Deutsche Physik 2(7)

THE SELF-ACCELERATING GENERATOR VENETIN COLIU – VI

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After explaining why the Monstein effect can be considered as the cause for the integral anti-Lenz effect in the generator VENETIN COLIU, I give a report on the measurements done with my last variation of this machine - the generator VENETIN COLIU -VI.

I have to introduce a certain correction into my paper dedicated to the self-accelerating generator VENETIN COLIU -V[1]. I wrote in the third paragraph on p. 9 of Ref. 1 (see fig. 3 in Ref. 1 or fig. 1 in the present paper): "The motion of the magnet during the time t_o-t_2 is a push motion, and during the time t_2-t_4 a pull motion." As a matter of fact, one can produce (in the coil in fig. 1 of Ref. 1) a cosinusoidal magnetic flux

$$\Phi = \Phi_{max}\cos(\omega t), \tag{1}$$

where $\omega = 2\pi/T$ is the angular frequency and T is the period, if the motion of the magnet in fig. 1 of Ref. 1 is as follows:

a) during the time t_1-t_2 a push motion with the north pole pointing to the magnet,
b) during the time t_2-t_3 a pull motion with the north pole pointing to the magnet,
c) during the time t_3-t_4 a push motion with the south pole pointing to the magnet,
d) during the time t_o-t_1 a pull motion with the south pole pointing to the magnet.

Thus at the moments t_1 and t_3, when the magnet is at its farthest position and the magnetic flux generated by it in the coil is zero, we momentary <u>rotate</u> the magnet at 180^o. At the moment $t_o = 0$ the magnet is in the coil with its south pole pointing downwards and the magnetic flux in the coil has its maximum positive (in fig. 1) value Φ_{max}, while at the moment $t_2 = T/2$ the magnet is in the coil with its north pole pointing downwards and the magnetic flux in the coil has its maximum negative value $-\Phi_{max}$. Denoting by U_{gen} the generated tension and by $U_{gen-max}$ its amplitude, we have

$$U_{gen} = - d\Phi/dt, \quad \text{i.e.,} \quad U_{gen} = U_{gen-max}\sin(\omega t) = \omega\Phi_{max}\sin(\omega t). \tag{2}$$

The magnetic flux which crosses a certain closed circuit L is defined by the following formula

$$\Phi = \oint_L \mathbf{A}.d\mathbf{l}, \tag{3}$$

where $\mathbf{A}$ is the magnetic potential along the circuit and $d\mathbf{l}$ is a linear element of the circuit. If the <u>linear</u> integral (3) is positive, the flux goes out from that part of the surface spanned on the circuit L, from which the elements $d\mathbf{l}$ are seen in a counter-clockwise direction. One can thus easily conclude that the magnetic flux goes out from the north pole of a magnet (a coil with current) and enters into its south pole. When the magnet in fig. 1 of Ref. 1 is in the coil with its south pole pointing downwards (i.e., at the moment $t_0 = 0$), the magnetic flux will go out from the upper part of the coil and will enter into its lower part. When moving the magnet upwards, the flux in the coil will begin to decrease and according to formula (2) the tension generated in the coil will have such a polarity that if the coil will be short-circuited, the flowing current will produce a north pole at the upper side of the coil, trying in this way to preserve the initial magnetic flux.

The generators VENETIN COLIU have a self-accelerating effect. The biggest self-accelerating effect showed the machines VENETIN COLIU -V, which are nothing else than the most common stepping motors used as generators. The stepping motor described in Ref. 1 reached a factor $\Delta P/P_m = -52.3\%$, where P_m is the power consumed by the driving d.c. motor at open coils of the generator and ΔP is the decrease of this power when these are short-circuited. The compagny Mörz produced for me a stepping motor with 10 times more copper than the copper in the motors which the compagny produces, but the coils made internal short-circuiting; I returned the motor for removal of the defect, but the repaired motor has not yet arrived. In the mean time my friend Christian Monstein found a stepping motor with a factor $\Delta P/P_m = -76\%$ and sent to me this very effective generator VENETIN COLIU -V.

