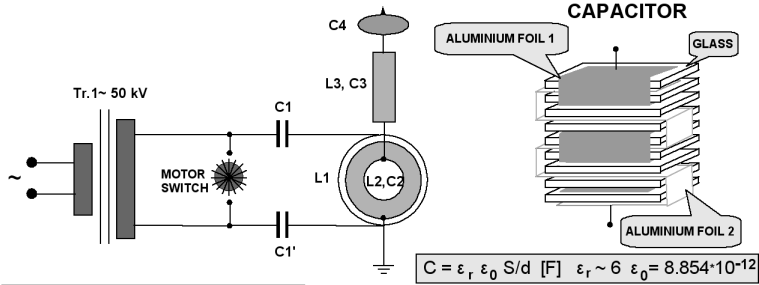


NIKOLA TESLA'S ENERGY TRANSMITTER (...work in progress...)

TRANSFORMER SCHEMA:

TESLA'S HIGH FREQUENCY TRANSFORMER



$$f = 1/(2\pi) \cdot \sqrt{1/(LC) - (R/2L)^2} \quad [\text{Hz}]$$

$$L1 = N^2 D \pi / 2 \cdot [4 \ln(2D/d - 1) + 1] \cdot 10^{-7} \quad [\text{H}] \quad N \sim 1-2$$

$$L2,3 = N^2 D \pi \cdot \ln [2\pi x^2 + \sqrt{(2\pi x + 1)^2}] \cdot 10^{-7} \quad [\text{H}] \quad x = D/h$$

$$C3 \sim \frac{k\epsilon h}{[1 - \ln(D/h)]} \quad [\text{F}] \quad k=4.89 \quad x=D/h \sim 0.1 - 1 \quad \text{Work in progress!}$$

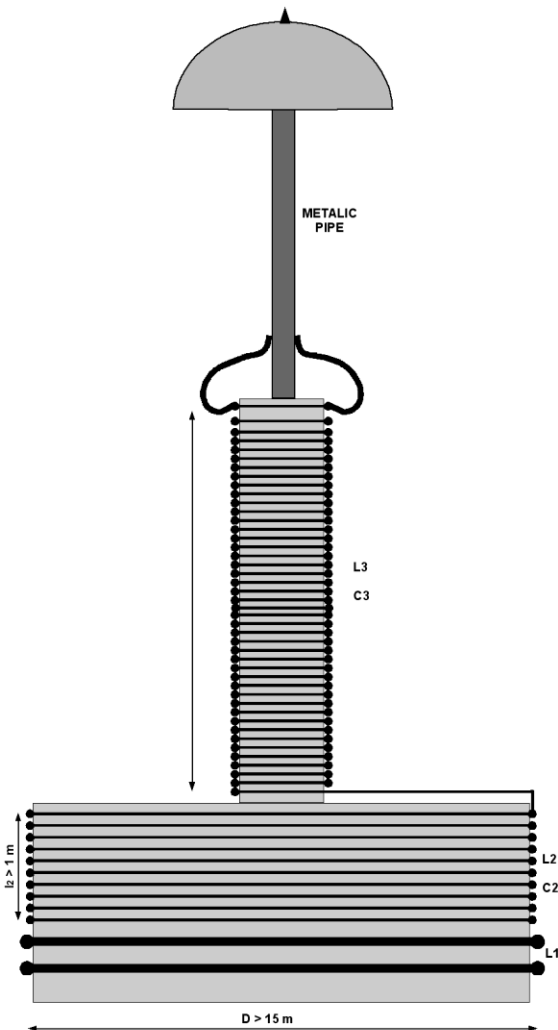
$$C = \epsilon_r \epsilon_0 S/d \quad [\text{F}] \quad \epsilon_r \sim 6 \quad \epsilon_0 = 8.854 \cdot 10^{-12}$$

S = active glass area [m²]
d = glass thickness [m]

N = winding number
D = coil diameter [m]
h = coil height [m]
d = wire diameter [m]
T = wire winding distance [m]
R = resistance [Ω]

TRANSFORMER DESIGN:

TESLA'S HIGH FREQUENCY TRANSFORMER



This are Tesla's patents for transmitter:

1: [645,576](#) 'System of Transmission of Electrical Energy'.

No. 645,576.

