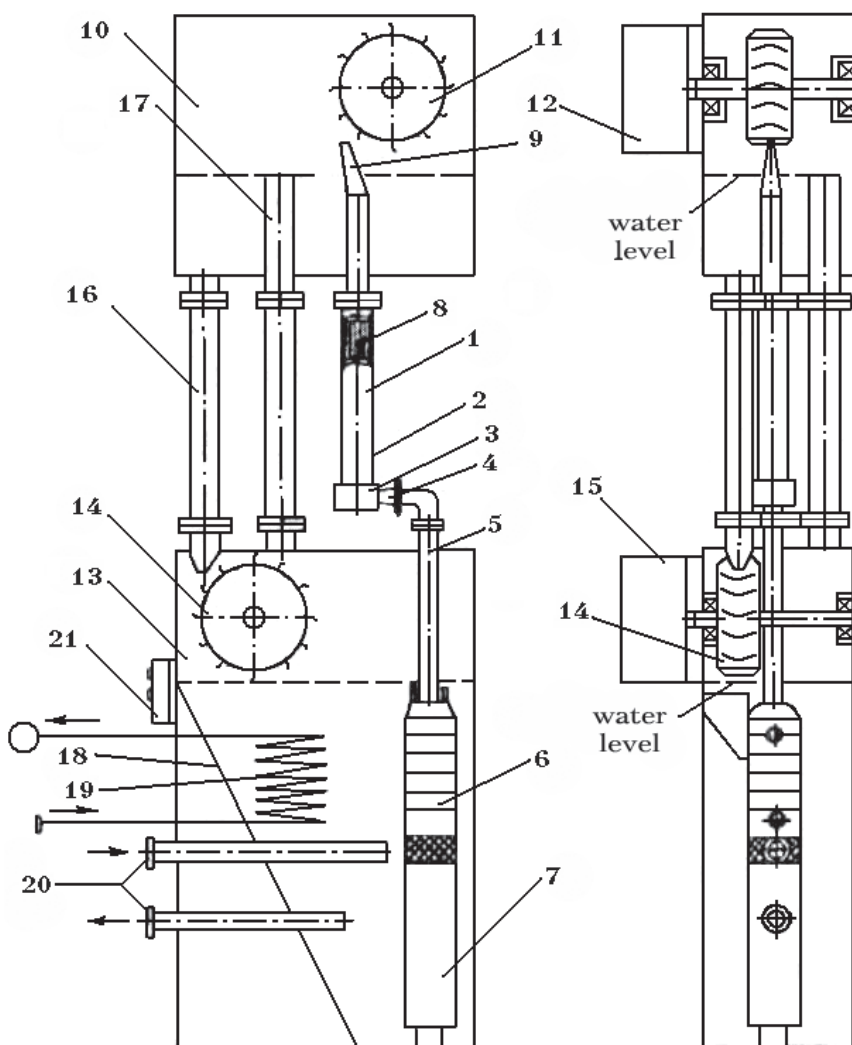

Fig. 3. A scheme of the two-stage quantum heat power plant

liquid motion accelerator – a cyclone 3 connected by an injection fitting 4, a passage, with a pump 6 put into action by an electromotor 7. In the upper part of the heat generator, a brake assembly 8 is set and a bottom with an exit hole (they are not shown in Fig.) is connected with an outlet fitting – a jet 9. The outlet fitting of the heat generator 1 is located in a capacity 10 in such a way that its end – the jet 9 is directed at a tangent to a hydraulic turbine 11. The turbine 11 is kinematically connected with a current generator 12 fixed at an outside wall of the capacity 10. The pump 6 and the electric motor 7 are installed in another capacity 13. The capacities 10 and 13 must be at different heights. In the lower capacity 13, a second hydraulic turbine 14 connected with an electric generator 15 and also the pump 6 and the electric motor 7 are installed. The lower and upper capacities are connected by a connection fitting 16 and a drain passage 17. An area of the connection fitting's exit hole is at least twice less than a cross-section area of the fitting. In the capacity 13 a partition 18 is fixed, a heat exchanger for hot water 19 and feed and reverse lines 20. The device can operate in the automatic mode. For this purpose, it has a temperature sensor with a feedback unit which controls operation of the electric generators and the pump and also a control desk.

3. Operation of the quantum heat power plant

The plant operates in the following way. After the electric motor 7 is turned on by the pump 6, working liquid is fed through the passage into the injection fitting 4, then to the cyclone 3 and to the heat generator's body 2 where the brake assembly 8 is located in the upper part. Changing physical environmental parameters, pressure and temperature grows in the heat generator's body and liquid is fed under pressure to blades of the upper turbine 11 which begins to rotate the generator 12 producing electric energy. Hot liquid is accumulated in the upper capacity 10 at some level which is
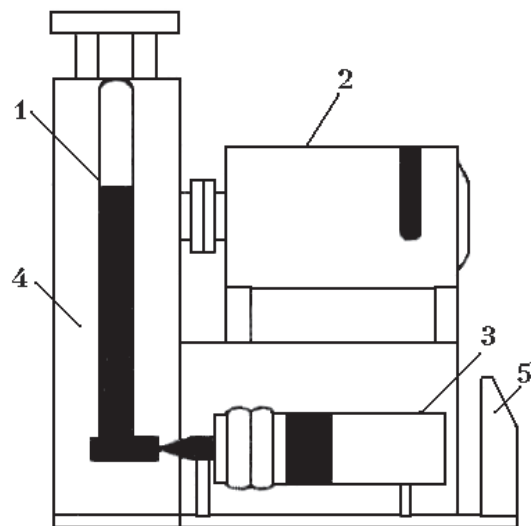

Fig. 4. A scheme of a single-stage quantum heat power plant.
1. "YUSMAR" heat generator; 2. Electric generator; 3. Electric ump; 4. Body; 5. Control desk.

maintained by the drain passage 17. At the same time, liquid is fed under pressure from the upper capacity 10 through the connection fitting 16 and goes to blades of the lower turbine 14 at the free fall speed. The turbine 14 begins to rotate the current generator 15. At this time, both electric generators 12 and 15 are connected to load by the control desk 21. Hot water goes to heat radiators through the feed and reverse lines 20 and cold water goes to the heat exchanger 19 which is located beyond the partition 18. Cold water is heated and supplied to consumers for their domestic needs. In order to provide for effective operation of the device, the connection fitting 16 must have an exit hole with an area which is two-three times less than a cross-section area of the fitting and a diameter of the drain passage must be bigger or the same as a diameter of the heat generator's body.

At an exit of the vortex heat generator's jet a working medium's temperature is about 70-100C and pressure is 8-10 atm. Due to the influence of a water flow coming out of the heat generator, the turbine in the upper capacity is put into operation. The turbine in the lower capacity is put into operation by liquid moving under the

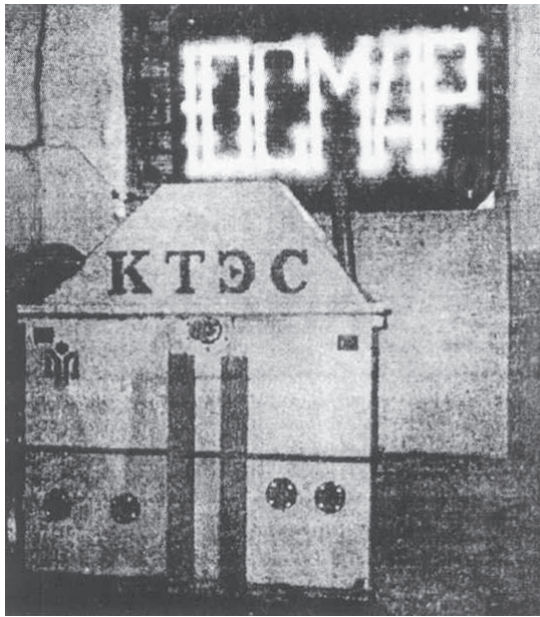**Fig. 5. An operating smallest quantum heat power plant with a power of 3.5 kW**

Fig. 6. An operating quantum heat power plant with a power of 38 kW

Fig. 7. A quantum heat power plant with a power of 800 kW

influence of its own weight from the upper capacity. Thus, the device produces heat energy by the heat generator and, at the same time, produces electric energy. Electric energy production requires no fuel, it is ecologically clean. This energy can be used for reduction of electric energy consumption of a driving electric pump or for other purposes, particularly:

• for additional liquid heating;
• for domestic electric energy supply;
• for supply of current drives of different equipment with three-phase or direct current.

According to the described QHPS structure, a prototype was built (see Fig. 2) with a pump having a power of 2.8 kW and a heat generator having a body with a diameter of 57 mm. 100 liters of water were in the device. The power of the upper generator was 1 kW and the power of the lower one was 0.7 kW. An initial liquid temperature was about 15C and the working temperature of the device was about 80-90C. Electric energy consumption was 3 kW per hour for the pump's drive and its return to the circuit was 1.7 kW per hour. Thus, it was used 1.3 kW per hour from the circuit for heating of 100 liters of water to 90C. Efficiency was > 100%.

The main advantage of the device is the reduction of traditional fuel consumption, reduction of transportation costs for fuel supply of customers and the improvement of ecological situation in residential areas. It is most useful to use the device which allows creating an autonomous system of hot water, heat and electrical energy supply of single shops, cottages and farms in districts where it is impossible to lay a gas or heat pipeline.

Another advantage of the quantum heat power plants is their small size in comparison with traditional heat power plants producing the same amount of heat for heating. The size of a quantum heat power plant grows only as cube root to its power. This can be seen comparing the devices which are shown in Fig. 5 – 7.

4. Wind power plants for heat and electrical energy production

The main drawback of the existing wind power plants is that they cannot operate without the necessary wind speed and require accumulating devices in the cases of stoppage in windless weather and reserve diesel power plants.

This problem can be solved by a new method and a device. The speed of an approach flow will always be sufficient for a wind power plant and will not depend only on the environmental wind speed. This wind power plant is used for electrical and heat energy production.

For example, the rotary radius of air intake is 2 meters. In this case, the route made by the air intake per a rotor's revolution will be: S=2•π•R=2•3.14•2=12.56 meters.

Hence, during rotor rotation at a speed of 60 rev/m, the approach flow speed will be 12.56 m/s which is enough for the effective operation of a vortex turbine of a molecular engine. Tests of the vortex turbine showed that pressure at its inlet and power shaft speed is: at 0.01 atm – 964 rev/min and at 0.09 atm – 16,700 rev/m. The test results for wind the power plant confirmed these indications with load. Vortex air power plants can successfully work in windless weather. (Fig. 8).

An aim of the new invention is to increase wind power plant's efficiency and obtain a wind power plant which is completely independent of the environment. The noted aim is achieved by atmospheric air at a temperature from 80C to -60C is being used as an actuating body. With the help of the air intake rotating with the necessary speed, it is fed under low pressure tangentially to the molecular engine. Rotational moment of the power shaft is taken through the reducer to the electric and heat generators. There can be more than two air intakes. Air does not change its physical and chemical state and can be used for breathing after operation according to the suggested method.

The new method is ecologically clean. Noisiness of such a device is lower than
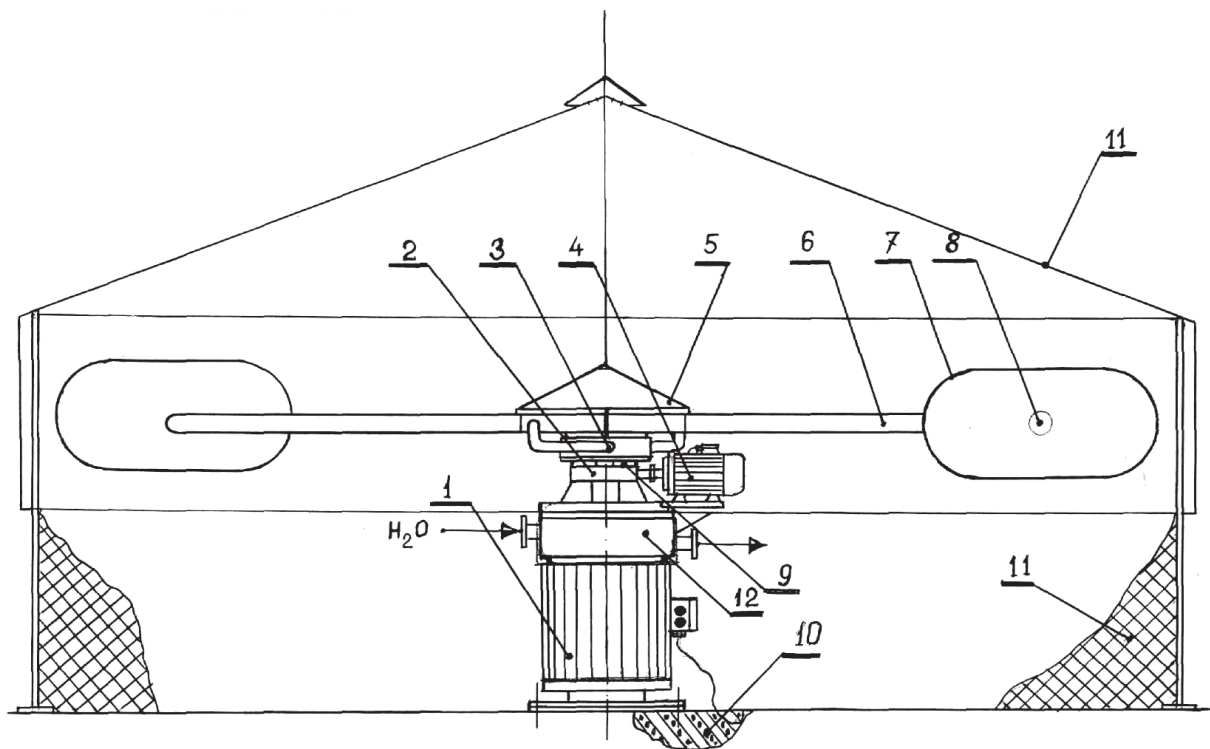

Fig. 7. Design of the vortex air power plant (VAPP) which operates without wind and produces electrical and heat energy

standards and can be reduced by noise insulation.

According to the method, heat and electric energy are produced by rotating low-powered electric engine EE through the reducer R, a cross-beam with the air intake AI, Fig. 9. Through AI, through airways air goes to an air reservoir AR where pressure from 0.01 to 0.09 atm is created. Then compressed air goes to blades of the vortex turbine VT through the lines.

Through the reducer R, the vortex turbine VT rotates the electric generator of alternating (direct) current EG which is connected to the vortex heat generator VHG of the first (Patent of the Russian Federation, # 2045715) or seventh generation through a coupler.

Load of the vortex heat generator and the electric generator is controlled by the control desk CD with a microprocessor. Depending on the generators' load, the speed of the power shaft is controlled. In case there is no generators' load, EG and VHG operate in the idle mode.

The new method of energy production can be carried out in a special device (Fig. 8) with a pivot pin placed vertically. The device consists of heat and electric generators 12, 1, reducers 2, 9, a vortex turbine 3, an electric engine 4, a cone 5, airflows 6, air intakes 7, 8, a basis 10 and a protection jacket 11.

The device for energy production by the new method operates in the following way. The electrical engine 4 supplied by an external electrical energy source. Through the reducer 2 it passes rotation to the airflows 6 and the air intakes 7, 8. Through the air intakes 7, 8, an approach air flow goes to the vortex turbine 3 which, in its turn, rotates rotors of the heat generator 12 and the electric generator 1 through the reducer 9. In order to protect the device from atmospheric precipitates and tornado, the jacket 11 and the cone 5 are fixed.