I explained[2] the self-acceleration of the generators VENETIN COLIU by two factors:

1) Eddy currents effect (§3 in Ref. 2). When the angle of retardation, ϕ, of the generated current with respect to the generated tension approaches 90^0, the magnetic flux produced by this current becomes exactly opposite to the magnetic flux produced by the moving permanent magnets (see fig. 1). As the eddy currents depend on the resultant magnetic flux, they must decrease and consequently decreases their magnetic braking action too.

2) Hysteresis effect (§4 in Ref. 2). I introduced hypothetically this effect for the case of a thick hysteresis loop to be able to explain the big self-acceleration effect. As, however, it was impossible to separate the above two effects one from another experimentally and to demonstrate whether the hypothetical "hysteresis effect" really does exist, I constructed the machine VENETIN COLIU -VI where only ferrites (soft and hard) are used which have no (as a matter of fact, feeble) eddy currents. Such was also my machine VENETIN COLIU - III, which demonstrated at the most an integral zero Lenz effect but where the yokes of soft ferrites were not closed.

The machine VENETIC COLIU -VI demonstrated also a self-accelerating effect, but now when I learned about the Monstein effect[3], I abandoned the hypothetical "hysteresis effect" and I explain the self-acceleration effect by the Monstein effect (see also Ref. 4). Before giving here the explanation how the Monstein effect leads to self-acceleration, i.e., to an integral anti-Lenz effect in Venetin Coliu, I shall describe the machine VENETIN COLIU -VI.

I give in fig. 2 one (of the three) generator's knots of the machine VENETIN COLIU -VI whose photograph (where again only one of the generator's knots is mounted) is given in fig. 3. Along the rim of the disk with diameter 180 mm there are aranged 24 cylindrical magnets with diameter 19 mm and height 6 mm. Any Π-form yoke (which can be seen in the middle of fig. 4) has the following dimensions: length 80 mm and height 90 mm. The cross-section of the yoke is of a square form 18x18 mm, but the parts going through the coils are made with circular cross-sections of about 19 mm diameter. The disk can be rotated by the d.c. motor which is seen in fig. 3 beneath the disk. The disk is fixed to an axle with diameter 4 mm which rotates on two ball-bearings fixed to the upper part of the machine. When the upper yoke with its two coils is fixed to the upper part, the disk is fixed to the axle at the respective distance from the coils (about 1 mm). Then the upper part is put on the four brass columns and, by letting it micrometrically fall down, the distance between the disk and the down coils is fixed at the respective 1 mm. The yokes of every generator's knot were displaced at 1/3th part of the distance between two permanent magnets, so that the "push-pulling" forces with which the yokes of every knot acted on the disk were substantially ballanced. Nevertheless certain unbalanced tangential and vertical forces remained.

My explanation that the Monstein effect is responsible for the integral anti-Lenz effect in VENETIN COLIU is the following (see fig. 2): When the permanent magnets come under the yokes, they magnetize the most near parts of the yoke, as their magnetic intensities at the more far parts are very feeble. This magnetization appears with a certain time delay and also disappears with a certain time delay (Monstein's effect). The magnetized near parts of the yoke, from their part, magnetize consecutively the more far parts and the magnetization in the yoke has a certain "avalanche" character. This "avalanche" continues to act (because of the Monstein effect) even when the permanent magnets cross their most near positions with respect to the yokes. Consequently the maximum of the magnetic flux in the yoke is not at the moment when the permanent magnets are exactly under the yokes but appears with a certain time delay (the "phase delay" is of minutes, hardly of degrees). Thus all curves in fig. 1 will be displaced to the right with this "phase delay". Now it is obvious that for $\phi \to 90^0$ there will be no zero Lenz effect but a certain integral anti-Lenz effect will appear. For clearness I shall call this integral anti-Lenz effect the Monstein anti-Lenz effect. Because the yokes in VENETIN COLIU - III did not build closed "magnetic circuits", the Monstein effect there was, certainly, low and an integral anti-Lenz effect could not be observed.

