

● **SECTION 8: Letters to NASA (December 3, 1999)**

December 3, 1999.

To
Dr. Daniel S. Goldin,
Administrator of
National Aeronautics and Space Administration
NASA Headquarters
Washington, DC 20546-0001 – USA.

**SUBJECT: Proposal for Participation in Mission Definition for
Grand Tour Missions to the Outer Solar System Program.
Your Dr. Francis W. Kemmett' letter, May 4th, 1971,
as Director of Staff - Inventions and Contributions Board**

Dear Sir,

In 1971, motivated by a general invitation from NASA relatively to the subject Mission, I and my Assistants Messrs. Mauro Pinheiro and Laercio Pinheiro have presented a proposal of scientific investigations, through a letter, January 4, 1971, from the Maua Engineering School Director, Professor I. M. Rozenberg. The proposal, published later (1985) in my book entitled, "**ESÇÃO (n~m~p): A Non-Von Neumann Computer**" (pp. 143-160), with **three parts intimately related to each other:**

1st PART: NEOMATHEMATICS (Pure Mathematical Field)

2nd PART: 4th TECHNIQUE: INHIBITORY PULSE CONTROL (Pure Technological Field)

3rd PART: NEURISTAL NETWORK (New Computer Technological Concept)

These three parts should be considered as a whole.

The letter referred above was written to me as reply to our proposal, told me in finished reword, that ***circumstances should change and the Board receives inquiries concerning my proposal in the future, you shall be happy to write to me again concerning its possible implementation.***

After these past 28 years, I think that **many circumstances might have been changed** and until now, **there was no interruption in the researches** carry out at the Polytechnic School of University of São Paulo and Maua Engineering School, Brazil. Some details about the results of those **lifetime researches** can be seen in my Curriculum Vitæ. The bulk of these researches are related to those **three parts** referred above, as it can be seen in the respective separated extracts annexed.

Although there was an incredible development of Information Science during this past time, solutions of some problems have not been found yet. These main problems are:

- .The chronic crisis in real time software;
- .The present viral proliferation in the sector;
- .The lack of common nucleus in the different applications of Artificial Intelligence;
- .The unobtainable software automatically free,
- .The fifth generation computer system.

For these reasons, the researches relative to the **1st PART (Pure Mathematical Field)**, led me to find a new area of studies, called **Boolean**

Arithmetic, mathematically isomorphic to the Boolean Algebra. The draft of my new book on “**Boolean Arithmetic and its Applications**” is ready, whose common copy with CD-Rom are annexed to this letter. Its *CONTENT* also presents some results of the researches, referring to **1st** and **3rd PARTS** of the extracts of the curriculum annexed. This present enlarged work shows that Boolean Arithmetic solves problems using only bits. But, and **as it is a mathematical logical system**, it may prove to be **a valuable instrument in remodeling computer programming** in order to avoid the current computer languages, which may cause problems to the operational system. Recently, a group of Brazilian students presented a paper entitled “**A Solution of the General Model for a Digital System**” at “1997- 48th-ISEF- International Science and Engineering Fair”, Louisville, Kentucky, USA, May 1997. This paper, inspired on my first book (“**ESÇÃO (n~m~p): A Non-Von Neumann Computer**”), won the following prizes: a) First Award offered by IEEE Computer Society; b) Second Award offered by Computer Science – Intel.

• **The researches relative to the 2nd PART: 4th TECHNIQUE: INHIBITORY PULSE CONTROL (Pure Technological Field)**, led me to find **three successive stages of discoveries**, as it can be seen in the respective separated curriculum extracts annexed.

In the 1st Stage relative to this 2nd PART (1967-1993): the discovery of switching devices of the 4th TECHNIQUE (namely Inhibitory Pulse Control and after, Quantified Energetic Pulse), that was called, **TRANSRUPTOR** and **TRANSJUNCTOR**.

In the 2nd Stage relative to this 2nd PART (1993-1997): the discovery of **Pulsating Energy Converted Electro-mechanically – PECCEM (also called PECCEM Transformation)**, that creates **Magnetic Super Pulse (MSP)**. As it is possible to submit this **MSP**, to one determined and controlled frequency of repetition “**f**”, these consequent devices could be classified according to the values of that frequency, with the following technological applications:

1st Application: Devices that depend on an **unique MSP** to be used in **ON** or **OFF** operations, whose frequency of the pulse repetition is **NULL**:

1.1 -- **TRANSRUPTORS** (Switching / coil with magnetic-iron nucleus)

1.2 -- **TRANSREEDS** (Switching / coil with magnetic-air nucleus)

1.3 - **TRANSJUNCTORS** (Switching & Protection of Electrical Circuits).

2nd Application: Devices that depend of **low controlled frequency on the MSP** to operate discreetly:

2.1 - **LINEAR MAGNETIC MOTORS (LMM)** - (Unity Trains)

2.2 - **ROTATE MAGNETIC MOTORS (RMM)** - (Turbojet Magnetic Engine)

2.3 - **AUTOMOBILE MAGNETIC MOTORS (AMM)** - (Connecting rod / crankshaft engines to cars, locomotives, ships, submarines, etc)

3rd Application: Devices that depend on **high controlled frequency of the MSP** to be discreetly operated:

3.1 - **MAGNETOSTRICTION OF THE PLASMA** (Thermonuclear Control of Fusion Energy from Hydrogen Plasma (or isotopes))

3.2 - **NUCLEAR MAGNETIC RESONANCE (NMR)** - (NMR Tomography), generally know as **MRI - Magnetic Resonance Imaging**.

3.3 – **MAGNETIC WAVES** (Telecommunications)

The 3rd Stage relative to this 2nd PART (1997-1999): the discovery that **Magnetic Super Pulse (MSP)** or **Pulsating Energy Converted Electro-mechanically** (also called **PECCEM Transformation**), responsible for the “4th Control Technique of Switching Circuits” is, **in fact**, **a macroscopic manifestation of one global inter-atomic Quantum Leap**.

•The researches relative to the 3rd PART: NEURISTAL NETWORK (New Computer Technological Concept), initially, led me to consider in my Professorship / Promotion Thesis (1967), an available historical bibliography. In that time, my proposal brought about some Supplemental Information – Appendix Nr 2, – a Post-graduate Course, whose last four items refer to the use of the Transruptor, as 4th Technique device, to realize Neural Circuits and Logical Neural Networks.

But, afterwards I studied several applications of the results obtained in the 1st and 2nd Part of my researches described above, as it can be seen in the separated extracts of the curriculum annexed, relative to this 3rd PART.

After this descriptive report about the researches, I have undertaken during my academic career, **concerned basically with the three parts of the initial proposal of scientific investigations**, some conclusions and suggestions that can be presented:

1. Problems aroused by current computer language into the operations system:

My approach via Boolean Arithmetic, can be transformed in a valuable instrument in remodeling computer programming.

Nowadays, Software Engineering programs are **empirically developed**. I may say that **Mathematics is not yet used in Programming**, whereas, Hardware Engineering is strongly based in Boolean Mathematics, through the algebraic and geometrical isomorphic aspects. This Boolean Arithmetic could be useful in searching solution for current problems in the computer operation of any software or firmware engineering programs. **The same safety operation which we have in the hardware computing can be achieved in the operation of the software and firmware computing, without any logical “bug” which blocks the computer operation.**

For this purpose in Chapter 5 of the annexed book, (**“Boolean Arithmetic and its Applications”**), I presented the 2nd Example (pp. 142-146) and the 3rd Example (pp. 146-151), which represent graphically a part of a general computing program. These simple examples show us that incompatibility, may cause logical “bug”, **and are not due to HUMAN FACTORS as it is ordinarily admitted**. These examples solved by Analytical Method are repeated in Chapter 6 (pp. 162-172), using numerical method as Partition Method, Doubling Operators, etc. The idea is to maintain the Nodal Decisions when the “forbidden eras”, could be technologically eliminated. In Section “11.2 – THE NODAL AUTOMATIC TRANSITION ANALYSIS (NATA)”, these examples are again repeated as a Problem on pp. 355-369, with more details, using the BAF(BAF) properties of Chapter 7 (pp.179-266). **It was shown how these “bugs” can be mathematically eliminated without any alteration in the CONCLUSION (or, NODAL DECISION) of that part of programming.**

2. Problems relative to the Non-Von Neumann Computing:

The last Chapter of the **“Boolean Arithmetic and its applications”**, refers to the book, **“ESÇÃO (n~m~p): A Non-Von Neumann Computer”**, also annexed. The mathematical fundamentals of that **Non-Von Machines and Non-Von Programming Styles** which was seen in the previous Sections of the book, **“Boolean Arithmetic and its applications”**, can be found in some publications referred in p.457, based on the last book. Other publications as referred on p.457, **show the mathematical fundamentals of that Non-Von Machines and Non-Von Programming Styles**, which possibly should have the solution for the problem.

3. The most important contribution of the book “*Boolean Arithmetic and its applications*”:

I think, in conclusion, that the most important part of this book is that it probably allows:

1st To establish that any pure sequential program can be recorded into a simple EPROM chip or CD-ROM device, without use of any current computational language;

2nd To establish a true Mathematical Model to the current Von Neumann Machines in order to eliminate the current logical bugs, mainly in the real time applications without the ordinary use of empirical methods. This elimination is guaranteed with some data alterations, but without any modification in its formal logical nodal decisions;

3rd To establish a true Non-Von Mathematical Model, with the elimination the microprocessor as a subsystem of the present computational machines. Thus, it will remain only the memory unit and the respective input/output devices. Then, the “Von Neumanns’s bottleneck” disappears, establishing a pure parallel processing without any resource to the present situation;

4th To establish a mathematical programming in the field of the hardware, software and firmware engineering, with the creation of a Technical Linguistics in the adequate field of the Negative Logic;

5th To re-establish new lines of logical mathematical researches in the field of Information Sciences, which has been broken since 1938 in Shannon’s time, with the Mathematical Von Neumann Deviation, as it was described in Chapter 13 (p. 416);

6th To establish promising researches in the field of the Reverse Mathematics, as it was seen as an application in Chapter 11 (p. 344) in the sense of Hilbert’s Program proposal;

7th To establish new promising researches in the field of Quantum Logic Gates of Quantum-Mechanical Computers, since it is possible to establish the Mathematical Model as a Quantum-Mechanical Non- Von Computers;

8th To establish new promising researches in the field of Genetics through Boolean Mathematical Models in computing applications of the Theoretical Biology. The Text Deduction of the Chapter 11, for instance, could be suggested its use instead of the computing of empirical models and isolated facts.

Thus, paradoxically, the absence of mathematics in the Information Science, which revealed the 4th Great Crisis in Mathematics and allowed the extraordinary technological development, began to demand in its growing and wide employment of the logical artificial thought, more and more fundamentals of the utilized scientific true.

4. The Macroscopic Quantum Leap Effect and its applications:

It was discovered that Magnetic Super Pulse (MSP) or Pulsating Energy Converted Electro-mechanically (also called PECCEM Transformation), responsible for the “4th Control Technique of Switching Circuits” **is, in fact, a macroscopic manifestation of one global inter-atomic Quantum Leap.**

The Project No. 2000-1227 presented to The Rolex Awards for Enterprise annexed entitled “**A Macroscopic Quantum Leap Effect and its application to the Automobile Motors**”, can prove this fact.

For this reason, it is possible to justify the following applications:

1st LINEAR MAGNETIC MOTORS - (LMM): In the Linear Magnetic Motors (LMM), PECCEM Transformation could be used as engine in the Unity Trains for passenger suburban railway traffic, as it could be seen in the Project annexed.

2nd ROTATE MAGNETIC MOTORS - (RMM): In the Rotate Magnetic Motors (RMM), the main application is the replacement of the combustion fuel energy with the pulsating electrical energy called PECCEM, for the propulsion of jet turbines nowadays in use in most aircraft, as it could be seen in the Project annexed.

3rd THE AUTOMOBILE MAGNETIC MOTORS (AMM): In the Automobile Magnetic Motors (AMM), the main application is the replacement of the combustion fuel energy such as, diesel oil, combustion oil, gasoline, propane gas, alcohol, etc. by the PECCEM. This replacement is extended to the propulsion of vehicles that use the “piston and crankshaft” technology, as it could be seen in the Project annexed.

4th MAGNETOSTRICTION OF THE PLASMA: The concept of MAGNETOSTRICTION is normally applied during the fabrication of magnetic materials (Fe-Ni alloys, metallic glass with Co, etc), where the percentile variation of their dimensions occurs during the magnetization process. In this present case, we are using the MAGNETOSTRICTION concept to signify the heating up of the plasma by axial magnetic compression, through the induction coil surrounding the contained unit. This magnetic constriction that produces the magnetostriction of the plasma is produced at an extremely high temperature intensity, which causes the plasma to behave like an “ionized gas” adiabatically super heated. This concentrated heat being axially accumulated by the extremely high frequency of repetition of MSP, causes growth temperature to reach at critical values of the thermonuclear fusion and as a consequence, its full control. This magnetic constriction that produces the magnetostriction of the plasma is produced at an extremely high temperature intensity, which causes the plasma to behave like an “ionized gas” adiabatically super heated. This concentrated heat being axially accumulated by the extremely high frequency of repetition of MSP, causes growth temperature to reach critical values of the thermonuclear fusion and as a consequence, its full control, as it could be seen in the Project annexed.

5th NUCLEAR MAGNETIC RESONANCE - (NMR): The application of this new transformation of energy PECCEM extends to Nuclear Magnetic Resonance (NMR), whose principles are known. The objective in such systems is to replace the magnetic pulses supplied by the radio frequency generator, which provides an oscillation highly stable. This replacement by the MSP created by the PECCEM is developed for the same rate of high frequency rates requirements and, as highly stable as the classic radio frequency utilized to generate the NMR signal, as it could be seen in the Project annexed.

6th MAGNETIC WAVES: This possible application of the described Macroscopic Quantum Effect to produce Magnetic Waves depends on the realization of physical experiment to be tried in the future, as it could be seen in the Project annexed.

CONCLUSION:

In Dr. Kemmett's letter referred above, you told me the following:

*"The inquiries have been made by this office but, because of the highly specialized nature of the subject of this proposal, it does not appear that there is a requirement at this time for an investigation of the concept that you have proposed by other program offices in NASA. So far as the Board in concerned, our authority is limited to the consideration of scientific and technical contributions that have been adopted and used by NASA, and proved to be **'of significant value in the conduct of aeronautics or space activities'**. Further more, it must be established that the use of such a scientific or technical contribution has produced a result beneficial to the U. S. Government. For these reasons, we believe you will recognized that the Board can take no further action in respect to your proposal, and we are returning to you, under separate cover, the documents and components which you submitted."*

For these reasons, I hope, after these long lifetime researches motivated by a general invitation from NASA relatively to that subject Mission in 1970, that the results obtained can be useful and proved by NASA Staff, **to be 'of significant value in the conduct of aeronautics or space activities'**. I hope too, that **'it must be established that the use of such a scientific or technical contribution can produce a result beneficial to the U. S. Government'**.

