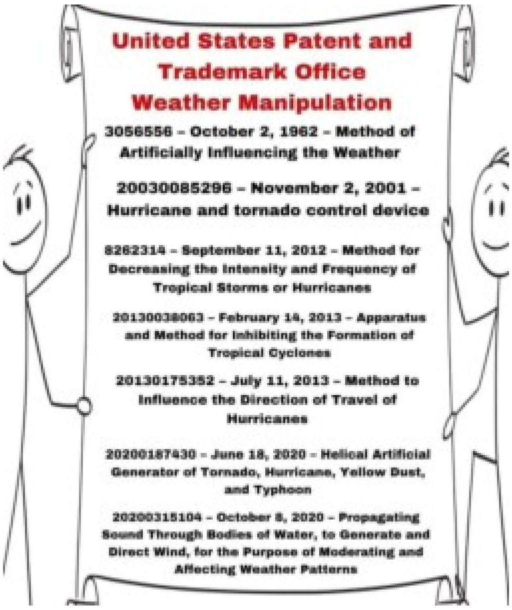
[Is the Extreme Weather in America Purposely Created by Technology to Blame it on Climate Change And Tax The Public for CO^2 Emissions?]



My wife sent me above meme. I fact-checked these patent numbers to see if they actually exist. They all do!

US patent #3056556: Method of artificially influencing the weather
Description
"United States Patent Oil" Patented Oct. 2, 1962 ICC The invention relates to a method of artificially influencing the weather by turning undercooled clouds into ice particles for the purpose of generating a rainfall and of preventing the formation of hail by seeding the said clouds with ice-forming nuclei, i.e. with freezing or sublimation nuclei in finely atomized form." (Source: https://patents.google.com/patent/US3056556A/en) Read More

The technique of seeding undercooled clouds in this manner has become known per se. In most cases the operation consisted in that undercooled clouds were turned into ice particles by the introduction of finely distributed silver iodide (Agl), whereby in certain circumstances an increase of the rainfall can be attained, or in other cases the formation of hail is made more diflicult, and in circumstances even a weakening of the electric phenomena attendant a thunderstorm is attained. The silver iodide has been either atomized on the ground by means of so called ground generators and distributed in the atmosphere under the assumption that the seeding material is entrained into the range of the clouds to be seeded by updraft, or alternatively it has been ferried directly into the clouds to be seeded by means of aircraft, rockets or artillery missiles. In the direct ferrying the atomization of the seeding material is effected by means of special devices built into the aircraft, or by the explosion of an explosive charge.

The use of silver iodide as a seeding material is based on this property of acting as freezingor sublimationnuclei even at a relatively high temperature, namely between -4 C. and 5 C., and of turning thereby undercooled clouds into ice particles. Hitherto only very few substances have become known which have nucleus properties similar to those of silver iodide, such as e.g. lead iodide (Pbl These substances have not, however gained any importance in practice for this purpose owing to detrimental properties, such as being poisonous. Even silver iodide has two properties detrimental to its use as a seeding material. There is for example the danger of its having it suitability for forming freezing nuclei strongly impaired when finely distributed in the atmosphere owing to photochemical decomposition by sunlight. Moreover its use in large quantities is uneconomic. It is the main object of the invention to provide substances, which show as good a capability of forming nuclei as silver iodide, but are more stable chemically and physically, and are less expensive to obtain.

With this and other objects in view we provide a seeding material consisting of a copper compound of one of the two first elements of the main column of the sixth column of the periodic table having an atomic weight between and 33 inclusive, for example copper sulphide (CuS) and cupro oxide (Cu O).

The suitability of the aforesaid substances as seeding materials for clouds has been recognized by systematic research. A great number of individual substances has been sorted out and grouped from the following two points of view:

(1) According to the crystallographic properties, such as atom distance, grid constant, type of structure, co ordination number, symmetry, forms of growth and of cleavage;

(2) According to surface properties such as polarizability of the crystal constituents adsorption properties.

On the whole, about individual substances have been selected in this manner and investigated together with a series of crystallized solid solutions within the temperature intervals of 0 to -10 C. and ’10 to 18 C. in a cooling chamber as regards: their capability of forming freezingor sublimation-nuclei. The atomization of the substances was carried out in principle in a mortar, the powder seeded by means of an air spray diffuser into an undercooled cloud produced in a cooling chamber.

The substances investigated can be divided into the following main groups:
(1) Crystallized inorganic substances;
((1) Artificially produced; (b) Natural rock-forming minerals; (2) Crystallized organic substances (cellulose or protein bodies); (3) Vitreous substances.
In order to make attainment more certain, moreover a great proportion of these substances has been examined by X-ray photography.

The investigations lead to result that within the same temperature interval as silver iodide and lead iodide (which had already been known) the following substances in dispersed form act as ice forming nuclei: copper iodide (CuI);

cupro-oxide (Cu O); copper sulphide (CuS); copper selenide (CuSe); mercury telluride (HgTe); vanadium pentoxide (V 0 silver sulphide (Ag S); silver nitrate (AgNO silver oxide (Ag O) and cadmium telluride (CdTe).

For the praxis of influencing the weather by turning undercooled clouds into ice particles mainly copper sulphide and cupro oxide come into question, because the other active substances enumerated are more or less unsuitable either owing to their poisonous character or for economic reasons.

The aforesaid seed-forming substances have to be brought into a state of fine dispersion for the seeding of the atmosphere, in the same manner as known for silver iodide.
For this purpose the following methods have been found particularly suitable:
(a) Atomizing by evaporation of colloidal solutions or emulsions of these substances,
(1;) Dispersing and atomizing by the aid of an explosive charge,
(c) Dispersing and atomizing by the burning off of pyrotechnical mixtures, 1
(d) Atomizing of pulverized substances by means of airspray diffuser appliances.
While we have herein described what may be considered typical and particularly useful embodiments of our invention, we wish it to be understood. that we do not limit ourselves to the particular details and compounds enumerated, for obvious modifications will occur to a person skilled in the art.

What we claim as our joint invention and desire to secure by Letters Patent is:
A method for artificially influencing the weather by turning undercooled dlouds into ice particles for the formation of rain and for the prevention of the formation of bail by the seeding in of ice forming nuclei as the cores of freezing and sublimation in an atomized state into such clouds wherein the seeding material is copper sulphide (CuS).

References Cited in the file of this patent UNITED STATES PATENTS 2,527,230 Schaefer et al Oct. M, 1950

US patent #20030085296: **Hurricane and tornado control device**
Abstract
A method is disclosed for affecting the formation and/or direction of a low atmospheric weather system. Audio generators are positioned to project sound waves toward a peripheral area of a weather system. The sound waves are generated at a frequency to affect the formation of the weather system in a manner to disrupt, enhance or direct the formation. The sound waves can also be projected in a manner to cause the system to produce rain. (Source https://patents.google.com/patent/US20030085296A1/en) Read More

BACKGROUND OF THE INVENTION

- [0001]
  1. Field of the Invention

- [0002]
  The present invention generally relates to a method of weather control. More specifically, the present invention is drawn to a method of employing high decibel sound waves to affect the formation of weather systems.
- [0003]
  2. Description of Related Art
- [0004]
  The ferocious winds and rains of tornadoes and hurricanes account for the loss of many lives and billions of dollars annually. Names such as “Hugo” and “Andrew” have become legendary when people talk of destruction caused by “Mother Nature”.
- [0005]
  In the U.S.A., the U.S. Weather Research Program and the National Oceanic Atmospheric Administration have invested millions of dollars in research to find a system(s) which will predict with accuracy the formation and path of potentially violent weather systems.
- [0006]
  Of the two, hurricanes are more predictable as to formation and direction. Hurricanes are born over warm tropical oceans and will most likely develop from lower atmosphere storm clusters which coalesce to form a tropical storm. Under certain conditions, water vapor pushed up from the ocean’s surface will fuel the tropical storm, creating the violent rotating winds which define a hurricane. Since warm water is the fuel, hurricanes will last much longer over water than over land.
- [0007]
  Although occurring in many parts of the world, data collected by the National Oceanic and Atmospheric Administration (NOAA) indicates that tornadoes appear most frequently in the United States east of the Rocky Mountains during the spring and summer months. In an average year, about eight hundred tornadoes are reported. Tornadoes are formed when a change in wind direction and an increase in wind speed create an invisible, horizontal rotating effect in the lower atmosphere as a more powerful weather system (thunderstorm) develops in the higher atmosphere. Rising air within the thunderstorm causes the lower atmosphere rotating air to tilt from horizontal to vertical and form a violently rotating column of air extending from the thunderstorm to the ground. Tornadoes may last from a few minutes (weak) to over an hour (violent) and have wind speeds which range from about one hundred miles per hour to over two hundred miles per hour.
- [0008]
  Ongoing research is also being done to cause weather systems to produce rain where needed. This capability would be of obvious advantage in the farming industry.
- [0009]
  There are systems disclosed in prior art for preventing the formation of hurricanes and tornadoes. For example, U.S. Pat. No. 2,903,188 (Hutchinson), U.S. Pat. No. 5,441,200 (Rovella, II), and British Patent 2,186,781A disclose methods of disruption of tornado formations which involve cloud seeding.
- [0010]

U.S. Pat. No. 1,980,171 (Amy), U.S. Pat. No. 2,480,275 (van Straten, et al.) and U.S. Pat. No. 4,848,656 (Magill) disclose the use of sound waves to control water droplet content in clouds.

- [0011]
  U.S. Pat. No. 230,067 (Ruggles), U.S. Pat. No. 1,279,823 (Balsillie), and U.S. Pat. No. 2,527,230 (Schaefer et al.) show methods of cloud seeding for the production of rain.
- [0012]
  U.S. Pat. No. 3,606,153 (Boucher) shows a method of dispersing fog by employing microwaves.
- [0013]
  U.S. Pat. No. 5,411,209 (oilivier) and U.S. Pat. No. 5,445,321 (Oilivier) are concerned with employing shock waves to prevent hail.
- [0014]
  British Patent 2,156,647A utilizes explosives to generate a cyclone.
- [0015]
  None of the above inventions and patents, taken either singly; or in combination, is seen to disclose a method of employing sound waves to affect the formation of weather systems as will subsequently be described and claimed in the instant invention.

SUMMARY OF THE INVENTION

- [0016]
  The present invention requires the recognition of the low atmosphere weather systems near the earth’s surface that have the potential to produce hurricanes, tornadoes or rain. When recognition is realized, mega generators are employed to produce high decibel sound waves, which sound waves are projected toward the clouds and rotating winds which form the low atmosphere systems. In one scenario, the high frequency sound waves will function to disrupt and slow the rotating winds, thereby preventing a hurricane or tornado from forming. In another scenario, the high frequency sound waves will function to enhance the rotation of the winds, thereby causing a hurricane or tornado to form. The inventive concept also incorporates utilization of high decibel sound waves to alter the direction of the low atmosphere systems, thereby determining the path of the potential hurricane or tornado.
- [0017]
  Sound waves may also be projected at potentially non-violent weather systems to cause such systems to produce rain.
- [0018]
  Accordingly, it is a principal object of the invention to provide a process for affecting the formation of low atmospheric weather systems.
- [0019]
  It is another object of the invention to provide a process to alter the direction of weather systems which may produce hurricanes and tornadoes.
- [0020]
  It is a further object of the invention to provide a process to disrupt or enhance the formation of hurricanes and tornadoes.
- [0021]
  Still another object of the invention is to provide a process to produce

rain from low atmospheric weather systems.

- [0022]
  It is an object of the invention to provide improved steps and arrangements thereof in a method for the purposes described which are dependable and fully effective in accomplishing their intended purposes.
- [0023]
  These and other objects of the present invention will become readily apparent upon further review of the following specification and drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

- [0024]
  FIG. 1 is an environmental, schematic view of sound waves directed toward a system which may form a hurricane or tornado according to the present invention.
- [0025]
  FIG. 2 is a schematic top view of sound waves directed toward a system which may form a hurricane or tornado according to the present invention.
- [0026]
  FIG. 3 is a schematic view of sound waves directed to steer a hurricane or tornado to the right according to the present invention.
- [0027]
  FIG. 4 is a schematic view of sound waves directed to steer a hurricane to the left according to the present invention.
- [0028]
  FIG. 5 is a schematic view of sound waves directed to create a hurricane or tornado according to the present invention.
- [0029]
  FIG. 6 is a schematic view of sound waves directed at a system to generate rain.
- [0030]
  Similar reference characters denote corresponding features consistently throughout the attached drawings.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

- [0031]
  Referring to FIGS. 1 and 2, the present invention employs at least two high decibel audio generators **12** positioned to focus and project sound waves **14** at a weather system generally designated at **10**. Weather system **10** comprises low atmosphere clouds and rotating winds having the potential to develop into a full fledged hurricane or tornado. Audio generators **12** are designed to produce sound waves **14** in the 100-2000 Hz frequency range. Generators **12** are not part of the inventive concept per se. For maximum effectiveness, the sound waves should be focused and projected toward a peripheral area of the rotating weather system and countercurrent to the rotating direction. As best seen in FIG. 2, generators **12** are disposed to direct the sound waves **14** in an area where the rotating velocity is approximately ten mph. When employed on a ship at sea, it may be necessary to utilize gyroscopes as mounts to ensure

steady focus and projection of the generators.

- [0032]
  Since hurricanes and tornadoes contain large amounts of moisture, it may be desirable to direct these systems to areas in need of rain before disruption. FIGS. 3 and 4 schematically illustrate how generators **12** may focus sound waves **14** to direct the path of the weather systems. FIG. 3 illustrates how the sound waves are focused to guide a weather system **10** so that the system makes a turn to the right. FIG. 4 illustrates how the weather system may be turned to the left.
- [0033]
  Under certain conditions, a nation might find it advantageous to create a tornado or hurricane. For example, creation of a strong storm system could deter an enemy attack. FIG. 5 illustrates generators **12** positioned to project sound waves concurrent with the rotational direction of winds to reinforce the rotating vector of weather system **10**, thereby assisting the system in attaining hurricane or tornado status.
- [0034]
  As illustrated in FIG. 6, a generator **12** projects waves **14** at a low atmospheric system **10** to produce rain. The contemplated projected frequency range is one thousand to two thousand fps. The sound waves are projected at an angle which would induce a rotational vector in the system having a partial rotational waddle of about five hundred to two thousand fpm.
- [0035]
  It is to be understood that the present invention is not limited to the sole embodiments described above, but encompasses any and all embodiments within the scope of the following claims.

US patent #8262314: Method for decreasing the intensity and frequency of tropical storms or hurricanes

Abstract
Modification of tropical storms or hurricanes by mixing the upper layer of a section of a body of water with water from a lower section of the body of water. Rapidly mixing the warmer upper layer with the cooler lower layer cools the surface of the water, thereby reducing the amount of heat energy available to fuel the intensity and movement of storms. By cooling selected sections of water, the frequency, intensity or direction of storms may be altered. In one embodiment of the invention, a bluff shaped object is attached to a submarine to facilitate rapid mixing of the upper and lower layers of the body of water. (Source: https://patents.google.com/patent/US8262314B2/en) Read More

Description
FIELD OF THE INVENTION
The present invention relates generally to the field of weather modification. More specifically, the present invention relates to methods for modifying and suppressing the spawning of tropical storms, and modification of the dynamics of hurricanes and diminishing their intensity.