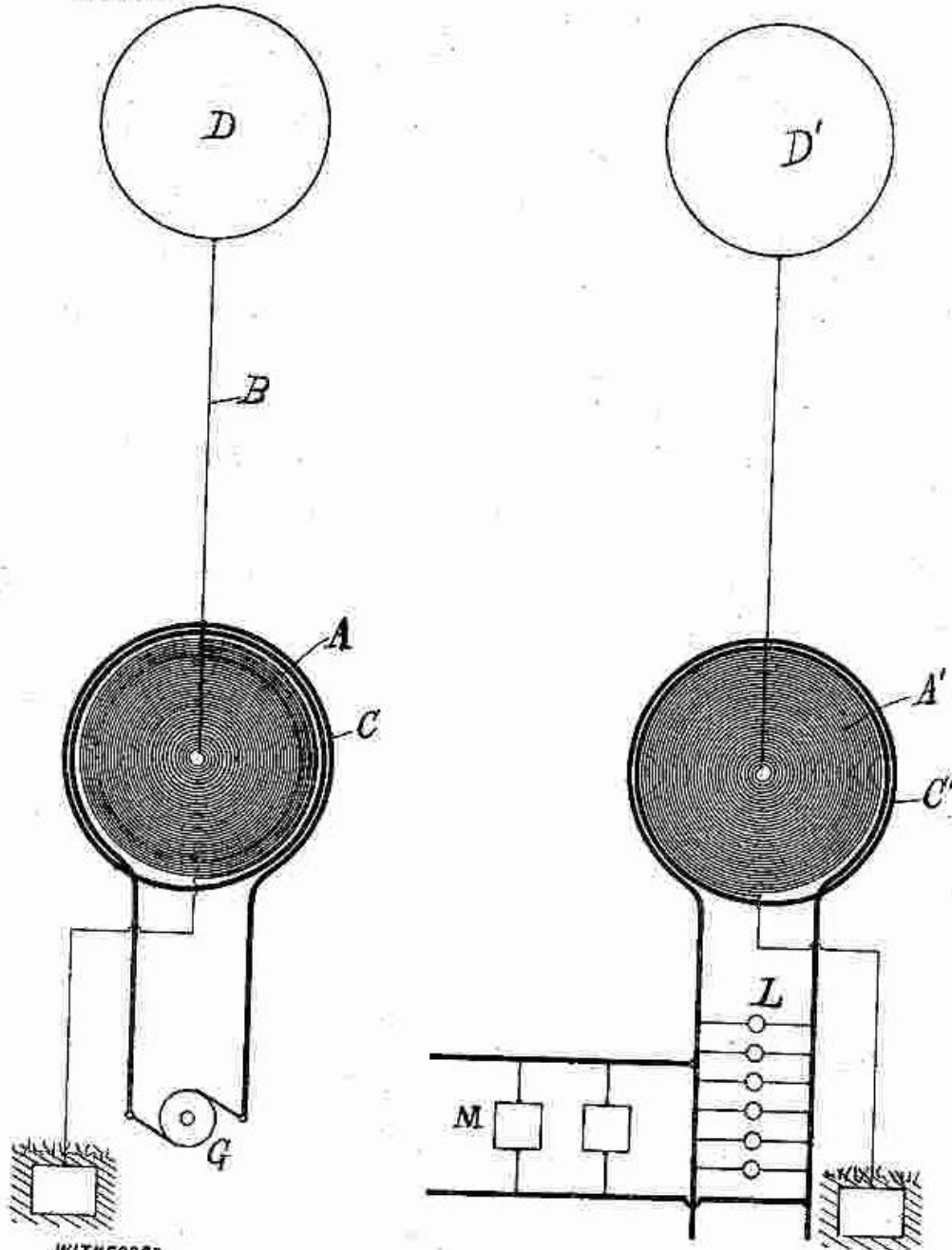
N. TESLA.

Patented Mar. 20, 1900.

SYSTEM OF TRANSMISSION OF ELECTRICAL ENERGY.

(Application filed Sept. 3, 1897.)

(No Model.)



WITNESSES

Dwight N. Cooper
M. Rawson

INVENTOR

Nikola Tesla
BY
Cur. Curtis & Page
ATTORNEYS.

No. 649,621.