When I was in Köln in October 1992, my friend Prof. Georg Galeczki, who is an expert in magnetism, informed me that the "Monstein effect" has been for the first time observed by J. A. Ewing[5] and called by him "time lag in the magnetization of iron" (this was also the title of his paper). The same effect was then investigated by

J. L. Snoek[6], by G. W. Rathenau (the son of Walter Rathenau) who published a couple of papers in the Dutsch journal PHYSICA in the fifties, and now by H. Kronmüller of the *Max Planck Institut für Metallforschung, Stuttgart*. This effect is, however, generally unknown and in no textbook on magnetism can one find references on it. For this effect the names "magnetic viscosity", "magnetic after-effect", "time effect in magnetization" have been used, but, for clarity and definiteness, I shall call it always the Monstein effect.

I intend to build a new variation of the machine VENETIN COLIU -VI (which I shall call VENETIN COLIU - VII), where the yokes in fig. 1 will be rotated at 90^0 with respect to the disk and the disk thus will cross only one of its "legs" while the other "leg" will be continuous and only one big coil will be wound on it. Now the points which lie far from the rotating permanent magnets will be much farther than in VENETIN COLIU - VI and the Monstein anti-Lenz effect will be more intensive.

Moreover I do my best to find magnetic ball-bearings and to reduce the friction to the possible minimum. Let me inform the reader that in 1991 I went to the *Treibacher Chemische Werke*, the biggest producers of magnets in Austria, which supply the *Vacuumschmelze* in Hanau with magnetic material. I ordered a pair of magnetic ball-bearings and the compagny requested the fantastic sum of 16,320 AS. For the amazement of the compagny (I said that I am perpetuum mobile constructor) I prepaid the money. However after a month the money was returned to me with the excuse that the compagny is unable to produce the necessary magnets which I designed in 10 seconds when ordering them and which any child can cut and magnetize if having their equipments. Here is the document with which the money was returned to me:

Überweisung durch Creditanstalt-Bankverein Gutschrift

Empfänger
Stefan Marinov
8020 Graz

Konto-Nr. des Empfängers: 0082-17077/00 bei: CA Graz

Verwendungszweck: Gutschrift Nr. 590122 v. 06.06.91 — 16.320,--

Konto-Nr. des Auftraggebers: 0981-33333/00 Auftraggeber: Treibacher Chemische Werke AG

00821707700+ [illegible] 41+

Later I learned the reason for this action. Those are the big ball-bearing compagnies FAG and SKF which do not allow that magnetic ball-bearings appear on the market.

I contacted my friend Les Adam, the owner of the magnetic compagny AZ *Industries* in Arkansas) who published my paper on VENETIN COLIU in his journal[7], to produce for me magnetic ball-bearings and I hope to have them soon.

Now I shall inform the reader about the results obtained in VENETIN COLIU - VI.

First I made, for the first generator's knot, four coils with wire of thickness 1.8 mm and resistance $R_1 = 0.33\ \Omega$ each, for the second generator's knot, four coils with wire of thickness 1.3 mm and resistance $R_2 = 1.1\ \Omega$ each, and for the third generator's knot, four coils with wire of thickness 0.8 mm and resistance $R_3 = 7.5\ \Omega$. The machine with 12 coils mounted on it is shown in fig. 5.

The currents generated in these three kinds of coils were $I_1 = 410$ mA, $I_2 = 200$ mA, $I_3 = 80$ mA, so that the produced power at short-circuited coils was

$$P_{gen} = 4(I_1^2R_1 + I_2^2R_2 + I_3^2R_3) = 590 \text{ mW}. \quad (4)$$

Even at the highest rotational velocity there was a normal Lenz effect which decreased with the increase of the rotational velocity.

I show in table 1 the calculated phase angle ϕ for two coils in the first generator's knot mounted on one of the Π-form ferrites: The tensions applied to the driving motor, U_{mot}, are given in the first column, the tensions generated by the coils, U_{gen}, are given in the second column, the currents generated at short-circuited coils, I_{gen}, are given in the third column, the impedances of the coils, calculated according to the formula

$$Z \equiv (R^2 + X^2)^{1/2} = U_{gen}/I_{gen}, \quad (5)$$

where $X = \omega L$ is the inductive resistance of the coil, L its inductance and R its ohmic resistance, are given in the fourth column, the inductive resistances, X, calculated again from formula (5) are given in the fifth column, the tangents of the phase angles, ϕ, are given in the sixth column and the angles in the seventh column.