BACKGROUND INFORMATION

The world's oceans and seas typically have temperature versus depth profiles that can be characterized generally as shown in FIG. 1. For example, the upper layer is usually at a uniform temperature as a result of wind and wave mixing. The temperature is determined by the intensity and duration of solar radiation, as well as the efficiency of wind driven surface mixing. Although the depth of the upper layer varies depending on the season, a nominal depth for the upper layer is approximately 50 meters. Deeper water is usually significantly colder, approximately 10° C. colder than the upper layer. The transition between upper and lower layers is referred to as the thermocline. The thermocline has a nominal thickness of approximately 20 meters. Although these dimensions vary depending on the time of year and geographic location, the numbers presented are for illustrative purposes.

It is well-known that hurricanes which travel to North America originate from tropical storms that are spawned in the tropical waters of the eastern Atlantic, near the Western coast of Africa. It also is understood that the originating tropical storms, and the hurricanes which develop from them, are fueled by the energy content of the warm, upper layers of the ocean. There is a strong correlation between the frequency and strength of such storms and the energy content of those upper, heated layers of the ocean.

Accordingly, decreasing the temperature of this upper layer of ocean water could diminish the occurrence and intensity of tropical storms. In addition, decreasing the temperature of the upper, warmer layer of ocean in the path of a hurricane could (1) diminish, or quench, the strength of a hurricane; or (2) alter the course of a hurricane.

U.S. Pat No. 4,470,544 and U.S. Pat. No. 5,492,274 disclose methods for slowly mixing layers of sea water to achieve greater rainfall in the Mediterranean basin. Slowly mixing layers of a large body of water increases the potential solar energy captured by the water, and increases the intensity of storms fueled by the energy content of the water. To diminish the strength of a hurricane or alter its course, however, rapid mixing of ocean layers is required.

SUMMARY OF THE INVENTION

The present invention provides an exemplary method for affecting the strength and/or direction of a storm, such as a hurricane, by cooling the upper, warmer layer of a large body of water and mixing it with the significantly cooler water that exists below the relatively warmer upper layer. The displacement and resulting mixing is achieved, for example, by submarines or other suitable vessels operating in the thermocline, the transition layer between the upper warm layer and the deeper cold layer of ocean.

In one exemplary embodiment of the present invention, relatively large areas of East Atlantic tropical waters are cooled to reduce the intensity and/or frequency of tropical storms.

In a second exemplary embodiment of the present invention, sections of upper ocean layers in the vicinity of a hurricane, or in the vicinity of the expected path of a hurricane, are rapidly cooled to alter the course of a hurricane, slow the speed of a hurricane, or reduce the intensity of a hurricane.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a diagram depicting the water depth of the thermocline for various months of the year.
FIG. 2 is a diagram depicting the warmer, upper layer of a large body of water and the cooler, lower layer of the large body of water.
FIG. 3 is a diagram of a submarine with a bluff-shaped obstacle mounted at the bow of the submarine according to an exemplary embodiment of the present invention.
FIG. 4 is a diagram of a submarine with a bluff-shaped obstacle mounted on the submarine at a location that is downstream from the bow of the submarine according to an exemplary embodiment of the present invention.
FIG. 5 is a diagram of a submarine with bluff-shaped obstacles towed behind the submarine according to an exemplary embodiment of the present invention.

DETAILED DESCRIPTION

A simple calculation suffices for determining the work required to cool the upper layer of a section of a large body of water by mixing it with water from a lower layer. For illustrative purposes, the large body of water is assumed to be the Atlantic Ocean. FIG. 2 depicts the approximate heights, densities and temperatures of two layers of the ocean as (H_u,ρ_u,T_u) and (H_l,ρ_l,T_l) respectively for the upper and lower layers. If a 1 m^2 column height H_l is raised to the average height of $H_u/2$ the work, W, required to displace such a column of ocean water can be estimated by the equation
$$W=\frac{g}{2}(\rho_l-\rho_u)H_l H_u$$
where g represents acceleration due to gravity (approximately 10 m/s^2). The resulting 1 m^2 column of height H_l+H_u will be at the approximate temperature
$$\bar{T}=\frac{H_u T_u+H_l T_l}{H_u+H_l}$$
The heavy, colder, lower layer of the ocean is approximately 0.2% heavier than the warm, upper layer of the ocean as explained in the Handbook of Chemistry and Physics, 1973 at D221, which is hereby incorporated by reference. As is known in the art, the nominal density of seawater in the upper layer is approximately 1025 kg/m^3 and the nominal density of seawater in the colder, lower layer is approximately 1027 kg/m^3. Therefore, for
$$H_u=50\text{ m}, H_l=20\text{ m} (g=10\text{ m/s}^2, \rho_l-\rho_u=2\text{ kg/m}^3),$$
the work required to displace the colder water into the upper warmer water is approximately $W=10^4$ joules. Under summer conditions, the water temperature of the new upper layer will be about 5° C. colder as a result of mixing the lower layer of colder water into the upper layer. For a nominal surface area of ocean of 10^{10} m^2 (roughly 3600 sq. miles), the work needed to mix the upper and lower layers in this fashion would be approximately $W=10^{14}$ joules.
Mixing Layers of Large Bodies of Water
Submarines offer a highly efficient means of ocean travel. Unlike surface ships, submarines create virtually no wave drag. Although performance information on nuclear submarines remains largely confidential, typical cruise speeds are reasonably assumed to be in excess of 30 knots, or approximately 15 m/sec. Nuclear submarines are highly streamlined, but only limited data is available in the literature concerning their performance and drag characteristics. See Polmar & Moore, Cold War Submarines (2003). However, a consensus value for the coefficient of drag of a nuclear submarine

is $c_f^0 \approx 0.4$ as understood by those skilled in the art.
Nuclear submarines can remain submerged for very long periods of time. Also, underwater travel is relatively unaffected by surface conditions. Hurricanes do not significantly affect submarine dynamics at a depth of approximately 50 m.
On this basis, the power output of a submarine with an effective cross-sectional area A cruising at speed U_0 is
$$P=\frac{1}{2}\rho U_0^3 c_f^0 A,$$
where c_f^0 is the drag coefficient. For U_0=30 knots (15 m/sec) and A=100 m^2
$P \approx 5\times10^7$ joules/sec(50 MW)
The streamlined features of a submarine makes it less than optimal for rapidly mixing layers of the ocean. In order to achieve rapid mixing of ocean layers, turbulent flow with eddy generation in the 5-10 m diameter range is desirable. As shown in FIGS. 3 and 4, such eddy generation can be achieved, for example, by (1) mounting on the bow of the submarine a bluff-shaped obstacle capable of generating the necessary eddy turbulence, such as a 10 m×10 m flat plate (normal to the direction of travel); or (2) mounting at some other location downstream of the bow of the submarine a bluff-shaped obstacle capable of generating the necessary eddy turbulence.
Turbulence devices such as bluff shaped objects may be mounted on the submarine so that they lie flat along the outer surface of the submarine, or so that they are located within the hull of the submarine, when turbulence generation is not desired (e.g. when the submarine is traveling to the section of the large body of water to be cooled). When turbulent flow is desired, the bluff shaped objects could fold away from the surface of the submarine or extend outward from the surface of the submarine to generate the necessary eddy turbulence.
As shown in FIG. 5, eddy generation also can be achieved, for example, by towing behind the submarine one or more bluff-shaped obstacles capable of generating the necessary eddy turbulence. Towing the bluff-shaped obstacles would also add more fluctuations. The towed obstacles may be attached to the submarines by cables, ropes, rods, chains, or similar means.
As also shown in FIGS. 3, **4** and **5**, one or more fins (**10**) may be mounted to at least one side of the submarine. Submarines typically employ multiple fins to help steer the submarines through the water. As appreciated by someone of ordinary skill in the art, the fins attached to a submarine typically have a shape similar to that of an airplane wing. Based on the principles of aerodynamics, when air flows over the surfaces of an airplane wing, the wing produces lift by generating a low pressure region near the upper surface of the wing, and a high pressure region near the underside of the wing. The resulting pressure difference between these two regions results in an upward force on the wing which allows the airplane to fly. In addition, the wing also asserts an equal and opposite force on the surrounding air, forcing the air downward.
Similarly, as appreciated by someone of ordinary skill in the art, submarine fins are used to raise or lower submarines by generating varying pressure regions on the surfaces of the fins when the fins pass through water. Those same pressure regions also cause the surrounding water to be directed perpendicularly to the surface of the fins. As shown in FIGS. 3, **4** and **5**, the fins (**10**) could be generally situated so that they lie parallel to the plane of travel of the submarine. The fins (**10**) could also provide a vertical force

on the water which could further enhance the mixing of the water. As appreciated by one of ordinary skill in the art, a plurality of fins could be arranged to provide alternating upward and downward force on the water.

A nominal drag coefficient for a flat plate moving normal to itself is 1.6. If we denote the coefficient of drag of the above modified submarine by $c_f^{\ b}$, and assume that the cross-sectional area of the modified submarine is equal to the original cross-sectional area of the submarine, it follows that under constant power, the speed of the modified submarine, U^b, is reduced by a factor of

$$\left(\frac{U^b}{U_0}\right)=\left(\frac{c_f^0}{c_f^b}\right)^{1/3}\;(\approx 0.63)$$

Given a speed of U_0=30 knots (kts) for an unmodified submarine, a modified submarine would travel at an approximate speed of $U^b\approx$18 kts, a speed which easily outruns typical hurricanes.

Diminishing the Intensity and Frequency of Tropical Storms

On the basis of the above estimates, a 100 km×100 km section of ocean surface can be cooled 5° C. by one submarine in approximately 24 days. For example,

$$W\_P=10145\times 107\ \text{sec}\approx 24\ \text{days}$$

A more substantial section of ocean surface, say 300 km×300 km (15,000 sq. miles), could be cooled by, for example, nine submarines in the same 24 day period. To minimize the number and strength of hurricanes in a given year, a desired number of submarines could cool the section of ocean a few weeks before the hurricane season.

Particular deployment of submarines can be optimized according to simulation models. Several factors support the proposition that the above mixing times can be achieved by, for example, nine submarines traveling at the depth of the thermocline. For example, the Reynolds number for typical submarine movement is $0(10^8)$, and the diameter of the turbulent wake is known to expand proportionally to $x^{1/3}$ to $x^{1/2}$ where x marks the distance traveled, as explained in Carmody, J. Basic Engng. Trans. A.S.M.E. (1964), Chevray, The turbulent wake of a body of revolution, J. Basic Engineering, Vol. 90 (1968), and Jiménez, et al., Preliminary velocity measurements in the wake of a submarine model, 4th International Symposium of Particle Image Velocimetry, Sep. 17-19, 2001, which are hereby incorporated by reference. After a suitable initial time, measured in minutes, to allow the submarines to develop sufficient eddy generation, 9 submarines traveling in parallel, roughly 500 meters apart from each other, could well mix 2,500 km^2 in roughly 18 hours.

Two additional effects enhance the turbulence intensity and aid in retarding natural turbulence decay. First, vertical stratification enhances the horizontal spread of eddies. This effect, sometimes referred to as "wake collapse," facilitates the lateral spread of turbulence. Second, the ocean surface itself acts as a reflecting surface for turbulent eddy spread, hence also enhancing horizontal spread of the turbulent eddies.

Alteration of Hurricane Paths and Intensity.

Current modeling and simulation provide reasonable forecasts for hurricane paths for up to 5 days. The core region of a hurricane, which accounts for energy uptake of the upper warmer layer of ocean, generally spans an area approximately 50 km×50 km. Such a region can be cooled 5° C. by 9 submarines in approximately 18 hours.

The above determined 18 kts modified submarine speed permits the submarines to outrun the hurricane. An interactive strategy of ocean cooling and renewed path forecasting provides a dynamic program for quenching and/or redirecting

hurricanes. Under natural conditions, the path of a hurricane is determined by available warm surface waters to fuel its movement and intensity. Therefore, selective cooling of the upper layer of ocean water can be used to redirect the path to areas less vulnerable than populated cities, such as the open ocean.
The possibility also exists for cooling the upper layers of the ocean surrounding the core region of a hurricane, thereby stalling the hurricane at sea. By continuing to encircle the hurricane, the intensity of the hurricane may be reduced and the hurricane may be completely quenched.
Although certain preferred exemplary embodiments of the present invention have been shown and described in detail, it should be understood that various changes and modifications may be made therein without departing from the scope of the appended claims.

US patent #20130038063: Apparatus and method for inhibiting the formation of tropical cyclones
Abstract
An apparatus for inhibiting the formation of tropical cyclones, comprising an elongated rigid tube through which cooler water is pumped from below to the near-ocean surface, thereby depriving incipient tropical cyclones of the heat energy they require for further development. The tube contains a pump comprising a fixed flap valve and a movable flap valve. The movable flap valve is attached to a drive disk encircling the tube at a depth where ambient waters have little vertical motion. The wave-driven vertical motion of the elongated tube causes the movable flap valve to oscillate with respect to the fixed flap valve, thereby pumping seawater upward onto the near-ocean surface. The apparatus also can navigate to alternative locations by means of a propulsion/steering system, and it can submerge to a safe depth to avoid oncoming vessels and potentially damaging seas. A fleet of apparatuses is required to provide the necessary cooling effect. (Source: https://patents.google.com/patent/US20130038063A1/en) Read More

Description

CROSS-REFERENCE TO RELATED APPLICATIONS

- [0001]
  This application claims the benefit of provisional patent application No. 61/523,024, filed Aug. 12, 2011.