In case of positive answer, I hope that it is possible to approve the following:

- 1) To the draft of my new book on *"Boolean Arithmetic and its Applications"*: With some revisions and your possible assistance, this text will develop into a book where the usefulness of Boolean Arithmetic can be achieved to solve some of that problems above referred (item 3 of this letter);
- 2) To confirm the results obtained in the Project annexed ("A Macroscopic Quantum Leap Effect and its Application..."): It is necessary to operate the device, TRANSRUPTOR type AB-5 / TR-64 to switch OFF position, as it is described in the five physical experiments (tests) of the annexed Project (pp. 13 -16 – Figs. 1, 2, 3 and 4);
- 3) To make a prototype and confirmation of the results obtained with the SUPERJUNCTOR: It is necessary to build firstly the SUPERJUNCTOR, because of the metallic contact of the Transruptor must be eliminated to obtain the MSP HIGH FREQUENCY GENERATOR, as it is described in the item 5 of the Project annexed (pp. 16 and 19 - Figs. 5, 6, 8, 9 and 10);
- 4) To make prototype of ROTATE MAGNETIC MOTORS (RMM) relative to the 2nd applications (item 4, p.5 of this letter) indicated in the annexed Project (p.17 and Fig. 6) and confirmation of the results obtained with the substitution of the kerosene fuel of aeronautics jet turbine by electrical energy (also called PECCEM Transformation), as indicated in the item 7 (p.17) of the annexed Project;
- 5) To make one prototype relative to the 4th applications (item 4, p.5 of this letter) indicated in the annexed Project (p.19 and Fig. 9) to confirm of the results obtained with MAGNETOSTRICTION OF THE PLASMA to produces a thermal effect. This thermal effect presents an accumulative and crescent temperature due to the high frequency of its repetition, as it is described in the item 9 (p.19). The discovery of this new MSP technology, I think, is highly recommended because the data collected for high temperature values of the plasma, probably,

might be reviewed and compared with the current conventional methods in use in the search of this Thermal Nuclear Energy or Fusion.

Looking forward to hearing from you, I remain

Yours Sincerely,

Professor Wagner Waneck Martins

Postal Address: Rua Barão de Itaúna, 155
05078-080 – São Paulo – SP – Brazil
Tel.: 0055 011 261-4641
Fax: 0055 011 261-4703 Tel. Cell: 0055 011 9262-0847
e-mail: <waneck@usp.br>

Copies to my Assistants,
Messrs. Mauro Pinheiro and Laercio Pinheiro,
Address:
4421, Robbins Street, San Diego, California,
CA 92122 – USA
Phon. (619)597-8968
e-mail: pinheirom@aol.com

ANNEXES:

1. Book: **“ESÇÃO (n~m~p): A Non-Von Neumann Computer”**.
2. Draft of the new book: **“Boolean Arithmetic and its Applications”**, with **“Curriculum Vitæ”** inside.
3. A **CD-ROM** copy of the book, **“Boolean Arithmetic and its Applications”**.
4. **Separate extracts of my Curriculum**, referred to the development of the three parts of the proposal made in former time.
5. The Project No. 2000-1227 presented to The Rolex Awards for Enterprise, entitled: **“A Macroscopic Quantum Leap Effect and its application to the Automobile Motors”**

(Annexes: a)1st draft of the book referred in the letter; b) mail with Prof. Dana S. Scott; c) Curriculum Vitæ; d) a copy of our project NR. 2000-1227 submitted for the **“2000 Rolex Awards for Enterprise”**, entitled: **“A Macroscopic Quantum Leap Effect and its application to the Automobile Motors”** – last item referred in that Curriculum).

[13] Cote Jr. A. J., **“Neuristor Propagation in Long-Tunnel Diodes”**, Proceedings of the IEEE, Vol. 83, nr. 2, Feb. 1965, pp. 164/165.

[14] Crane, H. D., **“Neuristor – A Novel Device and System Concept.”**, IRE, Vol. 5th, Oct. 1962, pp. 2048-2060.

[15] _____, **“Neuristor Studies”**, Stanford Electronics Lab., Stanford University, Calif., Tech. Rept. Nr.1506-2-AD 240-306, July, 1960.

[16] Urbano, R. H., **“Boolean Matrices and the Stability of Neural Nets”**, Trans. On Electronic Computers, April, 1963, pp. 63-66.

[17] _____, *"Some New Results on the Convergence Oscillation and Reability of Polyfunctional Nets"*, IEEE Trans. On Electronic Computers, Dec. 1965, pp. 760-781.

Note: This author in final of its Introduction told:

"In deference to persistent colleagues, referees, miscellaneous engineers and cocktail party acquaintances, The word 'neural' appearing in the title of Urbano [16] had been changed to the more descriptive appellation 'polyfunctional'. Some of these critics maintain that the former word implies that some attempt is being made to explain the organization of the networks of the nervous system. Others claim that the word is unnecessarily restrictive – that is, it gives the impression that only threshold nets are being considered. Since there is evidently an appreciable class of readers (the foregoing classes are, of course, excepted) who do not progress any further than the tittle, the author bows to the wisdom of previously mentioned individuals."

[18] Householder, A. S., *"A theory of Steady-State Activity in Nerve Fiber Networks: I. Definitions and Preliminary Lemmes"*, Bull. of Mathematical Biophysics, Vol. 3, 1941, pp. 63-70.

[19] _____, *"A theory of Steady-State Activity in Nerve Fiber Networks: II. The Simple Circuit"*, Bull. of Mathematical Biophysics, Vol. 3, 1941, pp. 105-112.

[20] _____, *"A theory of Steady-State Activity in Nerve Fiber Networks: III. The Simple Circuit in Complete Activity"*, Bull. of Mathematical Biophysics, Vol. 3, 1941, pp. 137-140.

[21] _____, *"A theory of Steady-State Activity in Nerve Fiber Networks: IV. N. Circuits with a Common Synapse"*, Bull. of Mathematical Biophysics, Vol. 4, 1942, pp. 7-14.

[22] Pitts, W., *"Some Observations on the Simple Neuron Circuit"*, Bull. of Mathematical Biophysics, Vol. 4, 1942, pp. 121-129.

[23] _____, *"The Linear Theory of Neuron Networks: The Static Problem"*, Bull. of Mathematical Biophysics, Vol. 4, 1942, pp. 169-175.

[24] _____, *"The Linear Theory of Neuron Networks: The Dynamic Problem"*, Bull. of Mathematical Biophysics, Vol. 5, 1943, pp. 23-31.

[25] MacCulloch, W. S. and Pitts, W., *"A Logical Calculus of the Ideas Immanent in Nervous Activity"*, Bull. of Mathematical Biophysics, Vol. 5, 1943, pp. 115-131.

[26] Landahl, H. D., MacCulloch, W. S. and Pitts, W., *"A Logical Calculus of the Ideas Immanent in Nervous Activity"*, Bull. of Mathematical Biophysics, Vol. 5, 1943, pp. 135-137.

[27] Arbib, M. A., *"Brains, Machine and Mathematics"*, McGraw Hill Book Co., 1964.

[29] Hanson, W. B., *"Ternary Threshold logic"*, Trans. IEEE on Electronic Computers, June 1963, pp. 191-197.

NOTE: The referred Dr. Francis W. Kemmett' letter, May 4th, 1971, as Director of Staff - Inventions and Contributions Board is the following:



NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

WASHINGTON, D.C. 20546

REPLY TO
ATTN OF

KB

May 4, 1971

Prof. Wagner Waneck Martins
Rua Barao de Itabora #155
Alto do Ipa
Sao Paulo 10, Brazil

SUBJECT: Proposal for Participation in Mission Definition for Grand
Tour Missions to the Outer Solar System

Apparently some time in January 1971, you and your colleagues submitted a "Proposal for Participation in Mission Definition for Grand Tour Missions to the Outer Solar System" to the Office of Space Science and Applications (OSSA) of NASA in Washington, D. C. The proposal consisted of four bound documents which were accompanied by three instrumentation components, viz., a switch and two objects identified as transraptors. The Planetary Programs Division of OSSA reviewed the material you submitted but concluded that it did not meet the requirements of the program in question, and forwarded all of your documents and components to NASA's Office of International Affairs. This office in turn, referred your material to the Inventions and Contributions Board in the belief that the Board might be cognizant of another office in NASA which would be interested in reviewing the proposal.

Inquiries have been made by this office but, because of the highly specialized nature of the subject of this proposal, it does not appear that there is a requirement at this time for an investigation of the concept that you have proposed by other program offices in NASA. So far as the Board is concerned, our authority is limited to the consideration of scientific and technical contributions that have been adopted and used by NASA, and proved to be "of significant value in the conduct of aeronautics or space activities." Furthermore, it must be established that the use of such a scientific or technical contribution has produced a result beneficial to the U. S. Government. For these reasons, we believe you will recognize that the Board can take no further action in respect to your proposal, and we are returning to you, under separate cover, the documents and components which you submitted.

NASA is presently adjusting its space and aeronautic programs to compensate for reductions that have been made in our operating budget,

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and it has made it necessary to eliminate certain previously scheduled projects and to make revisions in other space and aeronautical studies. We do, however, wish to express our appreciation for the efforts of you and your colleagues in compiling and submitting your proposal, and for your interest in contributing to the advancement of our accomplishments. If circumstances should change and the Board receives inquiries concerning your proposal in the future, we shall be happy to write to you again concerning its possible implementation.

A handwritten signature in cursive script, reading "Francis W. Kemmett", followed by a long horizontal flourish line.

Francis W. Kemmett
Director of the Staff
Inventions and Contributions Board

Separate Cover:

Basic Proposal

Three backup volumes in Portuguese

A Switch and Two Transruptors

NOTA: Como vimos no ítem 4, **“The Macroscopic Quantum Leap Effect and its applications”**, foi descoberto que o Super Pulso Magnético (MPM) ou Energia Pulsante Convertida Eletromecanicamente (também chamada Transformação EPCEM), responsável pela “4^{at} Técnica de Chaveamento de Circuitos”) é, **de fato, uma manifestação macroscópica de um salto quântico global interatômico**. O mais recente artigo sobre o assunto é o seguinte:

“A MACROSCOPIC QUANTUM LEAP EFFECT AND ITS APPLICATION”

by Wagner Waneck Martins

1. INTRODUCTION

In Quantum Mechanics, an electron in atoms has various discrete energy levels and it could have a *quantum leap* between two levels caused by the emission or absorption of a quantum of energy. Electrons occupying orbits farther away from the nucleus possessed more energy than those did that in the lower orbits. Atoms gave off radiation when an electron made a *quantum leap* from a higher orbit to a lower one, emitting one of Planck's quanta in the process. In the reverse process, that is, when an electron made a *quantum leap* from a lower orbit to a higher one, electrons could also absorb quantified energy and move to higher orbits. A *ground state* is the lowest Energy State and when an atom is in that state the electron occupied its smallest possible orbit and the atom could radiate no further.

However, the theory of Quantum Mechanics does not tell us when an electron will make this transition from one state to another. This theory only gives us a *probability* of a subatomic particle being in this or that state, that is, *the theory does not tell us how an individual particle will behave*.

According to the Uncertainty Principle announced in 1927 by Heisenberg (1901-1976), it is not possible to determine simultaneously the exact position, “x”, and the momentum, “p”, of an atomic particle, in order **to predict** its future location.

There is a dilemma in Modern Physics, which refers to “The Dual Nature of Waves and Particles.”

It is easy to visualize the transmission of energy by wave motion: All of the sun's energy reaching the earth is transmitted by eletromagnetics waves; all audible sounds, greatest radiation and many others, arise also as specific eletromagnetics waves.

We owe to Maxwell (1831-1879) the conclusion that light is an electromagnetic phenomenon. The electromagnetic theory of light was testable experimentally, and stood so remarkably well in laboratory trials. In “A Dynamical Theory of the Electromagnetic Field”, published in 1864, Maxwell said:

“The matter composing the ether had marvelous properties. It was very fine and capable of permeating bodies; it filled space with an elastic medium. It was the vehicle of the undulation of light and heat.”

For the practical purposes of the Modern Communication, Maxwell **predicted** these electromagnetic waves in his unforgettable work.

On December 14, 1900, an apologetic, soft-spoken, articulate, forty-two-years-old professor presented a strange concept to the august body of the German Physical Society This date would later be regarded as the birthday of the quantum. On that day, Professor Max Planck offered a mathematical exercise that averted the now well-known ultraviolet catastrophe (This ultraviolet catastrophe is the result from classical physics, which, if correct, would assign infinite energy to the high frequencies of black body radiation). Planck explained why heat energy does not always converted to invisible ultraviolet light waves. This explanation was, to Planck, merely a refinement, a sanding down of a rough theoretical edge. But it was this

edge that brought Herr Professor Max Karl Ernst Ludwig Planck before the Physical Society on that bleak winter day.

Six weeks earlier, he had called what he had done a **“lucky guess”**. His discovery did not take place in any laboratory; it took place in his mind. And he didn’t believe it, even after Einstein used the idea to explain away another **“rough edge”** five years later. He felt somehow a mechanical justification for his **“guess”** would be forthcoming. He was, remember, past the age of brilliance – a careful, middle-age academic. He fervently wished to change his guess to a **“statement of real physical significance.”** He recounted the event twenty years later during his Nobel Prize address:

“After a few weeks of the most strenuous work of my life, the darkness lifted and an unexpected vista began to appear.”

However, what was his discovery? [01]

The Quantum Theory was born in 1900, when Max Plank (1858-1947) published a paper on the exchange of energy between the walls of a cavity maintained at uniform temperature and the radiation within it. He found that it was possible, based in the results of experimental curves, **to predict** that all exchanges of energy between matter and radiation take place in units or quanta. These quanta values ($h \cdot f$) are proportional to the frequency f of the radiation, where h represents a number known as universal Planck’s constant.

Planck was astonished to find that matter absorbed heat energy and emitted light energy discontinuously. **“Discontinuously”** meant in lumps, and these lumps were totally unexpected. To better grasp Planck’s astonishment and the significance of his discovery; I ask you to consider an analogy. The analogy deals with the familiar experience of dropping stones into a pond. Remember that Plank’s discovery (**it did not take place in laboratory; it took place in his mind**) was in the nature of an explanation. Plank was, like Zeno, a theoretical scientist. His job was to explain what we saw or, if our conception of what we saw was incorrect, to correct our thinking. Ideally, the new insight would lead to a better understanding and a new **prediction** based upon that understanding [01].

In 1905, Einstein (1879-1955) **predicted** that not only do emission and absorption of energy take place in lumps, but that these lumps (or quanta) exist as such in the radiation itself. Einstein assumed that radiation is actually corpuscular in structure. These lumps of energy are called “photons”, each of which carries a single quantum of energy $h \cdot f$. According to Einstein, when an atom emits radiation, a particle is shot off carrying energy and momentum away; when it is absorbed, the particle collides with an atom and Disappears, yielding its energy and momentum. This **prediction** was a daring hypothesis that proved to be fruitful beyond all expectations.

These **predictions** above made by Planck and Einstein are in accordance with the following writing of Feynman [02]:

“The basis of science is its ability to predict.

To predict means to tell what will happen in an experiment that has never been done.”

How can we do that?

By if, we know what is there, independent of the experiment.

Then:

- **We must extrapolate the experiments to a region where they have not been done;**
- **We must take our concepts and extend them to places where they have not yet been checked. If we do not do that, we have no prediction.”**

“The question of whether rays of light are themselves quantized, or whether this quantum effect exists in matter only, is, in fact, the first and most acute dilemma facing the entire quantum theory”, said Planck, who besides fighting against the Copenhagen school’s adoption of Heisenberg’s Uncertainly Principle, wrote, “This is an intolerable limitation of the freedom of thought and a mutilation of the main work the theoretician has to deal with” [03].