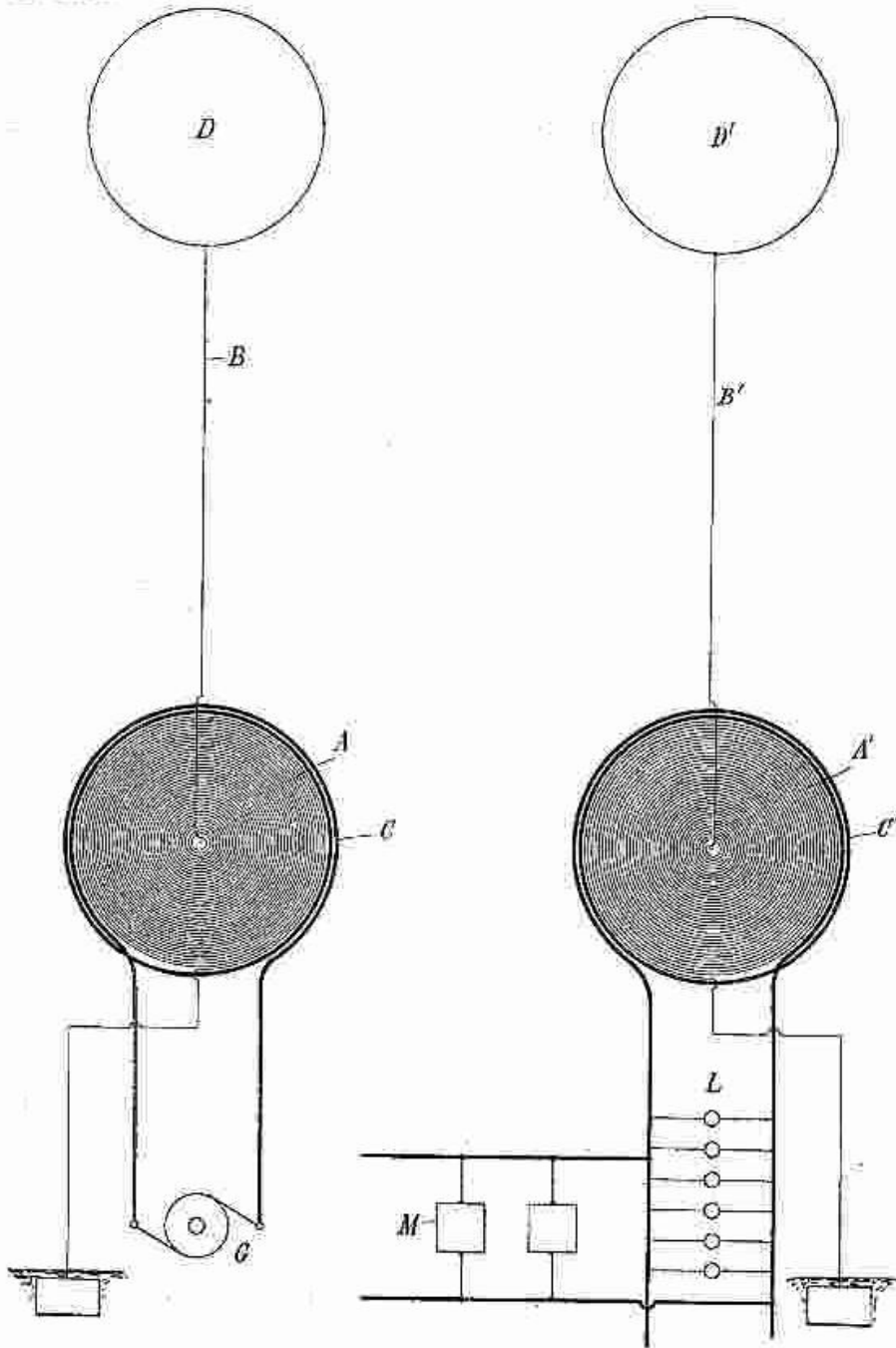
Patented May 15, 1900.

N. TESLA.

APPARATUS FOR TRANSMISSION OF ELECTRICAL ENERGY.

(Application filed Feb. 19, 1900.)

(No Model.)