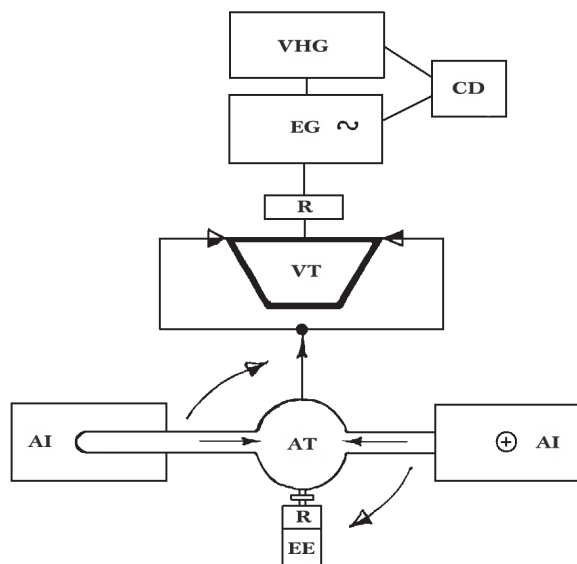During fast rotation (about 3,600 rev/m), liquid in the vortex heat generator is

Fig. 9. A flowchart of the new VAPP.
AT - air tank; AI – air intake;
EE – electric engine; R – reducer;
VT – vortex turbine – molecular engine;
EG – electric generator; VHG – vortex heat generator; CD – control desk

heated up to 95C. Heating to 250C is possible with heating efficiency more than 100%. Rotary speed of the electric generator's rotor must coincide to rotary speed of the vortex heat generator (about 3,600 rev/min).

Use of the suggested energy production method allows producing excessive heat and electrical energy. According to the new method, a synergistic effect works when the resulting effect is more than any components. This method does not violate the second thermodynamics' law as no fuel is combusted and no ideal gas operates, there is no Carnot cycle.

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THE LAW OF ELECTRIC CIRCUIT

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INTRODUCTION

In modern electrical engineering and pulse engineering, the following rules of power determination in the electrical circuits of continuous and pulse energy consumption have been established [2-4]:

1- during continuous consumption of electric energy its power   is determined by the dependence:

$$P = U_C {}^x I_C ,\qquad(1)$$

where U_C is average voltage magnitude, I_C is average current magnitude.

2 - during pulse consumption of electric energy its power is determined by other dependence

$$P = \frac{U_{IC} {}^x I_{IC}}{S} ,\qquad(2)$$

Here U_{IC} is average amplitude voltage magnitude (Fig. 1); I_{IC} is average amplitude current magnitude (Fig. 1); is pulse duty ratio.

It is known that an electromagnetic voltmeter and an ammeter average the regular pulses of voltage and current satisfactorily. Average magnitudes of voltage U_C and current I_C being indicated by these instruments appear to be equal to the readings of an oscilloscope if they are calculated according to the formulas:

$$U_C = \frac{U_{IC}}{S} ,\qquad(3)$$

$$I_C = \frac{I_{IC}}{S} ,\qquad(4)$$

It appears from this that power should be determined according to the formula [1]

$$P = U_C {}^x I_C = \frac{U_{IC} {}^x I_{IC}}{S^2}\qquad(5)$$

But the calculation according to this formula results in the violation of the law of conservation of energy. In some cases while heating, for example, of alkali liquor more thermal energy is released than electric energy, which is calculated according to the formula, is consumed (5). In order to do away with this contradiction, they decided to take duty ratio   into account once (2). They explained it by the fact that voltage and current are changed simultaneously and synchronously (Fig. 1). A situation took place when the formula (2) was considered to be correct, and the formula (5) was considered to be erroneous. The contradictions in the instrument readings were ignored. For example, if a voltage pulse amplitude is equal to U_{IC} =1000 V, a current pulse amplitude is I_{IC} =50 A and a pulse duty ratio magnitude is S =100, the formulas (3) and (4) give the following results: U_C =10 V and I_C =0.5 A. These magnitudes are indicated by the moving-coil instruments. If we take formula (2) as a basic one, we'll get

$$U_C = \frac{U_{IC}}{\sqrt{S}} = \frac{1000}{\sqrt{100}} = 100\,V\quad(6)$$

$$I_C = \frac{I_{IC}}{\sqrt{S}} = \frac{50}{10} = 5\,A\qquad(7)$$

The moving coil instruments indicate nothing of the sort. Besides, it appears from the formula (2) that in case of a single division by pulse ratio only one magnitude out of two values is changed. For example, when voltage is changed, it becomes equal to $U_C=1000/100=10$ V. Current magnitude $I_{IC} = I_C = 50$ A remains unchanged, and it should be registered by the instruments. But none of them indicates such value.

In order to eliminate these contradictions, it was necessary to carry out an experiment, in which a source, which had no galvanic coupling with the whole circuit, would generate such voltage pulses.

Experimental part

The cell of the water electric generator of heat was used in order to carry out this experiment. The magnetic inductor 1302.3728 (GOST 3940-84) with the changed coil was used as a voltage pulse source (Fig. 1).

Voltage pulses were rectified and corrected. The magnetic inductor was rotated with the help of on-phase electric motor energized from mains (Fig. 2). A domestic electric power meter was used in order to determine power consumed by the electric motor. The readings of the electric power meter 5 were doubled by the readings of the voltmeter V_1 and the ammeter A_1 arranged before the cell 1 as well as the readings of the oscilloscope 6 (Tektronix TDS 2014, Fig. 2). Energy of the heated solution was determined in a standard way.

The electric motor shaft 2 (Fig. 2) is connected with the magnetic inductor shaft 3 with the help of coupling 4. Total power consumption is registered by electric power meter 5. Power consumed by the cell is registered with the help of voltmeter, ammeter and oscilloscope 6.

Certainly, the magnetic inductor does not generate such voltage pulses, which provide significant energy effect. The magnetic
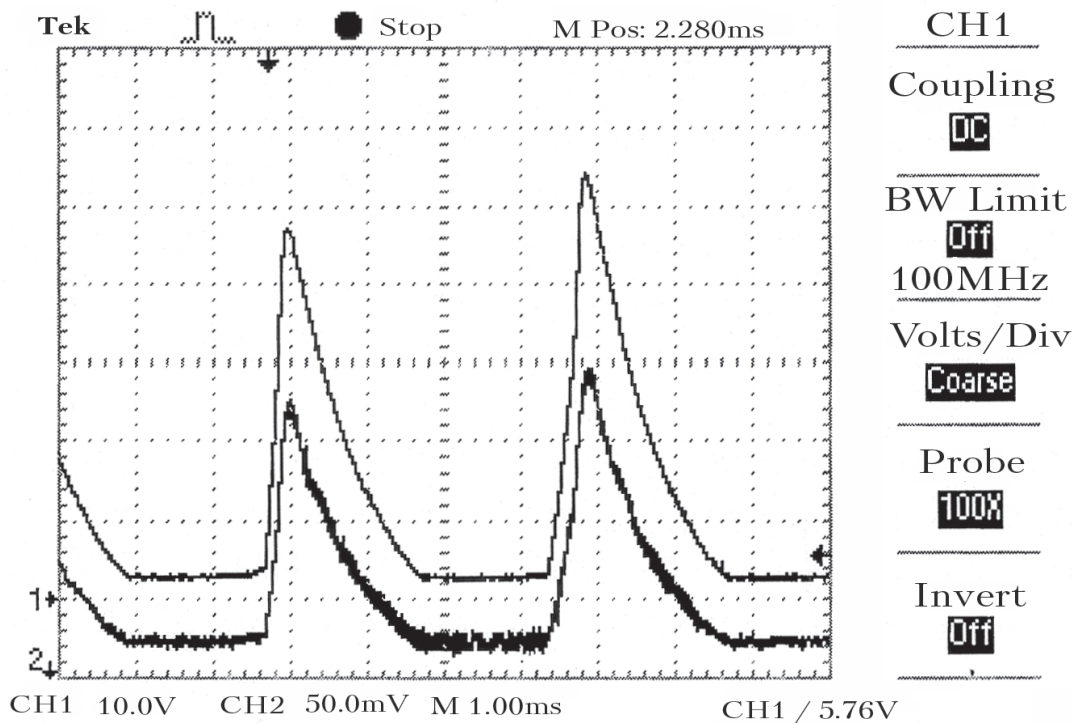

Fig.1. Sample of an oscillogram of voltage and current generated by the magnetic inductor

inductor was adjusted in such a way that it generated voltage pulses, which average amplitude was equal to $U_C \approx 46$ V instead of 900...1000 V. Average amplitude of current pulse was equal to $I_C \approx 1.5$ A instead of 80...100 A. Pulse duration was $\tau \approx 3.9$ ms instead of 100 mks. Pulse duty ratio was $S \approx 4.7$ instead of 80...100. Besides, the pulse form differed from the necessary one. Nevertheless, energy effect was registered.

The experimental method is simple. Solution consumption by the cell is determined. The electric motor, which makes the magnetic inductor rotate, is connected to the mains; it registers power consumed by the electric motor – magnetic inductor – cell system as well as the readings of the test instruments being arranged before the cell. Then the cell, which plays the role of a load, is de-energized. Energy consumption is registered during idle run of the electric motor- magnetic inductor system. A difference between these readings is equal to energy being consumed by the cell. Simultaneously, solution consumption and a change of its temperature are registered. In order to facilitate the analysis, consumed energy has been converted into power.

The experimental results are given in Table 1. Here ΔP is power consumed by the cell from the mains. It is equal to the difference between the readings of the electric power meter when the load (the cell) is energized and de-energized. P_1 is heat power of the heated solution. P_2 is power being indicated by the voltmeter and the ammeter arranged before the cell. P_3 is power being indicated

by the oscilloscope and determined manually. $\eta = P_1/\Delta P$ is an index of efficiency of the solution heating process.

As it is clear, average power of $P_2 = (4.3 ...5.1)$ W being determined in accordance with the average values of current and voltage is close to power value of $\Delta P = (3.1....4.8)$ W on the electric motor shaft when the cell is energized (without taking power for idle run into consideration) and power of $P_3 = (3.8....5.3)$W being obtained while oscillogram processing. If we multiply power value P_2 being indicated by the voltmeter and the ammeter by duty ratio S=4.7, it will correspond to a single registration of duty ratio, which is described in all textbooks on power engineering and pulse engineering. In this case, the readings of the voltmeter, the ammeter and the oscilloscope will exceed the readings of the electric power meter ΔP 4.7 fold. It does not correspond to reality. It appears from this that when average power is determined according to an oscillogram, the amplitude values of voltage and current should be divided by duty ratio not once as it is mentioned in the textbooks, but twice as it is shown in the formula (5). Only such power value will correspond to reality.

Now let us see what results can be obtained if electron pulse generator 2 (Fig. 3) is used instead of motor 2 and magneto 3 (Fig. 2). The readings of voltmeter V_1 and ammeter A_1 as well as the readings of oscilloscope 6 are not changed if the pulse parameters are the same. Meter 5 will indicate a different

Table 1. Indices of the direct experiment

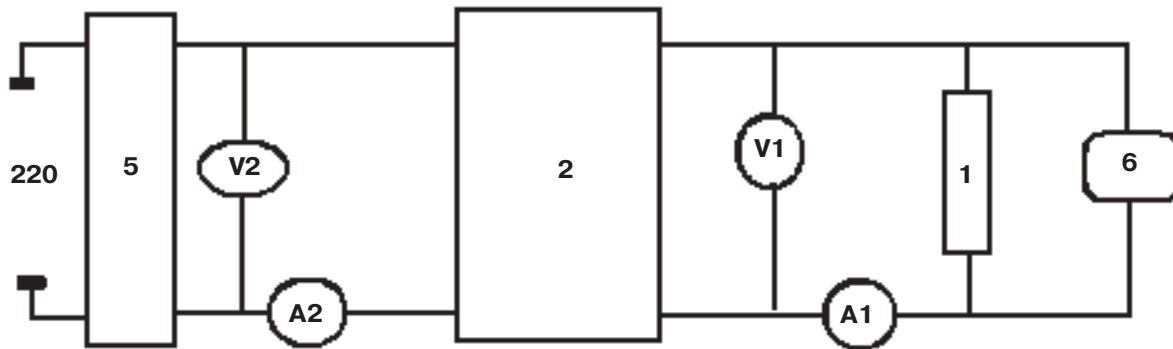| Experiment No.	P_1, W	ΔP, W	P_2, W	P_3, W	$\eta = P_1/\Delta P$
1	2	4	5	6	7
1	9,40	3,10	4,32	3,80	3,10
2	9,80	3,53	4,45	-	2,77
3	10,20	3,10	4,40	4,30	3,34
4	11,30	4,80	5,10	4,80	2,35
5	13,28	4,00	5,00	5,30	3,32

Fig. 2. Electric diagram of the system:
1- cell: 2- electric motor; 3 − generator (magnetic inductor); 4 − coupling connecting the motor shaft with the generator shaft; 5 − electric power meter; 6 − oscilloscope

value, and we cannot predict it. An average value of current indicated by ammeter A_1 is nearly 0.4 A. Ammeter A_2 will indicate a value of nearly 0.6 A. Naturally, voltmeter V_2 will indicate mains voltage of 220V. Power ΔP_2, which is registered by ammeter A_2 and voltmeter V_2 is as follows: $\Delta P_2 = V_2 \times A_2 = 220 \times 0.6 = 132W$. Meter 5 will indicate the same value.

Thus, if the electron pulse generator is used instead of the motor and the magneto, power consumed by the cell from mains is changed by $\Delta P_2 / \Delta P = 132/4.0 = 33$ fold. It appears from it that power of 132 W is fictitious power, which is not consumed by the cell. The cell consumes 4.0W; it is proved by the measurement results given in Table 1. That's why we have every reason to call the difference of powers $\Delta P_F = \Delta P_2 - \Delta P = 132 - 4 = 128W$ a fictitious power.

It appears from the analysis that **average power in each section of the electric circuit is equal to a product of average voltage, which is applied across this section, by average value of current. It is the law of electric circuits.**

For example, average voltage of 10 V is applied in the section of the electric circuit before the cell (Fig. 3); average value of current existing in this section is equal to 0.4 A. If we consider it, we'll see that the value of power in this section of the electric circuit will be 10 x 0.4= 4 W. Let us make a

vertical section on the diagram (Fig. 3) before meter 5. Average value of voltage in this section is equal to mains voltage of 220 V. If the average value of the current in this part of mains is equal to 0.6 A, average power in this section of the electric circuit will be 220 x 0.6= 132 W. **It is the law of electric circuits, which has been checked with the help of many experiments being carried out by us.**

We do not know if there is an enunciation of this law in modern electrical engineering, but without this law it is impossible to make a correct analysis of power engineering of mixed systems where energy is transferred and consumed continuously and by pulses.

Thus, in order to determine average power consumed by the cell, it is necessary to multiply average values of voltage and current indicated by voltmeter V_1 and ammeter A_1 or to take a product of average amplitude values of pulses of voltage and current indicated by the oscilloscope and to divide them by duty ration do not to once (as it is mentioned in the textbooks), but twice. Only in this case the results will correspond to average power actually consumed by the cell.

CONCLUSION

The law of electric circuits: **average power in each section of an electric circuit is equal to the product of average voltage, which is**

applied across this section, by the average value of current.

The law of electric circuits sent the law of conservation of energy in its modern enunciation to the science history section.

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WELCOME FINANCING

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On the Internet, at http://Kanarev.innoplaza.net, in the Articles 60 and 61, there is a book called "History of scientific search and its results" by Professor F.M. Kanarev. With the author's permission we publish a paragraph of this book. You will find the au-thor's opinion concerning methods of cooperation with investors and a description of other typical problems of Russian inventors.

Publication of the results on the Internet was rather useful. A head of one of foreign companies personally came to us and expressed a desire to finance our researches. A Russian-Foreign company was created. We were obliged to build a working laboratory model of a heating radiator which would produce heat energy 10 times more than consume electric energy. All necessary documents have been drawn up and discussed, and a company began working on February 1, 2005. In February, I drew up a patent application and noted that a power source of the heating radiator with a heat power of 1 kW is a motor impulse generator there. I gave a duplicate of the application to the investor.

At that moment, we only had a working low-efficient but higheffective unit. According to the data of the sensors installed in front of it, it produced heat energy 30 times more than consumed electric energy. The electronic impulse generator reduced this efficiency to 80-90%. I already knew that high energy efficiency of the unit is realized only due to a source of electrical impulses which had no galvanic connection with the whole power grid. However, there were no people who understood me; neither among electrical engineers, nor among my laboratory colleagues. It was necessary to conduct an experiment which would confirm or disprove my point of view. Such an experiment had been conducted using a diode and a 100-watt lamp. But my critics refused to acknowledge its results as they contradicted what was written in text-books on electrotechnology and impulse technology. It was necessary to conduct such an experiment with the unit.

A director of our company did not trust me as well and asked to build an electronic impulse generator. Leaders and specialists of the investor company shared this opinion. Moreover, they guaranteed that they would quickly build the electronic

impulse generator and it would give the necessary indications. Actually, they quickly brought such a generator but my prognosis turned out to be true. Sensors located in front of the unit showed its considerable efficiency while an active energy meter showed complete absence of any efficiency.