At the famous Solvay Physics Conference in 1927, Niels Bohr (1885-1963), laid down the law that the nature of light was not open to discussion, that is, light would simply be treated as a wave or particle, depending on the formulation of each particular experiment. As a compromise, Max Born (1882-1970) came up with the Probability Theory in the Quantum Mechanics, which is still the last word concerning this problem.

At that time, Planck defended the Causality Principle and warned that, ***“The introduction of non-causality into the physical world view might bring about opinions that could have disastrous consequences for our society”***, but this warning was not heeded. To be sure of a clear understanding of the sense in which “causality” is used, it is agreed a priori that whenever a reference is made to a “casual relationship” between two successive events or occurrences, these terms are understood to designate a certain regular connection between them, calling the earlier one the cause, and latter one the effect. In Planck’s way of thinking, this Principle is ***“An occurrence is casually determined if it can predict with certainty”***. Planck’s followers, physicists or philosophers are called Determinists.

However, certain laws of Physics enable us to predict with more or less certainty, which allows us to recognise and establish the following opposite principle, ***“It is never possible to predict a physical occurrence with unlimited precision”***. The followers of this principle are called Indeterminists. They claim that genuine causality actually does not exist in Nature but is merely an illusion and the discovery of a statistical cause in every law of Physics was regarded as laws of probability relating only to mean values of observations.

It is interesting to bring to light the following Planck’s words [04]:

“I have satisfied my inner need for bearing witness, as fully as possible, both to the results of my scientific labours and my gradually crystallised attitude to general questions – such as the meaning of exact science, its relationship to religion, the connection between causality and free will – by always complying willingly with the ever increasing number of invitations to deliver lectures before Academies, Universities, learned societies, and before the general public, and these lectures have been the source of a many a valuable personal stimulation which I shall gratefully cherish in loving memory for the rest of my life.”

“Of course, every step forward means also that the difficulty of the task increases, the demands on the analysis grow more exacting, and the need for an expedient division of labour becomes always more urgently imperative. In particular,

the division of science into experimental and theoretical was completed about a century ago. Experimenters are the shocktroops of science. They perform the decisive experiments, carry out the all-important work of measurement. An experiment is a question which science poses to Nature, and a measurement, is the recording of Nature's answer. But before an experiment can be performed, it must be planned – the question to Nature must be formulated before being posed. Before the results of a measurement can be used, it must be interpreted –Nature's answer must be understood properly. These two tasks are those of the theorist, who finds himself always more and more dependent on the tools of abstract mathematics. Of course, this does not mean that the experimenter does not also engage in theoretical deliberations."

"In conclusion, we may therefore say: The law of causality is neither true nor false. It is rather a heuristic principle, a signpost – and in my opinion, our most valuable signpost - to help us to find our bearing in a bewildering maze of occurrences, and shows us the direction in which scientific research must advance in order to achieve fertile results."

According to the Quantum Mechanics, one can only know whether something is moving or how fast that something is moving. The uncertainty of the position and of the momentum is complementary, and the product of the two is constant. Therefore, in its mathematical theory of particles, there is always some uncertainty in the specification of their position and velocities. We can, at best, say that there is a certain probability, " $p_1(x)$ ", that any particle will have a position near some co-ordinate " x " (that is, between " x " and " $x+D_x$ "), and similarly, say that there is another certain probability, " $p_2(v)$ ", that the velocity of any particle will be found near some velocity " v " (that is, between " v " and " $v+D_v$ "). Even, it is one of the fundamental results of Quantum Mechanics that these two probabilistic functions, " $p_1(x)$ " and " $p_2(v)$ ", cannot be chosen independently and cannot be made arbitrarily narrower. For the Heisenberg Uncertainty Principle, we may write the following basic relationship as its mathematical statement:

$$[D_x] \cdot [D_v] \geq h/m$$

That is, the product of the two widths must be, at least, as big as the number " h/m ", where, " h " is a fundamental physical constant called Planck's constant" and " m " is the mass of this particle.

In this microscopic world, it was discovered that there is an atomic leap, which is carried out by an electron, from an orbit of a certain level of energy to another. This leap is made without any trace of its path, or even the instant when it happens. For instance, when an atom has two levels that differ in energy by the amount " DE ", it can make a transition from the upper level to the lower level by emitting a light quantum (photon) of frequency " w ", where:

$$h.w = DE$$

It was discovered that under special conditions the peculiar quantum mechanical behaviour of matter on a small-scale character can appear on a macroscopic scale. The quantum measurement as a transition from atomic activity to knowledge through a process of irreversible amplification it is desirable, because on a microscopic scale the things do not behave like things on the macroscopic scale. "No elementary quantum phenomenon is a

phenomenon until it is brought to a close by an irreversible act of amplification by a detection such as the click of a geiger counter or the blackening of a grain of photographic emulsion”, said Bohr and Wheeler [05].

For this reason, it is very important to consider the possibility of an experimental discovery in our macroscopic world, to be a disclosure of the behaviour of atomic particles.

An example of this, undoubtedly, was the discovery of superconductivity in 1911 by Heike Kamerlingh-Onnes (1853-1926), who was awarded the Nobel Prize in Physics (1913). After these facts and up to now, the superconductivity milestones were:

- 1933 - W. Meissner and R. Ochsenfeld discover the Meissner Effect;
- 1937 - Fritz London speculates that supercurrents may exist in non-metallic systems;
- 1941 - Scientists report superconductivity in niobium nitride at 16°K;
- 1953 - Vanadium-3 silicon found to superconducting at 17,5°K;
- 1957 - Born the theory of superconductivity, called BCS Theory;
- 1962 - Westinghouse scientists develop the first commercial superconducting wire;
- 1972 - Nobel Prize, Physics, to Bardeen, Cooper & Schrieffer (BCS Theory);
- 1986 - IBM researchers make a ceramic that superconductors at 35°K;
- 1987 - Paul Chu & Maw-Kuen Wu make a ceramic that superconductors at 98°K;
- 1988 – Allen Hermann makes a ceramic that superconductors at 120°K and soon after, IBM & AT&T Bell Labs scientists produced a ceramic that superconductors at 125°K.

In the BCS Theory [06], due to the interactions of the electrons with the vibrations of the atoms in the lattice, there is a small net effective attraction between the electrons. The result is that the electrons form bound pairs also known as “Coopers pairs”. It was found that the “phonons” (somewhat analogous to photons), produced by the lattice distort, send these packets of energy which form a sort of trough of positive charge around a pair of electrons [07]. This phenomena of Quantum Mechanics whereby the two electron are linked up, instead of its natural repulsion, shows that the forces exerted by the phonons emitted by the lattice’s vibrations, overcomes this natural repulsion. For this reason the normally chaotic stream of electrons, which the macroscopic electrical current is a manifestation in the conventional conductor, is tamed by the order established by the formation of these electron pairs. However, the new high-temperatures superconductors represented by the ceramics, as a new experimental discovery in our macroscopic world, posed another set of questions. It may require, probably, an entirely new theory about the behaviour of atomic particles in their microscopic world.

About Paul Chu & Maw-Kuen Wu’s discovery (1987), said Donna Fitzpatrick, assistant secretary at the U.S. Department of Energy:

“Nobody ever thought ceramics would do this. Why should a ceramic conduct? That was the most interesting part of the whole thing. We had no theory that predicted this, and no theory to explain it. I think everybody agrees that this is a once-in-a-lifetime event, and we’re all very excited about it. And even though most people will tell you that we won’t have something we can use tomorrow – and that maybe we’ll get to room temperature and maybe we

won't – that jump into the nineties was astonishing. What really excites people is the theoretical question mark. We have something that we can't explain, and when we do, where is it all going to take us?"

It seems that there are fascinating quantum manifestation phenomenon's in our macroscopic level, where so many particles act as if they were a few. It is as if they were an amplification of microscopic phenomenon.

We believe that the same thing can happen in the magnetic field and it will be considered in this Project. The energy differences are so small that the frequency does not correspond to light, but to microwaves or to radiofrequencies. The transition from the lower to an upper energy level of an atom can also take place with the absorption of light or, in the case of atoms in a magnetic field, by the absorption of microwave or radiofrequency energy (or, probably by some other forms). Thus, normally, if we have an atom in the magnetic field, we can cause transitions from one state (lower energy level) to another (upper energy level) by applying an additional electromagnetic field of the proper frequency. In other words, if we have an atom in a strong magnetic field and we "tickle" the atom with a weak varying electromagnetic field, there will be a certain probability of knocking it to another level, if the frequency is near to the " ω " of the above equation.

We believe that there is no apparent reason that these transitions of energy of this atomic leap couldn't be obtained from other forms. For instance, by a particular method of electromagnetic inducing energy, that is, by an induced magnetisation through a solenoid, which surrounds a core of soft iron (that is, as a coil of an electromagnet).

In these conditions, suppose that we have this core of soft iron of the above coil, magnetically connected with one of their end faces, for instance, with the "north" magnetic face of a permanent magnet ceramic (or ferrite). Thus, due to this magnetic induction, in the end part of this core of soft iron near the ferrite, there is a stationary magnet south pole and in the opposite end, there is a north pole. Then, the permanent magnet which is in the stationary field, produce in the inner of the soft iron core of each pole, some dipole parallel magnetic field. These magnetic charges of their atomic dipoles are in the correspondent opposite sense.

Thus, when a discharge of an electric current passes through the conductor of the coil, another magnetic field is produced in the solenoid and the potential energy of the moving electric charge carriers is transformed into (potential) magnetic field energy. The strength of this field is proportional to the current and can be increased in two ways: by winding the conductor into the coil with as many turns as possible, or by making the core of this coil of a ferromagnetic material (soft iron) as we have. This magnetic stored energy, normally keeps the discharge current going after the driving electrical potential that has been removed. The rate of change of the current and magnetic field in reference time is directly proportional to the applied voltage.

However, according to the Quantum Theory, an atom can only assume certain stationary energy states. These are determined by the atomic number and these stationary states in their turn determine the distribution of the electrons over the various "shells". In the stationary energy states, each electron moves round the nucleus in a definite orbit in which it possesses a definite constant energy and thus does not radiate any energy and the atom is in its energetic "ground states", in which the electrons will assume orbits with the lowest energy levels, which are close to the nucleus.

In order to move an electron to an orbit with a higher energy level, one must supply it with a certain amount of excitation energy, which represents the energy difference between the two orbits in question.

It seems plausible to conclude that in the above referred self-inductance, all the electrons of the atoms of the core of soft iron are left in the maximum state of excitation energy, during the time in which the electric current is "ON". As we can see in the Fig. 2, this is the 1st. Stage where the period that takes to energise the induction coil (17) of the Transruptor (Fig. 1) is referred to as the "Full Charge" period. In the 2nd. Stage, the final period for the discharge of the magnetic energy stored in the same induction coil (17) is referred to as the "Discharge" period. The instant " t_1 " that separates these two stages, represents the instant of the mechanical activation by the strong magnetic repulsion over the armature causing the abrupt interruption of the supply of energy from the 1st. Stage.

In other words, if the direction of the displacement of the electric current produces in the face of the core of soft iron magnetically connected to the north face of the ferrite, another inductive north pole, it will be an instant " t_1 " when occurs a magnetic repulsion of the ferrite. As we can seen in the Fig. 1, in that instant " t_1 " the electric supply current in the coil goes to the "OFF" position. Then, we have a "Magnetic Super Pulse" (MSP) which characterises a new form of Electro-mechanical conversion of electrical energy also called 'Pulsating Energy Converted Electro Mechanically' or 'PECEM Transformation'.

It seems that this "Magnetic Super Pulse" (MSP) is supplied by the global energy returned from the excited state of all the assembled electrons of the atoms of magnetic core. The electrons of these atoms are left in the maximum state of its excitation, during the time in which the electric current is "ON", until the final instant " t_1 " of this Full Charge Period. In this 1st Stage these atoms absorb part of this outside supply of energy, as we can see in Figs. 2a and 2b. Then also, at that the "OFF" instant " t_1 " occurs the trigger of the Magnetic Super Pulse (MSP). Consequently, all those electrons in the maximum state of its excitation above referred, will jump spontaneously and simultaneously from its high-energy state to a state of lower energy, searching for one return to the ground state.

For this reason, it seems that this simple experimental fact in our macroscopic world allows the understanding of the global behaviour of the atomic particles involved. In other words, this "Magnetic Super Pulse" (MSP) is probably the macroscopic manifestation of one Global Inter-Atomic "Quantum Leap" (GIAQL). This global Quantum Leap (GIAQL) characterises the 2nd Stage where part of that stored atomic energy described above is emitted. This emission of magnetic energy corresponds to the total simultaneous referred jumps of atomic energy, now emitted by the electrons in its return to the late orbits.

It is convenient to observe that the Global Inter Atomic Quantum Leap (GIAQL), macroscopically emitted and given through the Magnetic Super Pulse (MSP), as it is a trigger of a unique macroscopic pulse of atomic energy, it is also an emission of atomic energy with frequency zero.

Then as we can see later, it is possible to submit this macroscopic trigger pulse of emitted atomic energy, to one determined and controlled frequency " ω ", whose values could be "low", "high", or even "extra-high".

CONCLUSION:

This Global Inter Atomic Quantum Leap (GIAQL) effect discovered, allows us to put outside electrical energy into the inner atomic space and then, allows its utilisation to produce normally mechanical labour. For this reason we justify now, that the "Magnetic Super Pulse" (MSP) characterises a new form of electro-mechanical

conversion of electrical energy, also named as 'Pulsating Energy Converted Electro Mechanically' or 'PECEM Transformation'.

2. NEW DEVICES AND PRACTICAL APPLICATIONS

'Pulsating Energy Converted ElectroMechanically' or 'PECEM Transformation', recently, was assumed that it is in reality a 'Global Inter Atomic Quantum Leap Effect' (GIAQLE), which characterises a new form of Electro-mechanical Conversion of electric energy.

This new form of Electro-Mechanical Conversion was discovered initially, during a lifetime research about switching and protection devices developed at Escola Politécnica da Universidade de São Paulo, Brazil.

A pulse of pure magnetic energy, called '**Magnetic Super Pulse**' (MSP), was created by '**PECEM Transformation**' and it is responsible for the viability of this new technology.

In this new form of energy conversion, naturally, **there are the appearances of new devices**, which use that "Magnetic Super Pulse (MSP)".

As it is possible to submit this **MSP** to one determine and controlled frequency of repetition " ω ", these devices could be classified according to the values of that frequency, with the following technological nomenclature of application:

1st Application: Devices that depend on an **unique MSP** to be used in ON or OFF operations, that is, devices whose frequency of the pulse repetition is NULL:

- 1.1 -- TRANSRUPTORS (Switching / coil with magnetic-iron nucleus) [08].
- 1.2 -- TRANSREEDS (Switching / coil with magnetic-air nucleus)
- 1.3 - TRANSJUNCTORS (Switching & Protection of Electrical Circuits / Extra Speed Protection Against Short Circuit with Low Amperes Effect (ESPASCLA - Effect) [09].