FEDERALLY SPONSORED RESEARCH

- [0002]
  Not Applicable

SEQUENCE LISTING OR PROGRAM

- [0003]
  Not Applicable

BACKGROUND OF THE INVENTION

- [0004]
  1. Field of Invention
- [0005]
  This invention relates to tropical cyclones, and, more specifically, to inhibiting the formation of tropical cyclones.
- [0006]
  2. Prior Art
- [0007]
  An early attempt to mitigate the destructive forces of hurricanes took place between 1962 and 1983 with a series of experiments known as project STORMFURY, carried out jointly by the U.S. Navy and the U.S. Weather Bureau, as it was then called. During these experiments, crystals of silver iodide were dropped into hurricane rainbands. It was theorized that the crystals would freeze the supercooled water in the rainbands, causing them to grow and weaken the eye wall. STORMFURY failed because hurricanes contained insufficient supercooled water, and the natural variability of hurricanes made it too difficult to interpret the experimental results.
- [0008]
  Other approaches involving cloud seeding are disclosed in U.S. Pat. Nos. 6,315,213 to Cordani (2001), 5,357,865 to Mather (1994), 5,174,498 to Popovitz-Biro, et al. (1992), 5,441,200 to Rovella, II (1995), 4,600,147 to Fukuta, et al. (1986) and 4,096,005 to Slusher (1978). For example, Cordani's patent utilizes a super-absorbent polymer to cause a large absorption of water, resulting in a gel-like substance that precipitates to the surface and lessens storm velocities. The patent to Rovella discloses combining the water vapor in the storm with sodium tartrate powder or, alternatively, cupric sulphate to form heavier drops that disrupt the eye wall through centrifugal force. These chemical approaches all have the potential to cause serious environmental harm, and since the cyclone has already formed and contains a tremendous amount of energy, the volume of chemicals required would undoubtedly be substantial.
- [0009]
  U.S. Pat. No. 7,798,419 to Solc (2010) discloses a wind-driven on-site pump that pumps into the eye wall a large volume (100's of m^3sec^{-1}) of seawater, which is carried aloft up to 10 to 15 km. The centrifugal force of the ascending water is said to impede the circular flow of the cyclone, inhibiting its further development. A disadvantage of this approach is the difficulty of injecting a sufficient volume of seawater into the eye wall to significantly affect the tremendous energy already contained in the cyclone. Moreover, constructing a water-injecting device of adequate capacity that could also withstand the huge sea and wind forces in and around an existing tropical cyclone would be challenging.
- [0010]
  U.S. Pat. No. 7,520,237 to Zhekov (2009) utilizes a wind-driven on-site pump, mounted on a securely moored and buoyant platform, to pump a large volume of on-site seawater into the eye wall, which is

carried aloft, thereby reducing the wind circulation velocity near the eye wall. A water pipe for sucking up the water is to extend to a depth of 450 to 500 feet, where water temperature is around 11 degrees C. This device has several apparent disadvantages, compared with the current invention. There is the cost for the platform, the mooring system, the wind turbine and its structure, the vertical pipe that extends downward 450 to 500 feet into the ocean and the associated electrical and mechanical systems. Moreover, the components and structures need to be fabricated to withstand the tremendous forces associated with hurricanes and high seas. Zhekov also describes how his structure can create bubbles to lower sea surface temperatures. Two principles operate here: the rising of the air bubbles physically push the ambient seawater upward; and through heat transfer, the cooled air within the bubbles absorbs heat from the water in the upper regions as the bubbles ascend, thereby cooling it. A major disadvantage with this method is that the compressors producing the bubbles would have to overcome deep sea pressures to function effectively. There is also a problem of scale: a large number of units would be necessary to achieve sufficient cooling, and there could be a problem of supplying the compressors with sufficient power.

- [0011]
  U.S. Pat. No. 8,161,757 to Rosen (2012) describes using a navigable vessel with a plurality of artificial snow-making devices to spread artificial snow in the path of an existing tropical cyclone. A major disadvantage with this technique is the huge amount of snow that would be required to significantly reduce the intensity of an existing cyclone.
- [0012]
  U.S. Patent Application 2002/0008155 to Uram (2002) discloses a method and system for first detecting the onset of a hurricane region and then rushing one or more apparatuses to the area to cool the surface waters, thereby inhibiting or weakening the hurricane’s formation. A retired submarine is the preferred embodiment for pumping cooler waters from below the surface onto the surface waters. In a later U.S. Patent Application 20050133612 to Uram, a method is disclosed for rushing one or more submarine pumping systems directly below a tropical storm in its infancy and to pump cooler water onto or near the surface waters beneath it to deprive the storm of the energy it requires for further strengthening. This invention requires prior detection of a tropical cyclone, the rapid deployment of the pumping units and a pumping capability sufficient to cool the waters in the storm’s path.
- [0013]
  U.S. Pat. No. 7,832,657 to Kitamura (2010) discloses a device comprising a plurality of elongated, substantially rigid pipes, each with a suction port and an injection port, a pump to suck cold water from the suction port out onto an aim region below the sea surface; an elongated, horizontally oriented platform, that is submerged, with the plurality of pipes secured to the underwater platform. The pipes are pivotable to minimize water resistance when

the platform is being relocated. A retired submarine is the preferred embodiment for the pumping function.

- [0014]
  Another technique for cooling surface waters with cool subsurface waters is described in U.S. Pat. No. 8,148,840 to Gradle (2012). His apparatus is operated from within the eye of a hurricane and travels along the anticipated track of the storm, staying within the eye. The apparatus comprises a wind turbine mounted on a platform that pumps water with a temperature at least 20 degrees C. cooler than the surface water temperature into a plurality of pipes. These pipes then inject the water into an elongate tube through which is passing an air stream, and the atomized air-water mixture is injected into the hurricane eye to de-energize the storm. One significant disadvantage with this method is that such cold water would normally be found only at considerable depth, and moving a platform along the surface at a speed sufficient to stay within the hurricane eye and with pipes extending downward to the required depth could impose a tremendous force at the juncture of the pipes and the platform. To deal with this, Gradle mounts one or more impellers on the shaft to reduce the strain, but keeping the impellers synchronized while driven by a variable power source, such as a wind turbine, could be challenging.
- [0015]
  In Super Freakonomics (S D Levitt and Dubner S J, William Morrow & Co., 2009), the authors report on inventors who are proposing a method for cooling surface seawaters in which a multiplicity of rings is floated on the ocean surface, each with a flexible tube extending downward into the cooler regions of the ocean. The rings extend above the surface so that when they are overtopped by waves, seawater within the rings is momentarily above sea level. The resulting hydraulic pressure will push the warmer surface water downward through the bottom of the flexible tubes, forcing cooler water upward as the water is ejected. The inventors claim that the devices can be very inexpensive, but they acknowledge that towing a large number of them to the preferred locations and mooring them would be costly. Barber, in U.S. Pat. No. 7,536,967 (2009) discloses a similar method, except that surface waters are forcibly injected into a region with cooler waters, forcing the cooler waters to rise to the surface.
- [0016]
  3. Objects and Advantages
- [0017]
  In most years, hurricanes cause major property damage in the United States. Katrina alone caused estimated damages of $85 billion in 2005. Blake et al. report estimates for the thirty costliest hurricanes to hit the United States since 1900.[1] Measured in contemporaneous dollars, damages total damages were estimated at $312 billion, or $408 billion in 2010 dollars. If each of those same hurricanes had struck the U.S. in the same way but with our current population distribution and current property exposure, the estimated total damages would have soared to slightly over $1

trillion. In the 112 years since 1900, the average annual loss from just these 30 hurricanes exceeds $9 billion per year. This estimate for hurricane Katrina, as well as the other statistics in this paragraph are from “The Deadliest, Costliest, and most Intense United States Tropical Cyclones from 1851 to 2006 (and other Frequently Requested Hurricane Facts),” Eric S. Blake, Rappaport, Edward N., and Landsea, National Hurricane Center, Miami, FL, updated 15 Apr. 2007.

- [0018]
  Hurricanes also cause substantial loss of life. While over 8,000 deaths were attributed to the 1900 Galveston hurricane, Katrina caused at least 1,500 deaths in 2005, even with the substantial progress over the past several decades in advanced warnings, emergency management plans, improved evacuation capabilities and more wind-resistant structures.
- [0019]
  It has been suggested that all Atlantic tropical cyclones, and even some tropical cyclones forming in the Pacific, originated as tropical waves from Africa’s West Equatorial coast, where they derive their power from warm sea-surface temperatures (SSTs) [http://www.physorg.com/news6753.html]. That is why the hurricane season begins in summer, after hot winds have warmed the coastal surface waters to above 80° F. Since water temperatures in the thermoclines below the sea surface are significantly cooler, a logical strategy for inhibiting tropical cyclone formation, as suggested by the prior art, is to bring cooler waters to the surface, thereby depriving the tropical waves of the heat energy they require to evolve into large, powerful and destructive storms. This potential to materially inhibit the formation of tropical cyclones by disrupting their formation off the West Coast of Africa is substantial.
- [0020]
  The basic invention is an apparatus that is suspended from the ocean surface and that pumps cooler water from below the ocean surface out onto the near-ocean surface. The pump is driven by wave energy and comprises two one-way valves, one fixed and one movable. By preventing SSTs from reaching the critical temperature of 80° F., the development of tropical cyclones can be inhibited.
- [0021]
  Another embodiment of this invention enables the apparatus to navigate to a pre-determined location. Yet another embodiment enables it to submerge to some pre-determined depth during heavy seas, during periods of calm, or when the apparatus is in the path of an approaching ship, and to re-emerge after these conditions no longer obtain. Still another embodiment enables the apparatus to operate as one member of a fleet of similar apparatuses, each maintaining its distance from the others in order to achieve a relatively uniform distribution of the cooler waters.
- [0022]
  The objects and advantages of the apparatus, as a result of inhibiting the formation of tropical cyclones, include major

reductions in:

- [0023]
  (*a*) loss of life from wind, storm surge, flooding and evacuation accidents;
- [0024]
  (*b*) economic losses from wind and water damage;
- [0025]
  (c) costs and inconvenience attributable to evacuations;
- [0026]
  (d) loss of electrical power;
- [0027]
  (e) disruption to national, regional and local product supply chains, including disruption of energy supplies;
- [0028]
  (f) loss of use of property;
- [0029]
  (g) disruption of the daily lives of residents in at-risk areas;
- [0030]
  (h) resources necessary to respond to and recover from tropical cyclones;
- [0031]
  (i) cost of hurricane insurance premiums, including flood insurance; and
- [0032]
  (j) anxiety among at-risk populations from an approaching storm.

SUMMARY

- [0033]
  The present invention is a method and an apparatus for inhibiting the formation of tropical cyclones, comprising an elongated rigid tube open at both ends, a flotation device at the top end, a weighting device at the bottom end; and a wave-driven device for pumping cooler seawater from the bottom end, through the tube and out onto the near-ocean surface. Additional major embodiments include a means for propelling and steering the apparatus and a means for submerging the apparatus and causing it to re-emerge.
- [0034]
  In the drawings, closely related elements may be designated by the same number but with a different alphabetic suffixes.

DRAWINGS FIGS.

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- [0035]
  FIG. 1. An apparatus for inhibiting the formation of tropical

cyclones

- [0036]
  FIG. 2. A pumping device for forcing cooler seawater upward
- [0037]
  FIG. 3. The valve action of the pump system in conjunction with wave motion
- [0038]
  FIG. 4. The elements of the navigational system
- [0039]
  FIG. 5. The elements of the depth-control system
- [0040]
  FIG. 6. A device for producing onboard electricity

DRAWINGS-Reference Numerals

100—rigid elongated tube
102—flotation device
104a—tube weighting device
104b—tube extender weighting device
106—fairing
108—water-ballast system
112—electronics package
114—solar cell
116—storage battery
118—rigid connecting member
120a—upper steering vane assembly
120b—lower steering vane assembly
120c—tube extender steering vane assembly
122—one-way fixed flap valve
124—one-way movable flap valve
126—support framework
128—drive disk
130a—upper pipe coupler
130b—lower pipe coupler
130c—tube extender pipe coupler
131—elasticized fabric
132—tube extender
134—tube extender clamp
136—flexible tubing
138—tube supporting rib
139—rib clamp
140—flap valve disk
142—elastomeric annulus
144—rigid plate

146—flat flap
148—flap valve hinge
150—bushing
152—pump shaft
154—strainer
155—elastomeric strip
156—vertical slots
158a—upper two-way slider
158b—lower two-way slider
159—elastomeric strip slit
160—cap
162—spoke
164—bracket
166—hub
168—water discharge opening
170—skeg
172—bracket
176—hinge slot
178—pinholes
180—pin
182—vertical stop
186—steering vane hinge
187—steering vane hinge shaft
188—upper steering vane panel
190—lower steering vane panel
192—pin
194—keyhole
196—mounting flange
198—mounting flange backer plate
200—rotary actuator
202—fiberglass covering
204—hinge knuckle
206—PTFE hinge lining
208—hinge leaf
210—reinforcing pin
212—marine rope
214a—outer fairlead
214b—inner fairlead
216—weighted container ring
218—weighted container
220—weight travel-guide tube
222—PVC clamp
224a—first nylon stop
224b—second nylon stop

226—rope-clamp pull-type solenoid
228—D-ring
230—solenoid mounting strap
232—ribbed clamping strip
240—flare
242—bevel
244—bracket
246—mercury switch
248—elastomeric hinge
250—upper air tank
252—vacuum tank
254—ballast tank
256—upper fairing
258—lower fairing
260—air tube
262—air pump
264—first one-way solenoid air valve
266—two-way solenoid air valve
268—second one-way solenoid air valve
270—thru-hull fitting
272—strainer
300—bell clapper
302—bell casting
304—bell electrical circuit
306—adjusting nut
308—electrical insulator (bell)
310—motion detector
320—emergency ascent capsule
336—generator/dynamo
338—drive gear
340—reduction gear set
342—gear-strip mount
344a—first gear strip
344b—second gear strip
346—guide rod
348—guide-rod channel
350—slide shaft
352—slide-shaft bore
354—slide-shaft block
356—upper bevel block
358—lower bevel block
360—vertical slots in pump shaft
362—domed pin
366—slide-shaft hole cap

DETAILED DESCRIPTION Preferred Embodiment—FIGS.