In May, we already had a working heating radiator with an irradiation surface of 1.6 square me-ters. Three its units consumed 15 Wt of power and a pump pumping a solution took the same amount. A power of 30 Wt was enough to heat the solution in the radiator to 90C with a surface temperature of 75-80C. Due to the fact that the sanitary code does not recommend having a temperature of more than 65C on a radiator's surface (organics are burnt and air is dry under higher temperature), we could think that we solved the problem of the creation of a heating device with such high efficiency. But the electronic impulse generator reduced all this efficiency. Only I understood the reason, told the others about it but they did not agree with me because my explanation contradicted what was written in textbooks.

Of course, fulfilling a requirement of the leaders to build the electronic impulse generator, I understood disutility of these efforts and actively searched for a variant of a mechanical impulse generator. By summer, more than 5 different electronic impulse generators and the same quantity of mechanical ones were tested. The first generators gave impulses with the necessary parameters but took all efficiency. The second generators were low-effective and the solution did not react to their impulses even in one unit.

We contacted Impulse Equipment Institute, Moscow. They agreed to build an impulse mechanical generator but warned that all indications would differ from the ones Prof. Kanarev expected, they would be the same as in textbooks. I was in despair. It was the middle of July. According to the contract, we built a heating radiator with the necessary efficiency. It was about 70%

of the planned efficiency. By that time, the investors transferred about 50% of the agreed sum. They visited our laboratory twice a month, controlled the working process and took photographs of the device. In April, they asked for a unit to test it at their laboratory. By that time, we trusted them so much that we gave them the unit. They came in two weeks and complained that they couldn't make the unit work and get any effect. They gave the unit back to us and expressed their distrust. We suggested testing it in our laboratory with their participation.

Of course, they disassembled the unit in order to know dimensions necessary to build a copy. I asked my assistants to check a secret gap. Of course, it was broken. I regulated it, we put the unit to a stand and a thermometer began to show fast temperature growth. The investor's representative and their specialist looked at each other in perplexity, began phoning to their laboratory and telling that the unit operated and gave the necessary effect. Of course, they were glad and asked for a better unit. We gave it, making an irreparable mistake.

I constantly asked my assistants to find a more powerful magneto generator for testing of my hypothesis. Finally, they brought a magneto generator from a tractor S-130. It was noncontact and more powerful than the previous ones. We quickly rewound a coil, connected a shaft of the magneto with a shaft of the electric motor, plugged it into power grid and, to our surprise, temperature in the unit began to rise. I understood that I finally reached a direct experiment for testing of my hypothesis.

I had been accused that I was using the wrong method to determine power consumed by the unit. Now an opportunity to check whether these accusations were true appeared. The electric motor putting the magneto's shaft into action is plugged into the power grid with an active energy meter. Voltage impulses generated by the magneto are fed to the unit. Thus, there is

the same power at the electric motor and magneto's shafts. We turn on the electric motor, it puts into action the magneto shaft, the magneto generates voltage impulses and passes them into the unit. We register consumption of the solution passing through the unit, its temperature change and also indications of the active energy meter, voltmeter, amperemeter and oscilloscope installed in front of the unit. We compare these results with the indications showed during turning-off of the unit and obtain the result **that I predicted** and contradicting textbooks. We repeat the experiment about 50 times. The result is the same – energy efficiency of the unit is **more than 1**.

I wrote an article "The law of an electric circuit" and thought that not only physicists and chemists but also electric and electronic engineers would hate me for the unusual results of my scientific research. I sent the article to the Internet and to those who argued with me concerning this question. A month passed but I received no answers. I phoned to Impulse Equipment Institute and asked when they would answer my suggestion to develop a mechanical impulse generator with the parameters calculated by me. They answered that they would solve this question. As a result, all my following e-mails sent to this institute were automatically forwarded back to me. The closed institute closed even more.

In the beginning of August, the investor with their specialists came. They told that they did not understand the experiment. We showed it to them. They still did not understand. They ask why the electronic generator did not realize the unit's efficiency and why it was necessary to build the mechanical one. I explained it several times to an investor's electronic engineer. They agreed and promised to bring a mechanical impulse generator which coincides with the calculations in a week. Our director reminded the investor that the money ended. The investor promised to transfer the rest.

In two weeks, I received a letter from the investor. He accused me and expressed complete distrust. I replied explaining that, according to the working plans, building the heating radiator with the necessary efficiency is 70% of all works. And you had transferred only 50% of the agreed sum. I already showed you that I found the power source which realized our heating device's efficiency. The calculations showed that it was necessary to build a magneto with a power of 15 W. The same energy was required for the pumping of the solution. The rest were losses. We admitted that they would be 4 times more than the paying load. In this case, the electric motor, magneto and pump are fixed at the same shaft. Together they will consume 30 W for yield and about 120 W would be losses. It was 150 W in all. You had already seen two similar radiators in the laboratory. One of them consumed 750 W and another consumed 30 W while they had the same temperature (about 80C) on their surfaces. Building of the noted impulse generator would lead to a commercial product with an energy efficiency of 750x100/150=500%. Was it a bad result for the first prototype? Our financial year ended in February. It was August at that time, and we had time to bring all indications to a standard. Further, we would update the impulse generator and we had all reasons to reduce energy consumed by it to 100 W and lower. We would develop more powerful heat and impulse generators later. We had big experience and would develop faster.

My justificatory letter was in vain. In his answer, the investor wished me success in cooperation with another company. So, Russian gullibility became fatal: how could we give the investor the most secret part of our research in the very beginning of our cooperation? I don't know, possibly, I made a mistake and the investor just did not intend to work in this direction. However, he got almost everything in order to finish it and enter the market with an effective heating device independently.

By that time, we had a good group of specialists who solved all questions connected with this research. I did not get my salary beginning from July. It was a pity to leave a perfect electronic engineer Igor Vladimirovitch Sklany, and I paid him his salary myself for two months hoping that the financing problem would be solved.

Two months passed since the day when a director of "AKOIL-Energiya" company promised to come and see our experimental results and begin financing the updating of the heat and hydrogen generators. September ended but no one came. I dismissed everyone and closed the laboratory.

I translated this paragraph into English and sent it to the investor. The next day, I received a letter from him expressing an active desire to continue the works.

The next day, I received from Juha Hartkka a report on readers' visiting of my home page which already contained more than 30 MB of information. This is the report:

Dear Prof. Kanarev,

September 2005 visitors hits on your most popular pages:

1496 hits on your main page http://Kanarev.innoplaza.net;
1920 hits on Kanarev/electrolysis/;
1243 hits on Kanarev.coldfusion.innoplaza.net.

So there is steady increase in interest in your pages. Only the most visited pages are shown on my statistics. There are more visitors on your other pages that my statistics do not indicate because statistics show only the 30 most visited pages.

In the beginning of October, we received such an e-mail:

Dear Mr. F.M. Kanarev,

Our specialist will come to you in 3-4 days.

You don't have to negotiate with foreign companies because today only our company can not only finance your projects but also provide for security at ANY level to you, your technologies and your family. We finance almost all advanced technologies in the field of energy and other directions.

Yours faithfully,
Director General of "AKOIL-Energiya".

The editor's note: We also cooperated with "AKOIL-Energiya" and we hoped that a heat generator from AKOIL will justify our expectations. Now we tested its efficiency and you can read our conclusions in article (page 72-73).

NEWS

Searl's antigravity aircraft

Ron Frazier
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If you are interested in antigravity or magnetics, check out this huge 25 MB file about the invention and experiments of Professor John Searl.

In the 1940's, based on a series of dreams, he invented a circular magnetic roller engine which was capable of producing electricity as well as exhibiting anti gravity effects without any external fuel source. He ultimately built one or more anti gravity flying saucers and operated them by remote control. Through a series of events including sabotage and theft, all prototypes of the aircraft and the engines were destroyed or lost. He and partners are working on rebuilding. I got the link for the file from Sterling Allan's FE_Update bulletin dated 04/29/05. This is available at

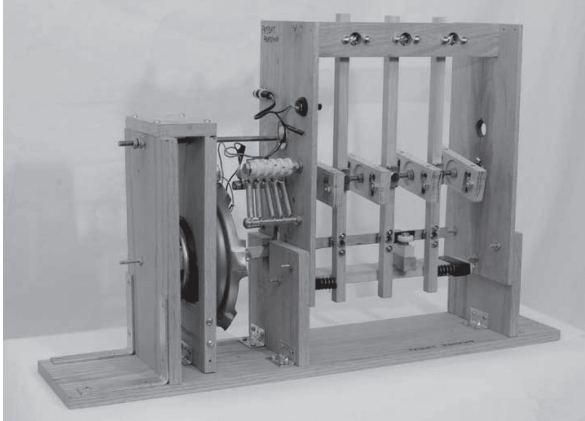http://groups.yahoo.com/group/fe_update/.
http://www.searleffect.com/ - Searl web site
http://www.searleffect.com/free/SEGREV/SEGREV.pdf - 25 MB pdf file.

Permanent Magnet Motor

**Stephen Kundel**
http://dogondesign.com/index.html

Have you ever felt the attraction and repulsion between two magnets and wondered about the energy flowing between them? After thinking about this concept for awhile, I developed a theory, and later a working model, of a motor that equally uses the natural attraction and repulsion of magnets to generate energy. This unique motor is portable, lightweight, and very efficient.
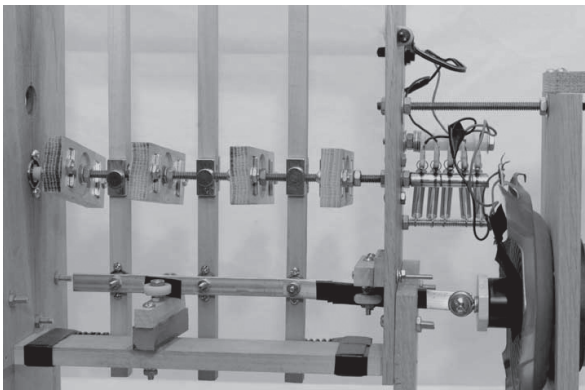
The basic concept behind the motor is quite easy to understand. In its simplest form, two magnets of opposing polarity are attached to a rotatable bar. By holding a third magnet at any point between the two magnets, the inherent attraction and repulsion properties produce an effect. Slightly oscillating the third magnet centrally between the two magnets causes a rotation of the two magnets 180° about the pivot point of their axis.

This concept can then be applied to create different devices having magnets of varying shapes and sizes with the same basic arrangement.
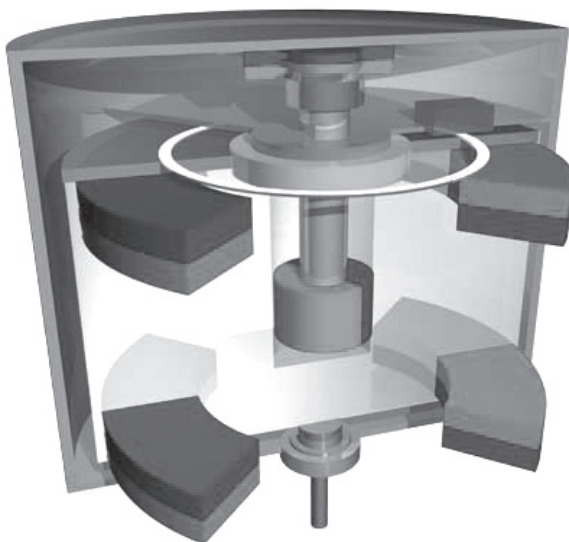
Note: The stronger the magnets the greater the output / torque. Neodymium and Samarium cobalt magnets with a coercive force exceeding 15 kOe are rarely affected by repelling forces.

Links:
• http://www.magnetapplications.com/USA/designguide2.htm
• http://www.suramagnets.se/support_guidedesign_3stability.php
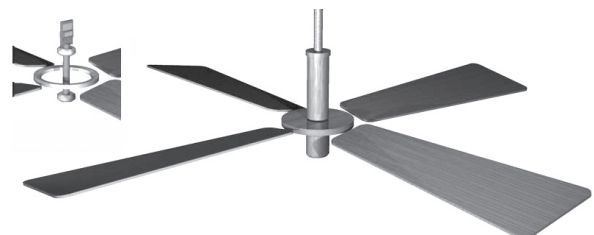
Thomas Bearden's principle

American scientist Thomas Bearden published in 1993 the article "The secret of free energy". In this article he considered the general principle of free energy devices. Below we publish the scheme from his article and foreword to his Denver report of 1994. This simple principle is not common but it must be taken into account in many research projects if some pulsed excitation of a working body is used in this project. In this case the extraction of energy is organized during the pause between the pulses of excitation. Readers of our magazine can find analogies with Prof. Kanarev's publications (Pulsing electrolysis), N. Zaev's research (pulsing magnetization and charging-discharging of non-linear capacitor), and also in the atomic hydrogen recombination experiments. Our research in this area allows us to assume that pulsed excitation of gas leads to extra energy output in the recombination phase. We recommend to our readers to study the Bearden's articles in depth. I very much respect Thomas Bearden because our correspondence with him started in 1990 and was very important for my alternative energy education.

Alexander V. Frolov, Faraday Lab Ltd.

Overunity Electrical Power Efficiency Using Energy Shuttling Between Two Circuits

Thomas E. Bearden

To enable an electrical power source to power a load with overunity efficiency, a two-circuit, two-cycle energy shuttle methodology is utilized. In the first cycle, a capacitor/collector is charged from the

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http://www.cheniere.org

source without entropy and without source depletion, by use of a stair-step ramp-up application of the source voltage utilizing several hundred small rectangular steps. In cycle two, the charged capacitor is disconnected from the source and shuttled to a separate load circuit, and discharges through the load to power it. Nearly free power is thus obtained in the load, without appreciable depletion of the primary source except to power the switching and miscellaneous losses. The two-cycle energy shuttle process is iterated, providing a heat-pump-like operation and permissible overunity operational efficiency.

The excess energy is extracted directly from the vacuum via the Stoney/ Whittaker/Ziolkowski bidirectional EM wave flow exchange between the vacuum and the bipolar separation of charges in the source. The source is utilized primarily as a receiving antenna for this vacuum-to-source free EM wave energy exchange, which constitutes the potential gradient between the source's terminals.

Notes from editor: after the quotation from Bearden's article we can consider some analogies. Bearden wrote about the discrete charge of a capacitor. It's one of methods to create gradual polarization of charges in capacitors without conductivity currents and without losses of a primary energy source.

Professor Kanarev published in this issue experimental data on the high efficiency of his electrolytic cells. By analogy with Bearden's principle, we can assume that pulsed mode of operation allow to activate the cell,

and in second cycle to take power in useful load.

N. E. Zaev also published many articles in our magazine (NET #2, 4, 5, 8) and he described two-stages cycles: for the first stage of the cycle the working body, for example a ferromagnetic or non-linear capacitor, was activated with some losses from a primary source of energy. For the second stage of the cycle, due to the special physical properties of the working body, it is possible to get extra power output in the useful load. The difference between output and input energy is compensated from environmental heat energy.