2nd Application: Devices that depend of **low controlled frequency** on the MSP to operate discreetly:

- 2.1 - LINEAR MAGNETIC MOTORS (LMM) - (Unity Trains)
- 2.2 - ROTATE MAGNETIC MOTORS (RMM) - (Turbojet Magnetic Engine)
- 2.3 - AUTOMOBILE MAGNETIC MOTORS (AMM) - (Connecting rod/crankshaft engines to cars, locomotives, ships, submarines, etc)

3rd Application: Devices that depend on **high controlled frequency** of the MSP to operate discreetly:

- 3.1 - MAGNETOSTRICTION OF THE PLASMA (Thermonuclear Control of Fusion Energy from Hydrogen Plasma (or isotopes))
- 3.2 - NUCLEAR MAGNETIC RESONANCE (NMR) - (NMR Tomography), generally know as MRI - Magnetic Resonance Imaging.
- 3.3 – MAGNETIC WAVES (Telecommunications)

It should be observed that devices that depend for their operation on the low/high frequency rate of MSP, such as the above 2nd and 3rd applications, require coupling with another device called **SUPERJUNCTOR**. This device, whose characteristics and detailed construction will be given later, allows the **elimination of the unique metal contact** found in the **TRANSRUPTOR** (Gadi - USP) [10].

3. THE DISCOVERY OF THIS NEW FORM OF ELECTRO-MECHANICAL CONVERSION OF ENERGY (PECEM).

As we have conclude in the Introduction, this ‘**Global Inter Atomic Quantum Leap Effect (GIAQL)**’ allows to put into the inner atomic space, outside electrical energy and then, makes its utilization to produces normally mechanical labor. For this reason, this new modality of ‘**PECEM Transformation**’ introduces a 3rd case of Electro-mechanical conversion of energy, besides the electric motors and generators.

The technological achievement of this 3rd case of conversion became possible, because of the development of a new technique of switching circuits, called “**4th Technique - Control by Quantified Energetic Pulse**”, whose technological evolution is shown in TABLE 1.

Initially, to understand this discovery, we need to consider the basic circuit of the TRANSRUPTOR shown in Fig. 1. These devices, as a little magnetic latching, can be operate where power dissipation is eliminated (not minimized) with a single short duration inhibit pulse called Magnetic Super Pulse (MSP). Then, after the metallic contact has transferred, no holding power is required. The magnetic latching feature of the TRANSRUPTOR provides a “memory” capability since the conventional relays (2nd Technique) will not reset upon removal of power.

This basic circuit was specially drawn to take oscillographical measurements in physical experiments. In this circuit, only when the reversible switch is connected in the left position “d”, it allows the “4th Technique” operation of the load “C” to OFF situation. To switch it to ON position, there is no switching alteration as a 4th Technique’s device.

This means that in these conditions we can switch the TRANSRUPTOR ON/OFF as a switching device that uses the “4th Technique ” (TABLE 1). But, if the reversible switch of Fig. 1 is connected in the right position “c” to the switch OFF operation, now the same device behaves like a “polarized relay” of the “2nd Technique”, as we can see in TABLE 1.

HORIZONTAL. EVOLUTION. VERT. EVOLUTION\ (PRINCIPLES) \	CONVENTIONAL TECHNOLOGY (COIL, CONTACT, ETC.)	ELECTRON TUBES (VALVES) TECHNOLOGY (PLATE, ETC.)	SOLID STATE SEMI- CONDUCTOR. TECHNOLOGY	INTEGRATED CIRCUIT TECHNOLOGY
1 st TECHNIQUE: CONTROL UNDER POWER	INTERRUPTERS, SWITCHES, ETC.			
2 nd TECHNIQUE: AMPLIFIED CONTROL	RELAYS, CONTACTORS-, ETC.	VACUUM TUBES, TRIODE, ETC.	TRANSISTOR. (BELL TEL.STAFF) (1948)	V.L.S.I. (MOS- FET,ROM, RAM, ETC)
3 rd TECHNIQUE: PULSE CONTROL	CIRCUIT BREAKER, SWITCH-GEAR, POLARIZED RELAY, ETC.	GAS TUBES, THYRATRONS, ETC	THYRISTOR /SCR 1957-(GENERAL ELECTRIC STAFF)	POWER ELECTRONICS (CHOPPER, ETC)
(BRAZILIAN TECHNIQUE)				
4 th TECHNIQUE: CONTROL BY QUANTIFIED ENERGETIC PULSE (BR. STAFF-1966)	TRANSRUPTOR, TRANSREED, TRANSJUNCTOR.			SUPERJUNCTOR (WITHOUT CONTACT)

TABLE 1 -- TECHNICAL AND TECHNOLOGICAL EVOLUTION OF
THE ELECTRICAL SWITCHING CIRCUITS

These devices determine the “4th Technique of Electrical Control” [08] appearance, that was called “Quantified Energetic Pulse” as we can see in TABLE 1, or in page 78 of the Brazilian patent deposit on 22nd of May 1995 about PECEM, in the name of Universidade de São Paulo and detailed in the Report on Component - Auxiliary Devices,
File E73633 - Project 79NK56340 April 1, 1980, made by Underwriters Laboratory Inc.(UL), Chicago, USA [10].

For the physical experiments, Fig. 2 (a) presents the graphical results of the **FIRST TEST: “IEE-01TR/64-CC”**, whose numerical values of times and energy are in the first line of TABLE 2. A Transruptor Type TR-64T/AB-5, operating in the 4th Technique to the OFF position was utilized. These graphical results are responsible for the four curves of Fig. 2 (b), which allow the following analysis:

1st Curve - (Channel 1) - The electric tension or voltages measured in (V) [$V=V(t)$]: Corresponding to the electric field produced by the Power Supply (DC or AC/60 Hz) in the end of the wires of the inductor coils of the Transruptor used in the test (terminals “2” and “3” of Fig. 1);

2nd Curve - (Channel 2) - The electrical current measured in (A) [$I = I(t)$]: Corresponding to the velocity of advancement of the free electrons that exist in the ionic crystalline structure, which constitutes the solid state of the copper wire used in the windings of the inductor coils;

3rd Curve - Electrical Power (in watts) measured in W [$W=W(t)$]: Corresponding to the amount of kinetic energy per unity of time that is transferred by the free electrons referred above to the ions of the crystalline structure that constitutes in microscopic form the metallic copper of the conductor used on the winding of the coils. This electrical power (W) was obtained through calculation, using the calculator TEKIMATE 2402, which is attached to the oscilloscope. The result of this calculation is the product of the series of values represented by the applied tension or voltage (1st curve, channel 1) and the current (2nd curve, channel 2), at the same value of the time period;

4th Curve - The electric energy (in joules), measured in (J) [$E=E(t)$]: Corresponding to the total of electric energy transferred by the free electrons to the ions of the crystalline structure of the metallic copper used in the winding of the coils; this electrical energy is called Inductive Energy Storage (IES). The calculation for this energy was also obtained using the microprogram that exists in the calculator TEKIMATE 2402. The value of this electric energy is the integer of the electric power mentioned before, represented by the 3rd curve above, that is:

$$E(t) = \int_{t_0}^{t_1} W(t).dt$$

Fig. 2 (b) also shows the typical configuration of these four curves, obtained during the tests. They represent the events before, during and after the Magnetic Super Pulse (MSP) triggering event, as a technological characterisation of the 3rd Case of the discrete and irreversible energetic transformation of which the Transruptor is part.

The four curves of Fig. 2 (b) are shown in the event periods that characterise the 1st and the 2nd Stages of the Transruptor operation:

In the **1st Stage**, the period of time that takes to energise the induction coil (17) of the Transruptor (Fig. 1) is referred to as the “**Full Charge**” period.

$$d_c = t_1 - t_0$$

In the **2nd Stage**, the final period of time for the discharge of the magnetic energy stored in the same induction coil (17) is referred to as the “**Discharge**” period.

$$d_d = t_2 - t_1$$

Instant “ t_1 ” that separates these two stages, represent the instant of the mechanical activation by the strong magnetic impulsion over the armature causing the abrupt interruption of the supply of energy from the 1st stage. **This magnetic impulsion uses the bulk of the stored magnetic energy put into the inner atomic space through the Magnetic Super Pulse (MSP). The remainder of this stored magnetic energy is used to continue to pull away the armature until the total discharges are completed in instant “ t_2 ”.**

Thus, we have:

-Curve V(t), part “a” of Fig. 2 (b), was obtained through channel 1 of the oscilloscope, and represents the continuous voltage applied by the external power source to the terminals “2” and “3” of the induction coil (17) of Fig. 1 to turn it OFF from the start of instant “ t_0 ” until the trigger of the MSP at the instant “ t_1 ”. **After the**

instant “ t_1 ” until the end of the instant “ t_2 ”, the curve represents the tension in the coil. Now, it starts to work as an “electric generator” using the remainder of the stored magnetic energy which supply the 2nd stage as described above.

-Curve $I(t)$, part “b” of Fig. 2 (b), was obtained through channel 1 of the oscilloscope, and represents the continuous voltage applied by the external power source. This current circulates through the same coil (17) of Fig. 1, until the instant “ t_1 ”, **when at that instant the current supplying the coil now operates like an “electric generator” until the end of the 2nd stage.**

-Curve $W(t)$, part “c” of Fig. 2 (b), was obtained through the calculator TEKIMATE 2402 (attached to the oscilloscope), and represents the numerical product of the time values of the two previous curves. This curve represents in the 1st stage the electrical power supplied by the external power source, and **in the 2nd stage it represents the electrical power generated by the stored part of that energy as magnetic power, as previously described.**

-The last curve $E(t)$, part “d” of Fig. 2 (b), was obtained through the same calculator TEKIMATE 2402, and represents the values of the defined integer of the tension (voltage) referred above, therefore, corresponding to the electrical energy being transferred into the inner atomic space. In these conditions, in the instant “ t_1 ” the value of “ $E(t)$ ” will correspond to the total energy transferred from the external source into the “induction coil (17)”, or the total value of the IES (Inductive Energy Storage), that is, we have: “ $E_1(t) = \int_{t_0}^{t_1} W(t).dt$ ”.

The value “ $E_2(t)$ ” from the instant “ t_1 ” until the end of instant “ t_2 ”, that is, “ $E_2(t) = \int_{t_1}^{t_2} W(t).dt$ ”, corresponds to the remainder of the magnetic energy stored or MES (Magnetic Energy Storage) in the inductor coil (17).

Then, the difference “ $E_3 = E_1 - E_2$ ” represents the energy of magnetic impulsion that repels the armature of the Transruptor, that is, in this formula,

$$“E_3 = E_1 - E_2”,$$

we have:

1) “ $E_1(t) = \int_{t_0}^{t_1} W(t).dt$ ”: value in “joules” of the IES (Inductive Energy Storage). It is the value corresponding to the total of the outside electrical energy transferred into the inner atomic space, which left in the maximum excitement state all the assembled electrons of the atoms of magnetic core/inductor coil (17);

2) “ $E_2(t) = \int_{t_1}^{t_2} W(t).dt$ ”: residual value in “joules” or MES (Magnetic Energy Storage). It is the remainder of the previous magnetic energy stored in the inductor coil (17). This remainder of this stored magnetic energy is used to continue to pull away the armature until the total discharges are completed in instant “ t_2 ”.

3) “ $E_3 = E_1 - E_2$ ”: value in “joules” of the energy of the MSP (Magnetic Super Pulse). It is the bulk value of energy utilised from that atomic storage energy “ E_1 ”, to produces mechanical labour. Also we can say, it is the mechanical energy of the referred above magnetic impulsion, which uses that bulk part of the stored magnetic energy put into the inner atomic space through the described Magnetic Super Pulse (MSP).

4. PHYSICAL EXPERIMENTS WITH TRANSRUPTOR.

Five physical experiments (tests) were prepared **to operate the same device, TRANSRUPTOR type AB-5 / TR-64 to switch OFF position**. These tests were realized, at Instituto de Eletrotécnica e Energia of the Universidade de São Paulo (IEEUSP) and at Instituto de Pesquisas Tecnológicas S.A. (IPTSA).

In the first three experiments the device were connected as "4th Technique", that is, the reversible switch in the left position (d) - Fig. 1 and in the other two experiments, as "3rd Technique", that is, connected as "polarized relay" or the reversible switch in the right position (c) - Fig. 1.

In all these five experiments, the same source of energy was used (110V.D.C.), to permit the confrontation of the results obtained in relation to time and energy values.

The findings showed that the mechanical labor to put this special device in OFF position was the same in both situations (4th Technique and 3rd Technique). These tests were the following:

FIRST TEST: "IEE-01TR/64-CC".

Oscilloscope used: TK 2440, coupled with TECMATE-2402 and COLOR PLOTTER HC 100. Numerical values obtained in relation to the performance in TIME and in ENERGY (see TABLE. 2). Graphical results (Fig. 2 (a)).

These graphical results justify the graphical presentation of Fig. 2 (b), where it is shown in detail that the 1st STAGE refers to the loading of electrical inductive energy in the respective coil, and the 2nd STAGE refers to the complementary discharge of the remaining electrical energy, left in that coil. Without any additional logic circuits in the process of the normal operation, these two stages are operated automatically.

It is important to observe the following in Fig. 2 (b):

1. CHANNEL 1 of the oscilloscope was used as the electric tension variable, " $V(t)$ " (first curve);
2. CHANNEL 2 of the oscilloscope was used as the electric current variable, " $I(t)$ " (second curve);
3. The third curve, " $W(t)$ ", was obtained through the firmware about numerical product installed in the TECMATE-2040;
4. The fourth curve, " $E(t)$ ", was obtained through the firmware about numerical integration installed in the TECMATE-2040;
5. **The difference in energy, " $E_3 = E_1 - E_2$ ", corresponds to 64,28% of the total inductive energy ($E_1 = 2,15$ joules) that was employed in the mechanical repulse of the mobile set of the contacts of the TRANSRUPTOR used (see Fig. 2 (a) and the first line of TABLE 2)**
6. **To prove this fact in laboratory, it is necessary to use one oscilloscope with four independent channels, where CHANNEL 3 could represent the applied force, " $f_0(t)$ ", in the instant of the repulsive impact, and the value of the initial speed in the same instant, " $v_0(t)$ ", should be represented by CHANNEL 4.**

Therefore, the pure magnetic energy, " $E_3(t)$ ", would be calculated through to the following expression,

$$E_3(t) = \int_{t_1}^{t_2} f_o(t) \cdot v_o(t) \cdot dt,$$

where we have the function " $F(t)=f_o(t)$ " in the CHANNEL 3 (from " t_1 " to " t_2 ") and " $V(t)=v_o(t)$ " in the CHANNEL 4 relative to the same period of time (from " t_1 " to " t_2 "). The product function, " $V(t).F(t)$ ", will be obtained through a firmware about numerical product installed in the oscilloscope, as well as, its numerical integration function, " $E_3(t)$ ", given in the above formula.

The other four tests were carried out with the same device. The next two experiments were connected as TRANSDUPTOR (4th Technique of Control) and the other two as POLARIZED RELAY (3rd Technique of Control), using the same oscilloscope (TEKTRONIX 2500 -- TEST LAB SCREEN) with the purpose of establishing a confront of the results. The parameters adopted are given in TABLES 3, 4 and 5, which can be seen in the Brazilian Patent Deposit, 05.22.1995, about PECEM (Gadi - USP) [10].

SECOND TEST: IPT - Nr. 29 TR - DEVICE CONNECTED AS TRANSDUPTOR (4th. TECHNIQUE OF CONTROL) - The results are in the second line of TABLE 2 and was determined in Figs. 20 and 21 of the Brazilian patent deposit, 05.22.1995, about PECEM (Gadi - USP). In Fig. 3 we have their graphical representation [10].