1

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2

,

4

and

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- [0041]
  A preferred embodiment of the current invention is shown in FIG. 1 *a*. The components of this apparatus are ruggedly constructed from materials highly resistant to seawater corrosion. Components near the ocean surface are constructed from materials that are also resistant to ultraviolet radiation. All components should be able to survive repetitive and constant pressures of at least three to five atmospheres. Commercially available components and materials will allow the apparatus to operate substantially trouble-free for a period of at least five years without maintenance. Most surfaces that are exposed to seawater are sprayed or otherwise coated with an ablative-type, anti-fouling coating, which can give protection against marine growth for up to eight years.
- [0042]
  A large plurality of apparatuses operates together as a fleet of apparatuses, with a master apparatus exercising remote control over other apparatuses in its fleet. One or more fleets operate in region(s) of the ocean whose surface waters are to be cooled.
- [0043]
  As shown in FIG. 1 *a*, the body of the preferred embodiment of the apparatus is a non-corrosive, rigid, substantially cylindrical elongated tube (**100**) 120 inches in diameter with a flotation device (**102**) at or near its upper extremity and a weighting device (**104** *a*) at or near its lower extremity. The rigid tube is fabricated from polyvinyl chloride (PVC), polyethylene or other material, depending upon current costs, as well as other considerations. For example, the wall thickness of the tube depends upon expected environmental conditions, as well as on the material, its durability and construction. FIG. 1 *b* depicts a double-walled tube with interior structural members that give the tube a higher strength-to-weight ratio. The length of the rigid tube will depend in major part on typical wave heights in the environment in which it will operate.
- [0044]

To add directional stability to the apparatus, a wedge-shaped, rigid plastic fairing (**106**) is attached with PVC fittings to the front of the rigid tube, as shown in FIG. 1 *e*. The fairing extends from the bottom of the upper steering vane panel set (**120** *a*) to the top of the lower steering vane panel set (**120** *b*). With the fairing attached, the top-view cross-section of the apparatus presents a tear-shaped profile. The orientation of the fairing with respect to the upper steering vane panel set (**120** *a*) is also shown in FIG. 1 *e.*

- [0045]
The length of the rigid tube is extended by means of a relatively inexpensive, flexible tube extender (**132**). The overall length of the tube extender is sufficient to reach seawater with a temperature in summer months at least several degrees Fahrenheit cooler than the sea surface temperature (SST) during warmer months. These cooler temperatures are typically found within the lower region of a thermocline. The specific overall length of the tube is to be determined by the marine environments in which the apparatus is expected to operate.
- [0046]
The construction of the tube extender is shown in FIGS. 1 *c* and **1** *d*. The extender is comprised of a length of flexible tubing (**136**) fabricated from heavy plastic film, supporting ribs (**138**) spaced several feet apart and rib clamps (**139**). The radius of curvature of the circular portion of the ribs is substantially the same as that of the circular tube, and the wedge-shaped portion of the ribs conforms to the shape and dimensions of the fairing (**106**).
- [0047]
As shown in the cross-sectional view in FIG. 1 *d,* the flexible tubing (**136**) is positioned between the ribs (**138**) and the rib clamps (**139**). The clamps hold the ribs and tubing in place by clamping the tubing onto the ribs. The bottom of the tube extender folds onto itself to form a pocket around the circumference of the tubing. The pocket (**104** *b* in FIG. 1 *c*) is filled with a heavy but inexpensive substance. Sand, which has a specific gravity of approximately 2.65 and is generally abundant around coastal marine environments, is the preferred substance; the pocket is clamped shut with a rib and rib clamp. One skilled in the art can determine the mass of the weighting device that is sufficient to overcome hydraulic drag as the apparatus rides the waves. Both the ribs and the rib clamps are constructed from PVC or similar material. The tube extender can be folded accordion-like into a relatively compact, stackable package for economical transport to the site where the apparatuses are launched after final assembly.
- [0048]
Between the rigid tube and the tube extender is a tubular length of expandable or elasticized fabric (**131**) to absorb shock should the apparatus experience a shock or suddenly change its vertical speed and/or direction. At its upper end, the elasticized fabric is held in place with tube extender clamps (**134**) constructed from two straps of webbing, as shown in FIG. 1 *g.* The fabric is clamped between the upper webbing clamp and the rigid tube. The fabric is then folded over the outside of the upper webbing clamp and clamped onto itself and the rigid

tube by a lower (**132** in FIG. 1 *c*) with a rib-and-clamp arrangement similar to that shown for the supporting ribs (**138**) and clamps (**139**) in FIG. 1 *d.*

- [0049]
  Upper and lower steering vane panel sets (**120** *a* and **120** *b*) are mounted in plastic pipe couplers (**130** *a* and **130** *b*) that can connect sections of the rigid tube (**100**). Steering vane panel sets also can be installed on the tube extender as needed; the couplers are attached to the tube extender by means of tube extender clamps (**134**), as shown in FIG. 1 *c.*
- [0050]
  In the preferred embodiment, the tube weighting device (**104** *a*) is a rugged, rigid, circular tube surrounding and attached to the lower outside perimeter of the rigid tube and filled with sand for ballast. One or more storage batteries (**116**) may be incorporated within the weighting device.
- [0051]
  In the preferred embodiment, the flotation device (**102**) is a rugged, rigid, round tube that surrounds and is attached to the upper outside perimeter of the rigid tube (**100**). The buoyancy of the entire apparatus, inclusive of other embodiments, is controlled by a water-ballast or submersion system (**108**) that is described later. There is also an electronics package (**112**) comprising, in the preferred embodiment, a global positioning system (GPS), a controller for providing the means to control current from at least one solar cell (**114**) to at least one long-life, deep-cycle storage battery (**116**), an antenna and receiver for receiving electronic signals, a transmitter for communicating information to other apparatuses in the fleet, a turbulence detector, temperature sensors, a mercury switch, a tilt meter; and, for controlling the submersion (**108**) and steering vane panel sets (**120** *a,* **120** *b* and **120** *c*), an electronic depth gauge, a processor, solenoids and an air pump. A transmitter on the master apparatus is capable of transmitting information to onshore receivers. In the preferred embodiment, there is also a package containing a plurality of solar cells (**114**) mounted on the top of the rigid tube.
- [0052]
  PUMPING. In the preferred embodiment shown in FIG. 1 *a,* the means for pumping cooler seawater upward through the rigid tube to the near-ocean surface is a pumping system comprising a one-way fixed flap valve (**122**) attached to the rigid tube (**100**) and a one-way movable flap valve (**124**) with supporting framework (**126**). The framework comprises a hub (**166** in FIG. 2 *a*) and a plurality of spokes (**162** in FIG. 2 *a*) fabricated from PVC. The movable valve is attached by means of a plurality of strong, rigid connecting members (**118**) to a flat outer drive disk (**128**) or ring that surrounds the rigid tube. The movable valve and drive disk are at a depth at which the ocean is normally vertically stable. The movable valve slides within the tube along a vertical PVC pump shaft (**152**), and the connecting members move within vertical slots (**156** in FIG. 2 *a*) that are fabricated into the rigid tube. The pumping system is powered by wave motion: the flat outer drive disk and the movable valve to which it is attached maintain their vertical position relative to ambient water that is generally vertically stable, while the fixed valve undulates

with the waves, thereby causing seawater to be pumped upward through the rigid tube, through the valves and onto the near-ocean surface through water-discharge openings (**168**) near the top of the tube. The bottom opening of the tube is covered with a strainer (**154** in FIG. 1 *f*) that prevents foreign objects from entering the tube and interfering with the operation of the flap valves.

- [0053]
  FIG. 2*a* shows the pumping device, or pump assembly, in greater detail. In the preferred embodiment, the movable flap valve (**124**) consists of a flap valve disk (**140**) with a diameter slightly less than the inner diameter of the rigid tube within which it operates. The disk contains four apertures (not shown), one in each quadrant of the disk. Overlapping each aperture on all sides is a flat flap (**146**) that is fabricated from an elastomeric material and that cover the apertures. Each flap is attached to the disk with a stainless steel hinge (**148**) along one straight side. On the top of each flap, there is attached a rigid plate (**144**) that substantially conforms to the outer edges of the aperture. In the preferred embodiment, it is slightly smaller than the aperture and centered within its non-hinged sides. The purpose of this plate is to facilitate a seal between the disk surface and the flap. An elastomeric annulus (**142**), whose outer circumference edge is shaped like a squeegee blade, is fabricated from a durable material that is affixed to the outer rim of the disk. It has a diameter slightly greater than the inside diameter of the rigid tube, thereby providing a seal between the inner surface of the rigid tube and the outer circumference of the disk. When the disk changes direction as it slides within the tube, friction causes the outer edge of the annulus to flip direction and to point in the opposite direction in which the disk is moving, similar to the action of a windshield wiper blade upon a windshield.
- [0054]
  In the center of the movable valve is a bushing (**150**) through which the shaft (**152**) of the pump assembly oscillates. The inner wall of the bushing is fabricated from a non-corrosive, low-friction and durable material, such as PTFE in the preferred embodiment. The drive disk (**128**) of the assembly is connected to the movable valve by means of rigid, “T”-shaped connecting members (**118**) that are attached to the disk between its apertures, and are connected to the outer drive disk through vertical slots (**156**) in the rigid tube. These connecting members are preferably made from stainless steel, and the valve disk (**140**) and drive disk are preferably fabricated from fiberglass.
- [0055]
  It is desirable that the vertical slots be as narrow as possible to minimize water leakage through them during pumping. FIG. 2 *b* shows a view of the rigid tube where a connecting member (**118**) extends through a vertical slot (**156**). The connecting member has an “I” cross-section rather than a “T” cross-section within the slot itself, so that the slot can be narrower. To further reduce leakage, FIG. 2 *c* shows a low-friction, abrasion-resistant, flat elastomeric strip (**155**), which completely covers each slot. The “I” section of each connecting member slides within a vertical slit (**159**) down the center of each elastomeric strip, opening and then closing the slit as it travels vertically.

- [0056]
The fixed flap valve (**122**) at the top of the pump assembly is substantially the same as the movable flap valve, except that instead of being connected to an outer drive disk, it is fastened to the inner surface of the rigid tube and sealed with a marine sealant. A PVC cap (**160**), affixed to the center of the fixed valve disk, caps the top of the pump shaft (**152**) and secures the shaft in place. The support framework (**126**) at the bottom of the pump assembly comprises a hub (**166**) and a plurality of spokes (**162**), each of which is attached at its outer end to a bracket (**164**) that is mounted onto the rigid tube. The preferred material for the support framework is PVC, except for the stainless steel brackets.
- [0057]
PROPULSION. The preferred embodiment includes a propulsion and steering system that is comprised of a device for: (*a*) propelling the apparatus through the water, (*b*) controlling the direction in which the apparatus moves, (c) imparting directional stability to its motion through the water, (d) receiving directional instructions from an on-board source and/or from a remote location, and (e) translating the directional instructions into physical action.
- [0058]
The device for propelling the apparatus through the water in the preferred embodiment comprises three steering vane panel sets mounted on pipe couplers (**130** *a,* **130** *b* and **130** *c*), with the upper steering vane panel set (**120** *a*) mounted near the top of the rigid tube, the lower steering vane panel set (**120** *b*) mounted near the bottom of the rigid tube, as shown in FIG. 1 *a,* and the third steering vane panel set mounted near the lower end of the tube extender, as shown in FIG. 1 *c*. Each assembly comprises left- and right-mounted, otherwise identical, steering vane panel sets, with the steering vane panel assemblies mounted on opposite sides of each pipe coupler and at the same distance from the top of the tube. The steering vane panels of each assembly are vertically aligned with each other. Due to ocean-surface turbulence, the upper steering vane panel set should be constructed to withstand greater stress forces than required by the lower steering vane panel set.
- [0059]
FIG. 4*a* shows a back and front view of a single steering vane panel assembly in the preferred embodiment. Each set comprises an upper steering vane panel (**188**) and a lower steering vane panel (**190**), with each steering vane panel pivoting independently on a butt-type hinge (**186**). The steering vane panels share a common hinge shaft (**187**) that rotates within the hinge knuckles (**204**). The vertical stop (**182**) is fabricated from fiberglass. Each steering vane panel assembly is mounted onto the pipe coupler by means of a PVC flange (**196**) and a PVC flange backer plate (**198**) and fastened with stainless steel mounting hardware. The steering vane panels are on the front side of each steering vane panel assembly, where the front is determined by the direction of motion of the apparatus.
- [0060]
Details of the construction of a steering vane panel assembly in the preferred embodiment are shown in the side view in FIG. 4 *b*. The hinge

(**186**) is fabricated from stainless steel and is incorporated into the construction of the fiberglass steering vane panels (**188** and **190**); the outer surfaces of the hinge knuckles (**204**) are also covered in fiberglass (**202**). Stainless steel reinforcing pins (**210**) or projections through the hinge leaves (**208**) reinforce the bond between the hinge leaves and the fiberglass panels. The hinge knuckles are lined with a layer of PTFE (**206**) to minimize friction between the knuckles and the solid PVC hinge shaft (**187**). FIG. 4 *b* also shows the detail of the outer or leading edge of the upper and lower steering vane panels. They are flared and beveled so that the upper panel (**188**) will rotate away from the vertical stop (**182**) by water acting on the bevel (**242**) when the apparatus is ascending from a wave trough, and it will be pushed against the vertical stop by water acting on the flare (**240**) when the apparatus is descending from a wave crest. Conversely, the lower panel, shown at the right of FIG. 4 *b*, will rotate away from the vertical stop when the apparatus is descending from a wave crest and be pushed against the vertical stop when the apparatus is ascending from a wave trough.

- [0061]
  Referring to FIG. 4 *c*, a steering vane panel assembly is assembled as follows: position both the upper and lower steering vane panels (**188** and **190**) so that the hinge knuckles (**204**) are aligned. Insert the hinge shaft (**187** in FIG. 4 *a*) so that the slot in the hinge shaft is aligned with and exposed through the slot (**176**) in the center hinge knuckle. Insert the vertical stop (**182**) through the slot, exposing the two pinholes (**178**). Install the two stainless pins (**180**) into the pinholes. Finally, install stainless steel fairleads (**214** *a* and **214** *b* in FIG. 4 *b*) in the upper and lower portions of the vertical stop.
- [0062]
  FIG. 4*b* shows the preferred embodiment assembly for controlling the rotation of the steering vane panels (**188** and **190**) about the hinge shaft (**187**) and away from the vertical stop (**182**). This assembly comprises a braided marine nylon line or rope (**212**), one end of which is spliced onto a ring (**216**) that is fabricated as part of a weighted container (**218**). The container is constructed of a rugged polymer, filled with sand and topped with seawater, and its total weight should be adjusted to reliably prevent any slack in the rope when the steering vane panels are rotating outward.
- [0063]
  To prevent the weight from swinging and damaging the vertical stop, it operates within a travel-guide tube (**220**) constructed from PVC pipe that is affixed to the steering vane panel with PVC clamps (**222**). The other end of the rope passes through the smooth stainless steel fairleads (**214** *a* and **214** *b*) mounted in either side of the vertical stop (**182**), and through a hole in the steering vane panel. The fairleads minimize abrasion of the marine rope. Finally, a first nylon stop (**224** *a*) is clamped to the upper end of the rope and a second nylon stop (**224** *b*) is clamped to the rope a short distance above the weighted container ring (**216**). The second nylon stop is disposed such that the rotation of the steering vane panel is limited to approximately 45° from the vertical stop when wide open. (To the extent that the prevailing orientation of the apparatus is not vertical—say, due to strong currents affecting only

part of the apparatus—the optimal angle of the steering vane panels with respect to the vertical stop may deviate from 45°.) Each steering vane panel is fitted with a similar assembly for controlling panel rotation (see FIG. 4 *a*).

