

TornadoGuard 1 (solenoid)

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Summary of Tornado protection equipment Patent

The invention consist in taking a protected zone (P), coil (C) winding made of insulated electrical conductor. The tips of the winding coils are connected to power source (G), high power so that the direction of current flow through the winding (C) for land situated in the northern hemisphere was the counterclockwise (In) and in the southern hemisphere clockwise (Is). Current may be switched manually or automatically at the threat of a tornado stipulation.

Way of ground protection against destructive effects of tornadoes.

This invention relates to ground protection before the devastating effects of tornadoes.

Not yet determined art the conditions phenomena of favorable weather conditions provoking the formation of funnel-shaped cloud in the form a violently rotating wind. The short duration and danger of this phenomenon, prevents registration or physical parameters and close recordings of this event, the phenomenon of thunderstorm, lighting, and hurricanes are not fully discovered.

All the information, so far known, remains in a phase of concept preventing and/or reducing the damages induces by tornado. All the methods aim is to defuse condition responsible for increasing energy of tornado.

According to the process described in German Patent DE 4109054 - in circumstances found by the meteorically services for the formation of characteristic parameters for tornado, balloons filled with explosive gas (hydrogen) are dropped from airplanes and by remote controlled methods, detonated. As result of the explosions there is no formation of a whirlwind.

In the British patent GB 2335342 and DE 4220695 presented an aircraft especially design to carry such a task.

Alternately described in German Patent DE 1200603 is the introduction of chemicals into the interior of a whirlwind consequent explosion triggers a pressure wave with is disrupting the formation of a whirlwind. In the cited patent DE 1200603 the author presents his own hypothesis of whirlwind formation.

After prolonged exposure to the Sun, a mass of water vapor is lifted in the heated air, supported in addition by cold air masses from both sides, directed down. The formation of the side wind is responsible for whirl winding of the air mass combined with increased power.

Known are also ways to change the structure consisting of clouds, for example, by spraying from airplanes or missiles shooting silver iodide in order to condense water vapor and hence the mass and energy vibrating mass of air.

The new hypothesis of the mechanism of formation of tornadoes.

In previous publications about the tornadoes did not take into account the revealing factors determining the formation of tornadoes, with are: storm cloud electrification and the Earth's Magnetic Field (EMF).

Lines of EMF, both in the atmosphere and the Earth surface do not have the horizontal direction, but are inclined to it at an inclination angle. The EMF does not change uniformly with latitude. In the areas of central Siberia and United States strength EMF is larger than the fall in the same latitude of the Atlantic and Pacific areas.

Increased values inclination and total EMF in the central and southern states US are one of the factors that contribute to the formation of tornadoes in these areas. This justifies the analysis of the frequency of tornadoes appearing at the U.S. with is the largest in central and eastern states, where both the intensity and inclination EMF are the greatest values.

The data and course summaries of tornadoes shown that they arise always on hot days. Water evaporates from the earth's surface (gas lighter than air) with causes the atmospheric pressure rapidly declining. Zones of formed cumulus cloud rising and reaching a height of several km. During evaporation and water vapor lifting occurs ionization of air understanding as separation electric charges particles. Humid, hot air rising to the top gets a positive electrostatic charges and cold air surrounding them - negative charges.

This is the main mechanism of electrification of the atmosphere. As a result of these events the top clouds gets large positive electric charges and the base - negative.

In the process of storm cloud formation plays also some role a windy stream (jet stream) flowing continuously for average heights 10 km, always from west to east. This cold wind born in the polar zones covers large portion of the globe. On way creates a difficult to forecast turbulence, with have a significant impact on the state of the weather.

This stream carries also large positive electric charges therefore significantly interferes with thermal and electric balance atmosphere.

Tornado is a phenomenon occurring relatively infrequently. However, observation shows that the storm cloud, at the base of which form tornado, usually exist a swirling turbulent jet stream.