In our research on atomic hydrogen dissociation-recombination cycles (NET #22) also was used a two-stage (pulsed) activation of working body (gas).
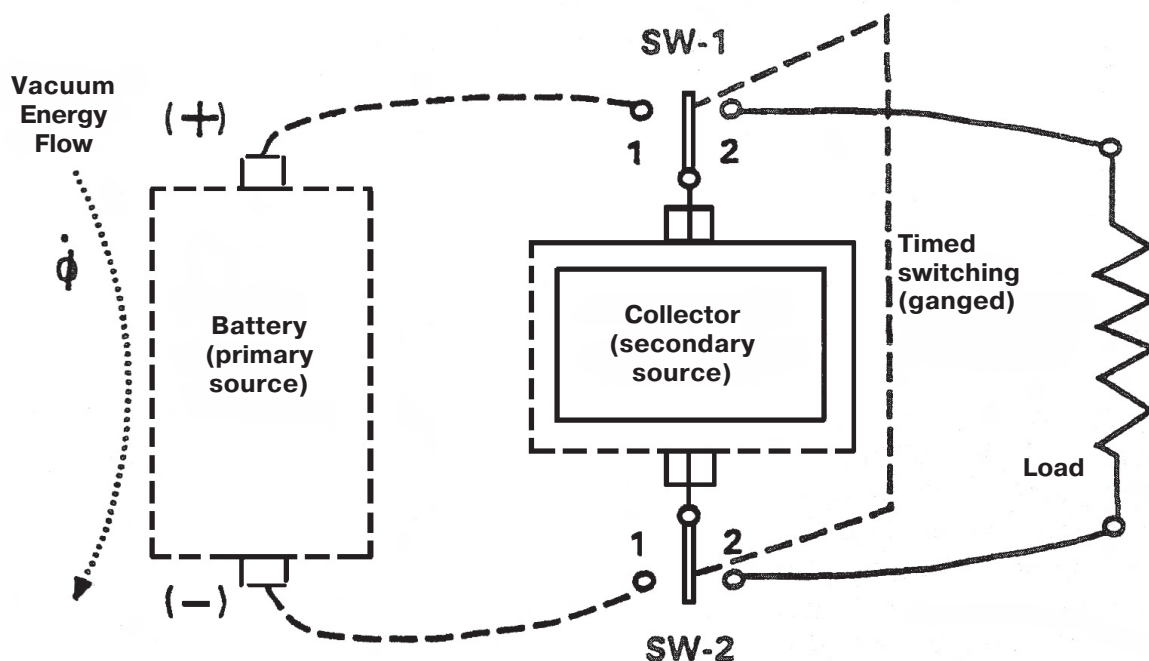
Alexander V. Frolov, Faraday Lab Ltd.

Fig. 1. Extracting and utilizing free electrical energy from the vacuum, via the internal wave energy flow exchange hidden inside the potential gradient across the source's terminals.

Influence of Aether Density on the Rate of Existence of Matter

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There are experimental data to confirm that the rate of existence of matter depends on density of aether. It is clear since any particle of matter is a vortex process in the aether. So, the rate of time (time velocity) is physically a rate of existence of matter in space i.e. in the aether and it is dependant of real parameters of the vortex. The rate of time (time speed) and the note of "time" can be removed from consideration in physics since it is a secondary notion. The primary notion is "the rate of process" and in this case it is the parameters of the vortex process, which create the particle of matter.

Let's consider examples of the simplest devices, which can create changes of the density of aether. The devices have no external power supplies. Their work is based on the fact of relative motion of our planet inside of the Universe aether.

Fig. 1 is a set of pipes, which creates standing waves in aether. Fig. 2 is spiral emitter of aether waves that is medical equipment of the 19-th

Fig. 2. Korshelt's aether emission device

century. These figures we found from V.Grebennikov's book "My World". Fig.3 is a photo of his cone emitter of the aether waves
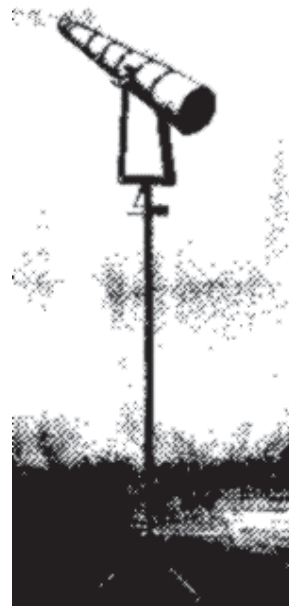

Fig. 1

Fig. 3

(outside view). The device material is paper and also three permanent magnets are installed in this device. The magnets are necessary since they are producing the excitation of the aether flows (any magnetic field can be considered as closed circle of aether flow).

At last, Fig.4 is well known pyramidal element (also it is figure from Grebennikov's book). We can see here two special points above the pyramid and inside of the pyramid. From the aether flow theory we can see why these points can create influence on the physical properties of matter.
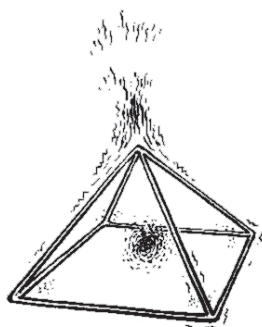

Fig. 4

The pyramid elements create an area of changed aether density inside of the pyramid and in other points we can find area of artificial aether flow.

One more example of similar technology is a discovery by Mr. Bogdanov (Arguments and Facts, #10, 2002). The author of the invention was interested to find real rejuvenation technology and he saw in his dream the scheme of a device. It must be a 30 m diameter sphere, which consists of many cone elements and in 8m diameter inner room the effects can be detected. Fig, 5 is a simple scheme of this device. We can see that the idea is similar to Fig.3 and Fig.4 but in this case the focusing principle is applied.

The idea was tested by Bogdanov on the base of a small model (50 cm diameter), which was made of paper. Testing in a Moscow research institute confirmed that inside of this device can be detected the effect of concentration of crystals. For example, manganese solution crystals form a spherical body. We can conclude
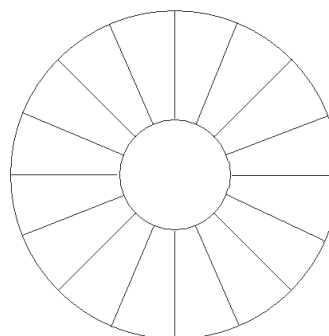

Fig. 5. Bogdanov's rejuvenation device

that Bogdanov's device is De Broigle's waves resonator of the aether waves and the effect is very powerful due to focusing method.

Let's note that passive reflectors and focusing of the aether flows are very primitive methods, which can be compared with a seal ship against modern ships. Well known electromagnetic methods can be re-considered from the aether point of view to find real ways of creation of the aether gradient. Some attempts of such researches were made by Dr. Vadim A. Chernobrov, Moscow. Fig. 6 is scheme of device, which can create controlled changes of density of the aether.

In a joint research project with Dr. Chernobrov we built and tested a device, which is shown here, Fig. 7.

Elements of this device are inventions by Dr. Chernobrov, Fig.8. It is 3-turn coil of current. We discussed this technology in detail in New Energy Technologies magazine, issue #3(12), 2003, page 4.
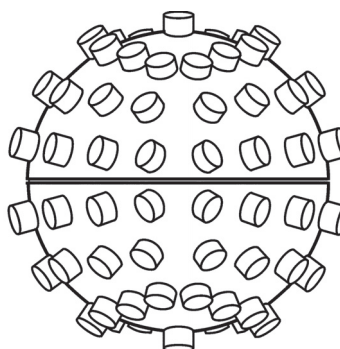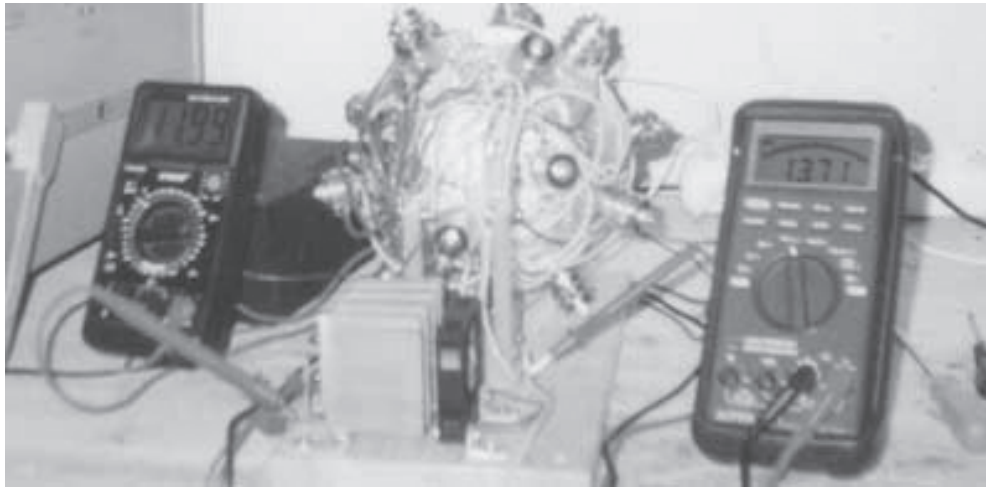

Fig. 6

Fig. 7. Testing of experimental device in Faraday Lab

Besides electromagnetic methods it is possible to use any irreversible processes, which are unidirectional changes of entropy. It was demonstrated in N.A.Kozyrev's research. The idea of the experiment is shown here as a proposal for a joint research project with a possible customer, Fig.9.

The process here can be any phase transition of matter, for example, from liquid to gas or crystallization processes. In this experiment we are planning to get proof of the principle and confirm that controlled changes of aether density are possible and also that it is a way to change physical properties of matter. In this experiment we cannot say that our detectors are wrong due to electromagnetic effects since here we have no electromagnetic fields.

We are looking for customers to develop this technology. Applied aspects of controlled changes of aether density are more important than fantasy about "time travel". We are opening a door to a new World of controlled matter properties. It is not only a material with new physical properties. Living matter placed in an area of controlled aether density can get the possibility for forced evolution, optimization of cell division processes, enforced immunities and new qualities of organisms.

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Fig. 8

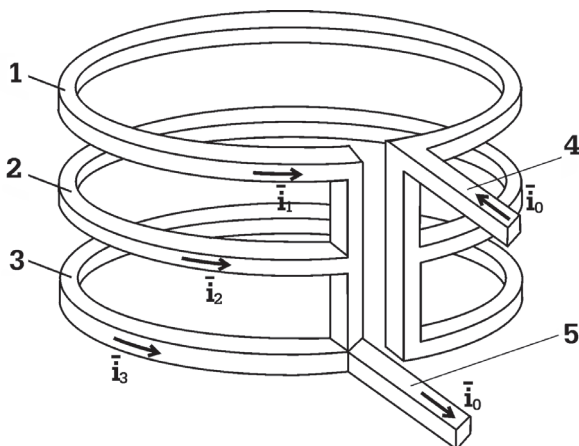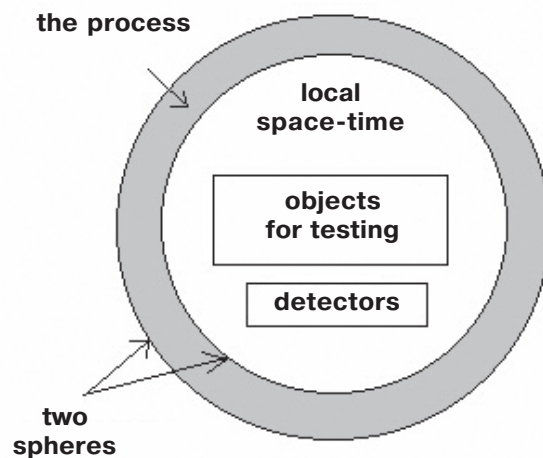**Fig. 9**

Testing of vortex Heat Generator

Alexander V. Frolov, Faraday Lab Ltd, St. Petersburg, Russia
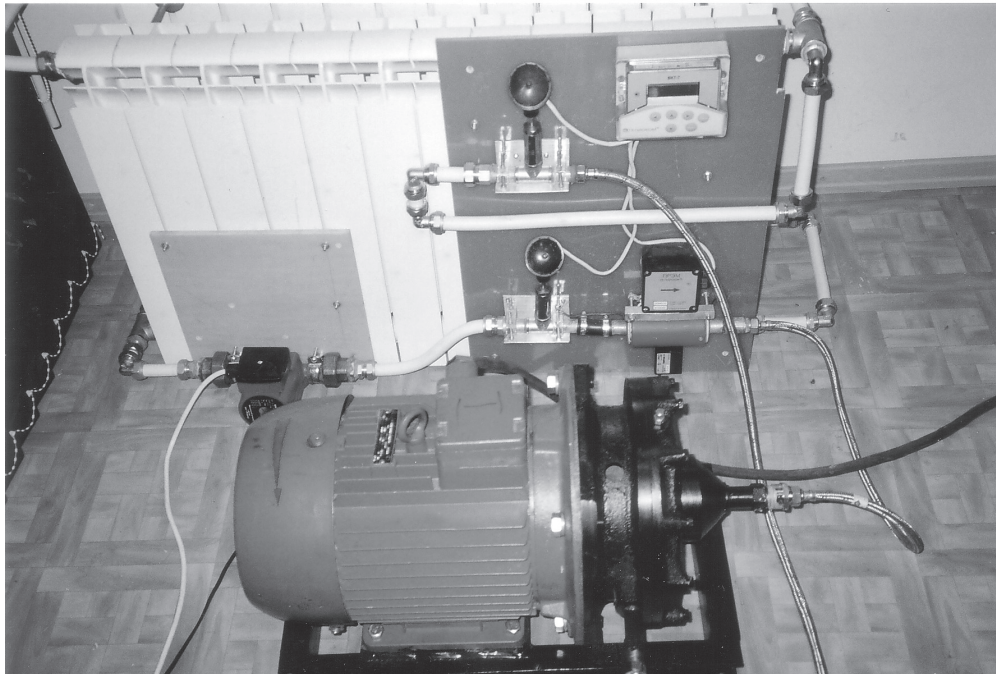**tel./fax: 7-812-380-3844**

Fig. 1. Water Vortex Heat Generator VTG-4 under testing in Faraday Lab.

Our company ordered from AKOIL a new Water Vortex Heat Generator VTG-4. We have received the device in October, 2005. This device is made of cast iron and due to this novelty the level of noise is very small. Besides, the producer can provide the device with a soundproof case.

Technical parameters of the device, according to documentation, are the following: heat-productivity is 11360 W and electrical consumed power (3 phase electromotor) is 11200 W. We tested the device in our laboratory. Consumed electrical power was detected by digital 3 phase watthourmeter. Heat calculations were made by certified equipment VKT-7. Fig 1 is photo of this experiment.

We were disappointed to see a very small heat productivity. In the next experiment we used the simplest scheme of measurement. The volume of water was 12 liters. Temperature on start was 12 degrees C. During the 7 min experiment, VTG-4 produced work to increase the temperature up to 72 degrees C. Consumed electrical power was 12360 W. Our calculations allow us to conclude that heat-productivity of this device is about 6500 W. So, efficiency of this heater is about 50%.

After the experiments, we contacted with the producer (AKOIL-Energia, Russia, Igevsk, ul. Kirova 172, tel 7-3412-420748, http://www.akoil.ru info@akoil.ru) and received some instructions to change the measurement methods. They explained that metal hardware of the device (about 120 kg) also was heated by the vortex process. Also they said that we must increase the volume of water up to 200 liters. For this case the heat losses will be not so significant. In any case, the designer

us to make a conclusion: this equipment is not ready for innovation as over-unity devices. It's clear that principles of operation in this case are placed in the frame of classical physics. Other inventors informed us about 300% results and the volume of water is not a critical parameter.

The producer (AKOIL) also said that VTG-4 can be used as a water treatment system. It's important that any aggressive liquids (including radioactive liquids) can be processed in this vortex process. We are interested to find a customer for such research to confirm this claim.

Also we can recommend to inventors the way of modernization and to develop a standard water pump. The high efficient water vortex heater can be made on the basis of a centrifugal water pump after upgrade of its impeller.

We hope that our collaboration with AKOIL will be continued and future water vortex heaters produced by AKOIL will be more efficient.

**Fig. 2. A.G.Kochurov,
General Director of AKOIL company**

of VTG-4 said that the efficiency must be about 100%.

Sure we are in agreement with this instruction, but results of our testing allow

Honda's More Powerful Fuel Cell Concept with Home Hydrogen Refueling

Green Car Congress Technologies
http://www.greencarcongress.com

Fig.1

Honda's new FCX fuel cell concept vehicle, unveiled at the Tokyo Motor Show, is a stylish sedan featuring a redesigned fuel cell system that delivers more power and increased range in less space than the current FCX 2005 model on the road, and a low-floor design that maximizes cabin space.

Enabling the low-floor design is Honda's new "3V" system: vertical gas flow, vertebral layout, and volume-efficient packaging.

Note the cutaway of the rear wheel showing the in-wheel motor. Click to enlarge.

In the 3V schema, oxygen and hydrogen flow from the top to the bottom of the fuel cell stack (vertical gas flow) and the fuel cells are arranged vertically in the center tunnel (vertebral layout) for new, high-efficiency fuel cell packaging (volume efficiency).