THIRD TEST: IPT - Nr. 30 TR - DEVICE CONNECTED AS TRANSDUPTOR (4th. TECHNIQUE OF CONTROL) - The results are in the third line of TABLE 2 and was determined in Figs. 22 and 23 of the Brazilian patent deposit, 05.22.1995, about PECEM (Gadi - USP). In Fig. 4, we have their graphical representation [10].

FOURTH TEST: IPT.-Nr. 31 TR - DEVICE CONNECTED AS POLARIZED RELAY (3rd TECHNIQUE OF CONTROL) - The results are in the fourth line of TABLE 2 and was determined in Figs. 24 and 25 of the Brazilian patent deposit, 05.22.1995, about PECEM (Gadi - USP). In Fig. 5, we have their graphical representation [10].

FIFTH TEST: IPT - Nr. 32 TR - DEVICE CONNECTED AS POLARIZED RELAY (3rd TECHNIQUE OF CONTROL) - The results are in the fifth line of TABLE 2 and was determined in Figs. 26 and 27 of the Brazilian patent deposit, 05.22.1995, about PECEM (Gadi - USP). In Fig. 3, we have their graphical representation [10].

The numerical values obtained in these tests and the final confrontation of these values in relation to time and energy are given in TABLE 2:

TESTS	TIME (ms)			ENERGY (J)			FIGURES	DEVICE CON- NECTED AS
	CHAR-GE δc	DIS- CHAR-GE δd	TOTAL δt	E1 (CHARG E)	E2 (REMNA NTS)	E3 (DIS- CHAR- GE)		
1st.) IEE 01TR/ 64TCC	11,550 56,48%	8,900 43,52%	20,45 100,0%	2,150 100,00%	0,768 35,72%	1,382 64,28%	Fig. 2	TRANSRUPTOR (4th.Tech)
2nd.) IPT Nr.29.TR	13,050 64,76%	7,100 35,24%	20,150 100,0%	2,508 100,0%	0,576 22,97%	1,932 77,03%	Fig. 20 Fig. 21 (**)	TRANSRUPTOR (4th.Tech)
3rd.) IPT Nr.30.TR	12,344 61,13%	7,850 38,87%	20,194 100,0%	2,949 100,0%	0,6941 23,54%	2,2549 76,46%	Fig.. 22 Fig.. 23 (**)	TRANSRUPTOR (4th.Tech)
4th.) IPT Nr.31.TR	85,200 57,34%	63,400 42,66%	148,600 100,0% (*)	9,530 100,0%	7,249 37,12%	12,281 62,88%	Fig. 24 Fig. 25 (**)	POLARIZED RELAY (3 rd Tec.)
5th.) IPT Nr.32.TR	40,450 74,02%	14,200 29,98%	54,650 100,0% (*)	9,209 100,0%	1,321 14,35%	7,888 85,65%	Fig. 26 Fig. 27 (**)	POLARIZED RELAY (3 rd Tec.)

(*) THESE TIMES WERE OBTAINED THROUGH MANUAL SWITCHING OPERATIONS 3rd Technique)

(**) THESE FIGURES ARE FOUND IN THE BRAZILIAN PATENT DEPOSIT Nr. PI 9 502 122-1 of 05.22.95

TABLE 2 - Results of the experiments

The resulting numerical values obtained in the confrontation of two of these tests, in percentile numbers are in following TABLE:

TESTS	TIME (ms)			ENERGY (J)			FIGURES	DEVICE -CON- NECTED AS
	CHAR- GE δc	DIS- CHARGE δd	TOTAL δt	E1 (CHARGE)	E2 (REM- NANTS)	E3 (DIS- CHAR- GE)		
1st. CONFRONTATION: TEST IPT Nr. 29.TR x TEST IPT Nr. 32.TR (SEE FIG. 3 OF THIS PROJECT)								
2°) IPT Nr.29.TR	13,050 100,0%	7,100 100,0%	20,150 100,0%	2,508 100,0%	0,576 100,0%	1,932 100,0%	Fig. 20 Fig. 21 (**)	TRANSRUPTOR (4th Tech.)
5°) IPT Nr.32.TR	40,450 310,0%	14,200 200,0%	54,650 271,2% (*)	9,209 367,19%	1,321 229,34%	7,888 408,28	Fig. 26 Fig. 27 (**)	POLARIZED RELAY (3 rd Tech.)
2nd CONFRONTATION: TEST IPT Nr. 30.TR x TEST IPT Nr. 31.TR (SEE FIG. 4 OF THIS PROJECT)								
3°) IPT Nr.30.TR	12,344 100,0%	7,850 100,0%	20,194 100,0%	2,949 100,0%	0,6941 100,0%	2,2549 100,0%	Fig.22 Fig. 23 (**)	TRANSRUPTOR (4th Tech.)
4°) IPT Nr.31.TR	85,200 690,2%	63,400 807,6%	148,600 735,9 (*)	19,530 662,26%	7,249 1044,37%	12,281 544,64%	Fig. 24 Fig. 25 (**)	POLARIZED RELAY (3 rd Tech.)
3rd CONFRONTATION (mean values):TESTS IPT Nr. 29/30.TR x TESTS IPT Nr. 31/32.TR								
2° e 3° IPT Nr 29/30 TR (mean)	12,697 100,0%	7,475 100,0%	20,167 100,0%	2,729 100,0%	0,6351 100,0%	2,00935 100,0%	Fig. 22 Fig.23 (**)	TRANSRUPTOR (4th Tech.)
4°e5°IPT Nr 31/32 TR (mean)	62,825 494,8%	38,800 519,1%	101,625 503,9% (*)	14,3695 526,55%	4,2845 674,62%	10,08452, 501,88%	Fig. 24 Fig. 25 (**)	POLARIZED RELAY (3 rd Tech.)

(*) THESE TIMES WERE OBTAINED THROUGH MANUAL SWITCHING OPERATIONS (3rd Technique)

(**) THESE FIGURES ARE FOUND IN THE BRAZILIAN PATENT DEPOSIT Nr.PI 9 502 122-1 of 05.22.95

TABLE. 3 -Numerical percentage results of the test's confrontation.

The numerical values obtained in TABLE 3 show that to realise the same mechanical labour, this PECCEM TRANSFORMATION, in time and energy values, presents a reduction of about 80% of the classical expected values.

Figs. 28 to 35 (these figures are found in the Brazilian patent deposit number: PI 9 502 122-1 of 05.22.95, [10]) present graphically the respective confrontation between these experiments. In this project, some of the graphical confrontations of these results of electric power and energy values are confronted in relation to their periods of time, as we can see in Fig. 3 (confrontation between 2nd and 5th tests) and in Fig. 4 (confrontation between 3rd and 4th tests). It is worth remembering that in all of these five tests, the mechanical labour to switch OFF this special device was the same.

In these figures it is possible to see in the same scale of time and energy, the visible contrast of the values of performance of energy consumption in relation to their periods of time, when the **same device** is used as **TRANSRUPTORS (4th Technique)** or as **POLARIZED RELAY (3rd Technique)**.

5. SUPERJUNCTOR

As we have seen in the beginning of this description, it was observed that certain devices depend on the high frequency rate of MSP, such as the case of the **3rd Application** for their operation.

The typical circuit of the Superjunctor is shown in Fig 5. Between the terminals “1” and “2” of their unique inductive coil (17), an inductive and temporary load are connected in parallel. The purpose of its temporary connection is to store, the repetitive pulsating super discharges of magnetic energy that is generated by the Superjunctor, since the metallic contact of the Transruptor has to be eliminated.

The repetition of these magnetic super discharges can be verified if one follows the circuit shown in this Fig. 5. So, a quantity of electrical energy is supplied to the Superjunctor when switch “S” is closed and at the same time (practically, with little loss of energy), this quantity of electrical energy is stored in their induction coil as magnetic energy. This energy supplies the magnetic flux, “ Φ ”, in the high-temperature superconductive ceramic “air-gap” (immersed in cryogenics temperature given by liquid nitrogen), which crosses in a perpendicular way the superconductive current, that flows through this superconductive ceramic. The intensity of this magnetic flux increases and it will become strong enough to interrupt that electrical superconductive current. In fact, this electric superconductive current will be interrupted by that magnetic flux because of the absence of the “Skin Effect”.

6. LINEAR MAGNETIC MOTORS - (LMM)

In the Linear Magnetic Motors (LMM), PECCEM Transformation could be used as engine in the Unity Trains for passenger suburban railway traffic. The rotor of the motor is placed linearly along the tracks of a railway as a “magnetic sleeper layout”. These sleepers are made in concrete and coated on the top surface with a layer of magnetic material adequately POLARIZED in its magnetization. The vehicles or Wagons will have in their underside (the stator part of the motor), the induction coils with soft iron connected in parallel with the output of the Superjunctor. It is to be adequately designed and dimensioned to generate the MSP, and to be coupled to its frequency time controller. The vehicles or Wagon can travel the tracks in the conventional manner, that is, upon iron wheels and a pair of rails, that is, using the Linear Magnetic Motor for propulsion only. Or using a permanent magnetic levitation,

through superconductive materials such as the “niobium wire” and helium as cryogenic medium.

In other words, new types of magnetic linear traction motors are possible based on PECM Transformation and MST Technology described above, operating in adequate low frequency's rates of MSP.

7. ROTATE MAGNETIC MOTORS - (RMM)

In the Rotate Magnetic Motors (RMM), the main application is the replacement of the combustion fuel energy with the pulsating electrical energy called PECM, for the propulsion of jet turbines nowadays in use in most aircraft. In this case, in the space utilized by the combustion chamber, we can attach to the “rotor” part of the turbine magnets with pre-determined magnetic polarity, and adequately installed around the “rotor”. The induction coils that discharge the MSP's are installed (facing the rotor) to form a “stator”, the coils are positioned in a tangent plane over the magnets that are attached to the “rotor”. These induction coils are all connected in parallel and form a set that discharges the Magnetic Super Pulse that act upon the magnets. The coils are connected to the Superjuncor which is the MSP generator, which in turn is coupled to its frequency tracking controller.

This way, by simply replacing the fossil combustion fuel by the pulsating electric energy called PECM, we will save adequately all the existing technology related to the extremely high rotation of these turbines. In Fig. 6, we are clarifying this application. It is shown two sets of magnetic turbines (I and II sets), coupled to the main axle and located in the Magnetic Repulsion Chamber, other sets of magnetic turbines can be added if more power is required. The set of induction coils form a “crown” of coils (for example, around 30 coils) to form a “stator”. These coils are positioned at 45° angle approximately. When the coils discharge, the soft iron core repels the magnets with the same polarity through magnetic energy, which are also positioned at 45° angle approximately around the main axle of the magnetic jet turbine. The axle will receive that way its rotation by magnetic repulsion simultaneously throughout the “toroidal combustion chamber”, now renamed “Magnetic Repulsion Chamber”.

In the same main axle, there is a fan-rotor, through which the suctioned air is moved towards the compressor, where with adequate compression force the air will be forced to exit through the rear exhaust tube. The escape of the jet of air causes a greater pressure in that area, which because of reaction is responsible for the forward thrust of the aircraft. Since the internal pressure of the air is maintained constant by fan-rotor-compressor combination, which are attached to the main-axle of the magnetic turbines, this turbine magnetic propulsion system will maintain the forward thrust of the aircraft.

8. THE AUTOMOBILE MAGNETIC MOTORS (AMM)

In the Automobile Magnetic Motors (AMM), the main application is the replacement of the combustion fuel energy such as, diesel oil, combustion oil, gasoline, propane gas, alcohol, etc. by the pulsating electrical energy (PECEM) for the propulsion of vehicles that use the “piston and crankshaft” technology.

In this case, the existing “cylinder head” is replaced with another cylinder head that adequately houses the induction coils with wrought iron core/ferrite that discharges the Magnetic Super Pulse (MSP).

These coils, when de-energized, act by magnetic repulsion upon ferrite/magnetic discs that contain a high concentration of magnetic energy (such as Samarium Cobalt or Neodymium). These magnets should be adequately epoxies or glued on top of the head of the pistons, which, as in the conventional way, through the connecting rods, will activate the crankshaft system (see Figs. 7 and 8). The electrical connections of these new induction coils will allow for similar “firing order” of the cylinder as used by the conventional distributors systems presently in use.

However, in case of the Automobile Magnetic Motors application, the frequency is not so high but the remaining energy, “ E_2 ” (see TABLE 2) can become greater. Then, the elimination of the unique metal contact found in the TRANSRUPTOR can also be necessary. For this reason, we need the coupling with another device called SUPERJUNCTOR, which allows that elimination. In fact, in applications where the use of metallic contacts, such as that existent on the “Transruptor” is not feasible, the use of the Superjuncutor, which has no contacts, is highly recommended.

In the same way, as previously mentioned, in case of Fig. 8, these induction coils are connected to the output of a Superjuncutor, which is the MSP generator for these induction coils, which in turn is coupled to a frequency tracking controller. As in the previous case, by replacing the combustion system with the electrical system PECEM, most of the remaining vehicle’s technology will be maintained.

Figs. 7 and 8, show the application of the PECEM to the Automobile Magnetic Motors (AMM). Fig. 7 shows the application of four Transruptors to four-piston engine system and Fig. 8 shows the application of a unique Superjuncutor, instead of these four Transruptors.

In relation to this figure, we can follow the sequence of events: The magnetic repulsion is applied by the soft-iron core of the induction coil over the ferrite/magnet discs which has a high concentration of magnetic energy (such as, Samarium Cobalt), which is fixed on top of the piston head, after the piston head passes by at least one degree the “top dead center” (TDK) of the movement of the piston inside the cylinder section of the cylinder block, and, with the cylinder chamber at atmospheric pressure, the crankshaft will receive adequately the mechanical impulses as a consequence of the MSP’s discharged by the induction coils installed in the modified “cylinder head”; the crankshaft, then transmit the respective traction force to the vehicle in the same way as it functions today. These AMM - Automobile Magnetic Motors can be called “single stroke” engine, because the classical four stroke internal combustion (intake, combustion power and exhaust) does not exist.

In Fig. 8, we present a draft with the application of the SUPERJUNCTOR to the AUTOMOBILE MAGNETIC MOTOR. This figure shows that a plate replaces the cylinder head of a classical automotive motor where the inductive coils are installed (one coil to each cylinder) coupled electrically in parallel two by two (the NR. 1 with NR. 4 and the NR. 2 with NR. 3). with the unique inductive coil of SUPERJUNCTOR. The operation in the suitable moment is given, for example, through the synchronisation with the axle-shaft.

9. MAGNETOSTRICTION OF THE PLASMA

The concept of MAGNETOSTRICTION is normally applied during the fabrication of magnetic materials (Fe-Ni alloys, metallic glass with Co, etc), where the percentile variation of their dimensions occurs during the magnetization process.

In this present case, we are using the MAGNETOSTRICTION concept to signify the heating up of the plasma by axial magnetic compression, through the induction coil surrounding the containment unit.

This magnetic constriction that produces the magnetostriction of the plasma is produced at an extremely high temperature intensity, which causes the plasma to behave like an “ionized gas” adiabatically super heated. This concentrated heat being axially accumulated by the extremely high frequency of repetition of MSP, causes growth temperature to reach at critical values of the thermonuclear fusion and as a consequence, its full control.