The storm starts creating cumulonimbus clouds and a series of electrical discharges occurring in it.

This follows by the similar discharges between cloud and the earth creating violent rain and hail.

Tornado formed always at the south-western part of the storm cloud. Initially, a slow moving swirl inside cloud, forming huge disc at bottom (wall cloud). After a while, there is formation of a fast rotation funnel with often reaching the earth surface. Funnel is moving together with the storm cloud usually in the north-east direction.

Characteristic phenomenon of a tornado is the lack of rain and thunders. However when the tornado funnel is moving over the power lines or other metal structures one may witness electric sparks in a form of electric welding bows.

On the basic it can be concluded, that a tornado has an electric nature.

The mechanism of formation of tornadoes is shown in fig. Pos.1

Between the storm cloud base and the Earth surface is forming electrical potential difference. In extreme condition this may reach hundreds of millions Volts. As result, there are lightning electrical discharges between the cloud and Earth surface. In short, we have now a powerful electric field between the base of the cloud storm and earth surface.

The polarization of this field is from the bottom up, but probably only below the central portion of the stormy cloud base, which has an excess of negative electrical charged particles. At the south-western edge of the cloud there is formation of the rotating wall-cloud, electric field is directed from the top to down. It has an excess positive charges located at the top of the cloud. This a positive gradient is too small to trigger a forcing thought electric power in the form of lightning but big enough to move, in linear motion the ionized particles of water vapor and water droppers downward.

The water particles moving in the electric field encounter resistance from neutral charged air gases set also in motion from top to the bottom.

Fact is that the positive charges particles moving downward as result of an electric gradient field, moving also in the Earth Magnetic Field.

The Lorentz law shows that the charged particle electric charge q , the net force operates two

forces.

$$F = F_e + F_v = qE + qvB.$$

Force F_e is a constant force causing an accelerated linear motion of a particle from the top down, forced gradient of the electric field E .

Force F_v is dependent on the particle velocity v and intensity EMF B , the direction of this force is perpendicular to both the direction of the particle (vector v) and the direction of magnetic field lines (vector B). Of this force as vector calculus is left rotator.

This condition is presented in Fig Pos.II, on which the arrow points to the resultant direction and the path of the particle.

Motion of particles subjected to the force perpendicular to their conversion traffic is traffic. Viewed from above, the particle will turn a circle and move in circular motion on northern hemisphere in the direction of K counter clockwise.

As was stated before, the direction of forces EMF to mid-latitudes is inclined to Earth's surface at an angle of dip angle on the particle and the resultant work force which is the sum of two forces F_e and F_v .

In this arrangement, a force particle trajectory will spiral helix facing surface opposite to the clockwise direction. This state is shown in Fig Pos.III.

The described set of phenomena is a mechanism born tornado.

The process begins in the south-western edge of the storm cloud. Number of onset ionized water vapor compared to the amount of air inert particles is relatively small; however, the Lorentz force is relatively large. Moreover, ionized particles of water in its path must overcome the resistance of neutral particles and propelled them into progressive rotary motion.

Overcoming this resistance progressively set in motion - a whirling storm clouds part, which at the base of a cloud takes the form of slowly rotating disk. Acting on the strength of F_v particles causes the progressive movement is a rotary continuous acceleration of particles and as the growth velocity v force F_v in proportion is growing. With this system the diameter of the spiral decreases and its peripheral speed is growing. Created the type of positive feedback, the more speed the greater the peripheral centripetal force and the smaller traffic circle diameter which in turn increases the strength of the rotating vortex.

Swirling air behaves like the funnel of a tornado accelerated spinning rotor of an electric motor powered by a large electrical voltage gradient E , in which ionized particles are put to spin under the influence of Earth's magnetic field B .

For every body moving in a circular motion with force of inertia. The inertia of the particles gives rise to centrifugal forces, which both return and are opposite to the direction of electromagnetic forces. The value of the centrifugal force is determined by the speed v as a quadratic function. $F_o = m v^2 / r$, where m - mass of the particle, v the peripheral speed, turning

radius r .