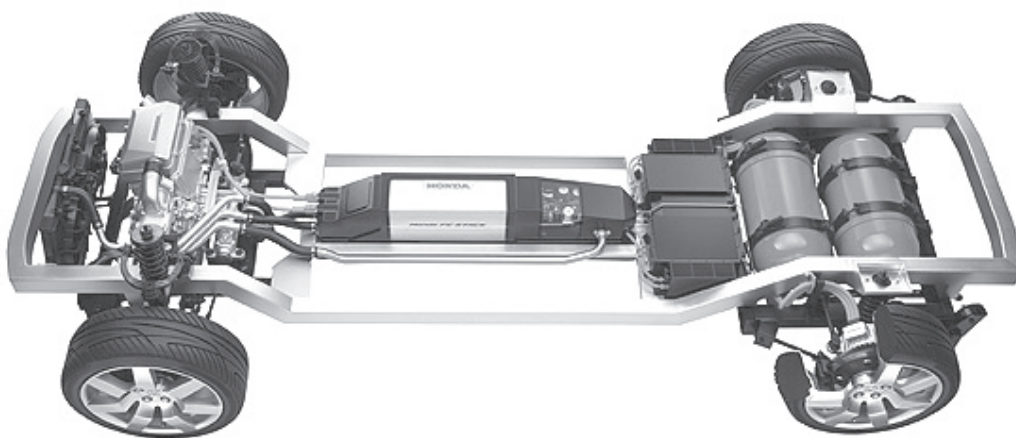Compact enough to fit neatly into the center tunnel but robust enough to deliver

Fig.2 The V-Flow system. Vertical gas flow, vertebral layout, volume-efficient
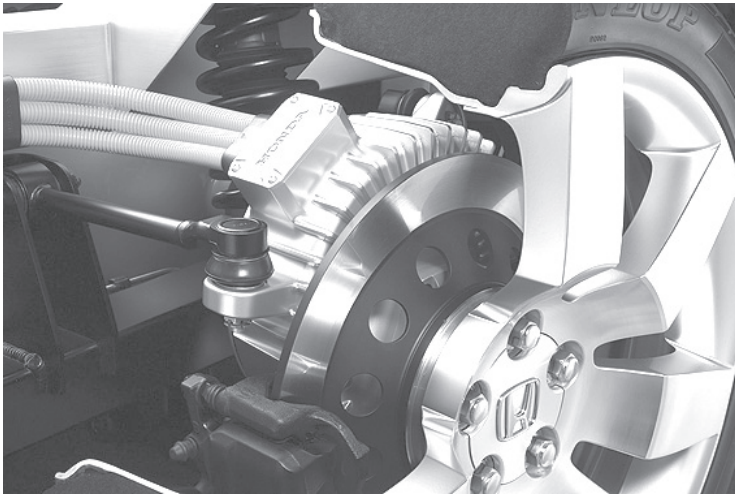
Fig.3 The 25-kW in-wheel motor

100kW of power, the V Flow fuel cell stack offers both space efficiency and high energy output. The key to fuel cell performance is water management. With vertical gas flow, an innovative process in which oxygen and hydrogen flow downward through the stack, Honda's new fuel cell stack takes full advantage of gravity to efficiently discharge water formed during electricity generation. By contrast, the FC stack in the FCX 2005 offers a maximum of 86 kW. (Earlier post.)

This improves system performance in sub-zero temperatures, achieving a new level of system reliability. The problem of cold-weather startup had been a key obstacle to the commercialization of fuel cell vehicles. In 2003, Honda solved the problem with the introduction of the Honda FC Stack, the world's first fuel cell that can be used at temperatures as low as −20° C. The V Flow fuel cell stack, on the other hand, now delivers ultra-low-temperature start-up performance on par with that of a gasoline engine.

The FCX-V Concept drive train features three energy-efficient motors: one in the front and two in the rear. The efficient delivery of this power through all four wheels and the low-center-of-gravity platform combine to deliver torquey performance and agile handling.
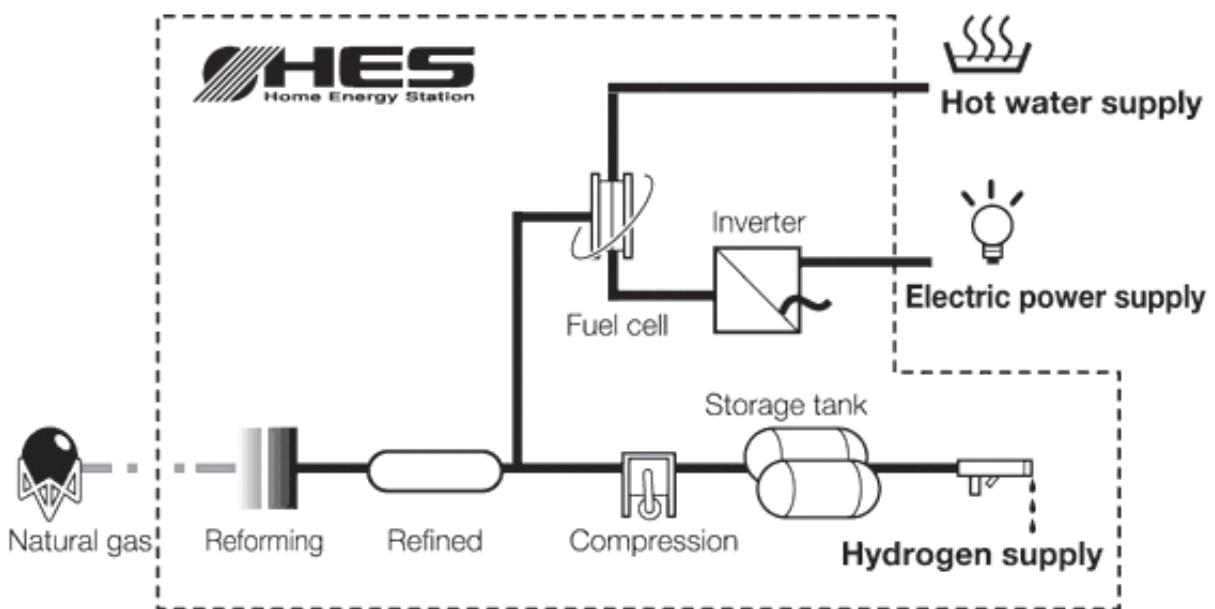

Fig.4 HES System

The space-efficient layout also contributes to the interior efficiency of the low-floor design, eliminating the need to use floor space for motors. Coaxial motor and gearbox. The 80-kW front-drive motor output shaft is coaxial with the gearbox for a more compact package and a shorter front-end. Rear in-wheel motors. Each of the rear wheels contains a thin, eccentric 25-kW motor.

To increase the driving range, Honda engineers chose not to increase storage tank pressure, but to use a newly-developed hydrogen absorption material that doubles the capacity of the tank to 5 kg of hydrogen at 350 atmospheres. With the new material, the tanks supply enough hydrogen to extend the cruising range to 560 kilometers (350 miles)—exceeding the DOE's range target for 2010. Again, by contrast, the current FCX 2005 model offers a range of 190 miles.

Honda also unveiled its current model of the Home Energy Station (HES), a home cogeneration and fueling system that uses natural gas to supply electricity and heat in addition to hydrogen fuel for vehicles. The system is equipped with fuel cells that generate electricity (5 kW) for the home, and is configured to recover the heat produced during power generation for domestic water heating. The HES can produce 3 Nm3/hr of hydrogen. In addition to reducing carbon dioxide emissions by some 40%, according to Honda's calculations, the HES system is expected to lower by 50% the total running cost of household electricity, gas and vehicle fuel.

New Energy Technologies

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Autothermia
Natural energy

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Prof. E.I.Andreev

The editor's note: We publish a condensed version of the materials from the new book of Prof. E.I. Andreyev called "Fundamentals of natural energy" [10]. In the end of the article, you will find descriptions of the three Andreyev's patents, # RU 2229619, 2229620, and 2179649.

The autothermia effect is combustion without consumption of organic or nuclear fuel. Historically, it was used and carried out for the first time in a carburetor engine of VAZ-2106 car on the 25th July 2001 in Saint Petersburg. Long before this moment, racing car engines were set to produce maximal power with the help of the methods polished by practice: providing for full lean air-fuel mixture; ignition angle and spark power control; adding of combustion catalysts. Some machines (cars, motorcycles) suddenly showed an increased power which considerably exceeded the engine power. This gave speed advantage and also rarer fueling though there was a lot of fuel and its consumption was not a problem. Such facts are known at least for about 20 -30 years.

During the following historical stage, some people began to use the racing practice of engine setting to standard passenger cars. For example, a mechanical engineer A.V. Chistov has set about 200 cars to the increased power and fuel economy mode during 20 years [8]. A fuel economy was from 30% to 70%. Absence of the theory and impossibility to explain the effect by ideas of the traditional physics during a long time prevented from getting a stable operation mode of the mentioned engines. The fuel economy mode quickly stopped and people had no thoughts about the autothermia mode (without fuel consumption).

During some years of communication with physicists, a lot of information about new physical theories has been processed. These theories (about one hundred), some of which are published as separate works, can be divided into two parts: improvement and mathematization on the basis of the current physics. And only one physical theory, a hyper-frequency physics of D.H. Baziev [5] published in 1994, considerably differed from the others though it was based on the same known experimental facts. The main difference was that existence of a new elementary particle which is much smaller than an electron was theoretically determined. The author called the particle electrino by analogy with an electron.

Later the electrino existence was experimentally proved [7]. The hyper-frequency physics allowed developing, understanding and showing the physical mechanism of combustion. Its main components were, as before, fuel and an oxidizing agent. But their roles and

interaction were discovered at the level of elementary particles – electron and electrino. Nevertheless, no thoughts about fuel-less autothermal combustion were expressed. Only by 2000, the fuel-less combustion theory was developed [1]. According to this theory, air could combust autonomously, without fuel, which was confirmed by the practice of setting and operation in the fuel economy mode of racing and passenger cars' internal-combustion engines. This mode was tested over a long period of time. These facts allowed believing in 100% realization of the autothermal fuel-less air combustion in carburetor motor engines. Due to this, they were used for experimental and development activities directed at the exclusion of fuel from the combustion process. Finally, this aim was reached.

The theory helped to correctly implement the autothermal air combustion process and obtain stable engine's operation during any load conditions.

Evolution of new views in physics and energy. From the theory understanding to plenty of energy

Two kinds of energy – the accumulated [1] and free [2] ones are considered as an inexhaustible source of ecologically clean energy renewable in natural conditions, created by Nature.

One of the main methods of energy generation is combustion of organic fuel.

Let us consider briefly the historical aspect of the combustion theory. The theory of phlogiston (an imponderable substance which caused combustion and participated in it) was the first. In 1669, a German chemist Becher, in his work called "Underground Physics", expressed a thought that there is a combustible component in bodies' compositions. In 1703, a German chemist Stahl re-published Becher's work and called the component "phlogiston". However, it was impossible to isolate phlogiston in its pure form, experiments did not coincide with the

theory and it became dislodged. In 1756, Lomonosov defined combustion as a reaction of a combustible and air and Lavoisier defined it as a reaction of substances and oxygen (a chemical oxidation reaction) in 1773. Since that time, nothing practically changed. Today combustion is considered as all exothermal chemical reactions including oxidation of a combustible.

No physical mechanism of combustion has been developed despite numerous works on theory and practice of combustion. Calorific efficiency of fuel is still considered as a given from above property with characteristics which are determined experimentally.

Let us consider one of paradoxes of the traditional combustion theory. It is known that oxygen explodes in the presence of lubricating oil's (or any hydrocarbon) traces. If we follow the theory of an explosion as fast fuel combustion in oxygen, it is clear that the heat of oil traces' reaction never coincides with the energy of oxygen explosion. This is the paradox: a small amount of fuel (a microgram in TNT equivalent) and huge energy of oxygen combustion, as if oxygen explodes by itself.

If we ignore the small amount of the oil's traces, we can see that there is only oxygen in the initial, pre-explosion medium. An oxygen molecule consists of two atoms connected with an electron. At the same time, there are always some oxygen atoms (ions) (plasma) in pure oxygen due to permanently happening phase transfer "molecule - atoms". And there are some free electrons in hydrocarbons containing many connection electrons. Presence of even a single electron and oxygen atoms with an opposite sign of excessive electrical charge inevitably leads to their interaction and a following explosion. A physical mechanism of this process was developed by D.H. Baziev [5]. When a free electron with the highest electro-dynamical oscillation potential enters plasma, it instantaneously becomes the first acting component in the system of

oxygen atoms-ions (plasma). An electron globule – a sphere made of oxygen atoms - forms around it. An energy generation mechanism's basis is electro-dynamical interaction of free electrons with substance atoms, during which a negatively charged electron layer-by-layer takes particles, which are much smaller than the electron, called electrino from an atom. Electrinos with a high start speed ($\sim 10^{16}$ m/s) give their kinetic energy remotely (electro-dynamically) and by contact (during clashes) to surrounding atoms and particles and turn into photons (energy-less electrino) themselves and go from the reaction zone into space at the speed of light ($\sim 10^8$ m/s). This energy liberation process is called a phase transfer of the highest kind (PTHK). As we can see from such a brief description of PTHK mechanism, two conditions are necessary for its behavior: the first one is presence of plasma as state of an ionized substance divided at least into atoms and the second condition is presence of free electrons.

During each interaction with an electron, an atom irretrievably irradiates an electrino which becomes a plasma hyper-frequency oscillator for a moment, during which it transfers its connection energy in an oxygen atom to surrounding oscillators.

Due to the fact that there is nothing except oxygen and nitrogen in the air combusted in an internal-combustion engine, reduction of organic fuel consumption occurs due to nitrogen involvement into combustion which is indicated by reduction of nitrogen contents in exhaust. In order to do this, it is necessary to decompose a nitrogen molecule at least to atoms or smaller fragments by some initiating influence. This can be made by an electric discharge, magnetic flow, explosion or other methods which consume much less energy than it is produced during PTHK. Such a nitrogen operation and combustion mode goes with oxidation up to H_2O, not to CO_2, which is more effective, according to energy and ecology.

PTHK processes with production of excessive power (which is bigger than the consumed one) were also obtained in cavitation heat generators using water.

Now let us talk about free energy. It is called by different names but nobody can formulate what it is. It is called aether energy, basic universal energy but if you ask, 'What is it?', they answer, 'Something', i.e. they do not mean any physical meaning. The surrounding physical vacuum or aether or quintessence is electrino gas, i.e. a medium containing invisible elementary particles – electrino discovered by D.H. Baziev in 1982. Their properties are considered in the works [5, 6, and 7] and electrino's existence was proved experimentally by the Russian Academy of Sciences in 2001 [7].

Since energy, as many people consider, is a motion measure, in order to use the environmental energy as free energy, it is necessary to make electrino move (in different energy devices).

In the work [2], a complete classification of energy devices' types including standard and non-traditional ones using accumulated and free energy is given. Physical mechanisms and their operational principles are described in details; a description of real devices using free energy is given. It is shown that energy exchange in nature and the energy devices consists in transfer of electrino flows as energy flows between interacting objects or between objects and the environment.

Free energy diffused in the environment can be transformed in mechanical, electric or any other kind of energy by vibration-resonance, electromagnetic and energy devices of other kinds. An example of the energy devices using free energy can be known engines of Searle, Floyd, Kushelev (the "continuously operating lamp", 2002) and other authors.

The developed physical mechanisms of energy production processes allow building industrial, stably operating, ecologically clean energy devices which do not consume fuel hazardous to people - organic and nuclear.

Difference of standard and fuel-less combustion

Standard combustion:

1. During standard combustion of, for example, carbon 12C, hydrocarbon chains of fuel decompose to single elements in such a way that each carbon atom has a connection electron which becomes free

$$C+e+C+e+\ldots \qquad (1)$$
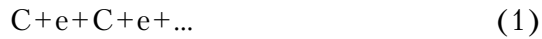
2. Air oxygen molecules, which consist of two atoms and a connection electron each, decompose to a positively charged atom (ion)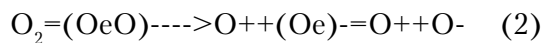 and a negatively charged ion consisting of a positively charged oxygen atom and a connection electron connected with it

$$O_2=(OeO)---->O++(Oe)-=O++O- \qquad (2)$$

3. A free electron obtained in combustion plasma from fuel (1) becomes an electron – energy generator, according to the physical mechanism of PTHK: it electro-dynamically interacts with ions O+, layer-to-layer, taking small elementary particles from them which creates a small defect of oxygen atom's mass (about 10^{-6} %). Such a small mass defect allows keeping oxygen's chemical properties. After the energy generation process (PTHK), products of the reaction combine into the most stable compound

(CO_2) C + O_2 = CO_2 or, taking into account electrons
$$C+e+O+O++e=OeCeO=CO_2 \qquad (3)$$
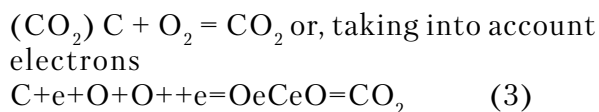
4. As we can see, during standard combustion, an atomic reaction of oxygen decomposition takes place. Due to the connection energy of its elementary particles, heat energy is produced. Fuel is a donor of electrons. The oxidation reaction (3) is a consequence of combustion.