Fig. 9 shows in detail this aspect of switching without metallic contacts, through the use of high-temperature superconductive ceramic of the Superjunctor. The induction coil of the Superjunctor is connected in parallel with a second coil, which wraps around the container unit or chamber where hydrogen isotope plasma, for example deuterium, is formed. Since this proposed container unit have a cylindrical form and not the conventional toroidal form, it is possible to call it “TSIKAMAK”. However, this same MSP technology can be utilized in the existing “TOKAMAK” projects.

If we compare the test performed with the Transruptor, we have in the 1st stage of the charging time of the Superjunctor, a simultaneity of operations of those three fields (the electric, the electromagnetic coupling and the mechanical). In the instant “ t_1 ”, the discharge of the MSP takes place, provoking the start of the 2nd stage, which refers to the discharge of pure magnetic energy that induces the magnetostriction of the plasma.

It is important to observe that, in the instant “ t_1 ” with the “interruption” of the superconductive current, the supply of outside electrical energy (“ E_1 ”) into the inner atomic space is cut-off. This energy is “storage” into the inner atomic space as magnetic energy of the induction coils and all other that could be connected in parallel.

This “storage” energy will transform the induction coil and the inductive load shortly into “electrical generators”, that will produce the magnetic discharge (as mentioned previously) until its complete discharge at the end of instant “ t_2 ” of the 2nd stage, as we can see in Fig. 2 (b).

As long as button “D” (Fig. 9) is making contact, the “energy charging” cycle will continue to repeat itself sequentially, as described above as 1st and 2nd stages. The frequency of this “Superpulsation of Pure Magnetic Energy” will depend on the total charging time of the 1st stage “ d_c ” and the discharging time of the 2nd stage “ d_d ” of the MSP. The period of the frequency will be given by the time that takes for the atomic structure of the material to become superconductive, or to return to its “normal state”, which takes approximately “1 ps or 10^{-12} s”.

However, as the Ionic mechanical mass of the “strictioned” plasma is practically null, as we have seen during the tests performed with Transruptors, that total period, corresponds to the load time “ d_c ” of the Superjunctor.

This means, that, the “energetic discharge” that characterise the 3rd case of energetic transformation, will take place in an instant extremely short, with the probability of producing extremely high pure magnetic energy for that magnetostriction compression of the plasma. This strong magnetostriction of the plasma causes at the same time:

- a) the reduction in its section;
- b) adiabatically concentrates the resultant heat caused by this magnetostriction along its axis.

As a result, this thermal effect presents an accumulative and crescent temperature due to the high frequency of its repetition. Therefore, the discovery of this new MSP technology, it is highly recommended that the data collected for high temperature values of the plasma might be reviewed and compared with the current conventional methods in use.

10. NUCLEAR MAGNETIC RESONANCE - (NMR).

The application of this new transformation of energy PECCEM extends to Nuclear Magnetic Resonance (NMR), whose principles are known. The objective in such systems is to replace the magnetic pulses supplied by the radio frequency generator, which provides an oscillation highly stable, by the MSP created by the PECCEM, developed for the same rate of high frequency rates requirements, and as highly stable as the classic radio frequency utilized to generate the NMR signal.

In these conditions, when the MSP generator is installed as a replacement for existing pulse generator in NMR systems, the remaining components of the NMR system remain practically unchanged. It will have the same components that represent the transmitter where the magnetic pulses are amplified until a certain level of several hundred watts and the receptor unit where these magnetic pulses are adjusted to conform to specific frequencies that might be required according to measurements specified in a computer program (see Fig. 10).

After the amplification (if necessary), such magnetic pulses are then transferred to the three gradient coils (each has an independent magnetic field) situated tri-orthogonally according to the Cartesian orientation (O, X, Y, Z), and operated under computer control. These coils, operating like antennas, excite the protons of the hydrogen nucleus, which in great part are composed of live tissue to be analyzed, and because of the natural properties of these atomic nucleus, would result in a spectroscopy produced by magnetic resonance of these nucleus resulting in the appearance of weak signals. These signals are detected and amplified by a noise detector, that sends the signals to the system of data acquisition, which is capable of digitizing and storing these signals for later processing. All the process of generating and acquiring data is controlled by complex computer system, which after processing these signals, would provide the final image tomographically.

11. MAGNETIC WAVES.

We owe to Maxwell (1831-1879) the epoch-making conclusion that light is an electromagnetic phenomenon. Electromagnetic waves are sent off when an electrically charged body is set into extremely high frequency of vibration. However, an oversimplified characterization of the wave-particle duality is to say that light behaves as a particle when it is emitted or absorbed. Between these two situations, light behaves like a wave. The conception of a single entity with dual characteristics, as particle and wave, is hard to understand.

The typical circuit of the Superjunctor showed in Fig 5, as we have seen, allows an inductive and temporary charge connected in parallel, as repetitive pulsating of magnetic energy. This possible application of the described Macroscopic Quantum Effect to produce Magnetic Waves depends on the realization of physical experiment to be tempted in the future.

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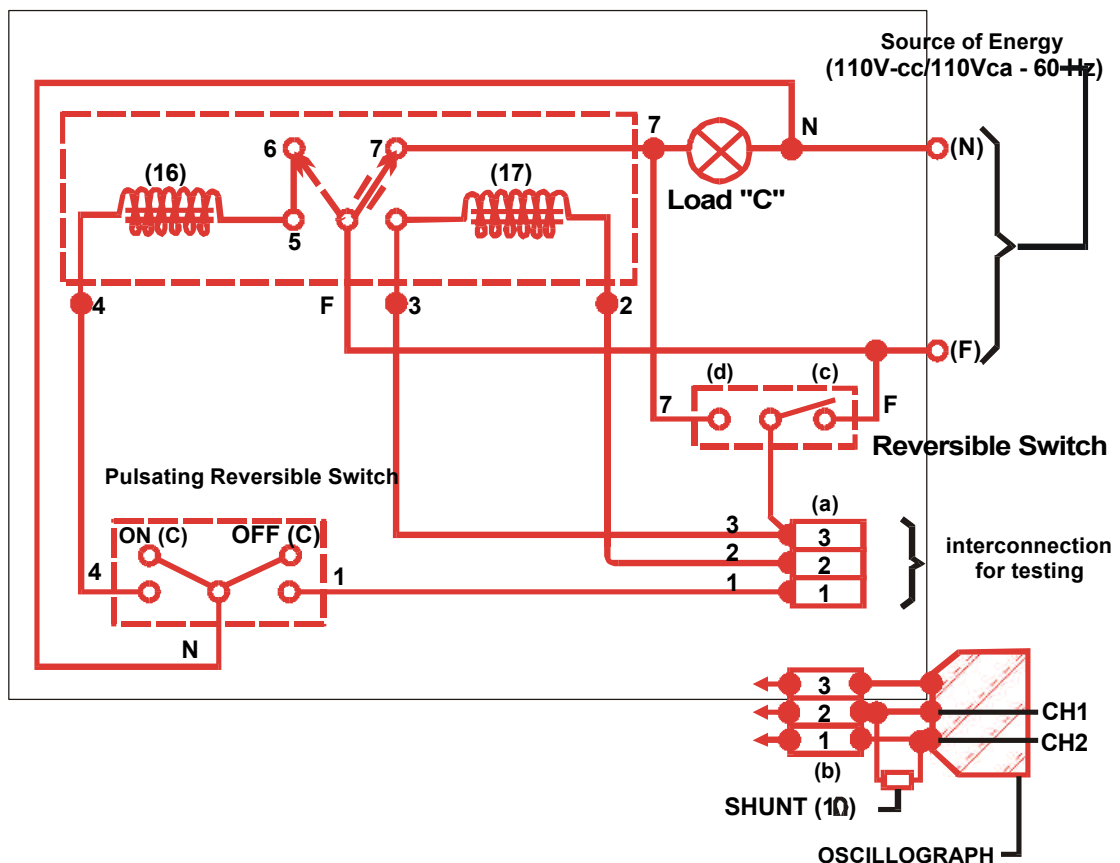


Fig. 1

Magnetic Repulsion

$$E_3 = E_1 - E_2 = \\ = 2,150 - 0,768 = 1,382 \text{ j}$$

$$\left(\frac{E_3}{E_1} \right) \times 100 = 64,28\%$$

$$\left(\frac{d_d}{d_c} \right) \times 100 = \frac{8,9}{11,55} \times 1,0 = \\ = 77,06 (\%)$$

(V) CH1 50 V S a 5 ms 50,0 V VERT

(I) CH2 1V = 1A

(E) RF1 1,28 V² 5 ms 768,0 mV² = 0,768 j

(W) MUL 256 V²

Test Nr.:
IEE - 01TR/64T - CC

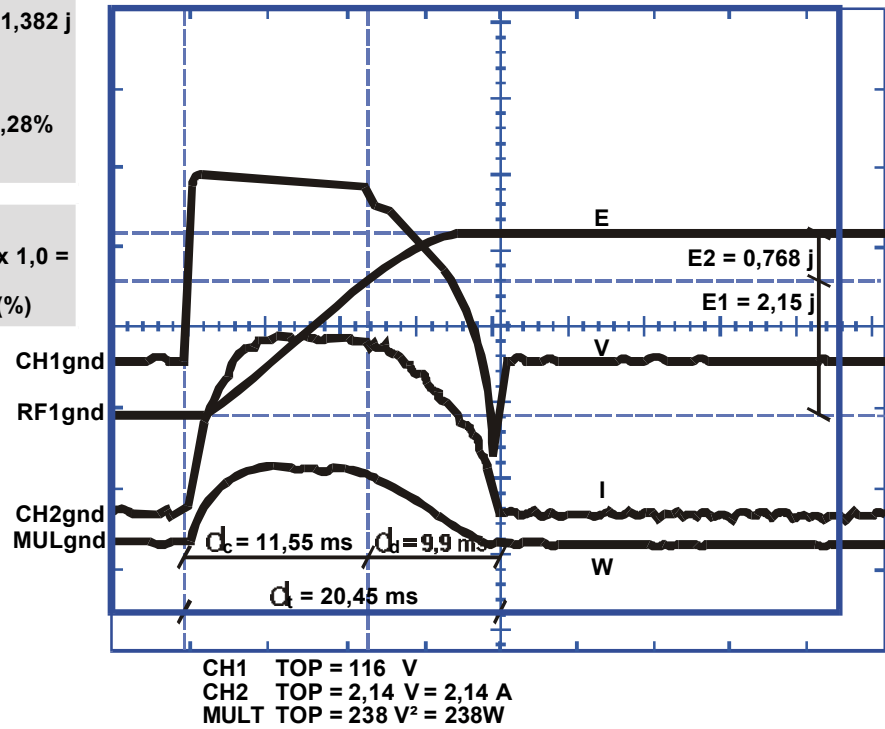


Fig. 2 (a)

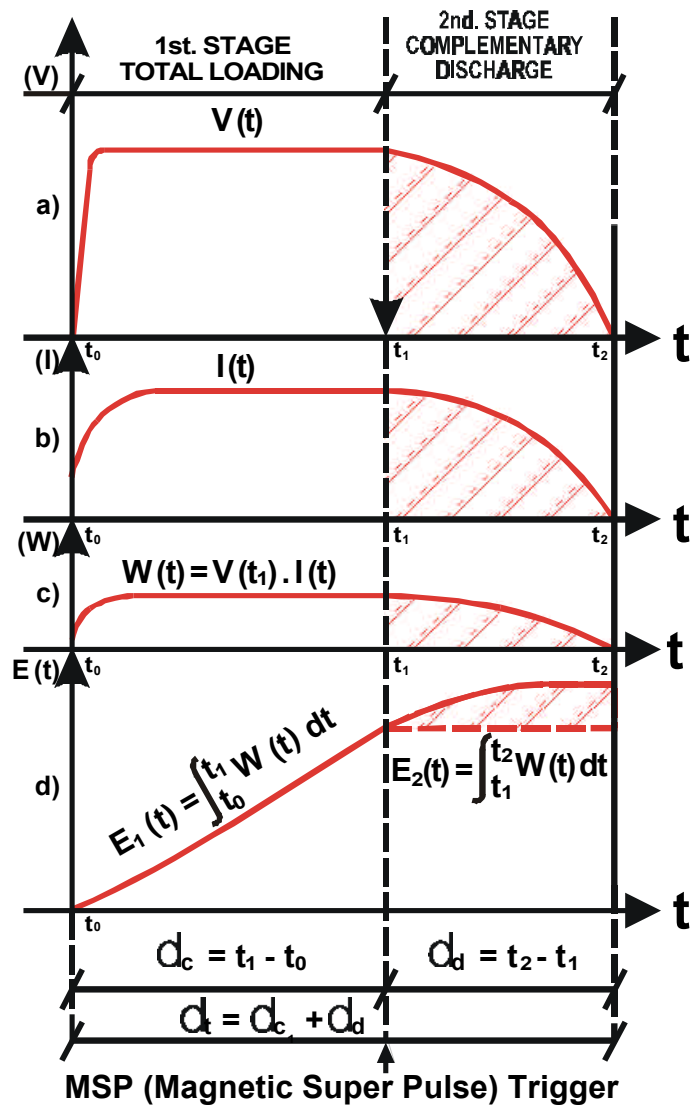


Fig. 2 (b)