- [0064]
  STEERING. FIG. 4 *a* shows a rope-clamp solenoid (**226**) mounted on the vertical stop in combination with the lower weight assembly. It enables the rigid tube (**100**) to change its direction of travel. FIG. 4 *e* shows details of the rope-clamp solenoid and its non-corrosive, sealed housing and mounting strap (**230**). A D-ring (**228**) is attached to the exposed end of the pull-type solenoid plunger, and a ribbed clamping strip (**232**) holds the marine rope in place when the solenoid's plunger is energized. The rope-clamp solenoid is powered directly or indirectly by a solar cell. A battery (**116**) is the indirect energy source. The wedge-shaped, rigid plastic fairing (**106**) and the shape of the tube extender (**132**) impart directional stability to the apparatus.
- [0065]
  The means for receiving directional instructions from an on-board source is the global positioning system (GPS) that is included with the apparatus's electronics package (**112**). The means for receiving directional instructions from a remote source or location is an antenna-equipped receiver, which is also included in the electronics package.
- [0066]
  The means for translating the directional instructions into physical action is an electrical or printed circuit board (PCB) that includes a processor and memory with encoded instructions. In “local” mode, software compares the desired position of the apparatus with its actual position, as determined by the onboard GPS. The encoded instructions determine when the PCB is to signal the rope-clamp solenoid(s) (**226**) to engage and for how long. In the “remote” mode, the directional instructions are received by the PCB from a remote location and similarly are translated into signals sent to the rope-clamp solenoids.
- [0067]
  The rope-clamp solenoid is normally energized when the apparatus is ascending; i.e., when the movable valve (**124**) is on its downstroke. This is facilitated by a mercury switch (**246**) in the preferred embodiment. This switch is attached to the external wall of the vacuum tank (**252**) of the water-ballast system (**108** in FIG. 5 *c*) by an elastomeric hinge (**248**) and a bracket (**244**). The contacts are on the hinged end of the mercury switch, so the contacts close when the unattached end of the mercury switch is elevated; i.e., when the movable valve (**124**) is moving away from the fixed valve (**122**). The signal from the PCB to the rope-clamp solenoid goes through the mercury switch, so the solenoid can be energized only when the mercury switch is closed.
- [0068]
  SUBMERSION. In the preferred embodiment, the apparatus has the capability to submerge below the surface and to re-emerge when conditions are favorable. This system is mounted on the rigid tube (**100**) on its trailing side; i.e., orthogonal to the axis of the steering vane panel sets and at the rear of the apparatus when it is moving forward. The main components of the submersion system are shown in FIG. 5 *a* and

comprise a tank or chamber for holding pressurized air (**250**); a vacuum tank or chamber (**252**) that contains a (partial) vacuum when the apparatus is on the ocean surface; a tank or chamber for holding water ballast (**254**); a one-way air pump (**262**) for transferring air from the vacuum tank to the pressurized air tank; a first one-way solenoid air valve (**264**) for transferring air from the pressurized air tank to the vacuum tank; a two-way solenoid air valve (**266**) for allowing airflow between the vacuum tank and the ballast tank; a thru-hull fitting (**270**) to permit seawater to flow into and out of the ballast tank; an upper fairing (**256**) and a lower fairing (**258**) to facilitate the laminar flow of water around the apparatus when it is ascending and descending; a strainer (**272**) fitted into the apex of the lower fairing to screen out foreign objects; and a printed circuit board (PCB) with embedded coded instructions for signaling the transfer of water ballast into and out of the ballast tank by controlling the submersion system's electrical components. The PCB is contained within the electronics package (**112** in FIG. 1 *a*). Arrows shown on the electric components in FIG. 5 *a* indicate the direction of airflow.

- [0069]
  If air needs to be replenished to the system, a second one-way solenoid air valve (**268**) permits fresh air to enter the vacuum tank via an air tube (**260**) that extends to the surface. This air tube runs upward along the outside of the submersion system tanks, over to the rigid tube (**100**), and finally up the outside of the rigid tube to the flotation device on the surface, forming an inverted "U" as it curves around the top of the flotation device with its end facing downward. A ball-check valve at the end of this air tube inhibits water from entering the tube. In the preferred embodiment, the electronic components (**262**, **264** and **268**) are housed inside a waterproof compartment between the pressurized air tank and the vacuum tank. An electronic depth gauge, included in the electronics package (**112** in FIG. 1 *a*), facilitates maintaining the apparatus at a predetermined depth when it is submerged. A PCB with embedded digital instructions controls the action of the depth control system, including ascending, descending and, with the aid of the electronic depth gauge, maintaining a given underwater depth.
- [0070]
  In the preferred embodiment, when an oncoming vessel approaches the apparatus, the apparatus submerges. To implement this feature, all vessels plying waters populated by the apparatus would have a legal requirement to transmit a continuous directional signal that would be received by any functioning apparatus in the vessel's path. A transmitter range of a mile would likely be sufficient, except for unusually fast vessels. When the antenna and receiver aboard the apparatus receive the appropriate transmitted signal, the PCB is signaled to initiate the submersion process.
- [0071]
  In the preferred embodiment, the apparatus also possesses a means for detecting heavy sea conditions. A simple bell-shaped motion detector (**310**), such as that shown in FIG. 5 *b*, can provide adequate warning. This device is housed within the electronics package (**112** in FIG. 1 *a*). Sufficiently unsettled seas cause the stainless steel clapper (**300**) to

contact the stainless steel bell casting (**302**), closing an electrical circuit (**304**) and signaling the PCB to initiate the submersion process. The height of the clapper is adjustable: by raising (lowering) it within the bell casting by means of an adjusting nut (**306**), it will become more (less) sensitive to turbulent motion. An insulator (**308**) keeps the clapper electrically isolated from the bell casting. To reduce the likelihood of false alarms, the clapper is required to make contact with the casting a predetermined number of times within a given time period before the onboard electronics signal the apparatus to submerge.

- [0072]
  When the apparatus determines that conditions might be favorable to return to the surface, it begins its ascent. As it approaches the surface, if the clapper contacts the casting a predetermined number of times within a given time period, indicating turbulence, the apparatus re-submerges. The frequency with which attempts are made to resurface would depend upon the average duration of heavy sea conditions in the local area and the electrical charge status of the battery, as the system is reliant on battery power to resurface. In a preferred embodiment, the decision on when to submerge and re-emerge due to heavy seas would be based on satellite weather information, with appropriate instructions sent electronically to a receiver onboard the apparatus and included in the electronics package.
- [0073]
  In a further embodiment, an emergency-ascent capsule (**320** in FIG. 1 *a*) is tethered to or mounted on the apparatus to provide a means for ascent if the primary ascent system should fail. This capsule contains a packed bladder that can be inflated by a self-contained CO2 cartridge when signaled by an onboard receiver. When the receiver receives an encrypted dedicated wireless signal, a solenoid punctures the CO2 cartridge, releasing gas into the bladder. As the bladder expands, it forces the ends of the capsule to be ejected and provides the apparatus with sufficient buoyancy to ascend to the surface. Ideally, the receiver is capable of receiving the remote signal even if the apparatus is resting on the ocean floor.

Operation—FIGS. 1-5

- [0074]
  The present invention deprives tropical waves of the heat energy they require to develop into tropical cyclones. The invention is a wave-driven apparatus that pumps cooler water from below the ocean surface and redistributes it onto or near the ocean surface. As already noted, to inhibit the formation of tropical cyclones, the surface waters must be kept below 80° F. The preferred embodiment is the apparatus shown in FIG. 1 *a.* A rigid tube (**100**) and tube extender (**132**) extend down from the ocean surface to a region where the water is cooler than sea surface temperatures by at least several degrees during warmer months. The lower extent of a thermocline would serve best. A flotation device (**102**) attached to the top of the tube enables the apparatus to float on the ocean surface, while a weighting device (**104** *a*) at the bottom of the rigid tube (**100**) causes the apparatus to be suspended from the surface

in a substantially vertical position. The weighted device (**104** *b*) at the bottom of the tube extender keeps the extender fully extended.

- [0075]
  PUMPING. As the apparatus rides the waves, a pump within the rigid tube forces water out through openings (**168**) near the top of the tube, at the same time sucking water in through the bottom of the tube extender. The main components of this pump are a fixed flap valve (**122**), a movable flap valve (**124**) and a support framework (**126**) that anchors a shaft (**152**), along which the movable valve slides. The movable valve is attached to a flat outer drive disk (**128**) by rigid connecting members (**118**) that project through slots (**156**) fabricated into the rigid tube.
- [0076]
  In deep water, the vertical motion of water due to surface action drops off rapidly with depth, so that both the flat outer drive disk and the movable valve to which it is attached largely maintain their vertical position relative to the ocean floor while the pump is operating. When the apparatus is riding waves on the ocean surface, the fixed valve oscillates with respect to the movable valve, pumping seawater upward through the tube and tube extender.
- [0077]
  FIG. 3 shows the action of the fixed (**122**) and movable (**124**) flap valves as the rigid tube (**100**) is moved vertically by wave action. In this figure, the wave motion is from right to left, as indicated by the upper arrow; the direction of the apparatus relative to the waves is indicated by the lower arrows above the apparatus. The vertical arrows above and below the movable valve show the direction of motion of the movable valve relative to the fixed valve. The action of the flaps of both the fixed and movable valves is also shown.
- [0078]
  As the apparatus comes off of a wave crest and begins its descent, ambient water pressure acting on the lower face of the flat outer drive disk (**128**) keeps the movable valve (**124**) substantially in place, while the tube (**100**) slides downward and water pressure above the movable valve keeps its flaps closed. As water inside the tube above the movable valve is pushed upward, the fixed valve (**122**) is forced open and water spills out onto the near-ocean surface through the openings (**168**) near the top of the tube. At the same time, reduced water pressure below the movable valve causes water to be sucked in through the bottom of the tube extender.
- [0079]
  As the apparatus ascends toward the crest of the next wave, water pressure acting on the upper surface of the flat outer drive disk creates a pressure drop in the volume of water between the fixed and movable valves as the tube slides away from the movable valve. This pressure drop causes the flaps of the fixed flap valve to close and the flaps of the movable flap valve to open. Pressure is equalized as water flows up through the movable valve. When the apparatus reaches the wave crest, the cycle begins again.
- [0080]
  PROPULSION. In the preferred embodiment, the apparatus has the ability to navigate through the water in a specified direction by means of a

propulsion and steering system. Given the tendency of the apparatus to be moved by the action of wind, waves and currents, this system can—within limits—maintain the apparatus in a globally fixed position. The navigation system also enables the apparatus to travel to another specified location, and/or to maintain a given distance between itself and other like apparatuses so that a relatively uniform distribution of cooler water onto the sea surface can be achieved.

- [0081]
Referring to FIG. 4 *b*, when the apparatus is moving upward through the water, water pressure on the bevel (**242**) of the upper steering vane panel (**188**) causes the panel to rotate outward until the second nylon stop (**224** *b*) on the marine rope (**212**) is stopped by the outer fairlead (**214** *a*). At the same time, water moving over the flared bottom edge (**240**) of the lower steering vane panel (**190**) will push and hold this panel against the vertical stop (**182**). Gravity acting on the weighted container (**218**) prevents any slack from forming in the lower panel's marine rope, which could otherwise interfere with the closing of the lower steering vane panel.
- [0082]
Given the upper steering vane panel's angle of attack as it ascends, water impinging on the panel's upper surface imparts a horizontal component to the motion of the steering vane panel, and therefore to the apparatus. The operation is similar when the apparatus is descending through the water, except that the lower steering vane panel is rotated outward, while the water flow presses the upper steering vane panel against the vertical stop.
- [0083]
Another substantially identical steering vane panel assembly is installed on the opposite side of the pipe coupler (**130** *a* in FIG. 1 *a*) and oriented in the same direction as the first set. As the tube undulates in the waves, substantially equal water pressure acting on both upper steering vane panels causes the apparatus to make way through the water in approximately a straight line, its directional deviations dampened by the wedge-shaped fairing (**106** in FIG. 1 *e*) attached to the front of the rigid tube. As long as the upper steering vane panels' angle of attack through the water is the same, the apparatus will be propelled in the same substantially linear direction on both the upstroke and downstroke of the rigid tube. By positioning a steering vane panel set near the top of the rigid tube, another set near the bottom of the rigid tube, and a third set near the bottom of the tube extender, the efficiency of the movement of the apparatus through the water is significantly increased.
- [0084]
The direction of motion of the apparatus will be approximately at the same angle and in the same direction as the opened steering vane panels, but the length of the flare and the slope of the bevel can affect that direction. The horizontal progress of the apparatus through the water can be optimized by adjusting the length of the marine rope (**212**) between the two nylon stops (**224** *a* and **224** *b*).
- [0085]
Steering the apparatus is accomplished by controlling the outward

rotation of the lower steering vane panels mounted on the front of each steering vane panel set. A lower steering vane panel is prevented from rotating outward by energizing the rope-clamp solenoid (**226** in FIG. 4 *a*) mounted on the back of the vertical stop. When the apparatus needs to change direction, a printed circuit board (PCB) receives a signal either from the onboard GPS or from a remote location. This signal is converted into an electrical current that is sent to the appropriate solenoid. For turning the apparatus, one and only one solenoid in the steering vane panel set is energized, which holds its steering vane panel in the closed position, while the lower steering vane panel in the opposite assembly is permitted to open.

- [0086]
  When the apparatus is to be turned in a clockwise direction, as viewed from above, the rope-clamp solenoid on the lower right steering vane panel is energized on all three steering vane panel sets (**120** *a,* **120** *b* and **120** *c* in FIG. 1 *a*); and when the apparatus is to be turned counterclockwise, the rope-clamp solenoids on the lower left steering vane panels are energized. The length of time the solenoid is energized determines the amount of turn.
- [0087]
  The PCB is populated with a processor and a memory encoded with program instructions. In one operational mode, the program instructions compare the apparatus's desired global position with its actual global position. If a change in position is called for, the processor determines which rope-clamp solenoids, if any, to engage and for how long in order to orient the apparatus in the desired direction. In another operational mode, the PCB receives its input from a remote location. Because the apparatus could be driven off course by wind, waves and currents to a point of no return, a decision could then be made at a remote location how best to deploy the apparatus for future operations. Instructions resulting from the decision would then be transmitted to the master apparatus's PCB via its antenna and receiver included in the electronics package (**112**). It would then transmit instructions to the apparatuses under its control, which units are also capable of receiving instructions remotely.
- [0088]
  Referring to FIG. 4, in the preferred embodiment, a marine rope (**212**) goes through a rope-clamp pull-type solenoid (**226** in FIG. 4 *e*) mounted on the back of the vertical stop (**182** in FIG. 4 *a*). When the apparatus is at or near a wave crest and starts its descent, the mercury switch (**246** in FIG. 5 *c*) closes, and the solenoids are energized on the apparatus's downstroke.
- [0089]
  Referring to FIG. 5 *c*, the mercury switch is mounted on the external wall of the vacuum tank (**252**) of the water-ballast system (**108** in FIG. 5 *a*) by an elastomeric hinge (**248**) and a bracket (**244**). The electrical contacts are on the hinged end of the mercury switch, and these contacts close when the unattached end of the mercury switch is pushed upward by the flow of water, which happens while the apparatus is descending. During descent, the electrical current from the PCB can go through the mercury switch and energize the appropriate solenoid.