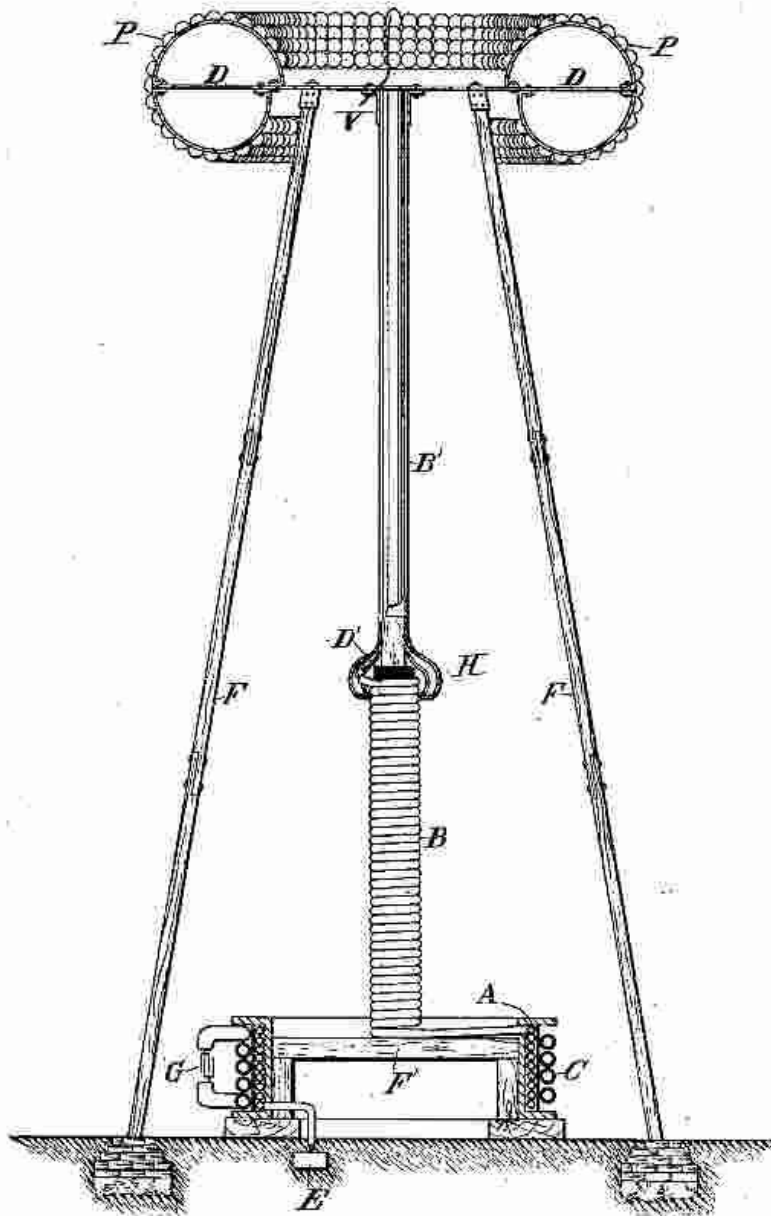


Witnesses:
Benjamin Miller.
G. W. Martling

Nikola Tesla, Inventor
by *Ken. Page Cooper* Attys

N. TESLA.
APPARATUS FOR TRANSMITTING ELECTRICAL ENERGY.
APPLICATION FILED JAN. 18, 1902. RENEWED MAY 4, 1907.

1,119,732. Patented Dec 1, 1914.



WITNESSES
M. Lawson Dyer
Benjamin Miller

INVENTOR,
Nikola Tesla,
BY *Kennerly & Cooper,*
his ATTORNEYS.

Principle of transmitting:

1. High elevation (~60 m)
2. High electromotive force make air discharge around top of transmitter (make more and more ionisation and heating in passing time of transmitting, and it create tunnel to low pressure air stratosphere).
3. High frequency current pass through ionized air to low pressure stratosphere (capacitance: $1/(2 \cdot \pi \cdot f \cdot C)$ and conducting: R current).
4. Capacitance of Earth between ground and low pressure air stratosphere is all around the Earth conductor.

Tesla's stationary waves observation from Colorado Springs:

When thundering was ending, about 20 minutes after, instrument in his laboratory was start measure the same signal from Earth. And again, and again, in that interval. All night, after thundering was gone. Interesting stuff is lifetime of that phenomenon. High voltage thunders, transform Earth conduction in long lived oscilation system. Tesla think, that it is of great important, and can be make with his transformer (need of high voltage). Earth stationary waves. It need more investigation. Why about 20 minutes interval of repeating?

This are Tesla's patents for receiver:

1: [685,953](#) 'Method of Intensifying and Utilizing Effects Transmitted through Natural Media' (like 685,955).

No. 685,953. Patented Nov. 5, 1901.
N. TESLA.
METHOD OF INTENSIFYING AND UTILIZING EFFECTS TRANSMITTED THROUGH NATURAL MEDIA.
 (Application filed June 24, 1899. Renewed May 29, 1901.)
 (No Model.)

Fig. 1.