Table 1

Driving tension U_{mot} (V)	Generated tension U_{gen} (V)	Generated current I_{gen} (A)	Impedance Z (Ω)	Inductive resistance X (Ω)	Tangent $\tan\phi = X/R$	Phase angle ϕ (^{o})
5	7	0.41	17	17	25.8	87.78
10	24	0.41	59	59	89.4	89.36
15	40	0.41	98	98	148.5	89.61
20	55	0.41	134	134	203.0	89.72

Ohmic resistance of the double coil $R = 2R_1 = 0.66\ \Omega$

Then I made four coils with wire of thickness 0.3 mm and resistance $R_4 = 188\ \Omega$ each. Their phase angles were slightly higher than in table 1 and at a higher rotational velocity an integral anti-Lenz effect could be observed. Finally I made four coils with wire of thickness 0.2 mm and resistance $R_5 = 1600\ \Omega$ each. Here the phase angles were the highest and the anti-Lenz effect was also the highest (the numerical data will be given beneath).

It turns out that only tenths and hundredths parts of the degree (i.e., arc minutes) in the phase angle play a decisive role for the character of the Lenz effect.

I showed in Ref. 8, p. 31, with very simplified calculations, that two coils with the same geometries but with different number of windings must have the same phase angles, however, for real coils, as my measurements also showed, the coil with the higher number of windings has a greater phase angle.

Let me draw the attention of the reader to the following important behaviour of the coils: The currents in the coils of different knots are independent one of another, as those are completely autonomous magnetic systems. However the currents in the coils of the same knot depend strongly one on another. Taking the coils with thickness 0.2 mm of the wire, I established that the current in coil 1 (see fig. 2) was:

I = 7.4 mA when coils 2,3,4 were open,
I = 5.4 mA when coil 2 was closed and coils 3,4 were open,
I = 6.2 mA when coil 3 was closed and coils 2,4, were open,
I = 5.1 mA when coil 4 was closed and coils 2,3, were open,
I = 3.7 mA when all coils 2,3,4 were closed.

Indeed the yokes of soft ferrites make these coils magnetically dependent one on another, increasing (because of the mutual inductances) their inductive resistances.

The biggest is the mutual inductance between coils 1 and 4, as there is no air gap between them, and the less is the inductance between coils 1 and 3, as there are two air gaps between them.

First I mounted only one generator's knot with four coils with wire thickness 0.2 mm (see fig. 3). The measurememts are presented in table 2.

Table 2

Driving tension	Driving current: without yokes without coils	Driving current: without yokes with coils	Driving current: with yokes with coils (open)	Driving current: with yokes with coils (closed)	Current difference	Current change $\Delta I =$	Power change
U_{mot} (V)	I_0 (mA)	I_{00} (mA)	I (mA)	I' (mA)	$I-I_0$ (mA)	$I'-I$ (mA)	ΔP (mW)
5	33	33	38	53	5	15	75
10	46	46	53	54	7	1	10
15	65	65	80	70	15	- 10	- 150
20	88	89	104	91	16	- 13	-260

Generated current: $I_{gen} = 3.7$ mA, Generated power: $P_{gen} = 4 I_{gen}^2 R_5 = 88$ mW

The driving tensions, U_{mot}, are given in the first column, the currents I_0 consumed by the motor when the disk rotated alone are given in the second column, the currents I_{00} consumed by the motor when the coils are mounted without the yokes

(and even without the wires) are given in the third column. I show in fig. 4 (at the left) how I mounted the coils without the yokes. Comparing columns 2 and 3 one sees that the friction of the air when the coils are mounted is so feeble that it can be neglected. The currents, I, consumed by the motor when the coils are mounted with the yokes of soft ferrites are given in the fourth column, for the case when the coils are open. The currents, I', for the case when the coils are closed (i.e., short-circuited) are given in the fifth column. The differences of the currents I and I_0 are given in the sixth column. The changes $\Delta I = I' - I$ of the currents at closed and open coils are given in the seventh column. The changes $\Delta P = U_{mot}(I' - I)$ in the driving power are given in the eighth column.