- [0090]
Referring again to FIG. 4 *e*, when the solenoid is energized, the D-ring (**228**), through which the rope passes, pulls the rope against the ribbed clamping strip (**232**), thereby preventing the lower panel from rotating outward. Each of the lower panels is similarly configured.
- [0091]
SUBMERSION. In the preferred embodiment, the apparatus also has the capability to submerge when facing hazards such as oncoming ocean vessels and heavy seas, or when ocean waves are too small to pump water from the lower depth, or to avoid a strong, adverse surface current. Moreover, unless the apparatus needs to reposition itself or recharge its batteries, submersion also may be preferable when the water temperature at the base of the tube extender is not sufficiently cooler than the water at the surface. In this last case, a further embodiment would include an electronic temperature sensors mounted at the top of the rigid tube and at the bottom of the tube extender and integrated with the PCB.
- [0092]
The components of the submersion system are shown in FIG. 5, and the action of the electronic components is described in the table below. When the apparatus is on the ocean surface, the air pump (**262**) is turned off and both the first one-way solenoid air valve (**264**) and the two-way solenoid air valve (**266**) are in the normally closed position. Air is fully pressurized in the upper tank (**250**), a (partial) vacuum exists in the middle tank (**252**), and a relatively small amount of seawater is in the bottom of the water-ballast tank (**254**). When the submersion system is signaled to submerge, the two-way solenoid air valve (**266**) opens, causing air to rush from the ballast tank into the vacuum tank. This reduces air pressure in the ballast tank, causing water to rapidly enter through the thru-hull fitting (**270**), thereby causing the apparatus to submerge. When the electronic depth gauge signals that the apparatus is nearing its desired depth, the first solenoid air valve (**264**) opens, allowing pressurized air to flow through the vacuum tank and into the water-ballast tank, displacing enough water to achieve neutral buoyancy, at which point the two-way solenoid air valve (**266**) closes. The air in both the upper and middle tank is still under positive pressure, though pressure remains greater in the upper tank. The air pump then pumps air from the vacuum tank into the upper tank to achieve a proper pressure differential between the vacuum tank and the ballast tank.

Component	Maintain	Submerge	Stabilize	Maintain	Ascend	Stabilize	Maintain
262	Off	Off	Off	Off	Off	On	Off
264	Closed	Closed	Open	Closed	Open	Closed	Closed
266	Closed	Open	Closed	Closed	Open	Closed	Closed

- [0093]
While the apparatus is maintaining its depth below the surface, a PCB with embedded digital instructions receives signals from the electronic depth gauge, which it compares with the desired depth. If the desired

depth is greater than the actual depth by some predetermined amount, the PCB signals the two-way solenoid air valve (**266**) to open and initiate the submersion process. If the desired depth is less than the actual depth by some predetermined amount, the PCB signals both solenoid air valves (**264** and **266**) to open and initiate the ascension process. Otherwise, the PCB maintains the current depth within an appropriate range.

- [0094]
  Whenever the submersion system is signaled to ascend, both solenoid air valves are opened for a predetermined time, allowing air under pressure to enter the ballast tank and forcing water out through the thru-hull. After both valves are closed, the air pump (**262**) re-pressurizes the upper tank (**250**), creating a partial vacuum in the middle tank (**252**). This prepares the apparatus to submerge again.
- [0095]
  If, during an ascent, the motion detector (**310** in FIG. 5 *b*), located in the electronics package, detects adverse environmental conditions, or it is signaled that a vessel is approaching, ascent is suspended, and the apparatus is signaled to descend to the desired level as described earlier. The PCB also has the capability to signal the apparatus to re-emerge on demand, after, say, receiving an external electronic signal from a maintenance crew.
- [0096]
  To fully implement the submersion capabilities of the apparatus, all vessels plying waters populated by the apparatus would have a legal requirement to transmit from an onboard transmitter a directional signal along the vessel’s path and to a depth of, say, 100 feet below the vessel’s draft. The latter requirement will prevent an apparatus from ascending into the path of a vessel or into the vessel itself. In this embodiment, when the apparatus receives the transmitted signal, it interprets the signal as an instruction to submerge. If it is already ascending, it must open the two-way solenoid air valve (**266**), and, at the same time, pump air from the vacuum tank into the pressurized air tank, thereby sucking seawater into the ballast tank and causing the apparatus to submerge.
- [0097]
  In the preferred embodiment, the apparatus also possesses the means for detecting heavy sea conditions, as well as the means for detecting the absence of such conditions so it can return to the surface. The simple, bell-shaped, turbulence detector (**310**), shown in FIG. 5 *b* and mounted within the electronics package, can provide adequate warning. Sufficiently unsettled seas will cause the clapper (**300**) to make contact with the bell casting (**302**), closing an electrical circuit (**304**) and signaling the water-ballast system (**108**) to initiate the submersion process. An insulator (**308**) keeps the clapper electrically isolated from the bell casting. To reduce the likelihood of false alarms, the clapper is required to make contact with the casting a predetermined number of times within a given time period before the onboard electronics signal the apparatus to submerge.
- [0098]
  To determine when it is safe to return to the surface, the same

criterion is applied: as the apparatus is approaching the surface, if the clapper contacts the casting a predetermined number of times within a given time period, the apparatus re-submerges. The frequency with which attempts are made to resurface will depend upon the average duration of heavy-sea conditions, as well as on the charge status of the on-board battery. The latter criterion is imposed to minimize the chance that the battery will be drained beyond further use, thereby rendering the submersion system inoperative. However, in the preferred embodiment, the decision when to submerge and re-emerge is based on satellite weather information, with appropriate instructions sent electronically to the antenna and receiver onboard the apparatus.

Use of the Invention

- [0099]
The task of reducing sea surface temperatures (SSTs) to below 80° F. requires that a large number of apparatuses be distributed over a region of the ocean, and particularly the ocean region off the West Coast of Africa, where most powerful Atlantic cyclones originate. In this region, SSTs in the summer normally do not exceed 86° F.
- [0100]
It has been determined that the current invention offers both a technically and financially feasible solution. The method will be technically feasible if it can be shown how surface temperatures can be reduced by 5° to 6° F.; it will be financially feasible if the expected direct and indirect costs attributable to future tropical cyclones are sufficiently greater than the cost of inhibiting the formation of tropical cyclones by producing, distributing, launching and maintaining a sufficiently large fleet or fleets of the current invention.
- [0101]
If the current invention is operating in an oceanic region in which the average wave height over a typical 24-hour period is four feet and the average wave period is seven seconds, then, if its rigid tube has an inside diameter of five feet and its pump operates at 80% efficiency, it will disgorge about 775,000 cubic feet of cooler water per day or nine cubic feet per second onto the near-ocean surface. The volume of water pumped over the course of a month by a single apparatus and spread uniformly over an area of one square mile would have a depth of 10.0 inches, or, in a year, 10 feet, less any output lost while in a submerged state.
- [0102]
The efficiency of the pump will be less than 100% because there will be some vertical movement in the drive disk (**128**) relative to the water in which it directly operates, and also because the ambient water itself will have some vertical motion due to motion on the ocean surface. I estimate that the efficiency loss from the latter will be about 12% if the drive disk is 15 feet below the wave trough and the wave length is 60 feet. In addition, the flap valve flaps may be momentarily open at the beginning of each stroke, though this pumping loss should be minor. Furthermore, there may be minor leakage through the movable valve’s bushing (**150**), around the elastomeric annulus or seal (**142**) and around

the flaps (**146**) of the flap valves. Finally, leakage will occur through the slits (**159**) in the elastomeric strips (**155**) that cover the vertical slots (**156**) in the rigid tube.

- [0103]
  Under most conditions, the volume of pumped water will be sufficient to cool the ocean surface waters surrounding each pump. Because, over deep water, nearly all of the water circulation and mixing occurs in the region near the surface, the cooler water will mix well with the surface waters, and the dissipation of the cooling effect to waters several feet below is likely to be small. Moreover, the effect of wind and the Stoke’s drift will further cause the cooler waters disgorged from the apparatus to spread outward.
- [0104]
  If a large plurality or fleet of apparatuses is deployed in the area off the West Africa coast, but more specifically, in the area somewhat north of 16° North latitude and between 18° and 23° West longitude, then the cooler water from the apparatuses will be driven by the prevailing winds, waves and surface currents southward initially, and then westward, along the same pathway where most major tropical cyclones form, develop and make their journey to the Western Hemisphere. Of course, the cooler water may be slowly dissipated to deeper waters the further it travels, which suggests that booster fleets of apparatuses may need to be deployed along the westward pathway. On the other hand, the effect of just the original fleet of apparatuses off the West Africa coast may be sufficient to disrupt the sequence of environmental conditions needed to generate most tropical cyclones.
- [0105]
  If surface currents are inadequate to move the cooled surface waters to the south and then to the west, then the ability of the apparatuses to reposition themselves can be used to deploy at least some of the apparatuses further to the south where the currents tend to be stronger. If the efficiency of the steering vane panel sets is 70 percent, average wave height four feet and the wave period seven seconds on average, then the apparatus will be able to make way through the water at a speed of over one-half mph, or nearly 25 cm/s.
- [0106]
  A person skilled in the art will be able to determine the number and placement of apparatuses required to provide sufficient cooling in a given environment. As already noted, the output volume of the pump is readily determined from the diameter of the cylinder tube, the average wave period and wave height of the ambient waves, and the efficiency of the pump. Next, the volume of water that is to be cooled per unit time must be estimated. An upper layer of water is mixed as a result of wind and wave action, and water that is deeper than about half the wave length will experience little mixing. In addition, the horizontal velocity of water below the wave trough falls off rapidly with depth. The water volume per unit time that is to be cooled can be calculated as equal to the layer depth times the average velocity at which this upper water layer is moving times the average distance between pump centers.
- [0107]
  The distance between pump centers, or, equivalently, the number of

equally spaced pumps to be deployed, is determined in part by the temperature difference between the pumped cooler water and the surface waters: the greater the temperature difference, the greater this distance can be, and the fewer the number of pumps needed. In the earlier example, a five-foot-diameter rigid tube pumped nine cubic feet of cooler water per second. If the SST averages 88° F. and the water pumped up from a thermocline is 70° F., then to reduce the SST to no more than 79° F., the volumes of pumped water and warmer surface water per unit time must be in a ratio of at least 1:1. Thus, the average distance between pumps must be such that no more than nine cubic feet of warmer surface water per second crosses an imaginary line between adjacent pumps.

- [0108]
  To minimize the number of pumps needed, the pumps should be placed where the sea surface waters are driven almost entirely by mild-to-moderate prevailing winds and any underwater currents move slowly. The navigational capabilities of the apparatuses enable them to proceed to locations characterized by these conditions. It is noted that in the ocean region of interest, currents at a depth of 50 feet (15 m) are less than two inches (5 cm) per second [http://www.cpc.ncep.noaa.gov/products/GODAS/]. Of course, normal wind and waves have virtually no effect on currents at a depth of 50 feet.
- [0109]
  If 90,000 individual apparatuses were positioned equidistantly along a straight line between 18° and 23° West longitude in the region just north of 16° North latitude, their center points would lie just 17.6 feet apart. Assume wave height averages six feet, wave length 60 feet, wave period seven seconds, and that water mixing 15 feet below the wave trough is negligible. After adjusting for the difference in flow rates as a function of depth due to the Stokes drift, the average flow of ocean water between pumping units is estimated at 48 cubic feet per second. This compares well with the 54 cubic feet per second of cooler water that are pumped from each apparatus.
- [0110]
  Having considered the technical feasibility of the project, we now consider the financial feasibility. A rough estimate of the current cost of each apparatus is $15,000 each. The cost of 90,000 units would then be $1.35 billion. Delivery and launch of the units should be no more than an additional 10 percent of these costs. Predrilled cylinder tubes and subassemblies (e.g., tube extenders, and steering and submerging subassemblies) could be stored efficiently on a delivery vessel, and final assembly of the units could take place on deck prior to launch.
- [0111]
  As stated earlier, the apparatus is designed to operate at least five years without maintenance. However, there still will be failures and losses. Lost units, if not recovered, would have to be replaced, and it usually would be cost-effective to refurbish failed units. If the apparatuses are located within the approximately 300 miles between 18° and 23° West longitude, and within a relatively narrow band above 16° North latitude, two to four ocean-going vessels with tenders operating full-time could provide security, recovery, maintenance and replacement

services.

- [0112]
When all costs are amortized, the annual cost of maintaining a fleet of 90,000 units is estimated at well under $300 million. Refurbishing a unit after five years of use should be considerably less than $5,000. The most expensive component, the rigid tube (**100**), estimated to cost about $160 per foot, should last indefinitely. Should booster fleets be necessary to provide additional cooling of SSTs along the tropical cyclone sea-lanes, costs would increase accordingly. However, even multiple fleets would not have to eliminate or mitigate many tropical cyclones to be cost-effective. As already noted, the total cost of losses from Hurricane Katrina alone was estimated at $108 billion (2005 U.S. dollars)
- [http://www.nhc.noaa.gov/pdf/TCR-AL122005_Katrina.pdf, p. 13], and the estimated average annual cost of hurricanes in the U.S. is $9 billion in 2006 dollars, given the extensive urbanization along the coastal regions of the Atlantic Ocean. Moreover, nearly 85% of major hurricanes began as easterly waves off West Africa [Landsea 1993, cited at http://www.faqs.org/faqs/meteorology/storms-faq/part1/#b]. Thus, the full cost of maintaining a single fleet of the current invention would be about three percent of the expected costs incurred from Atlantic hurricanes.

Other Embodiments

- [0113]
While the above description contains many specificities, these should not be construed as limitations on the scope of the current invention, but as exemplifications of the presently preferred embodiments thereof. Many other ramifications and variations are possible within the teaching of the invention. Examples are provided below. Thus the scope of the invention should be determined by the appended claims and their legal equivalents, rather than the examples given.
- [0114]
In most cases, the apparatus and its components can be constructed from a wide variety of materials. The best materials to use at any given time will depend on the environmental conditions in which the apparatus operates the durability and effectiveness of the materials and their cost. If dissimilar metals are used in combination, then zincs or other devices to protect against galvanic action should be installed.
- In further embodiment of the apparatus shown in FIG. 1A:
    - the rigid tube has other than a cylindrical shape;
    - a radar reflector, a flag or pennant, and/or a strobe light mounted on a staff at the top of the rigid tube serves as a backup avoidance device in the event that oncoming vessels are unable to signal the apparatus to submerge to avoid physical contact;
    - a sound sensor included in the electronics package detects the sound of ship engines and initiates submersion procedures when such sounds are detected, thereby obviating the need for vessels to signal the apparatus.

- a beaconing device that transmits bursts of information to a satellite system that can identify and report the GPS position of an apparatus and, optionally, its status (e.g., whether submerged or on the surface), and whether any components are malfunctioning. An alternative arrangement is to have this technology aboard only the master apparatuses, which would continually collect status and diagnostic information from the apparatuses under its control, transmitting any anomalous information via satellite. This embodiment could provide more time responses by maintenance vessels;
- the printed circuit board contains an instruction set that allows diagnostics to be conducted on the electronics components, which can then be reported to the master apparatus, or, in the case of the master apparatus, directly to a maintenance unit. The instruction set would test the navigational electronics (e.g., GPS, rope-clamp solenoid, mercury switch), the submersion system electronics, (e.g., air pump, air solenoid valves, depth gauge, etc.), solar power system or generator/alternator, temperature sensors, tilt meter, etc. Some of the components could be tested for anomalous readings by comparing these readings with corresponding readings from nearby apparatuses; others would be tested to see if the apparatus responds, say by submerging or altering direction.