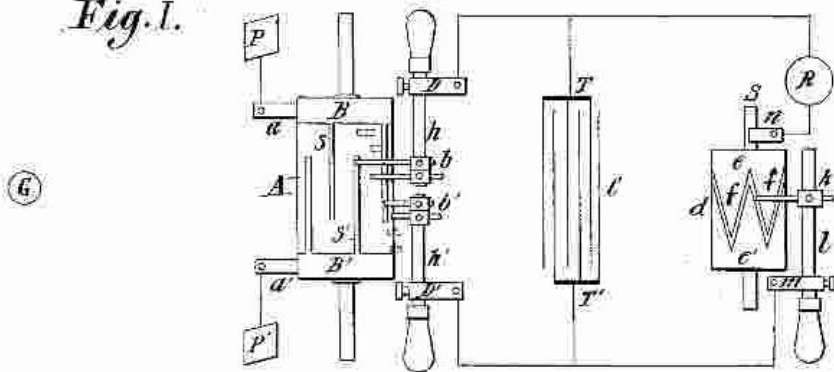
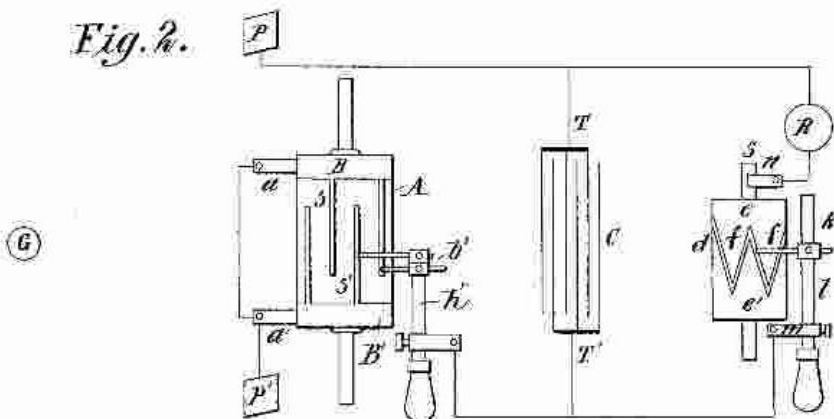


Fig. 2.



Witnesses:
 A. B. Lewis
 Hillary C. Musgrave

Nikola Tesla, Inventor
 by Kerr, Page & Cooper
 Att'ys

No. 685,955.

Patented Nov. 5, 1901.

N. TESLA.

APPARATUS FOR UTILIZING EFFECTS TRANSMITTED FROM A DISTANCE TO A RECEIVING DEVICE THROUGH NATURAL MEDIA.

(Application filed Sept. 8, 1899. Renewed May 29, 1901.)

(No Model.)

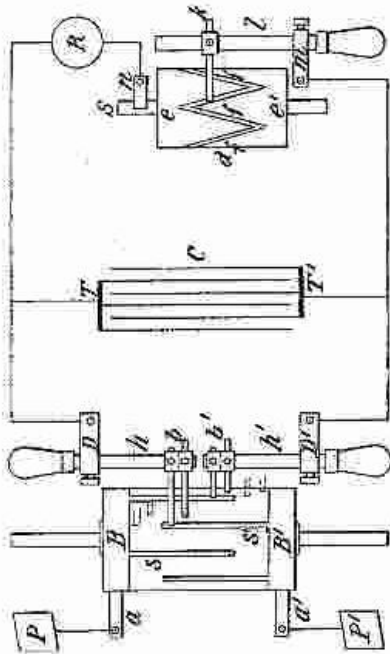


Fig. 1

(6)

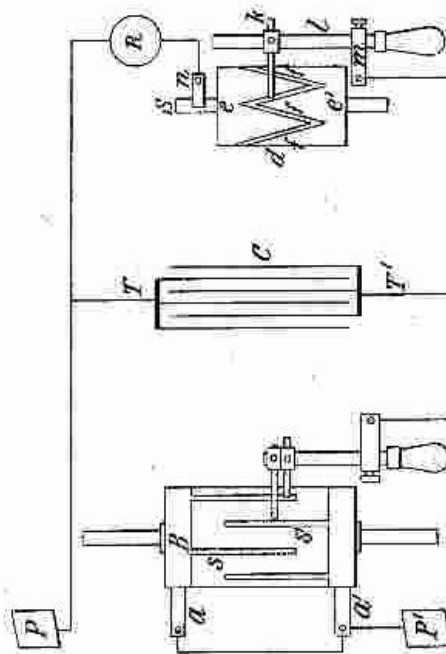


Fig. 2

(6)

Witnesses:
G. B. Linn
Henry C. Messinger

Nikola Tesla, Inventor
by Ken. Page & Cooper
Att'ys

Principle of receiving:

1. Resonance circuit.
2. Two places grounding for different wave point using. Electrical wave has movement in ground. With two point it has electro potential and can be use one wire connection.