Nitrogen does not participate in standard combustion. It is a dead weight in the air composition.

Unusual – "fuel-less" combustion:

5. If an oxygen molecule is decomposed producing a free connection electron

$$O--->O+ +e+O+ \qquad (4),$$

this free electron will become an electron – energy generator just like the electron obtained from fuel (1).

6. In this case, fuel is not necessary and combustion becomes fuel-less though with the same oxygen mass deficit Δm as during standard combustion

$$O_2 --->O_2 - \Delta m \qquad (5)$$

7. In pure oxygen, the energy production reaction, according to (4), happens with an explosion (fast combustion). In order to begin it, as we know, hydrocarbons' traces are only needed (lubricating oil, petrol, diesel fuel and others).

In air, nitrogen prevents the explosion. Nitrogen molecules with a negative excessive charge surround each oxygen molecule with a positive excessive charge and form sets from oxygen protected by nitrogen from electrons' influence.

8. I.e., in order to provide for fuel-less combustion, it is necessary not only to decompose oxygen, according to (4), but to preliminary decompose the oxygen sets with the nitrogen screen. Thus, nitrogen is not only the dead weight but also a structurally organized medium preventing access to oxygen and its explosion.

9. If the initiating influence is sufficient for decomposition of nitrogen with molecule twice stronger than oxygen ones because it has not one but two connection electrons, nitrogen is decomposed not only to atoms but also to fragments which present other chemical elements

$$N_2 --->C,O,H. \qquad (6)$$

10. These elements, especially oxygen and hydrogen, participate in the energy

production reaction (PTHK) with the electrons – energy generators.

11. Nitrogen participation in PTHK increases the energy production reaction's efficiency due to additional connection energy of elementary particles in atoms of the mentioned substances. Such a combustion reaction is called a nitrogen reaction.

12. Products of the nitrogen reaction are mostly water vapor (water) H_2O, partially, oxygen O_2, carbon C and, to a lesser degree, CO_2, CO, NOX and other substances.

Realization of new ideas in energy engineering
Fuel-less autothermal mode of air spontaneous combustion in an internal-combustion engine.

Autothermia is an effect of spontaneous combustion of, particularly, air when the air combustion process, for example, in an internal-combustion engine, happens autonomously, independently – without consumption of organic or other kinds of fuel.

The theory [1, 2] has been developed for seven years and tested practically using, first of all, carburetor car motors for three years. First, the fuel-less engine operation mode was obtained on the 25th of July 2001. It took more than a year to obtain the fuel-less air spontaneous combustion mode in engine's cylinders of VAZ-2106 car during its motion with load and a speed of 120 km/hour on the 25th of August 2002. Fuel consumption was determined quickly using a standard regular track computer and a sensor of fuel consumption set in the car. Fuel consumption indications of the sensor and the computer were periodically controlled by the volumetric method, measurements of a fuel level in a fuel tank, using a bottle installed on a measuring jar instead of the tank close to a carburetor float chamber. Control measurements showed that accuracy of the fuel consumption sensor coincided with the volumetric measurements. Particularly,

when the sensor and computer showed zero fuel consumption, a fuel level in the measuring jar (with a diameter of 1 cm and a length of 1 m) was stable too staying on the same mark.

According to the main car motion modes:
- with a speed of 60...70 km/hour and a speed of the engine of 2000...2500 rev/min;
- with a speed of more than 70 km/hour and a speed of the engine of more than 3500 rev/min;
- and also idling with a speed of the engine of 200...1500 rev/min
there was no fuel consumption at all; it was zero.

During start and warm-up of the engine and also during transient modes and throttling, short-term fuel combustion took place. According to the total run, it was 1.0...1.5 l per 100 km.

The fuel-less combustion mode was provided by air procession and carburetor setting to lean mixture without any changes of the engine's construction.

The fuel-less air combustion mode (autothermia) requires no constructional changes of an internal-combustion engine while the energy production process PTHK is the same as during standard combustion using fuel as an electron donor. During autothermal combustion, air electrons are used, this is why fuel is not necessary. In order to provide for the autothermia mode, it is necessary only to set some auxiliary systems and equipment elements.

Air moisture load is an important factor. In summer, at a temperature, for example, +25C and a relative humidity of 50%, air moisture load is 10 g/kg (tem grams of water in the form of vapor per a kilogram of air), i.e. it is 1%, according to mass. At the same temperature and relative humidity of 100%, air moisture load (of saturated air) increases to 20 g/kg, i.e. to 2%. In summer, air is dry. Its moisture load decreases by 1...2 orders, i.e. to one tenth and one hundredth of a percent. In moist air, not only molecules of nitrogen and air

oxygen giving electrons decompose to atoms but also moisture. A water monocrystal is a chain of molecules connected by connection electrons: during its decomposition, 3,760 electrons are released at once (an electron per each molecule). During water molecules decomposition, another two electrons are released per each molecule. So, it is three electrons per molecule or, which is the same, an electron per 6 atomic mass units. During petrol decomposition, it is approximately an electron per 4 atomic mass units. As we can see, fuel and water are almost the same, according to efficiency of their use as fuel for combustion. Air is behind them because, during its decomposition, approximately 16 amu per an electron which became free energy generator are released. However, both air and water, unlike fuel, contain a sufficient number of oxygen atoms and, therefore, they can combust spontaneously because their plasma contains everything which is necessary for PTHK: both oxygen atoms and electrons.

According to the carried out analysis, we can understand which measurements must be taken in order to easily start an engine using lean mixture not only in summer but also in winter cold season:

1. It is better to improve magnetic-catalytic air and fuel procession before feeding them into engine cylinders. In this case, other measures could be not necessary which will simplify the starting system.
2. To increase fuel feeding during the starting period.
3. To moisten air adding 1...2% of moisture.
4. Carry out preliminary heating of air, moisture, fuel and the engine.
5. To improve the initiating influence in the engine cylinders (condensers-reservoirs, plasma ignition plugs and others).
6. To bring an electron bunch to the cylinder from the outside, for example, by an electron gun.

All these measures, of course, can complicate the engine starting system; this is why they must be used in a reasonable combination with each other.

The best way to prepare an engine to the autothermal mode

Today the best way is to form a sufficiently "thick" layer (~ 20 mcm) of the catalyst on the cylinder walls. It coincides with a run of 4,000...5,000 with an optimizer. It is necessary to intentionally decrease compression, for example, to 7 kgs/cm², with an initial gap increase by 20 mcm. Later this gap will close and compression will be automatically restored to 12 kgs/cm². Under these conditions, the engines can operate without fuel, without an optimizer and improved plugs, during all modes, revolutions, and loads.

Description of the inventions

A method of fuel-air mixture preparation and a device for its realization. Patent RU 2229619.

The invention is related to energy engineering, heat power plants and engines including internal-combustion ones. The suggested method of fuel-air mixture preparation can be carried out in the described below device. The device for fuel-air mixture preparation including permanent magnets which form magnetic field lines perpendicular to air flow is made in the form of a flat cylinder with a nonthrough central hole. A groove connected to the central hole by canals is made along the external side surface of the cylinder. Ring permanent magnets are installed on the external side of the groove opposite to each other in such a way that a gap is formed between them which allows air passing between the magnets into the internal space of the groove and, further, through the canals, into the central nonthrough hole. The internal space of the groove is filled with the catalyst and a pipeline is connected to the central nonthrough hole for mixture of the processed air with fuel and feeding of the fuel-air mixture to an engine or heat power plant.

In Fig.1, the device for air-fuel mixture preparation using the suggested method is shown.

The device for air-fuel mixture preparation is made in the form of a flat cylinder 1 with a nonthrough central hole 2. A groove 3, which is connected to the central hole by canals 4, is made along the external side surface of the cylinder 1. Ring permanent magnets 5 are installed on the external side of the groove opposite to each other. A gap 6 is formed between them. It allows air passing between the magnets 5 into the internal space of the groove 3 and, further, through the canals 4, into the central nonthrough hole 2. The internal space of the groove 3 is filled with the catalyst 7. A pipeline 8 is connected to the central nonthrough hole 2. Fuel is fed to the pipeline, for example, through an injector 10, for formation of the fuel-air mixture. The pipeline 8 connects the device for fuel-air mixture preparation with an engine or a heat power plant (they are not shown in Fig.). The magnetic field lines are shown as arrows 9.

The invention's formula. The method of the fuel-air mixture preparation consisting in preliminary, pre-combustion processing of components of the fuel-air mixture by a magnetic field. Only air is preliminarily processed by a combined influence of the magnetic field and catalyst. Induction of the magnetic field is formed and, with it and in the presence of the catalyst, not only air oxygen molecules but also nitrogen molecules dissociate to ions. Then the processed air is mixed with fuel in a ratio providing for obtaining extremely lean air-fuel mixture. The formed mixture is fed into an engine or heat power plant for combustion. The device for fuel-air mixture preparation including permanent magnets which form magnetic field lines perpendicular to air flow. It is made in the form of a flat cylinder with a nonthrough central hole. A groove connected to the central hole by canals is made along the
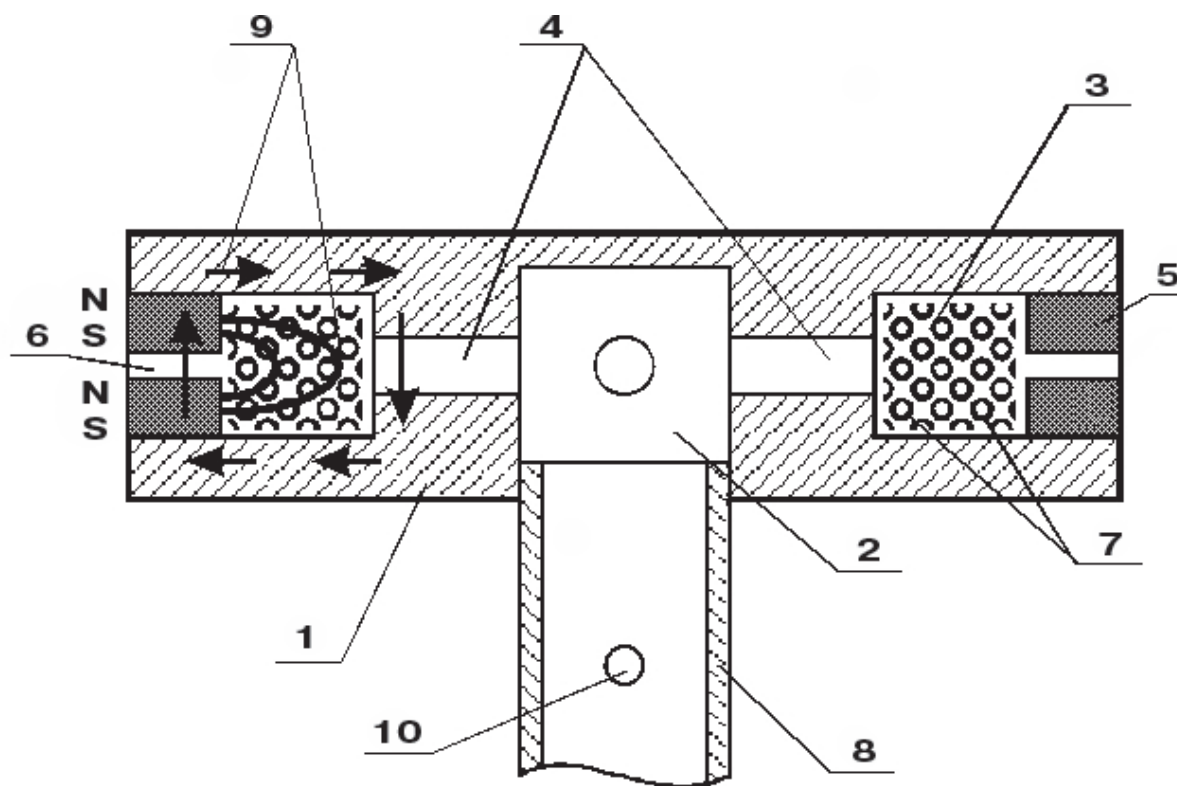

Fig. 1. The method of the fuel-air mixture preparation and a device for its realization

external side surface of the cylinder. Ring permanent magnets are installed on the external side of the groove opposite to each other in such a way that a gap is formed between them which allows air passing between the magnets into the internal space of the groove and, further, through the canals, into the central nonthrough hole. The internal space of the groove is filled with the catalyst and a pipeline is connected to the central nonthrough hole for mixture of the processed air with fuel and feeding of the fuel-air mixture to an engine or heat power plant.

Another invention: A device for processing of air-fuel mixture's air. Patent RU 2229620.

The invention is related to energy engineering, heat power plants and engines including internal-combustion ones. The obtained technical result is increase of heat power plants and engines' efficiency and decrease of injurous additive concentration in the used gases.

The processed air is fed into a cylinder 1 by a branch 2. Inside the cylinder 1, air is evenly spread over the whole cylinder's volume through gaps 5. After that, air moves to a part of an exit branch 3 inserted into the cylinder 1. Air goes between permanent magnets 4 and a catalyst layer 6. When the magnetic field influences air in the presence of the catalyst, molecules of oxygen and also nitrogen dissociate. The dissociated air goes through holes 7 and goes into the exit branch 3 for the following formation of the air-gas-mixture.

Another patent: A method of increase of working medium energy for yield production. Patent # 2179649 from 25.07.2000. F 02 G 1/02, F 02 M 27/04.

The invention's formula. A method of increase of working medium energy for yield production consisting in working medium ingestion, compression, transmission of an electrical exciting impulse through it, its expansion with yield
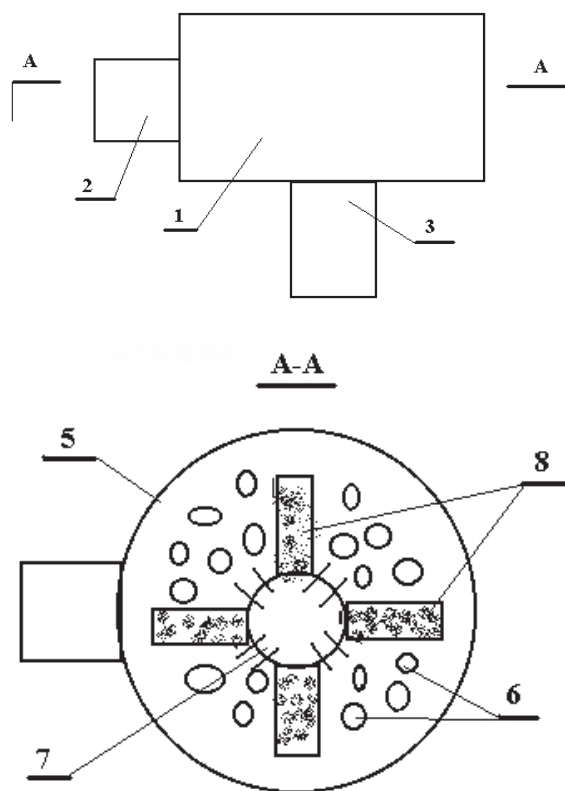

Fig. 2

production. Ingestion of a working medium consisting of a gas part – air – and a liquid one – water – is carried out during three stages. At the first stage, an initial air portion is fed but, at the second stage, the given air portion is expanded to low pressure. At the third stage, an additional air portion is fed along with water. Water is preliminary saturated with catalyst and processed by a cavitation device with formation of cavitation bubbles. Then the working medium is compressed which leads to destruction of the cavitation bubbles and heating of the working medium. After that, during the expansion stage, an electrical exciting impulse runs through the working medium providing for the working medium energy increase due to its ionization and evaporation of the liquid part. After the expansion, the working medium is released into the atmosphere.