Alternative Embodiments

- [0120]
The following are alternative embodiments to the current invention:
  - the elongated tube (**100**) has a diameter other than ten feet, depending, in part, upon the environmental conditions in which the apparatus operates;
  - the elongated tube has a non-cylindrical shape. In this embodiment, the perimeter of the fixed and movable valves are shaped to conform with the contour of the interior walls of the elongated rigid tube;
  - although the initial cost of each unit would be increased significantly, the tube extender is comprised of a sufficiently long, rigid, cylindrical tube and fairing. This would likely reduce maintenance costs, as the rigid tube could be cleaned and reused, whereas a tube extender made from plastic film would likely have to be replaced during each regular maintenance cycle. For improved directional stability, a skeg (**170**) can be added to the bottom of the rigid tube extender and installed with stainless steel brackets (**172**), as shown in FIG. 1 *f;*
  - the flotation device (**102**) is a collapsible, inflatable bladder. An onboard small, electric air pump and solenoid air valve allow air to be added to or removed from the bladder to adjust the buoyancy of the apparatus. If this embodiment is used as a replacement for the water-ballast submersion system,

a reversible air pump can be employed to remove air from the bladder more quickly and increase the submersion rate;

- the flotation device (**102**) comprises a plurality of smaller flotation units;
- the hinge (**148**) attaching each flap valve to the flap valve disk is replaced by an extended part of the flap valve, and the flap valve, or at least its hinge portion, is constructed from a durable elastomeric material having a low fatigue factor;
- leakage through the vertical slots (**156** in FIG. 2 *c*) can be reduced further if the edges of the slit (**159**) in the elastomeric strips (**155**) form a closure-type seal, as in a Zip-lock bag with a slider. A two-way slider (**158** *a*) mounted atop the “T” section of the rigid connecting member (**118**) opens the slit ahead of it when the movable valve is moving toward the fixed valve, while a second two-way slider (**158** *b*) mounted on the bottom of the “T” section of the connecting member closes the slit behind it. When the movable valve is moving away from the fixed valve, the lower slider opens the slit ahead of it, while the upper slider closes the slit behind it. In this embodiment, the elastomeric strips are only unsealed near the location where the connecting member protrudes through the slit;
- steering vane panel assemblies are mounted directly onto the rigid tube (**100**), omitting the pipe coupler (**130**);
- an additional steering vane panel set is mounted on a pipe coupler that is between and adjoined to segments of the rigid tube (**100**);
- an additional steering vane panel set is mounted on a pipe coupler that is between and adjoined to segments of the flexible tube extender (**132**);
- the upper steering vane panel (**188**) and the lower steering vane panel (**190**) each operate on a separate horizontal hinge shafts (**187**); the hinge shafts are parallel to each other and vertically aligned;
- the hinge shaft (**187**) is fabricated with a metal rod core for added strength;
- a knot replaces each of the nylon stops (**224** *a* and **224** *b*) clamped onto the rope, but serves the same function;
- a rotary actuator key replaces the rope and rope-clamp embodiment. The rotary actuator (**200**) is mounted on the lower backside of the vertical stop, as shown in FIG. 4 *f*. A pin (**192**) is inserted orthogonally through the outer end of the actuator’s rotor shaft and projects through a keyhole (**194**) in the vertical stop and through the lower steering vane panel (**190**). When the actuator is energized, it rotates and pulls, locking the steering vane panel firmly against the vertical stop.
- a spring-loaded rope winder mounted on the vertical stop (**182**) replaces each of the weighted containers (**218**) and weighted container rings (**216**);
- instead of a separate solenoid rope-clamp (**226**), a solenoid

clamping device is fabricated integrally with a spring-loaded rope winder, which replaces the weighted container assembly (**216**, **218**, **220**, **222** and **224** *b*);
  - the rope-clamp solenoid or rotary actuator embodiment could be mounted on the upper steering vane panels instead of the lower steering vane panels, but this is a less-effective arrangement, as gravity acting on the lower panels assists in maintaining the panel in a closed position. This arrangement also would impede diving speed when the apparatus submerges.
  - instead of, or in addition to, solar panels as the primary source of electrical power, one or more generators (**336**), dynamos or alternators are installed within an elongated rigid tube that is the pump shaft (**152** in FIG. 2). See FIG. 6. The generator is connected to the bushing (**150**) of the movable flap valve (**124**), and is driven by the drive disk (**128**). The generator assembly could be based on a 6-watt, 12-volt, bicycle light-type generator/dynamo (**336**) sealed within a non-corrosive housing. FIG. 6 *a* presents a front view of the generator assembly, FIG. 6 *b* a side view, FIG. 6 *c* a top view, FIG. 6 *d*—a detail of the right slide-shaft block (**354**), which is within bushing (**150**) for the movable valve, and FIG. 6 *e*—a detail showing the pump shaft (**152**), bushing (**150**) and slide shaft (**350**). Referring to FIGS. 6 *a*, **6** *b* and **6** *c*, the rotor shaft of the generator is rotated by a rack-and-pinion arrangement comprising a drive gear (**338**) and reduction gear set (**340**), and opposing vertical gear strips (**344** *a* and **344** *b*), or racks, which are affixed to the gear-strip mount (**342**), or rack mount. The gear-strip mount is mounted onto the interior wall of the pump shaft and extends the full travel length of the movable valve (**124** in FIG. 2 *a*).
- [0139]
The reduction gear set is interposed between the drive gear and gear strips because the rotation of the drive gear, if driven directly by the gear strips, would likely be insufficient to achieve maximum electrical output from the generator. To stabilize the motion of the generator assembly in the horizontal plane, a guide rod (**346**), which is an extension of the generator rotor shaft, travels within a guide-rod channel (**348**). The guide rod channel is installed on the interior wall of the pump shaft nearly opposite from and parallel to the gear-strip mount (**342**). Components exposed to seawater are made from corrosive-resistant materials. For example, gears and gear strips in the preferred embodiment are made from nylon, while the slide shafts and guide rod are made from titanium or stainless steel.
- [0140]
The generator assembly is designed to generate electricity on both the upstroke and downstroke of the rigid tube (**100**). In the preferred embodiment, a mechanical means is used to slide the generator back and forth between the opposing gear strips. When the apparatus is ascending from a wave trough—i.e., when the movable valve (**124** in FIG. 2 *a*) is moving downward, away from the fixed valve (**122** in FIG. **2**)—water pushing from below on the lower bevel block (**358**) causes the generator to slide

towards the first gear strip (**344** *a*), which it engages; conversely, when the apparatus is descending from a wave crest—i.e., when the movable valve is moving upward toward the fixed valve—water from above pushing on the upper bevel block (**356**) causes the generator to slide towards and engage the second gear strip (**344** *b*). The cap (**160** in FIG. 2) is vented or replaced with a pipe coupling to allow water to flow through the pump shaft (**152**).

- [0141]
To slide between the two opposing gear strips, the entire generator assembly slides along two cylindrical, round-ended, titanium slide shafts (**350**) that slide within bores (**352**) that have been bored through the movable valve bushing (**150**) and into each polymer slide-shaft block (**354**) mounted on opposing sides of the generator housing. The slide shafts are oriented orthogonally to the rotor axis of the generator. The height of the bushing (**150**) is such that the bottom edge of the lower bevel block is at least ⅛″ above the lower end of the bushing, and the upper edge of the upper bevel block is at least ⅛″ below the upper end of the bushing.
- [0142]
To prevent the generator from pivoting around the slide shafts, a vertical, small-diameter domed pin (**362**) is pressed orthogonally through each slide shaft (**350**) near its inner end, as shown in FIG. 6 *d*. In this figure, the bushing (**150**) side is distinguished from the slide-shaft-block (**354**) side. Opposing sides of the bushing are bored to receive the slide shafts, which are screwed into them; the outer bores are each covered with a cap (**366** in FIG. 6 *e*). The bores (**352**) for the slide shaft (**350**) are slotted (**364** in FIG. 5 *d*) to receive the pins, which prevent the generator from rotating about the slide shafts. Each slide shaft projects inward through a vertical slot (**360** in FIG. 5 *e*) fabricated into the pump shaft (**152**); these slots extend from the bottom of the cap (**160** in FIG. 2 *a*) on the pump shaft down to the top of the hub (**166** in FIG. 2 *a*) in the support framework (**126** in FIG. 2 *a*). The bushing (**150**), which contains the generator assembly, is attached to the movable valve disk (**140** in FIG. 6 *e*).
    - Instead of the pin (**362**) and slot (**364**) arrangement for the slide shafts (**350**) and blocks (**354**), an extra slide shaft is fitted to one or both slide shaft blocks (**354**) and the bushing (**150**). This will also prevent the generator assembly from pivoting.
    - The generator assembly is installed during the assembly of the apparatus as follows. Install the gear strips (**344** *a* and **344** *b*) onto the gear-strip mount (**342**). Then install the gear-strip mount and guide-rod channel (**348**) onto the interior walls of the pump shaft (**152**), using pre-drilled, countersunk holes. Assemble the generator assembly inside the bushing by screwing the slide shafts (**350**) into the bores (**352**) from the outside of the bushing (**150**) until they are inside the slide-shaft blocks (**354**). Install the caps (**360**). Slide the bushing into the two slots (**360**) at the top of the pump shaft (**152**) and slide it down. Finally, attach the bushing to the movable valve disk (**140**).

- The generator assembly uses only one gear strip, generating electricity on only the upstroke or downstroke of the rigid tube (**100**).
- As a backup device, or instead of the bevel blocks, an electrical means, such as a solenoid, is used to shuttle the generator back and forth along the slide shafts. The solenoid replaces one of the slide-shaft blocks (**354**, **356**) in FIG. 6, and its plunger is affixed to the inner end, or is an extension, of a shortened slide shaft (**350**). When the apparatus is ascending, the solenoid is energized, and the gears engage the first gear strip; and when the apparatus is descending, the solenoid is not energized, and the gears engage the opposing gear strip.
- more than one generator can be used at the same time, in which case they are stacked and vertically aligned. Only the top and bottom generators have slide-shaft rods installed in order to provide a smooth and trouble-free operation. Toward this end, the generator assembly should have substantially neutral buoyancy to minimize frictional drag. This arrangement utilizes only one upper bevel block (**356**), which is mounted onto the top generator; and only one lower bevel block (**358**), which is mounted onto the bottom of the bottom generator. The generators charge the battery (**116**) installed in the weighting device (**104**) at the bottom of the rigid tube (**100**). It is desirable to pre-install the plurality of generators within a sealed waterproof container whereby only the geared components, the slide shafts and slide-shaft bores are exposed to seawater. The top and bottom surfaces of the container would be appropriately beveled and replace the upper and lower bevel blocks.
- the smaller gear in the reduction gear set (**340**) and the gear strips are replaced by a drive wheel that is a friction roller and friction strips, respectively. For example, the former can be a ribbed stainless steel roller, and the latter can be ribbed elastomeric strips.
- the water-ballast system comprises a two-chamber tank, similar to the preferred embodiment but without the vacuum chamber. A two-way air pump pumps air between the two chambers to control the volume of water in the lower chamber. This embodiment would be less expensive to produce, but the apparatus would not dive as quickly.

Benefits from the Current Invention

- [0150]
  From the foregoing description, several advantages of the invention are evident. It has been shown how the current invention, when implemented as a multi-unit fleet is capable of cooling SSTs to below 80° F. over a wide area. Relatively slow surface currents in the critical area off the West Coast of Equatorial Africa make this possible with a smaller number of deployed units.
- [0151]

The current invention requires no platforms to be constructed, no mooring lines to be secured and no external power other than from sun and waves. Its pump is powered by wave energy and has few moving parts, which will keep maintenance low and reduce risk of premature failure. Its electrical components are solar-powered with supplementary battery capability. Its onboard navigational ability provides the mobility to maintain a given position, to operate as an optimally spaced fleet or to be deployed to a more advantageous location. The apparatus can make way through the water at about 0.5 knots, depending on wave height and wave period, and therefore it can maintain its position against modest, adverse surface currents. It also can be instructed to proceed to a different location; for example, it can travel westward in the South Equatorial Current, further cooling the surface as it proceeds. Working its way southward to about longitude 50° West, it then can catch the Equatorial Countercurrent eastward (except in the winter months, when the Countercurrent is weak or nonexistent; but it could still make progress eastward using wave energy). The Countercurrent will carry the apparatus back to the Gulf of Guinea, where the travel cycle can begin anew.

- [0152]
  The ability of the apparatus to submerge increases its survivability by avoiding collisions with ocean vessels and by preventing damage from major storms. Submersion also enables the apparatus to retard degradation when seas are too calm to produce sufficient wave energy and to remain on location when surface currents are too strong for holding an advantageous position.
- [0153]
  The objective was to design a unit that is simple, rugged, versatile, and efficient. Because of the hostile environment in which the apparatuses would be operating, rugged materials are used throughout toward achieving a goal of five-year, maintenance-free operation. Simplicity of design for each of the apparatus’s three main functions—pumping, navigating and submerging—contributes to this goal.
- [0154]
  If the units are to be commercialized, they must be cost-effective. In the Background of this document, we observed that after adjusting hurricane loss estimates in the United States for changes in personal wealth and coastal county populations, the estimated average property loss from tropical cyclones amounts to $**9** billion annually, and this estimate is based on only the **30** most costly hurricanes. Our estimate of the annual amortized cost of producing, distributing, launching and maintaining a fleet of the current invention off the West Coast of Africa would be under $300 million annually. It is quite possible that this fleet alone could disrupt the process of hurricane development. But even if additional fleets are required, the net benefits from of this invention with respect to property losses averted are still quite favorable, and this conclusion holds, even without consideration of the other less costly hurricanes as well as the lives saved.

US patent #20130175352: Method to influence the direction of travel of hurricanes

Abstract

In like manner that winds intersect and deflect each other in space we can intersect and deflect the hurricanes and storms at the area of thrusting between their steering winds and their outer edge, with blasting explosion waves of non-nuclear high-power propellant fuel missiles thrown in vertical perpendicular alignment, against the routing of the steering wind current at N equal number of levels, first for testing a 300 pounds missile thrown, by adequately equipped air-vehicles for missiles launching, to observe the effect on the hurricane configuration, then decide to adjust the explosive quantity to thrust successfully, all blasts of each round of missiles should be detonated in a timely manner, then continue the rounds of explosives at intervals approximately similar to the time required by the prior blast to travel twice the diameter of its explosion, repeating as necessary, hitting always at the thrusting area until achieving success. (Source: https://patents.google.com/patent/US20130175352A1/en) Read More

Description

STATEMENT REGARDING FEDERALLY SPONSORED RESEARCH OR DEVELOPMENT

- [0001]
  This Method to be implemented requires the full support and sponsorship of the United States Federal Government to conduct research, under controlled Laboratory Conditions, to the proper size scale, and live field testing, for the following:
- [0002]
  E-1) Testing of the wind currents interaction as vector forces and their compliance with the mathematical rules of vectors.
- [0003]
  E-2) Testing of selected propulsion wave forming explosives impacting on wind currents.
- [0004]
  E-3) Testing of selected propulsion wave forming explosives impacting on large balloons suspended inside wind currents.
- [0005]
  E-4) Conduct research on selected explosives to find the best fitted compliance with the requirements of the Inventor, as follows:
- [0006]
  E-4-a) Find the explosives that shall push more effectively on the spinning mass of winds and water vapor.
- [0007]
  E-4-b) Find the properties of the explosives: 1) Density of the expansive gases. 2) Heat generated by the explosions. 3) Also their combined effect with different types of detonating explosives. 4) Thrusting power. 5) Storable safety. 6) Cost.
- [0008]
  E-4-c) Find the best fitted missiles to deliver the swaying vectors as well as any other better way to accomplish the objective. Find the safest distance to launch the missiles or explosives as well as the safest minimum height to launch them and the best-fitted air-vehicles to

use, or other better ways, in lived field testing.