At low speeds v force is small, but at higher speeds, peripheral, its value is growing rapidly. This force prevented further decline in the funnel of a tornado. Establishes certain equilibrium, the result of which it is the shape of a whirlwind, which can be approximated by the exponential function.

The centrifugal force of a tornado funnel plays an important role, it causes the inside of a tornado funnel T pressure in comparison to the pressure outside the hopper, is significantly smaller. And this fact is the main cause of the ravages made by the tornado. When the tornado funnel reaches the earth's surface to its interior sucks in everything that is on this surface.

Should be taken into account the fact that the objects he draws from the surface have electrical charges. These charges in relation to positively ionized tornado funnel mantle are negative. They will cause a slow reduction of a big positive electrical potential tornadoes and funnel through it will cause the power source by reduction of tornado high positive potential storm cloud.

The mechanism of the devastation is as follows. Sucked into the funnel objects are electrostatically neutralized and discarded centrifugal force outside the hopper. This phenomenon is continuous, at the junction of the tornado funnel and the land items electrically neutralized, such as debris and dust are rejected outside the tornado's funnel with great force, forming around the funnel reverse cone characteristic of turbulent winds. It also explains the point of discharge is often seen as short-lived flares, sparks or electric arcs when the vortex passages of the metal structures and power lines.

On this basis, a tornado can be defined as follows:

Tornado is a form of electrical discharge occurring between a thundercloud and the ground surface, in which ionized air particles accelerated a large gradient of the electric field E , existing between the cloud and the earth, move along helical-spiral motion forced by the earth's magnetic field, creating a single vortex touches the ground surface, which become violently sucked interior of matter and electrical charges, and after their neutralization matter is rejected outwards by centrifugal funnel that gives rise to turbulence in the form of devastating winds.

The duration of a tornado is relatively short, lasting from a few to tens of minutes. There are exceptional situations when the tornado lasts several hours. At this time tornado discharge accumulated electric charge in a cloud, with is of a source his power. After the exhaustion of the charge, funnel tornado falling to pieces and disappears.

Another proof of correctness above reasoning is that the northern hemisphere and the return eddy movements of air masses in both tornadoes and powerful hurricanes (cyclones and typhoons) is always counterclockwise, while in the southern hemisphere clockwise. This phrase is forced of the opposite direction magnetic field lines of Earth on its hemispheres.

Protection against a tornado.

The analysis conditions of the origin, mechanism of action hypothesis of tornadoes and tornado new definition allows you to draw conclusions on the opportunities to protect land against their devastated consequences.

In order to protect the area against tornados need eliminate or reduce the impact of at least one of the described factors determining their performance.

It is therefore necessary to reduce or eliminate the electric field formed between the thundercloud and the earth and / or reduce or change the direction the local Earth's Magnetic Field.

The essence of the invention.

Lies in the fact that the protected zone girdling the site I created coil windings (solenoid) with a large diameter, made of insulated electrical conductor. Tip winding join the DC power source high power so that the direction of electric current through the winding of the coil, for land located in the northern hemisphere was the counterclockwise while in the southern hemisphere clockwise.

The current in the coil is switched manually or automatically direct threat during a tornado.

When you turn on the coil to a power source, it will be produced a magnetic field directed opposite to the vertical component EMF.

Local inversion EMF recovery would result in significant disruption trajectory ionized air particles in the vortex resulting in the lower part of the tornado funnel changes its course and pass a protected area. This will be the shape of the sheaf of magnetic field lines generated by the solenoid, outside whose EMF is strengthened.

Solenoid coil can be shallow buried underground or installed on its surface. Due to the large number of turns needed 100-200, large electrical wire allows current to flow of a magnitude up to several hundred amperes and the power supply of several hundred volts, the coil must be properly enclosed and protected against mechanical damage. Power source should be a generator with a capacity of several hundred kW. As a power source can also be used provided batteries for continuous operation under load.