TEKTRONICS 2500 TESTLAB PRINT SCREEN

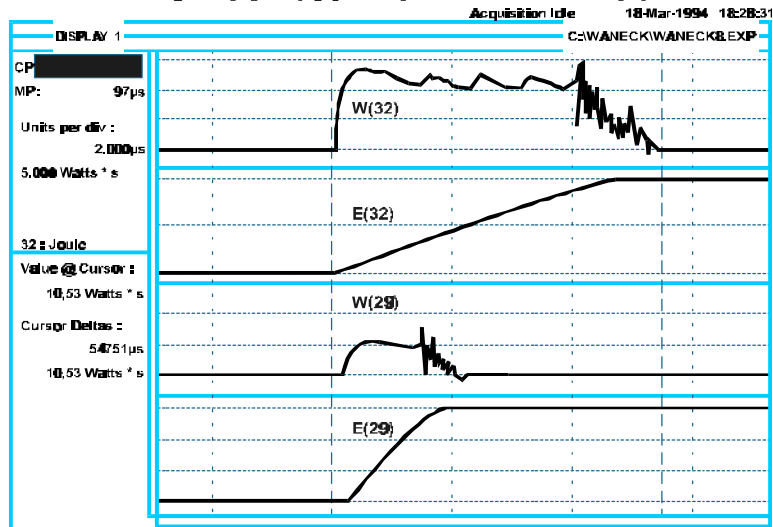


Fig. 3

TEKTRONICS 2500 TESTLAB PRINT SCREEN

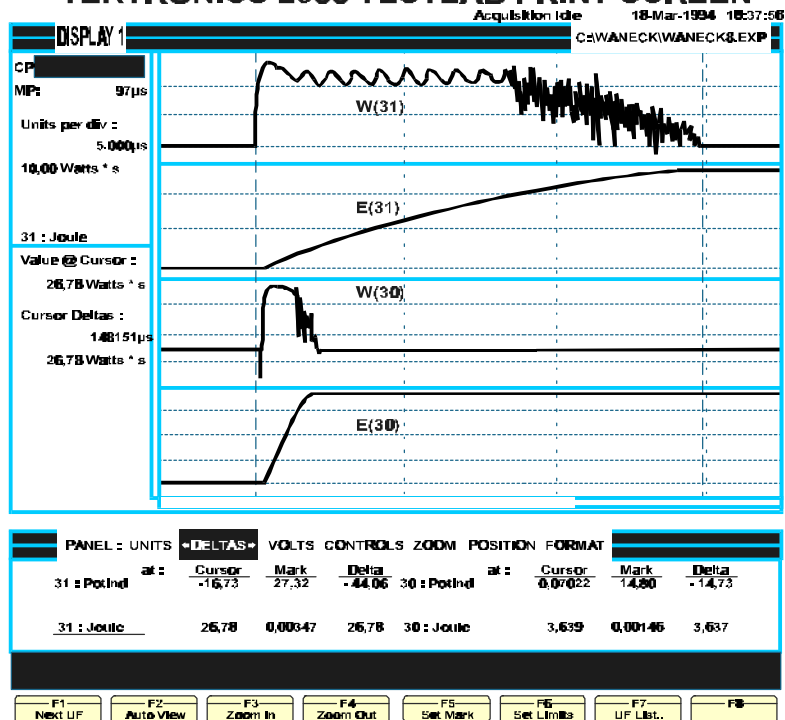


Fig. 4

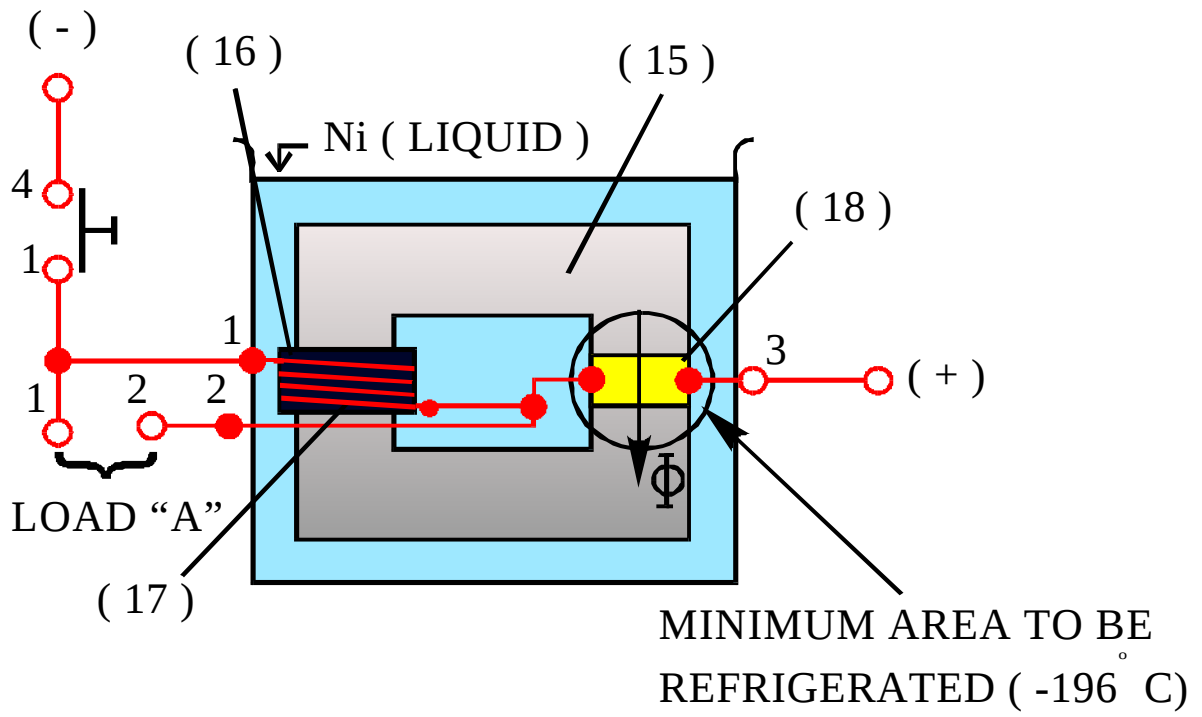


Fig. 5

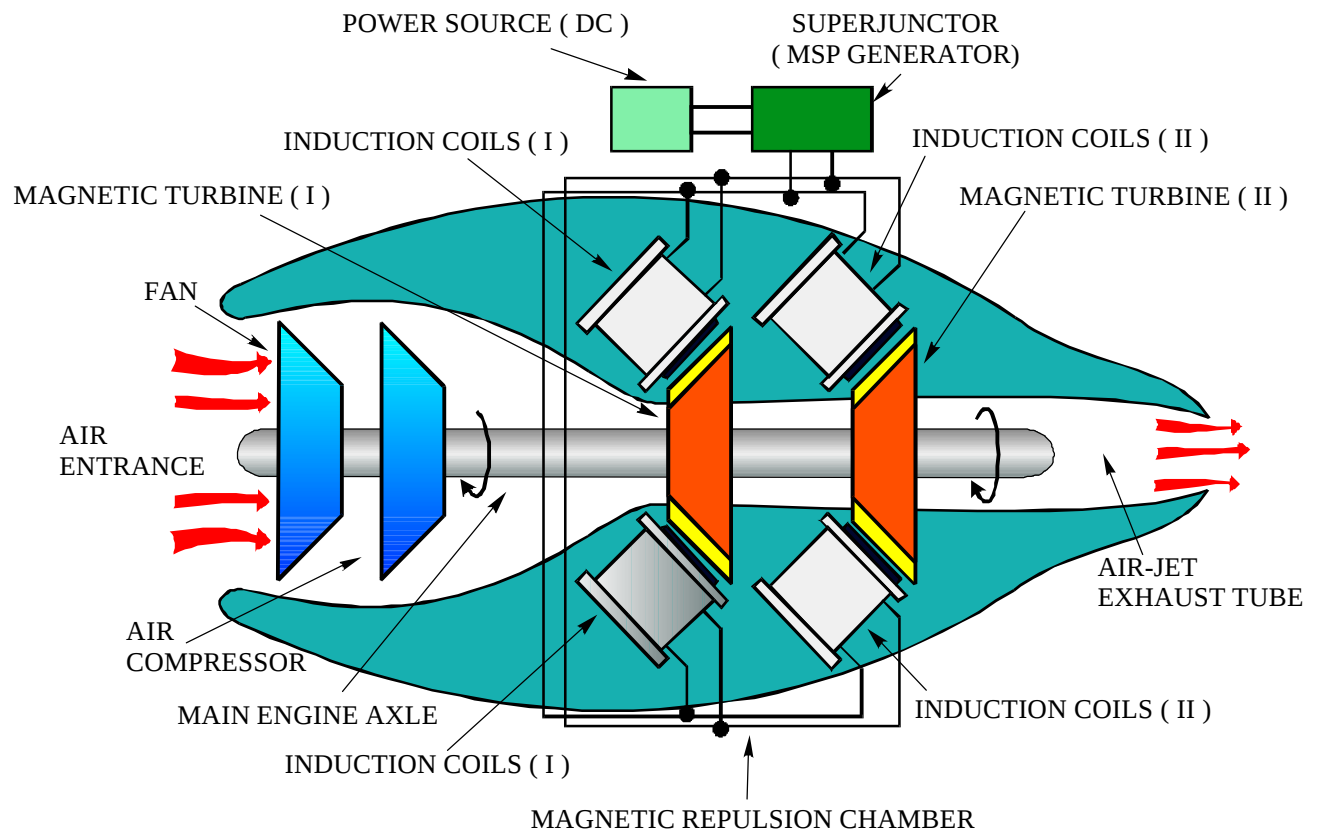


Fig. 6

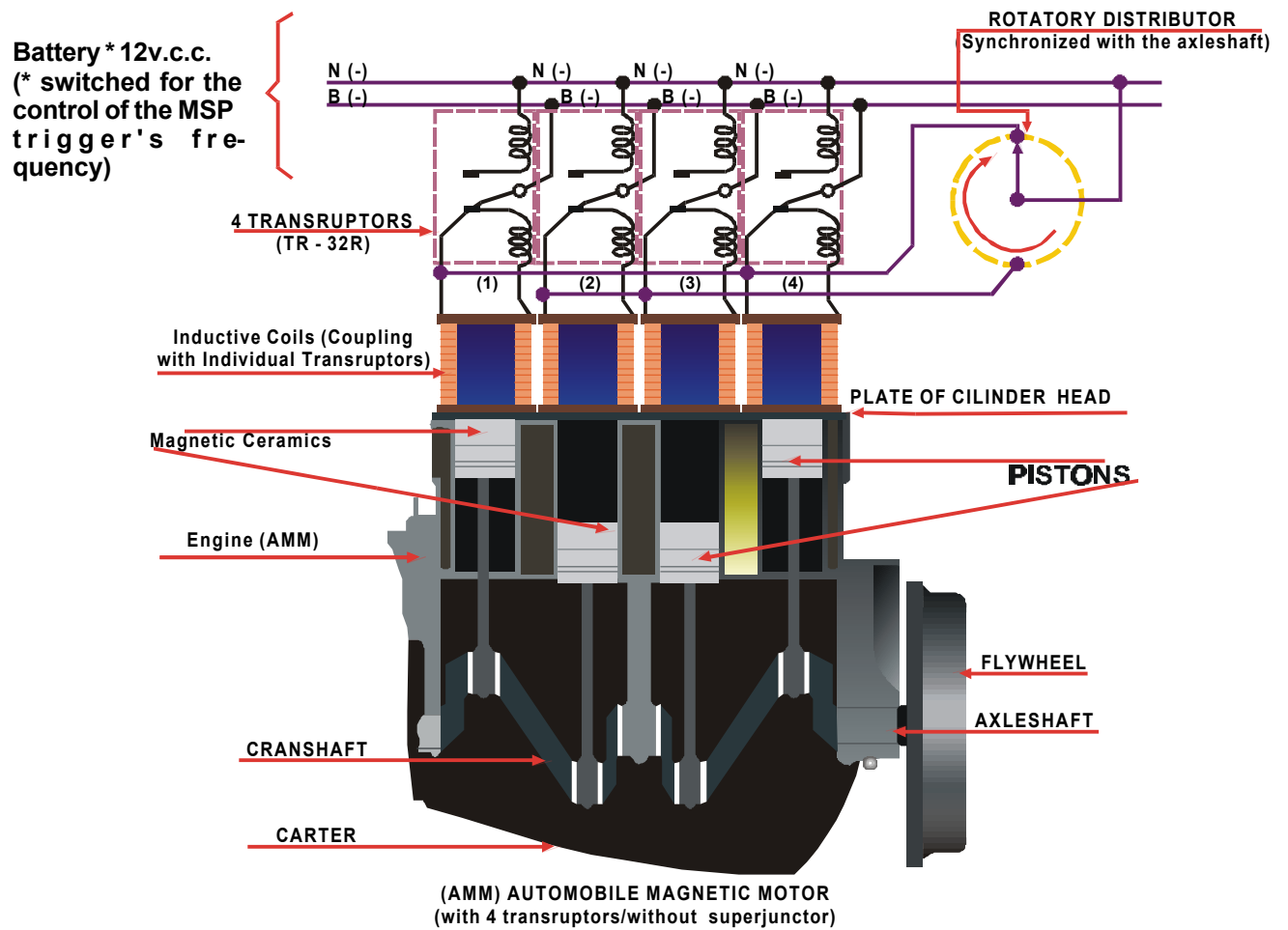


Fig. 7