If considering the last line of this table, we see that the law of energy conservation is violated. Indeed, at $U_{mot} = 20$ V we have for the power difference $P - P_0 = U_{mot}I - U_{mot}I_0 = 320$ mW, meanwhile we have $|U_{mot}\Delta I| + P_{gen} = 260 + 88 = 348$ mW. Or to put it different: At $U_{mot} = 20$ V and closed coils the driving current is 91 mA. Of this current $I_0 = 88$ mA (as a matter of fact $I_{00} = 89$ mA) are spent for overwhelming the mechanical friction and only $I' - I_0 = 3$ mA, or $P' - P_0 = 60$ mW are spent for producing electrical energy; meanwhile only the electric power produced as heat in the wires of the coils is $P_{gen} = 88$ mW. To this power one must add also the heat power of the remaining eddy currents (which, unfortunately, cannot be measured).

Because of the lack of money, I made only six coils with wire of thickness 0.2 mm (every coil costs abour 100 DM). In table 3 I give the measurements when these six coils were mounted in all three knots of the machine taking the places 1 and 3 of the coils in fig. 2. Four coils of wire with thickness 0.3 mm took the places 2 and 4 in two of the knots and two coils of wire with thickness 0.8 mm took the places 2 and 4 in the third knot. In columns 2 - 5 only the six coils with resistances R_5 are closed, while in columns 6 - 9 all twelve coils with resistances R_5, R_4 and R_3 are closed.

Table 3

Driving tension U_{mot} (V)	Open coils I (mA)	Closed coils I' (mA)	$\Delta I = I' - I$ (mA)	$\Delta P = U_{mot}\Delta I$ (mW)	Open coils I (mA)	Closed coils I' (mA)	$\Delta I = I' - I$ (mA)	$\Delta P = U_{mot}\Delta I$ (mW)
5	62	motor stops			62	motor stops		
10	80	109	29	290	80	90	10	100
15	101	107	6	90	101	96	-5	- 75
20	135	123	- 12	- 240	135	118	- 17	- 340

$I_{gen} = 6.2$ mA

$P_{gen} = 6 I_{gen}^2 R_5 = 369$ mW

$R_5 = 1600\ \Omega$

$I^5_{gen} = 4$ mA, $I^4_{gen} = 10$ mA, $I^3_{gen} = 55$ mA

$P_{gen} = 6 I^{5\,2}_{gen} R_5 + 4 I^{4\,2}_{gen} R_4 + 2 I^{3\,2}_{gen} R_3 = 274$ mW

$R_5 = 1600\ \Omega$, $R_4 = 188\ \Omega$, $R_3 = 7.5\ \Omega$

My aim now, as already said on p. 19, is to suspend the rotor of VENETIN COLIU on magnetic ball-bearings and to reduce the current I_0 practically to zero. Further I look for soft ferrites practically without eddy currents and hysteresis losses and to make thus the currents I_0 and I equal. Then, after setting the rotor into rotation by friction (see fig. 5 in Ref. 2), to take the driving motor away, to short-circuit the coils and to realize in this away a perpetual motion.

Another way for realizing a perpetual motion is to try to drive the rotor by an electrostatic motor, taking into account that a good corona motor consumes even less electric power than the mechanical power which it produces (see Ref. 9, p. 24).