The angular diameter of the coil, such as a solenoid, number of turns, sections of conductor and the power supply connected to the winding, depends on the size of the protected area and the expected intensity of tornadoes.

Solenoid coil is connected to a power supply only in the case of direct threat signaled by meteorological services. The system can be used for integrating the computer takes into account the physical parameters accompanying tornadoes. The present invention is shown in

the embodiment in Figure. Figure 1 presents the schematic way in terms of protection of land with single objects and outbuildings. The dashed line marked with approximate boundaries of the protected zone.

In the sample solution into the protection area in a circle with a diameter of 100 m was used coil unit in a circle with a diameter of about 90 m can be the following parameters:

Coil diameter of	\varnothing 90 m
Diameter aluminum wire	\varnothing 10 mm
Number of turns of the coil	50
Winding resistance	$R = 5 \text{ Ohm}$
DC Current	$I = 100 \text{ A}$
The supply voltage	$U = I \times R = 500 \text{ V}$
Unit power	$P = U \times I = 50 \text{ kW}$

As shown in Figure 1 the protected zone of individual objects O includes coil windings made of the electrical conductor, whose ends are connected to the generator set G, DC or battery. In the direction of current flow in the winding of the coil located in the northern hemisphere is the left-handed. The use of exhaust G DC generator or battery is necessary due to the possible tornado damage over the next grid.

Generating set G is activated and activated manually or remotely radio signal R given by the Meteorological Service.

Current through the coil C winding, generates magnetic field - directed opposite to the Earth - with a value of magnetic flux on the surface about 1.5 Gauss. At about 45 m above the surface, this flux offset vertical component of the EMF and a significant reduction is followed to the height of 100 m

Coil unit provides protection against small land tornadoes that occur in central Europe, for example in Poland and Germany where Fujita scale of tornado are a size 0 – 1. To protect the area of larger tornadoes, around the protected zone should install greater number of sample units.

Their estimated number and the required power of the device is shown in the table below.

Power F scale of tornado	Required units (solenoid)	Aggregate power (kW)
0	1	50
1	2	100
2	3	150
3	5	250
4	8	400
5	Requires larger diameter solenoid	750 - 1000

A patent claim

Way to secure the site against destructive effects of tornadoes, characterized in that the protected zone of land shall be included in P C coil windings made of insulated electrical conductor, whose tip Join the DC power source G high power so that the direction of current flow through the winding of the coil C to site located in the northern hemisphere was the left-handed (In) and clockwise in the Southern Hemisphere (Is), the current (In, Is) is switched manually or automatically direct threat during a tornado.

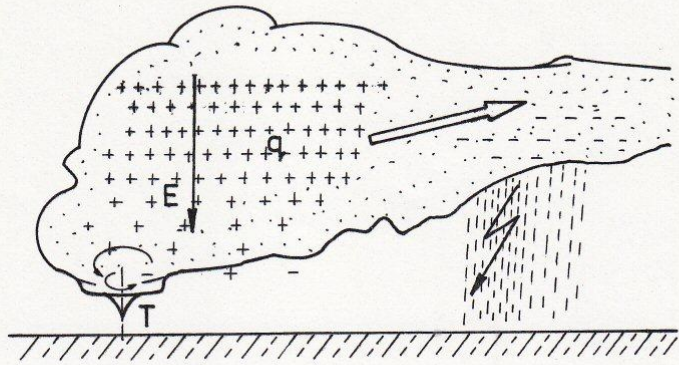
TORNADOGuard

Abbreviation Description

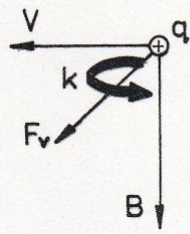
The invention consists in the taking of a protected zone (O), coil (C) coil made of insulated electrical conductor. Tips winding join the DC power source (G) high power so that the direction of current flow through the winding of coil (C) for land located on the northern hemisphere was the counterclockwise (In) and clockwise in the southern hemisphere (Is .) Electricity is turn on manually or automatically if direct threat During a tornado. See Figure 1