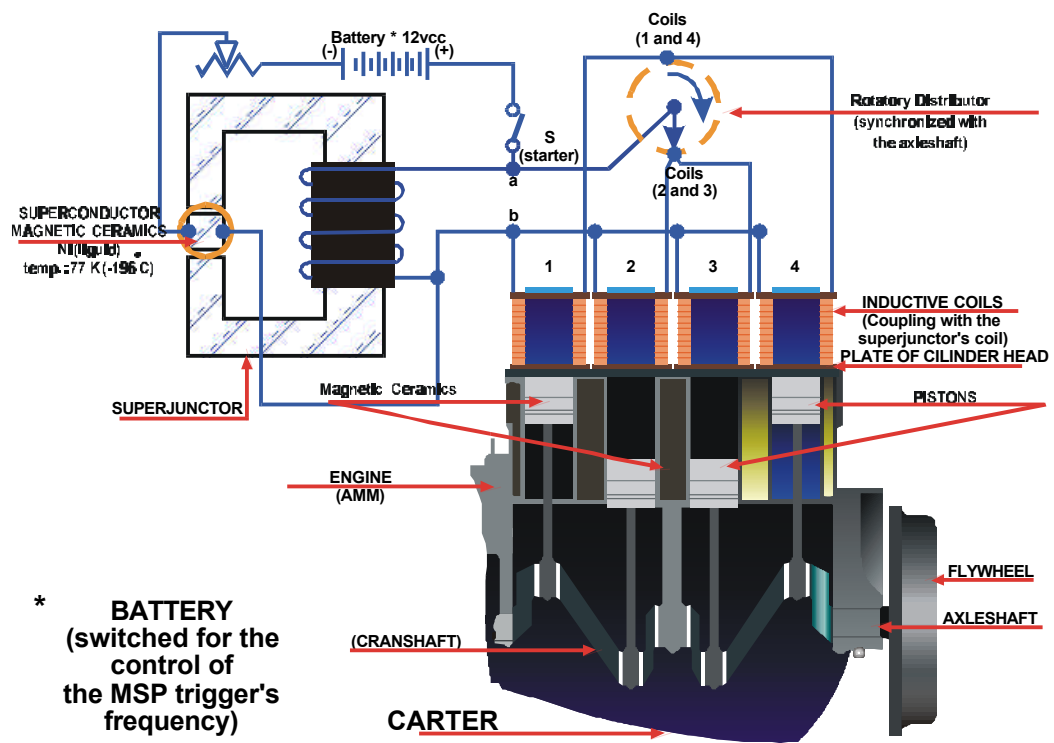


Fig. 8

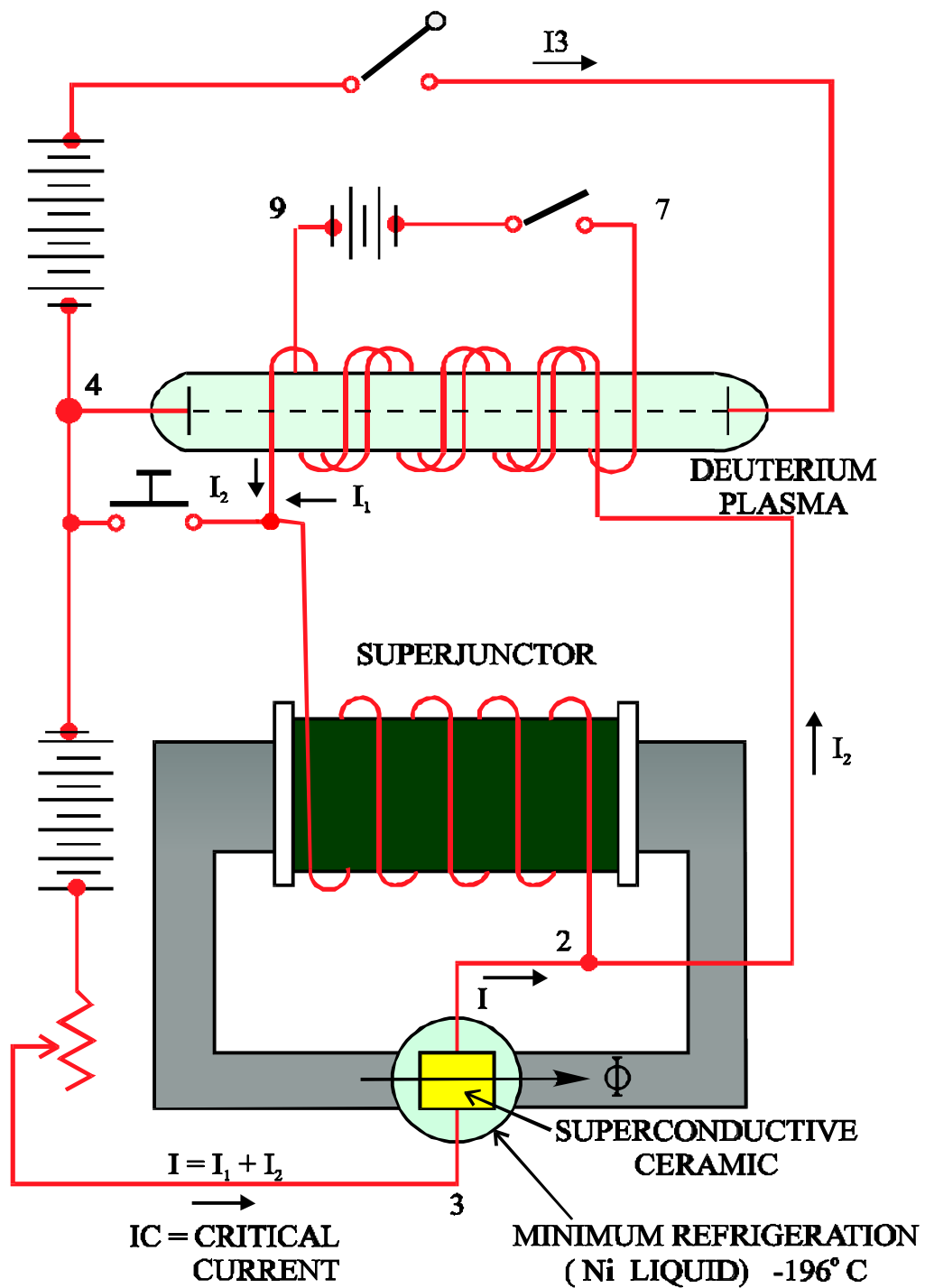


Fig. 9

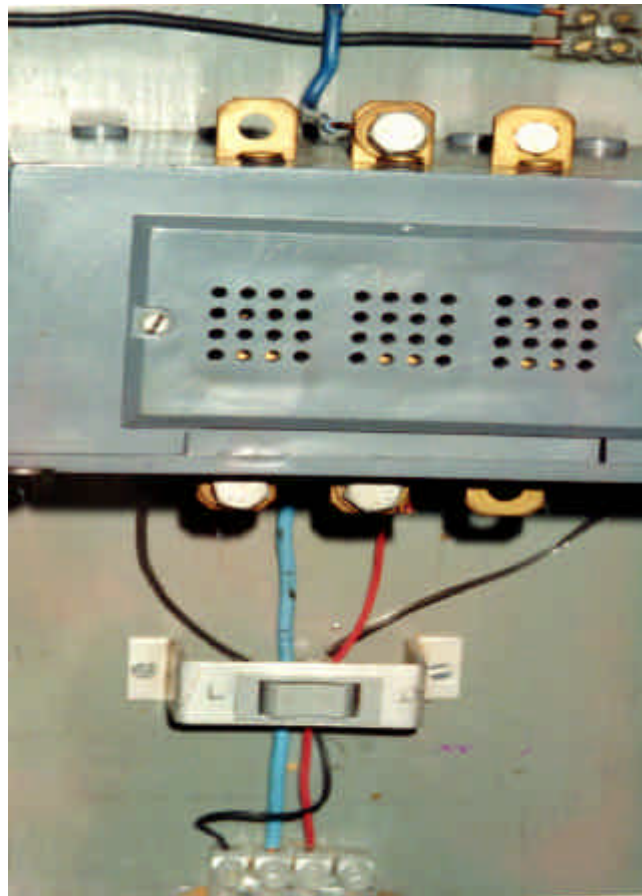


Fig. 11

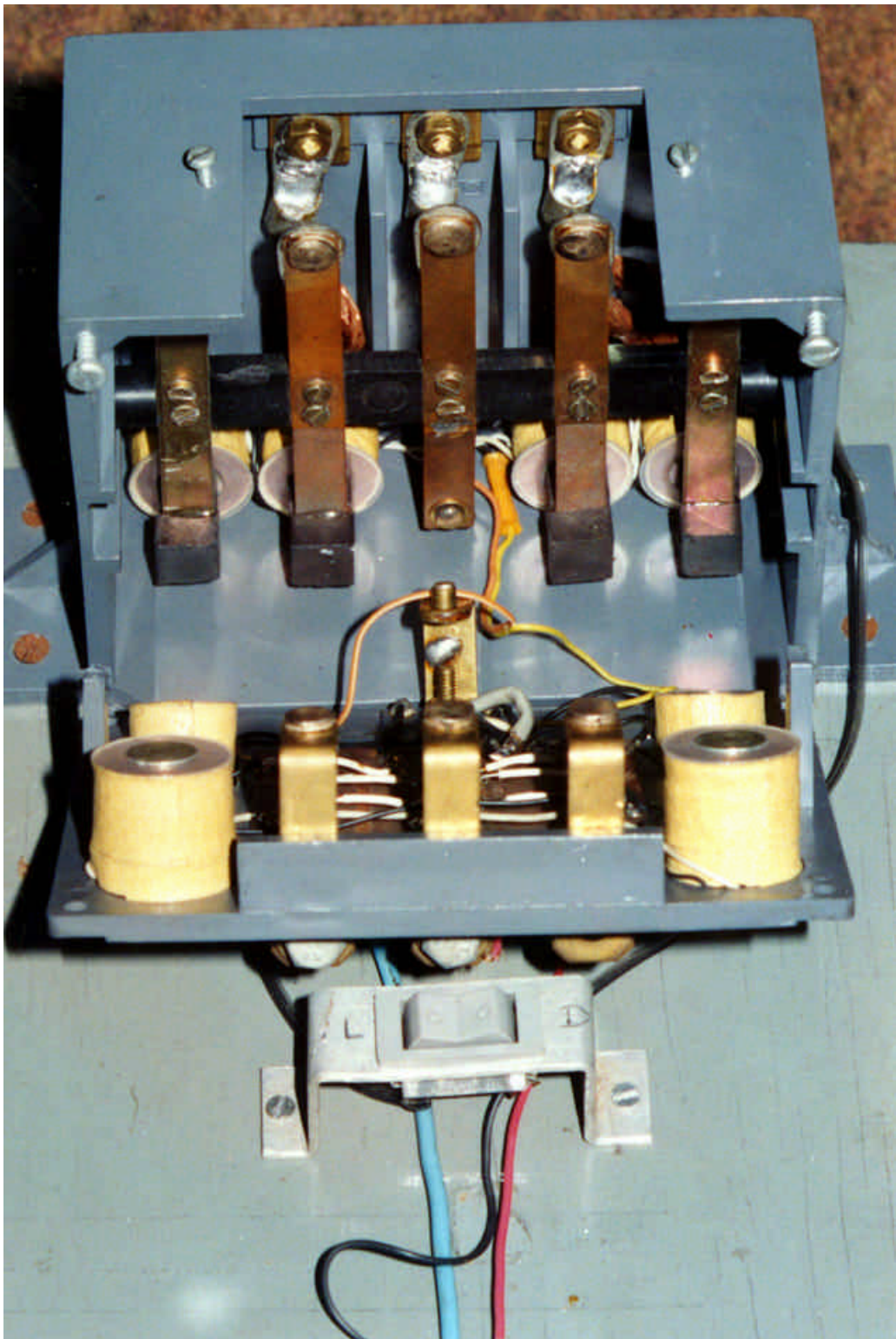


Fig. 12

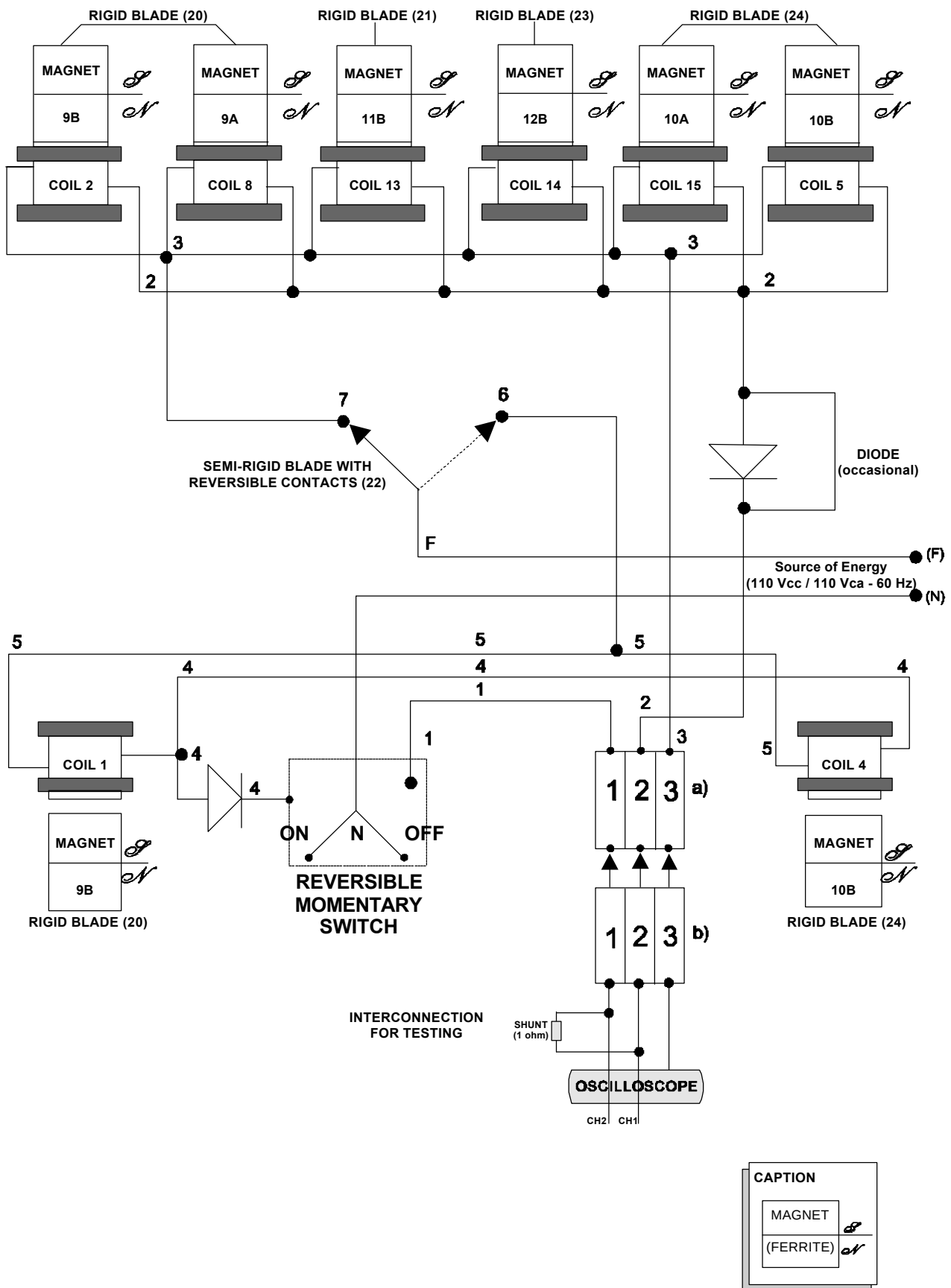


Fig. 13



TRANSRUPTOR (TYPE:AB-5/R-64)

ENSEMBLE OF THE ARMATURE

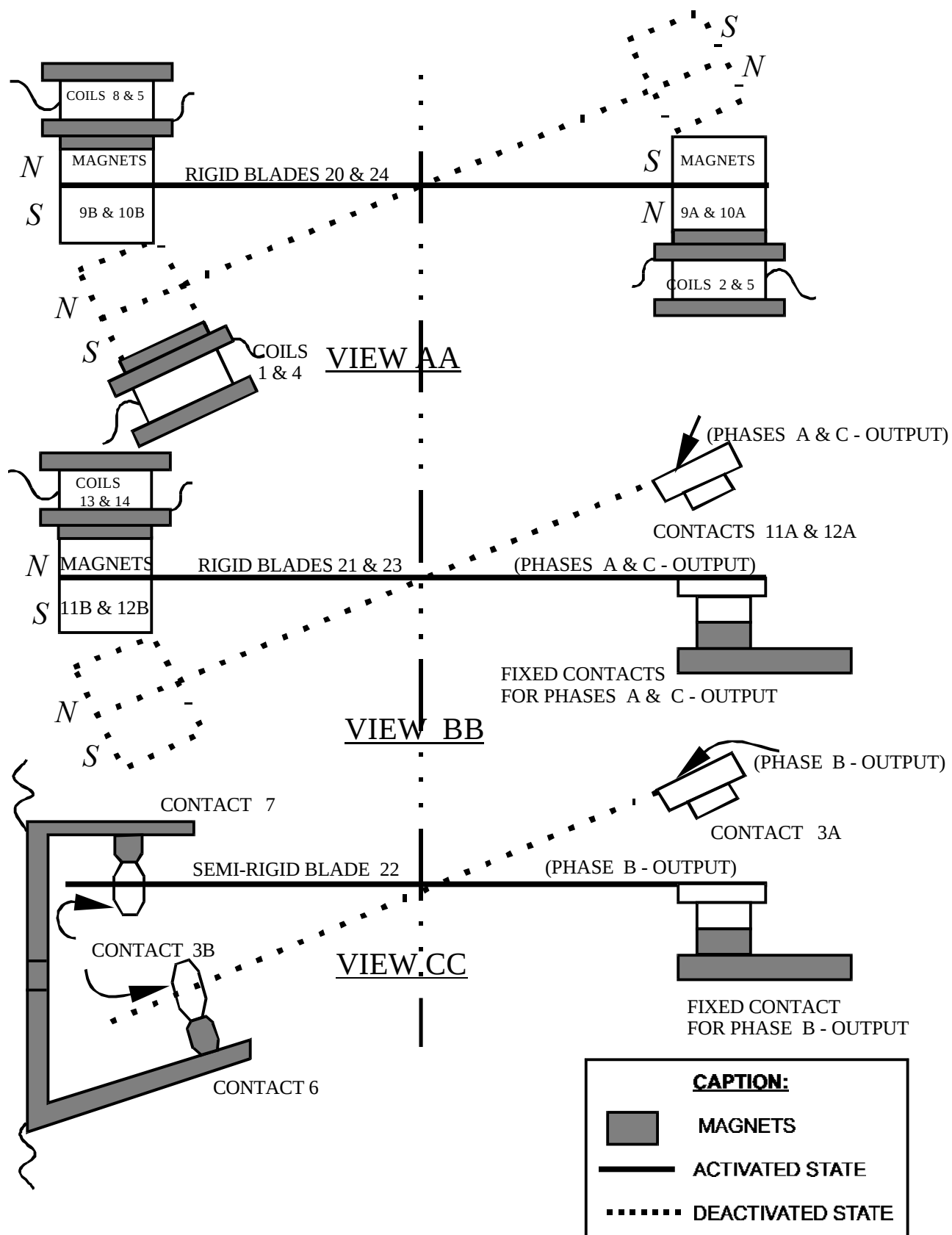


Fig. 15