I show in fig. 6 the electrostatic corona motor constructed by me which was driven by the electric output of VENETIN COLIU-VI. This corona motor was of the type of my corona motor shown in figs. 1 and 2 of Ref. 10, where the high tension electrodes are put in the gap of two very rough disks. Any of the coils with wire thickness 0.2 mm generated at U_{mot} = 5, 10, 13 V, respectively, the tensions U_{gen} = 220, 660, 1000 V. Four coils produced tension four times higher. The resultant tension was rectified and further enhanced by the help of a cascade which can be seen in the TESA-box in fig. 6. There was not even the slightest change in the driving current when the corona motor was put in rotation or stopped. Thus for the action of the corona motor practically no power was extracted from VENETIN COLIU. However the diodes in the cascade were not ideal (i.e., without back currents) and some power was extracted from VENETIN COLIU for covering the losses in the cascade. If ideal diodes and condensers (without leakage) can be found and the only corona discharge will be realized from the motor's electrodes, then any child can make a perpetuum mobile by coupling a corona motor with VENETIN COLIU suspending the rotor on magnetic ball-bearings. One can avoid the cascade by making coils with many turns (there is no limit for the tension induced in VENETIN COLIU), but the problem for rectification of the tension without losses still remains.

REFERENCES

1. S. Marinov, Deutsche Physik, **2**(5), 5 (1993).
2. S. Marinov, Deutsche Physik, **1**(1), 40 (1992).
3. C. Monstein, Deutsche Physik, **2**(6), 5 (1993).
4. S. Marinov, Deutsche Physik, **2**(6), 3 (1993).
5. J. A. Ewing, Proc. Roy. Soc. (London), **46**, 269 (1889).
6. J. L. Snoek, Physica, **6**, 161 (1939).
7. S. Marinov, Magnets in your future, **6**, 5 (1992); the same article was published in Italian in No. 66 of INEDITI of the società ANDROMEDA, S. Alende 1, I-40139 Bologna.
8. S. Marinov, The Thorny Way of Truth, Part IX (East-West, Graz, 1991), p. 8.
9. S. Marinov, The Thorny Way of Truth, Part V (East-West, Graz, 1989), p. 8.
10. S. Marinov, The Thorny Way of Truth, Part VIII (East-West, Graz, 1990), p. 34.