(1 a reservation)

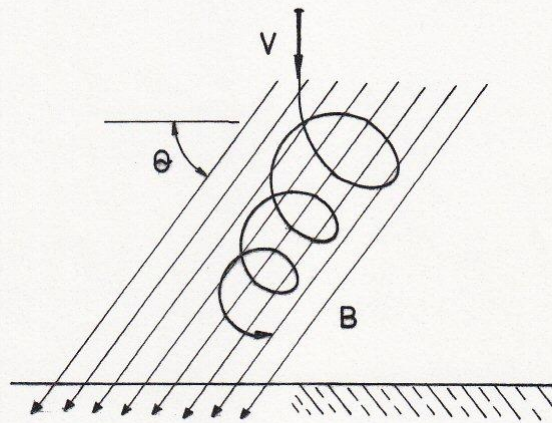
By Wajda, Tadeusz 2004



POS.I



POS.II



POS.III

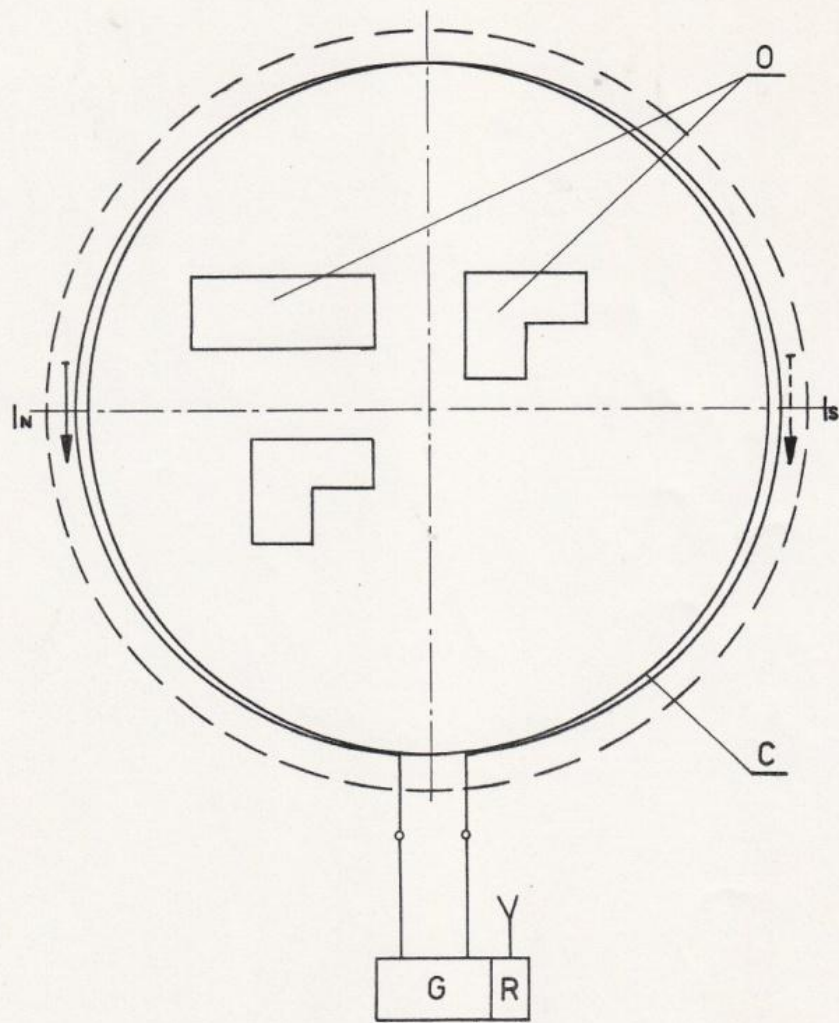


FIG.1