Conclusion

So, the theory of natural energy – energy of the XXI century is completed to a first

approximation. Mankind suffers from the energy deficit and ecological problems connected with it while there is an abundance of energy accumulated in matter and in the environment. On the basis of the new hyper-frequency physics and application works on fuel-less energy, it was managed to realize the autothermal air combustion mode without consumption of organic or any other kinds of fuel practically, during a considerably short term, using car engines.

Traditional science, most of all physics, does not assume even a possibility to create a "perpetual motion machine" while we use it for a long time. It is a standard engine, without any constructional changes and even without change of the energy production process – the phase transfer of the highest kind (PTHK). Its physical mechanism was not known up to now. It is impossible to explain everything in a brief conclusion, it is necessary to read and understand all three books of my trilogy. But it is necessary to remind and stress some moments. First of all, it is not that we could make an engine work in the fuel-less mode but that exclusion of fuel from the combustion process as a needless component improves ecological situation, keeps all good factors of standard combustion including the absence of radiation and adding new good things: absence of CO_2 and CO, clean exhaust, solution of the fuel problem...

Use of natural energy stored, particularly, in oxygen, as during standard combustion, is very efficient, due to only a one hundred millionth part of its mass which is filled up in natural conditions, as it was before. So, in this sense, ecology is undisturbed.

Development of natural energy excluding the use of organic and nuclear fuel, which is ecologically hazardous for mankind, will allow providing people by light, heat, and electricity in abundance everywhere, including cold northern regions, with minimal costs and damage to nature.

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The last issue of the "New Energy Technologies" magazine

Review by S. Shlenchak, A. Frolov.
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7-812-3803844

Our magazine has been published since July 2001 to the end of 2005. These 23 issues were financed by a foreign investor Dr. Christopher Bremner who considered it most important to develop contacts with inventors and scientists working in the alternative energy field. Such a publishing activity is unprofitable due to a small audience of creative people who would be interested in the magazine. Only a few hundred people in the world conduct the given researches, this is why it is considered by us an unreal task to increase subscription and get a profit.

Further publication of the magazine is inexpedient not only due to financial reasons. Infomedia is changing; it becomes more favorable for development of alternative energy discussions. These processes are determined by dramatic changes in the energy carriers market. It is possible to say that today a change to the alternative energy became an obvious need for all who are somehow connected with it. Certainly, we are all connected with energy by its development prospects mainly concern my responsible State employees and businessmen thinking about business development under conditions of fuel prices' growth. They are ready to consider new projects on the alternative fuel-less energy seriously.

Thus, the situation has changed; this is why it is inexpedient to spend time and money for publication of the specialized magazine. Today Internet, television and almost all printing give attention to this subject. Theorists and inventors who were laughed at and criticized earlier can publish their articles not only in our magazine but also in professional ones. On the other hand, almost all researches should not publish their results in details because competition and plagiarism in the field of the given technologies become more and more spread.

Further, we would like to thank our subscribers on behalf of the editor stuff, though financial resources obtained from the subscription didn't exceed 10% of the publishing costs.

Due to the fact that this issue will be the final one and publication of the "New energy Technologies" magazine ends, we prepared a short review for readers who would like to find an article on the subject, which they are interested in, in our collection (on a CD).

Alternative energy

Experiments on the single-wire energy transfer is presented in the articles of Professor D.S. Strebkov (#1, 8, 9, 21). The quasi-superconducting technologies for electric energy transfer are described (#1). The testing results for single-wire electrical systems of power transfer adduced (#8, 9). In Institute of Agricultural Electrification, devices with a power of 20 kW were built. Electric power transfer by this method (due to bias currents) occurs without heating of wire, i.e. without losses (#21). This subject is also considered in the article of S.S. Makukhin (#13). The author explains physical meaning of Nikola Tesla's experiment on electric energy transfer by a single open and ungrounded wire by the example of different experiments.

N.V. Kosinov (#13, 19) described the experiments and devices for the single-wire energy transfer using the "diode Avramenko plug" and a standard bridge circuit.
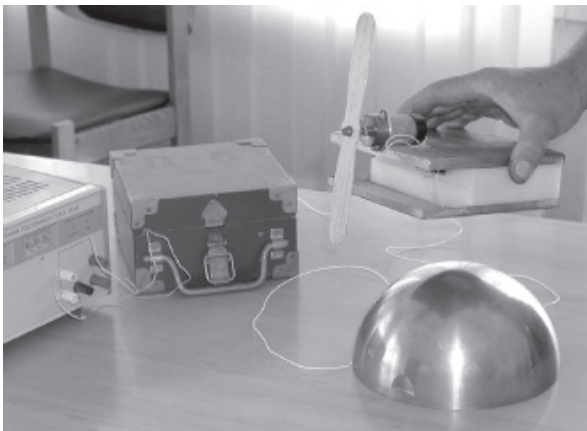

Fig. 1. General view of the Kosinov's device for demonstration fo wireless power transmission

The theory and experiments on transformation of environmental energy into electric energy during charge-discharge cycles of nonlinear condensers and during magnetization-neutralization of ferrites are presented in the articles of N.E. Zayev (Moscow) (#2, 4, 5, 8). The articles describes physical principles of environmental heat energy transformation into electric energy and show that the most effective transformers can be the devices using nonlinear magnetic materials during the "magnetization-neutralization" cycle. Besides, some positive results were obtained during study of the "charge-discharge" cycles of nonlinear condensers.

The theory and different experiments on alternative energy are presented in the articles of S.A. Gerasimov (#11, 12, 14-15, 18, 20, 22). The author gives a scheme of the non-driving motion mechanism (inertia device) (# 11) and measures a rotary moment of self-operation, which influences the moving part of the non-reference engine (# 12). In another article, a scheme of the experimental device is presented (# 14-15). IN the 20th issue of

the magazine, this author suggested a method of an asymmetric body levitation based on gas screening produced by the same body. In the 22nd issue, S.A. Gerasimov suggested a design of the flying platform (an endless belt with rotating unbalanced masses).

The theory and experiments on excessive energy generation in the form of high-frequency radiation and heat energy are presented in the articles of V.I. Korobeynikov (# 17, 21). A simple experimental device can be based on construction of the magnetron used a standard microwave oven. The authors calculations show that minimal costs for electric field formation in the magnetron allow generating efficiency much more than 100% during the special operation mode.

The generators using environmental heat are presented in the articles of Y.N. Novozhilov (#14-15, 17, 18, 19). The author describes his invention: a fuel-less engine, which uses different heating of its elements caused by different temperature of environments contacting with the engine or irradiation of different intensity (# 14, 15). Operation of the thermomagnetic engine with permanent magnets and ferromagnetic elements made of up-to-date materials with the according value of Curie point is also described (#17). In another Novozhilov's article, a description of the solar pump is given. A power element with the form memory is used for the pump's drive. Such an element changes its form during heating and cooling. It is heated by sunbeams and cooled by water or curtain darkening (#18). Another interesting article of this author considers Kelvin dropper as a high-effective device which allows generating an electric charge up to 15,000 V. This device operates due to water drops polarization with the subsequent charging in the device's elements (# 19).

The experiment on creation of the capillary engine (the patented method) is

presented in the article of I.I. Elshansky (# 14, 15). The ideas and experiments on creation of the real working "perpetual motion machine" are described in the article. The idea was based on capillary structures of plants.

The theory and experiments on torsion fields are presented in the articles of A.E. Akimov (# 1, 16). The author gives history and prospects of development of torsion fields' research, properties of torsion fields and operation principles of torsion generators are described.

The aether dynamics theory is presented in the article of V.A. Ayutskovsky (# 1, 12). Suggesting that aether is a standard viscous compressible gas obeying the standard gas dynamics' laws, the author defined its parameters and structures of the main stable elementary particles (proton, neutron, electron, photon, atomic nuclei, atoms and some molecules).

The experiments on the use of centrifugal forces for fuel-less energy generators are presented in the articles of V.I. Bogomolov (#13, 14-15, 16). The author considers the physical principle of excessive mechanical energy generation (# 13). The considered generator's rotor can accelerate due to the constructional peculiarities without an external energy source. In another article, the improved design of Maxwell's pendulum is given (# 14-15) and nature of the process of free energy production in the precession generator is explained. The given generator uses free energy during formation of centrifugal forces' kinetic moment in the centrifugal inertia forces' potential field (#16).

In the articles of V.D. Dudyshev (# 9, 10, 13, 17, 18, 19, 20), a **whole range of alternative energy subjects** is considered: for example, the experiments on the use of electrostatic forces or magnets. The author substantiates importance and prospect of fire-heating technologies' further improvement, in particular, using the method of the new electric-fire technology of any matters and gases' pure

combustion with the use of electrical fields as a combustion catalyst. He considers the technology's use in heat engineering, heat transport engines, devices of fire recycling of wastes etc. The author shows how to increase combustion processes control (temperature, heat conductivity gradient, gas pressure) (# 10). In the 13th issue, the author suggested the new low-cost technology of kinetic and electric energy production from the electrical field's potential energy and shows his own inventions as examples.
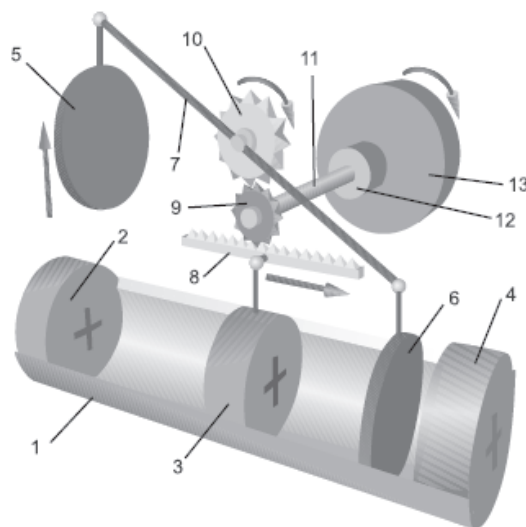

Fig. 2. Dudyshev's perpetual mobile using the potential energy of electrical field

In the 17th issue, V.D. Dudyshev carries out a research on a physical effect of the impulse self-adjusted collective charge-mass transfer in a unipolarly charged under-conducting nonpolar liquid in the external impulse electric field. During the experimental process, he discovered the abnormally high efficiency and energy of the charge-mass transfer process. In the article, the schemes and descriptions of the devices are given (# 17). In the 18th issue, the author studies the effect of direct conversion of the permanent magnets' magnetic field energy and its use in energy engineering and mechanics. In the 19th issue, original constructions of the new current-less magnetic engines are given

and some new kinds of the magnetic energy transformers with permanent magnets are also suggested. The other articles of this author are devoted to the analysis of the use of the electro-hydraulic Yutkin's effect and cavitation for production of heat, mechanical and electrical energy. The new fuel-less electro-hydro-dynamic turbines, engines, pumps, heat generators and electric generators with minimal energy consumption which work using external energy of liquids, air and environmental energy, such as noncontact cavitation heat generators, an electric hydro cavitation heat generator, a two-stage EHD-heat generator, cavitation-gravity generators and others. The author also suggests the noncontact regulating transformer which allows saving energy, carrying out smooth start of electric load, reducing inrush currents, providing for thermal protection and maximal current protection of electric equipment. Besides, Dudyshev suggests an original method of electric energy production from the atmospheric natural electricity – the fuel-less rope electric station. In the 20th issue, he suggests the new methods of extraction and use of the internal matter energy. A number of the author's electrophysical experimental discoveries and inventions are described in the article.

The gravity-centrifugal motors and other devices are presented in the articles of A. Evert (# 18, 21). In the review published in the issue # 18, interesting data on his gravity-centrifugal motor, oscillatory motor, wheel-pendulum, Bessler's wheel, solar wheel, high-effective turbines are presented. Professor Evert imparts his understanding of aether, which is used by him in his experiments. The given review can be useful for developers of autonomous energy sources including vortex movers. In the 21st issue, Prof. Evert explains origin of irradiation, electrons, charges, electron flows etc. with the help of his understanding of aether and gives simple descriptions of some aether motion collection aspects. In his article, he describes such devices as the antenna for energy accumulation, magnetic pump, aether current generator and others.

The energy source based on mechanical systems with the unbalanced wheel is described in the review of "Environ" company (# 20). Their technology consists in a wheel connected with a generator producing electric energy without external fuel spendings. Further to the wheel, the company created a high-performance generator which can be attached to the wheel for electric energy production.

Fig. 3. Environ's wheel connected to a generator produces electricity without the need for any external fuel

Development of Tesla's works on fuel-less cars designing is presented in the article of Klaus Jebens, Germany (# 16). The article tells about of the research of the German society GFE's. Klaus Jebens is its President and Director-General. They pay attention to the innovation energy technologies, space energy; they also give their opinion about the future of energy engineering.

The pneumo-hydro turbines which can be used as high-performance generators of electric energy are presented in the article of V.F. Markelov, Saint Petersburg, Russia (# 16). Schemes and calculations of the patented devices (the pneumo-hydro engine and pneumo-hydraulic turbine which extract energy) are given in the article.

The theory of vacuum as an energy source is presented in the articles of L.G. Sapogin (#6, 9, and 21) and A.V. Rykov (# 2, 3, 4, 5, 12). A review of the book "Unitary quantum theory and new energy sources" is given. This book was written by Russian professors of physics and mathematics for mathematicians, physicians and engineers. General theoretical fundamentals of the unitary quantum theory, the approximate equation of a single particle with an oscillating charge, use of the oscillating charge equation for interpretation of the richest experimental data, which cannot be kept within the frame of the standard quantum-mechanical science, and the possible theory and the general approach to the chemical catalysis problem are considered in the book (# 21). In the 12th issue, Rykov gives the model of physical vacuum and methods of influence on the vacuum.

Magnetic generators

Motors with permanent magnets are presented in the articles of V. Vallone, a director of Integrity Research Institute, USA (#10). The article is devoted to the motors which are used for trying to produce efficiency>1 by a change of communication chart's configuration, electronic switches' circuits, and magnetic configurations. Some constructions which can be considered as standard and also some constructions which seem available are presented. The engines with switchable magnetic resistance, the toroidal motor, the linear motors, Hartman's patent, the unipolar motor are considered in the article.

In the articles of A.V. Frolov (#5, 9, 14-15), **constructions of the devices for energy transformation** are given and also **theoretical bases of operation of the devices working with the efficiency more than 100%** are done. It is shown that, in any case, energy cannot appear from nothing but is a result of some energy kind's transformation or structural space changes (aether polarization).

The experiment with the magnetic generator of Searl's construction is presented in the articles of S.M. Godin and V.V. Roschin (Moscow) (#1, 2, 20). The articles are devoted to the experiments on creation of the electric energy generator using rotating permanent magnets. In these works, it is shown that rotor's rotation can be self-powered in the given system. Besides, it was demonstrated that a considerable power level with a paying load of 7 kW had been reached and it was noted that the system lost up to 30% of its weight.

The theory and experiments on longitudinal magnetic interactions are presented in the article of G.V. Nikolayev (# 2).

The development works and experiments with magnetic motors are presented in the articles of Eric Vogels, Denmark (# 11, 20). The author tells about Minato's wheel which rotates only due to the permanent magnets' force and also about his ideas and experiments on building of the same engines. (#11). The author considers creation history, designs and operation of Bauman's magnetic engine and gives recommendations on independent engine assembling. (# 20).

The use of magnets in the devices of energy transformation and patents are presented in the article of Y.N. Novozhilov (# 17). The author considers the method of effective energy transformation. The method of transformation of compressed air's potential energy produced during electrolytic water decomposition into electric energy is given.

A patent for the magnetic motor producing continuous rotary moment is presented in the article of A.E. Rumin (# 19). Working on his invention, the author aimed at simplifying of the known constructions and improvement of user friendliness, power and efficiency of magnetic action. A distinguishing feature of the device is that magnetic field vector of the stator's and rotor's permanent

magnets at an angle of 25 – 45 degrees depending on the rotor's diameter in relation to the magnets' work surface. The author gives drafts of motor parts in the article.

The magnetic hydro-dynamic engine and experimental suggestions are presented in the article of S.A. Gerasimov (# 18). In the article, the construction and operational principle of the magnetic hydro-dynamic device (MHD engine) are described and experimental values of rotary moment influencing the MHD engine's rotor are given.