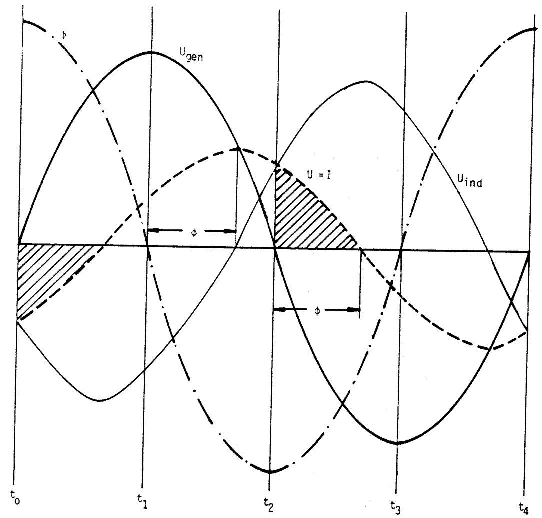

Fig. 1

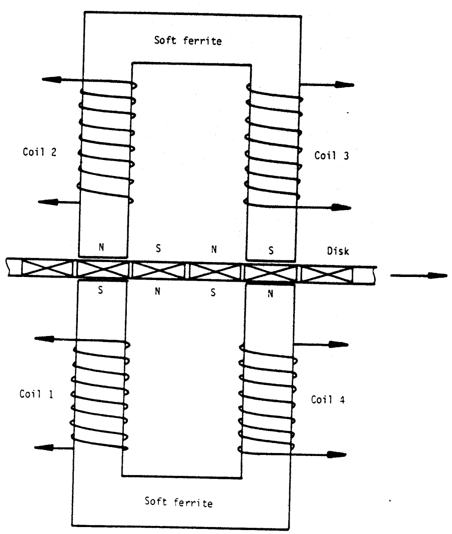

Fig. 2

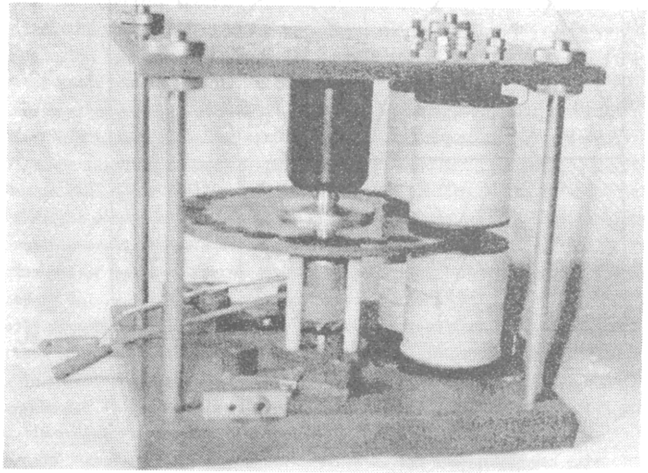

Fig. 3

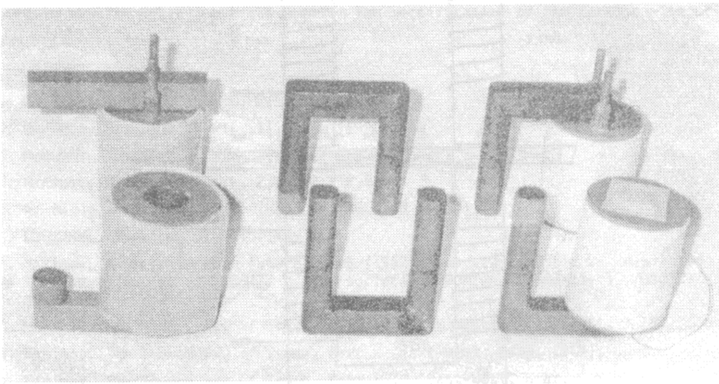

Fig. 4

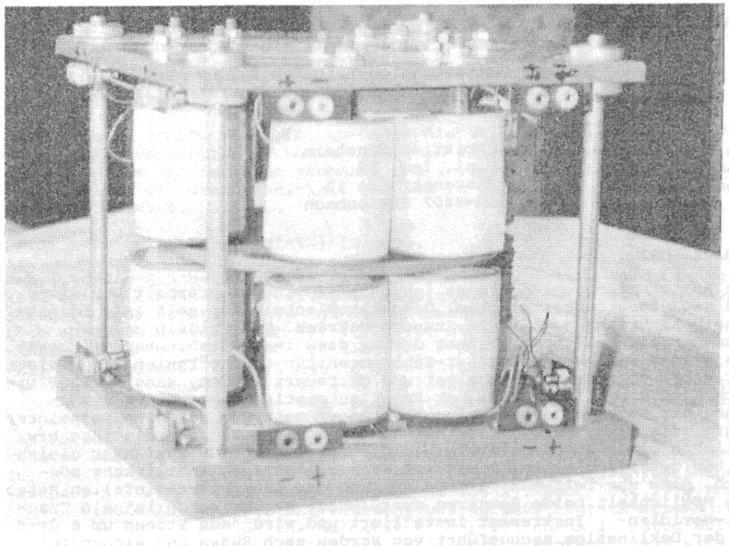

Fig. 5

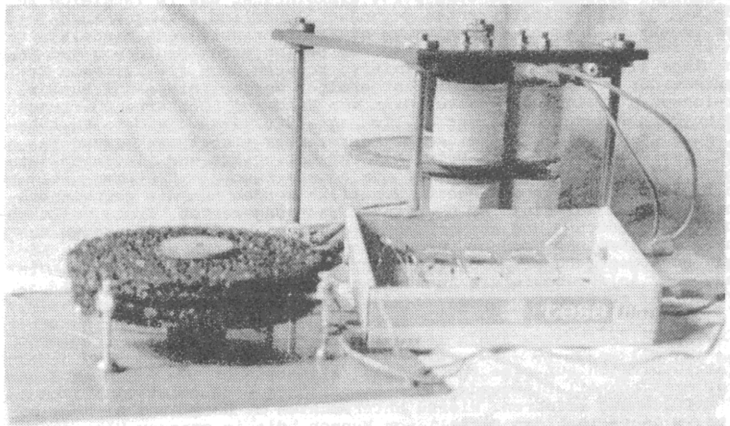

Fig. 6