Free energy from earth?

(look at patents picture)

This is important patents, and need experiments. Two plates in the ground. First rotating switch is like mechanical diode for resonant frequency.

Problem with diode is diode barriers. This mechanical switching device has not barriers, and can be mechanically synchronise with some frequency.

This is on input of device. Second rotating part is for discharge in right time.

My thoughts go on, and I ask myself: Is thundering from all over the Earth, source of lot of frequency? Solar bombarding on stratosphere?

Can be possible make lot of different radius switching device on the same shaft, which are for different frequency and charge more than one capacitor?

And how much energy can be get?

Is there a lot of energy? It need experiments...

Second rotating switch can be replace with diode, but first can't (barrier), if voltage on capacitor is greater than 0.6 volt (silicon diode).

This rotating switching device is used in Tesla patents when he detect high radiant energy. One plates in the ground and one in the air, exposed to rays. And swithing device charge capacitor.

It need research. My or yours, who care?

COAXIAL CABLE PRINCIPLE OF TRANSMISSION:

SCHUMANN EARTH FREQUENCY:

n	real	equation
1	7.83	7.83
2	13.7	13.82
3	19.6	19.71
4	25.5	25.59
5	31.4	31.43
6	37.3	37.30
7	43.2	43.15

MY EQUATION:

$$f = 5.86 * \sqrt{n (n + \pi/4)}$$

$$5.86 \sim c / (8R_e) \quad R_e = 6\,378\,137 \text{ [m]}$$

COAXIAL CABLE TRANSMISSION:



Earth is great capacitor and has some inductance too. It is like great coaxial cable. With high electromotive force it can use for transmission of energy.

I put here my simplify equation for Earth Schumann frequencys. In standard equation my change is in (n+1) parameter with (n+PI/4). Constant is near $c/(8R)$. $4R$ is path through Earth and back.

That resonant frequency is change it day/night time with little oscilation around that. If more X-ray come from Sun to the Earth, frequency go little up. If more protons come to the Earth from Sun, it going down.

This equation is middle aproximation for Schumann frequencys, and is good enough.

If solar energy can change that oscilation, Tesla's transformer can change that too.

Through coaxial cable can be send more high frequency, and can be generate stationar waves.

In my mind I use that model for understanding Tesla's style of transmission. It is not electromagnetic wave emissions. It is current transmission through Earth capacitance and inductance (like in coaxial cable).

And receiver can use differences of electromotive force on two different places of that transmission Earth line.

I think that Tesla will succeed, but the world was not ready.

Patents about receive radiant energy:

1: [685,957](#) 'Apparatus for the Utilization of Radiant Energy'.

No. 685,957.

Patented Nov. 5, 1901.

N. TESLA.

APPARATUS FOR THE UTILIZATION OF RADIANT ENERGY.

(Application filed Dec. 21, 1901.)

(No Model.)