Molecular reactions

The theory and experiments on high-effective molecular reactions are presented in the articles of A.V. Frolov (#14-15, 17, 21, and 22). In the experiments 2003 on hydrogen recombination, excessive heat (up to 250%) was obtained for the first time. The theory is created and calculations for different operation modes are shown. The theory is based on the invention of Academician Alexandrov made in 1962.

Fig. 4. The experimental device for hydrogen recombination research

The atomic hydrogen recombination research is presented in the article of N. Moller (# 3). Nicholas Moller used the idea of William Lyne about possibility of the high-effective atomic hydrogen systems. In 2003, in cooperation with "Faraday Lab

Ltd.", he organized the experimental program on atomic hydrogen recombination research. Today Moller carries out his experimental research in a laboratory of Jean-Louis Naudin, France.

Continuation of the atomic hydrogen recombination research is presented in the 22nd issue of our magazine. In 2005, Jean-Louis Naudin (France) reproduced the experiments of A.V. Frolov on dissociation and recombination of hydrogen molecules in the device exported from Russia. The efficiency test showed the result up to 2,000%.

The theoretical principles of molecular reactions are presented in the 17th issue of our magazine in the article of William Lyne who is the author of the idea to use hydrogen recombination for excessive heat production. He suggested a construction based on hydrogen welding device. His book called "Occult Ether Physics", 1997, was used by N. Moller as a basis of his own project.

Propulsion force and antigravity

Aether engines are presented in the article of P.V. Scherbak and S.A. Mikhalev (# 12), a group of inertialess processes investigation. The article is devoted to the experiments on demonstration of the "mass defect". During the experiments, a presence of interaction of the incoming and outcoming energy flows for matter supply with the environment that was displayed as the "mass defect".

Vortex mercury engines are presented in the articles of O.S. Plolyakov (# 1, 7). The method of driving force production is considered, a description of the device and the experimental results of Polyakov and his followers is given.

In the articles of A.V. Frolov (#2, 4, 8, 11, 16, and 18), a number of subjects is presented: **the experiments on propulsion force production due to aether pressure gradient in electrically charged bodies** (according the theory of T.T. Brown). This

subject was called the "asymmetrical capacitors" or "Frolov's capacitors". The experiments with the vortex engine built according to the improved Polyakov's design are described. The theory and experiments on thermal gravity are given.

The engines based on resonances are presented in the articles of G.P. Ivanov (# 17, 20). Possible methods of aether propulsion and models of the aether resonators are considered in these articles.

The theory and experiments with Lifter asymmetrical condensers are presented in the articles of Tim Ventura (# 6, 7, 20). The article in the 20th issue is devoted to the electric gravity and antigravity research history and the development works on Lifter technologies from the originating of this idea to creation of the prototypes and projects.

The theory and experiments with asymmetrical capacitors according to Frolov's design are presented in the article of Zoltan Losonc, Hungary (# 16).
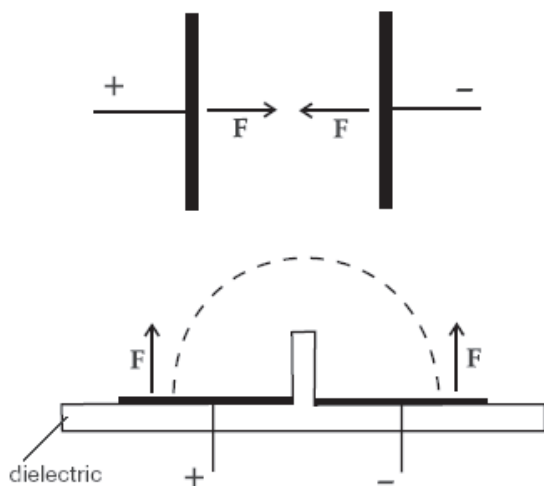

Fig. 5. Frolov's capacitor creates propulsing force

The theory of rhythm dynamics and experiments on propulsion force production during interference of waves from different sources are presented in the articles of Y.N. Ivanov (# 2, 7). In the article in the 2nd issue, the example of a hypothetical black hole and effects which accompany this phenomenon is suggested. This example helps develop the idea of the reasons of gravity attraction. New ideas concerning nonamplitude fields (gravity fields), the nonamplitude quant (graviton), and frequency diapasons are also suggested. The author tells about his discovery: the gravity dynamic paradox (an unusual physical phenomenon). The paradox's meaning is in the existence of a situation which is not forbidden by physical laws and allows each man (even a child) to hold and carry things with a weight of more than 100kg with the help of a simple device. The phenomenon demonstrates the possibility to remove weight characteristics of any material object (# 7).

The theory and suggestions on experiments on production of longitudinal waves and antigravity are presented in the articles of K.P. Butusov (# 2, 5). The author suggests a perfect physical-mathematical system which is symmetrized Maxwell's equations. In practice, it gives a possibility to create longitudinal waves in vacuum (energy density's longitudinal waves in aether). The author gives research history of longitudinal waves in vacuum, defines conditions of longitudinal waves' irradiation and the physical meaning of longitudinal waves (# 5).

Electric magnetism and gravity, gravity waves production, and experiments are resented in the article of D.Y. Tsepenuk (# 12). A series of preliminary experiments on testing of the possibility to generate the gravity field during deceleration of charged massive particles in matter is carried out.

The theory of gravity interactions (the mathematical approach) is presented in the article of Christopher Bremner and David Noever (# 6, p. 2).

Thermal levitation, the use of air molecules' kinetic energy for production of the unidirectional propulsion force is presented in the article of M.P. Beshok (# 13). The author shows that, on the whole, air molecules' motion is chaotic but motion of a molecule during the time between

clashes can be considered as ordered and predictable. The average distance passed by the molecule during this time is dozens nanometers. The recently appeared nanotechnologies allow carrying out the author's constructive solutions for the use of air molecules' energy and unidirectional propulsion force generation. In the article, the author defined the better plate's profile which allows generating propulsion force and energy from the air. The use the given technologies is possible not only in cosmonautics but also in energy engineering because it is a possibility to create the continuous rotary moment at the generator's shaft.

The theory and experiments with Frolov's asymmetrical capacitors, development of the electro gravity theory (conversion of electromagnetic energy into gravity one) is presented in the article of Professor A.A.Nassikas (# 18). The construction for propulsion force production is described. The construction is the asymmetrical capacitors made of a set of metal arts located asymmetrically inside a solid isolating shell which, for its turn, is located inside a metal body with zero potential. When the given construction operates in the mode without corona charge, propulsion force is produced. According to energy engineering, this is a high-performance process with an efficiency of more than 100%.

The experimental suggestion on inertia engines and unbalanced rotors are presented in the article of E.I. Linevitch (# 18). In the article, an operation principle of the inertia engine made for a power drive of different devices. The device contains a gyroscope, an unbalanced electrical drive able to conduct curvilinear-oscillatory motions, and a control system. The author states that this engine is high-effective and will allow flying to any place on the Earth in some minutes, without such inconveniences as overload and zero gravity.

In the article of V.A. Chernobrov, Moscow (# 13), **the review of the gravity plane**

Fig. 6. Grebennikov's antigravity planform (photo from "My world" book)

(the machines with gravity control) developments is given. The projects on creation of gravity engines, magnetic gravity planes, electric gravity planes, and gravity screens are described.

Our readers expressed special attention to the publications devoted to **the antigravity effect of Grebennikov – Zolotarev** which had been discovered studying de Broglie stationary waves created by cavitary structures (# 16, 22). We hope that even discussion of this arguable data will be helpful for the development of experimental aether dynamics.

Vortex processes

In the 20th issue, **vortex heat generators, heat steam generators, vortex steam generators of "Akoil" company** are presented. Descriptions and key features of the generators are given.

Water vortex generators and autonomous electric power stations are presented by an author-developer Yu.S. Potapov (# 16, 17, 18, 19, 20, 21). In his articles, descriptions of Potapov's vortex heat generator and molecular engine, plans of technological improvement, heat generator's designs and photographs of the produced models.
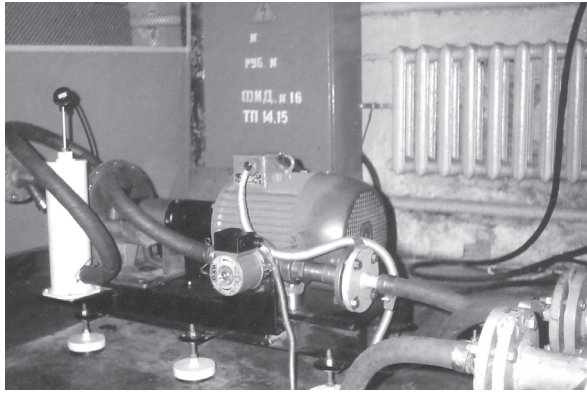
Fig. 7. Vortex heat generator

The theory and experiments in the field of vortex processes are presented in the articles of E.D. Sorokodum (# 5, 12). The problems of vortex heat generators' creation are considered, common properties of energy transformers are described and, on the basis of them, some problems occurring during creation of renewable energy sources are analyzed.

The experiments with the air (molecular) vortex electric power station made according the improved Potapov's design and also **tests of the water vortex heaters** are presented in A.V. Frolov's articles (#18, 19, 20, 21).

The idea of air flow's impulse mode which allows producing excessive energy is presented in the articles of B.M. Kondrashev (# 16, 19). The methods of low-potential energy transformation for production of excessive power in the form of high-potential heat and "cold" are considered. In these methods, the scientifically grounded and experimentally tested technical solutions realized in ejector jets of gas turbines are used. It is shown in the articles that the impulse mode of an air-blast provides for the use of environmental energy which allows getting high efficiency of the jets which can operate in the fuel-less mode.

The theory and experiments with high-effective water vortex processes are presented in the articles of S.A. Lisnyak (# 4, 7). The author considers the vortex energy possibilities, gives drafts of vortex generators, explains energy excess at the outlet during a medium's flow rotating in the vortex tube (# 4) and shows the possibilities of the vortex electrical devices (# 7).

The big **review of vortex technologies** is published in the 23rd issue, the article of A.I. Azarov.

Cold fusion and transmutations

The high-effective (plasma) water electrolysis which allows generating excessive energy during the impulse mode, its theory and experiments are presented in the articles of F.M. Kanarev (# 1, 10, 11, 12, 14-15, 16, 17, 19). The author convincingly shows that, during water plasma electrolysis, transmutation of alkali elements' atomic nuclei and cathode material's atomic nuclei takes place. The experiment described which shows that low-ampere water electrolysis allows producing cheap hydrogen from water. (# 11). The author finds out the reason of excessive energy generation during covalent bonds' formation in the processes of synthesis of oxygen, hydrogen and water molecules; besides, the source of this energy is described. (# 12). The results of experiments on electro dynamic destruction of water molecules' chemical bonds by electric impulses of different frequencies are presented. The experimental aim was to verify the statement that electro dynamical influence on water molecules allows considerably reducing energy costs for destruction of their chemical bonds and the following synthesis of these molecules considerably increases excessive energy production in the form of heat (# 14, 15). Analysis of the measuring of electrical energy consumed by the water electric heat generator is carried out; drafts of the water electric heat generator's cells with their description are given (# 16). As the author states, electrical energy is transformed by a cell of the water electric heat generator into heat energy with an energy efficiency index of more than 50%. (# 17).

The theory and experiments on formation of the magnetic quasi-monopole and investigation of its influence on matter

parameters are presented in the articles of I.M. Shahparonov (# 2, 6).

The experiments on remote influence of fields created by rotating objects on radioactive isotopes' stability are presented in I.A. Melnik's article (Tomsk, Russia) (# 7). The given experiments prove the possibility to develop new technologies of radioactivity cancellation and radioactive wastes procession.

Other experiments on the influence on radioactive isotopes' stability are presented in the article of A.V. Frlov (# 10). The theory and the generator's construction are based on Prof. Butusov's works about nature of longitudinal waves and de Broglie waves.

The theory and experiments of E.I. Andreev on air auto-thermia are presented in the 16th issue, the review by A.V. Frolov. Peculiarities of the air auto-thermia process – fuel-less air combustion, during which heat energy at the outlet is the result of change of the air molecules' properties are considered in the article. Air molecules react in the presence of catalysts.

The idea of proton decay and water decomposition for energy production due to proton decay is presented in the article of N.V. Kosinov (# 19). A new method of energy generation is suggested. It exceeds the efficiency of controlled nuclear fusion by dozens times. The method is based on the new physical effect: induced proton decay. The induced proton decay makes water an inexhaustible and the most effective energy carrier and allows solving the energy problem. Water becomes the most effective kind of fuel which can substitute oil, coal, natural gas, uranium. Many substances which were not considered energy carriers can be the most effective energy carriers.

The fourth dimension, teleportation

The experiments on control of time characteristics using electromagnetic quasi-monopole are presented in the articles

of V.A. Chernobrov (#1, 3, 12, and 13). Interesting experimental results concerning influence on physical processes' speed, i.e. time speed, are given. The experimental devices created the magnetic quasi-monopole inside a limited volume not continuously but for a short time, by the pulse method. As a result, it was determined, for example, that processes of time acceleration and deceleration differ according to their nature and consequences. Thus, deceleration happened far more smoothly and steady while, during acceleration, abrupt changes of indexes occurred and this process' passing was unstable and depended on many external factors.

Fig. 8. Experiments with Chernobrov's time machine

In the article of A.V. Frolov (# 3, 4, 6, 12, 18, 20), this subject is presented as **the theory and experiments on change of matter existence's speed (time speed)** due to aether density's change. Practical use of the time speed control theory including military aspects. Physical principles of a "Time machine" are shown (# 3, 6), i.e. of the device which the described effects have been studied in. This invention relates to methods and devices for control of various physical processes' speed including the very process of matter existence in space-time. According to the invention, the result is reached by increase or decrease of space energy density (physical vacuum or aether), # 12. In the 20th issue, the author shows that discrete nature

of energy levels, particularly quantized atom states, according to Plank, is a particular case of four-dimensional resonance conditions. Other examples of manifestation of the common law concerning space-time formation of elementary particles and also such living matter objects as DNA-molecule are shown. The four-dimensional resonance theory and calculation examples are given. A concept of the space drive producing propulsion force is presented.

The theory and experiments on aether properties research are presented in the articles of A.M. Mishin (Saint Petersburg) (# 1, 2, 4, 5, 6, 9, and 12). The author conducted the experimental research of aether (# 1) with the help of the so called "physical system of the artificial bio-pole". Mishin's experimental research leads to an astrophysical discovery: a center of the Universe is found.

Fig. 9. Alexander M. Mishin

The author's experiments on the longitudinal thermo magnetic effect (# 5) allowed finding out aether's basic properties. Long-term researches and experiments show that matter existence in our world is a form of the initial universal matter's motion (aether vortexes). On the basis of different experiments, a review of matter, space and time aspects according to the concept of aether field and problems of parallel worlds are presented. (# 9). The author described the new physical reality in the form of quasi-real aether-dynamical

structures ("topological harmonics") caused by the matter world's dynamics.(# 12).

The theory and experiments on the use of scalar waves for time speed control are presented in the article of Glen Roberts (# 19). In his article, the author describes some interesting constructions which allow influencing physical processes' speed and space-time curvative.

The theory of mutual transformation of electromagnetic and gravity energy is presented in the article of A.A. Nassikas, Greece (# 18).

The teleportation theory and a comprehensive concept of engines are presented in the article of Donald Reed (# 17). The theory of basic matter fields' structure is considered in the article. Existence of vacuum energy structure with a basic essence which is not dichotomic and scalable is suggested.

The theory of active time properties, the development of N.A. Kozyrev's works is presented in the articles of L.S. Shikhobalov (# 3, 5). N.A. Kozyrev's ideas about active time properties which are the source of star energy and development of theses ideas is considered.

The theory of nature of time and electron is presented in the articles of Lev Price (# 5, 9, 17, and 19). The article called "Introduction to gravity" is a review of different publications about this subject. Aether speed, neutrino, fourth dimension, sub-atomic matter structure, experiments of Einstein, Podolsky, and Rosen are considered in the article (# 5). The article continues in the 9th issue. The considered theory of electron's nature is a part of the modern developing theory of dynamical aether. (# 17). The author defines a notion of "time speed", different kinds of time, factors influencing time speed (# 19).

Certainly, not all authors and publications were listed in this review. You can order the complete version of our magazine on a CD.