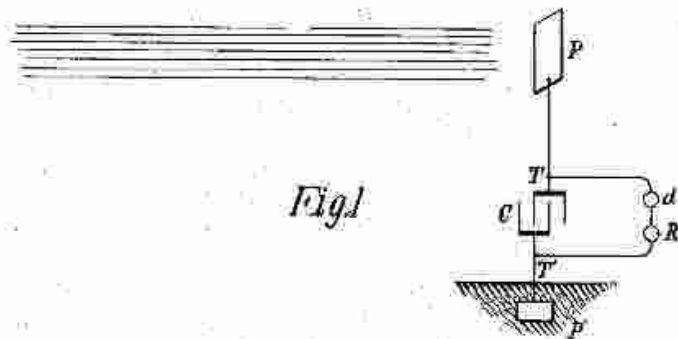


Fig. 1

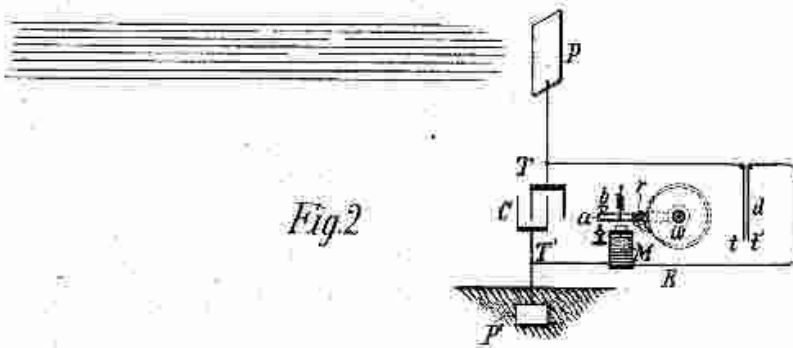


Fig. 2

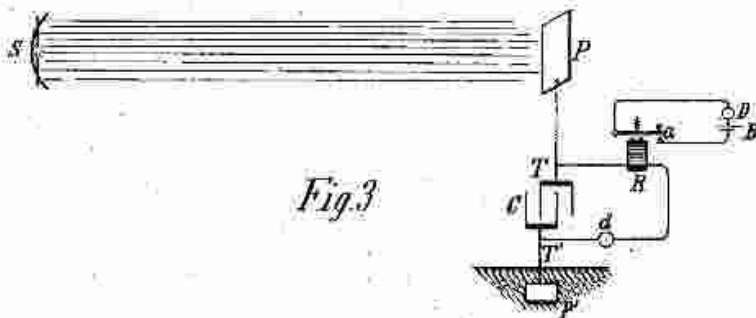


Fig. 3

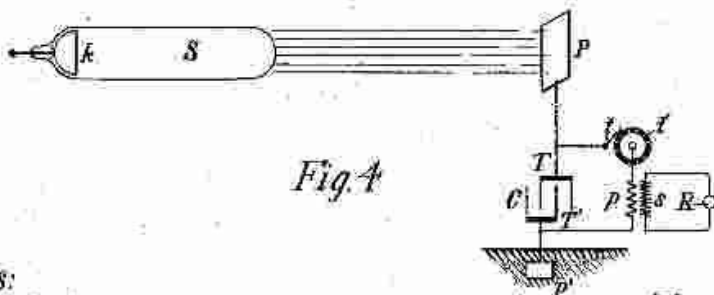


Fig. 4

Witnesses:

Rudolf Ritter
Dr. Kaimon Dyer.

Inventor

Nikola Tesla

by *Ken. Page & Cooper* Attys.

455-619	AU 233	EX
FIP8106	OR	685,958

55

No. 685,958.

Patented Nov. 5, 1901.

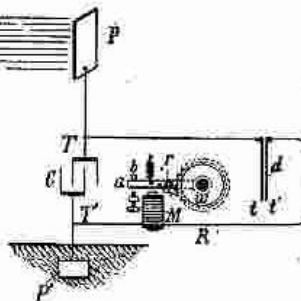
N. TESLA.

METHOD OF UTILIZING RADIANT ENERGY.

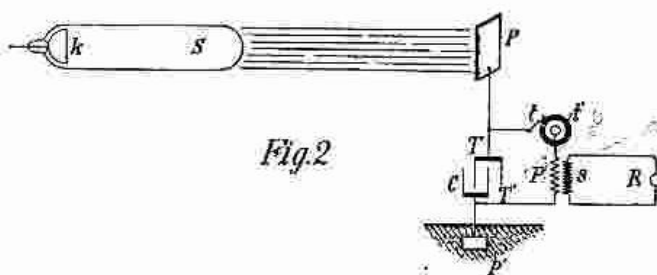
(Application Filed Mar. 21, 1901.)

(No Model.)

*Electric stepping motor
energized by capacitor
energy from sun*



No. refs.



Witnesses:

*Raphael Netto
M. Samuel Dyer*

Nikola Tesla, Inventor

by *Wm. Page & Cooper*
Attys

This two patents are very important, and it can be put in part of 'Energy of space' on this web pages.

But because connection with upper Tesla's system, I will explain it here.

Principles for understanding in this patents are simple. When solar or other energy photons comes to plates elevating in air, it generate current in capacitor which is connecting to earth (grounded) plate.

Why? We have high potential between stratosphere and Earth. Some current are always here, because of that. High energy photons or particles ionize and plate became source of energy.

Capacitor must be the best, without self-discharge.

It looks like little source of energy.

But what will be if we virtual increase surface of plate with ionize air around plate with source of X-ray or UV-ray or other? Sun absorb UV waves when ozone is here.

Is Tesla thinking about using this system near his high voltage transmitter, which generate ionization around, and with this principle collect high Sun energy, with this virtual high surface solar panel?

It need more experiments, and maybe this low energy solar collector, can become high free energy source.

Just a thoughts!

Because of not understanding Tesla's principle, important thoughts from Nikola Tesla (pat. 649,621), if someone think it is radiant (wave) system:

"It is to be noted that the phenomenon here involved in the transmission of electrical energy is one of true conduction and is not to be confounded with the phenomena of electrical radiation which from the very nature and mode of propagation would render practically impossible the transmission of any appreciable amount of energy to such distances as are of practical importance."

Another one:

"To be more explicit, I take a very large self-inductance and a comparatively small capacity, which I have constructed in a certain way so that the electricity cannot leak out. I thus obtain a low frequency; but, as you know, the electromagnetic radiation is proportionate to the square root of the capacity divided by the self-induction. I do not permit the energy to go out; I accumulate in that circuit a tremendous energy. When the high potential is attained, if I want to give off electromagnetic waves, I do so, but I prefer to reduce these waves in quantity and pass a current into the earth, because electromagnetic wave energy is not recoverable while that [earth] current is entirely recoverable, being the energy stored in an elastic system. You see, the apparatus which I have devised was an apparatus enabling one to produce tremendous differences of potential and currents in an antenna circuit. These requirements must be fulfilled, whether you transmit by currents of conduction, or whether you transmit by electromagnetic waves. You want high potential currents, you want a great amount of vibratory energy; but you can graduate this vibratory energy. By proper design and choice of wave lengths, you can arrange it so that you get, for instance, 5 percent in these electromagnetic waves and 95 percent in the current that goes through the earth. That is what I am doing. Or you can get, as these radio men, 95 percent in the energy of electromagnetic waves and only 5 percent in the energy of the current. . . . The apparatus is suitable for one or the other method. I am not producing radiation with my system; I am suppressing electromagnetic waves. . . . In my system, you should free yourself of the idea that there is radiation, that the energy is radiated. It is not radiated; it is conserved.

Because of that earth currents, put horizontal or vertical antenna position, has no changing in connection between transmitter and receiver. If mountain is between them, it is not important, because current go through earth.

It is one wire system, and capacity is for return path.

It is like water pipe with oscillating piston on one end, and compression chamber on other end.

If we have 30 m of capacity disk on 60 m of high, and distance between ionosphere is more than 100 km, with 50 kHz frequency, this capacity will have about 100 Mohm.

Great energy can pass through this on 50 million volt. Ionisation around disk, virtually increase capacity, and heating and ionisation of air, increase conducting path to ionosphere too.

Tesla's wireless system for transmission of energy is simple and come from genius mind.

I write this, only for historical reason. If we have energy source everywhere (from heat around us), it will be the best approach, and could not be ignore or control like this wireless system.

(...Work in progress notes...)

My inductance equation is good, but problem is with self capacitance. I have in mind few equations, but sometimes work, sometimes don't. It is different for using input power, and voltage on coil.

It need lot of real measurement. I have Tesla's from Colorado, but when try with little coil (from modern experiment), it is not good.

I will try to put thing together. I am not satisfied with equation which are in use. This fantastic machine need better understanding.

Spark gap (rotary or not), can be replaced with thyristors in series, with optical switching. It does not need resonant frequency switching, and impulse discharge (like with motor switch) will be a good approach. Thyristors need to be good conductors for resonant frequency oscillation, and for low switching.

System with primary/secondary coil, without a magnifying coil, is a bad approach, and I will go in Tesla's direction. It is a way to reduce losses in conversion of power.

I like this part of theoretical investigation, based on real measurement.

This is 'Transmission line theory' way to go. Thanks all guys who are first thinkers in this direction. I think, it was Tesla's way too.

Explanation will come, with some new ideas for secondary coil.

I am adding a new equation for C in extra coil. It needs more experiment testing, and improvement.

Inductance and parasitic capacitance are near experimental measurement (I collect data...). Basic resonant frequency is very close to real measurement, when put these two equations together. It is a big step!

I like a picture with bell ringing, which I found on the web. Thanks all Tesla-guys from the internet, because of their work and thoughts.

Bell clapper works on lower frequency, and bell ringing on its own (first secondary coil is 'clapper' for extra coil, and doesn't need resonant work, because it works like a classical transformer, and needs a hard connection with primary oscillator, for good energy transfer).

Frequency is (example) four times or more less than extra coil resonant 'ringing'. Best effect (needs more investigation) will be if that 4 or more lower frequency is subharmonic of extra coil 'ringing'. This system with extra coil is better than 2 coil system. Energy losses in 2 coil system are greater. This different style of work is important for understanding Tesla's extra-coil system.