- [0009]
  E-5) It is anticipated that density of the expansive gases selected to push on the steering wind current and the spiraling winds of the hurricane should be no greater than air, because air pushes on the storm, due to the combined density of water vapor and air of the storm, being greater than air.

CROSS-REFERENCE TO RELATED APPLICATIONS

- [0010]
  Cross-Reference No. 1: “PHYSICS De MYSTIFIED BY MR. STAN GIBILISCO”: Mathematics of Vectors for two and for three dimensions.

INCORPORATION-BY-REFERENCE OF MATERIAL, SUBMITTED ON A COMPACT DISC

- [0011]
  Not Applicable.

BACKGROUND OF THE INVENTION

- [0012]
  1. Field of the Invention
- [0013]
  Engineering, Meteorology, Mechanical, Mathematical Rules of Vectors, Explosives and Military Equipment Expertise:
- [0014]
  The background is mainly Mechanical Engineering because hurricanes are thermodynamic systems from the moment they are born to the moment they get extinguished. They absorb energy in the form of heat and water vapor by way of its center opening called eye. Rotate absorbing energy and water vapor and storage it by revolving. Grow in size by increasing its speed. The system keeps its mass in place by the combined action of the centrifugal and centripetal forces that also causes the typical spiraling doughnut form. Dispose of the excess energy thru the perimeter, outer edge of the system, in the form of rain and gusts. The rotating vectors of the storm, allows it to be pushed by the steering wind vectors action and reaction forces. The thermodynamic roll is present at all times from birth to extinguishment. The thermodynamics is trying to reach equilibrium in a state of storm due to a process of transfer of energy that is inherently a non-equilibrium process.
- [0015]
  The Meteorology background is related with the barometric pressure differences that cause wind currents and regulate their movements. Meteorology is indispensable in the initial conditions for the birth and growth of storms, to become hurricanes and to keep them working.
- [0016]
  The math of vectors works, all the time when thrusting on the back of the storms and at the time of interception, with other currents, as clearly shown in the photographs **2** thru **10** of the section of Drawings and Photographs of this application.
- [0017]

Knowledge on explosives and military equipment expertise is required as part of the Federal Sponsorship for research and development. At this stage, of my application, my guesses are based on what information is available in the Internet and my own judgment.

- [0018]
  Hurricanes are formed usually over the ocean at hot areas where there is great activity of heat and mass transfer (see Ref. #**2**). Also, the atmospheric barometric conditions favor the formation of winds that together, with the excessive heat and mass transfer, creates a turbulence that accidentally succeeds in getting organized, starts rotating, grow and accumulates energy in becoming a thermodynamic system. When the hurricane is steered to new areas the energy transfer conditions are favorable and the storm grows, increasing the storage area by way of increasing the rotating speed. The centrifugal and centripetal forces also grow proportionally to the increment of rotational speed. Hurricanes do not have forward motion of its own, thanks GOD. The storms depend on the thrusting of a steering wind to move.
- [0019]
  By swaying Hurricanes away from their steering winds and usual routes we will save many lives and billions of dollars, to the Country. Also, by thrusting against the outer edge of the Hurricane, with moderate quantities of expansive explosive waves we can push the storms towards calm areas. There in the calm area, the storm may dissipate its energy in due time and the thermodynamic of the system will win its struggle and cease.
- [0020]
  2) Description of Related Art Including Information Disclosed Under: 37 CFR 1.97 and 1.98: Excerpt Re: 37 CFR 1.98
- [0021]
  I did not found applicable information from 1.97: “Filing of information disclosure” and 1.98: “Content of information disclosure” from the Consolidated Patent Rules, at this time.

BRIEF SUMMARY OF THE INVENTION

- [0022]
  MY METHOD SHALL INFLUENCE THE DIRECTION OF TRAVEL OF HURRICANES AND STORMS BY WAY OF CUMULATIVE BLASTING EXPLOSIONS. WE SHALL USE NON-NUCLEAR SOLID OR STORABLE LIQUID PROPELLANT FUEL THAT SHALL PRODUCE HIGH-TRUST EXPANSIVE WAVES OF HOT GASES. THESE GASES SHALL BE OF LESSER DENSITY OR EQUAL TO AIR. THE EXPLOSIVE WAVES MUST BE OF ADEQUATE SPEED AND THRUST POWER TO EFFECTIVELY PUSH ON WIND CURRENTS AND ON THE ROTATING WINDS OF HURRICANES. THE EXPLOSIVES SHALL BE ENCAPSULATED INSIDE MISSILES LAUNCHED FROM ADEQUATELY EQUIPPED AIR VEHICLES. ALL IMPACTS MUST BE ON ONE SIDE SECTION OF THE OUTER EDGE PERIPHERY AND OR INSIDE SPINNING WINDS OF THE STORMS. SUCCESS DEPENDS ON STRIKING ALWAYS INSIDE THE THRUSTING AREA BETWEEN THE STEERING WIND AND THE OUTER EDGE OF THE HURRICANE. A THREE HUNDRED POUNDS MISSILE OF PROPELLANT FUEL, AS MENTIONED ABOVE, SHALL BE TRIED FIRST ALONE FOR TESTING, IF NOT RECOMMENDED OTHERWISE BY THE TESTING LABORATORY. OBSERVE THE EFFECTS ON

THE HURRICANE CONFIGURATION. THEN DECIDE IF IT IS ADEQUATE AS LAUNCHED OR IF IT IS REQUIRED TO ADJUST THE QUANTITY OF EXPLOSIVE OR ITS POWER. IF THE EXPLOSIVE BLAST IS TOO FAST OR TOO STRONG IT WILL PUNCH A HOLE INSTEAD OF PROVIDING US WITH THE THRUSTING POWER THAT WE SEEK. THE EXPLOSIONS SHALL BE TIMED AND ALIGNED IN THE SELECTED ROUTING TO ACCUMULATE THE FORCES IN ONE DIRECTION, AS VECTORS DO. THE MISSILES SHOULD BE THROWN IN VERTICAL FORMATION PERPENDICULAR TO THE ROUTING OF THE STEERING WIND. THE TOTAL HEIGHT OF THE STEERING WIND SHOULD BE DIVIDED BY NO MORE THAN TWICE THE LENGTH OF THE DIAMETER OF THE EXPLOSION, TO FIND THE NUMBER OF LEVELS OF ACTION. ALL LEVELS OF ACTION SHOULD BE LOADED AT THE SAME TIME AND DETONATED SIMULTANEOUSLY OR IN A SEQUENCE OR OTHERWISE, AS PLANNED. THE GENERATED VECTOR FORCES OF THE EXPLOSIONS SHALL INTERCEPT THE STEERING WIND CURRENT AND COMBINE WITH IT. ALSO COMBINE WITH THE COUNTERCLOCKWISE VECTORS OF THE OUTER EDGE OF THE HURRICANE. THE COMBINED FORCE OF THESE THREE VECTORS THUS FORMED SHALL BE FOLLOWED ALMOST IMMEDIATELY BY EQUAL RESULTANT VECTORS OF THE FOLLOWING EXPLOSIONS. THAT ACTION SHALL BUILD-UP TO START SWAYING THE HURRICANE. UNTIL, FINALLY SUCCEED IN REACHING THE OTHER SIDE OF THE STEERING WIND RANGE. THE HURRICANE SHALL CONTINUE BY INERTIA FURTHER AWAY.

BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWINGS

- [0023]
  The Method is all, in one page only, of typical drawing (See page 1 of 10). The other nine photographic pictures are to illustrate how each steering wind complied with the vector rules of Descartes and steered, in turn, behind the rotating winds in its own direction. (See pages 2 thru 10)

(Method Drawing, Specification):

- [0024]
  This is a typical drawing that illustrate the method to influence the direction of travel of hurricanes, as follows: (See **1** of **10**) this is, a not to scale drawing that shows a three dimensional representation of a Hurricane called ‘H’ and its steering wind called ‘St. W’., its range width and its height called ‘h’. Also, showing the thrusting area called ‘Th. A’., with ‘N” being the number of levels of action found by dividing the height of the steering wind by two times the diameter of the typical explosion called ‘2d’, hence N=h/2d. The drawing **1** of **10** shows three missiles only (for clarity of drawing, only.) the missiles are indicated by the symbol: O>O>O> shown at each level of action at the instant just before entering into the Thrusting Area. The intention is to have it spaced twice the typical explosion diameter before exploding inside the Thrusting Area. Also, the drawing shows the instant when prior missiles are exploding inside the thrusting area indicated by the symbol of: ∘ ○ O precisely at the moment of combining with the vectors of the steering wind and the counterclockwise vectors of the outer edge of the hurricane (see enlarged detail in **1** of **10**). The resultant vector of one explosion will add-up to with the resultant vectors of the immediately following explosions and keep-on moving the hurricane

towards the outer edge of the range of the steering wind, (see the drawing detail enlargement showing the interception and combination of the three vectors in space). The Method will succeed when finally the hurricane have been moved completely out of the range of the steering wind.

- [0025]
  Method Nomenclature:
- [0026]
  H=Hurricane
- [0027]
  SW=Steering wind
- [0028]
  TA=Thrusting Area
- [0029]
  E=Enlargement Detail
- [0030]
  N=Number of Levels of Action
- [0031]
  NTS=Not to Scale
- [0032]
  w=Width of Wind Current
- [0033]
  h=Height of Wind Current
- [0034]
  d=Diameter of Missile explosion
- [0035]
  SV=Steering Wind Vectors
- [0036]
  EV=Explosion Vectors
- [0037]
  CV=Counterclockwise Vectors
- [0038]
  R**1**=Resultant of SV and EV
- [0039]
  R**2**=Resultant of R**1** and Counterclockwise Vectors

  (Amended Drawings, Photographs of Hurricanes Katrina, Wilma and Irene, See the Corresponding Markings in Prior Revised Clean Versions)

- [0040]
  The following nine photographs (pages 2 thru 10) are for the purpose to illustrate how the steering winds intercept and produce a resultant vectors that steer the hurricane in a different direction as they did for hurricanes Katrina, Wilma and Irene. Every new turn in direction correspond exactly to the rules of Descartes. Also, it shows the pivotal point and last chance for using my method to sway the hurricane in a different direction that could have been used, presented, as follows:
- [0041]
  A-1) Case 1: Hurricane Katrina, as it happened, in year 2005. Katrina’s photograph shown in page 2 of 10 shows the hurricane poised over the Bahamas, east of Florida and north east of Guantanamo. At this time

Vector **2** a powerful Atlantic Ocean wind current traveling in a south-western direction intercepts Vector **1** that was the steering wind carrying hurricane Katrina in a north-western direction up to that point. See in page 3 of 10 how Vector **2** prevailed and established Resultant Vector **2**″ with a south-western routing. Vector **3** a powerful Pacific Ocean wind current traveling with a northeastern direction confronted Vector **2**″, over the Gulf of Mexico, prevailed establishing a new resultant with a north-western routing. Vector A, the #**4** vector, prevailing North America wind, traveling in a south-eastern direction confronted the resultant vector of **3** and **2**″ deflecting the routing of hurricane Katrina directly into the City of New Orleans. The wide and powerful North America's vector A, # **4**, continued deflecting the resultant vectors and established a new over land north-eastern routing of the storm, until final extinguishment.

- [0042]
  On page 4 of 10 we have a situation we wish never have: a complete developed hurricane that will require our full blasting capacity and maximum coordination at the pivotal point A over the Bahamas intercepting the steering wind **1** with our swaying vectors SW SV. We will intercept almost immediately the powerful Atlantic wind **2** to do our very best to prevail. If we succeed to push the Hurricane over the ocean in front of Daytona Beach, Saint Agustin area at B, second point of action for our swaying vectors. Then we still need to push the hurricane with some more missiles at its back to finally reach the destination area D. Any calm waters wherever available.
- [0043]
  In real life, if allowed the privilege to use my method I would rather have chosen an earlier location of the trajectory of the storm on the eastern side of the Virgin Islands where I would have selected a destination area in the general direction of the known calm waters, but NOT inside or close to the Vessels Museum of Nature, the famous Sargasso Sea area, far enough to avoid disturbing it, and to let the storm dissipate its energy.
- [0044]
  B-1) Case 2: Hurricane Wilma, as it happened in year 2005. The photograph called Hurricane Wilma page 5 of 10 shows the critical pivotal point where Vector **2**, a wide Pacific Ocean wind current, traveling in a north-eastern direction, intercepts and deflects Vector **1**, which was the steering wind that was carrying hurricane Wilma, see page 6 of 10, establishing a resultant vector with a north-western course. The continued intercepting and swaying Vector **2**, acted upon the new resultant vector and deflected near Cancun the routing of hurricane Wilma towards the north. Vector **3** the prevailing wind from North America intercepted the new resultant vector of **2** and **1** in the middle of the Gulf of Mexico to send it directly to hit Florida with an Eastern routing.
- [0045]
  B-2) Case 2: Hurricane Wilma, as it could have been swayed away in year 2005. Hurricane Wilma, shown in page 6 of 10, could have been swayed away at an earlier point of the trajectory of Vector **1**, the steering wind that was carrying hurricane Wilma. In the case shown in the picture

our best option was to apply our swaying vectors at the south-western side of the hurricane at point A to push the hurricane towards a destination area located on the north-eastern side of Jamaica Island to leave it there, stagnant, to consume its energy or further move it to the north-eastern side away from Guantanamo Bay.

- [0046]
  C-1) Case 3: Hurricane Irene, as it happened in year 2011: Page 8 of 10 of the photographs shows hurricane Irene carried by Vector **1** the steering wind that was carrying hurricane Irene was traveling north of Puerto Rico and Dominican Republic with a north-western direction. Vector **2** a wide Pacific Ocean wind current intercepted Vector **1** and deflected it see page 9 of 10. The interception caused a gradual deflection of Irene yielding towards the north. Vector **2** combined with a North America wind continued swaying the resultant vectors until succeeding in total control of the hurricane, in the vicinity of South Carolina, establishing a north/north-eastern routing, crossing over cape Hatteras to finally hit the area of New Jersey.
- [0047]
  C-2) Case 3: Hurricane Irene could have been swayed away in year 2011. Page 10 of 10 shows an early point A where we could have applied our north-eastern pushing swaying vectors. Our vectors would have succeeded deflecting the hurricane Irene into a pre-selected destination area located north of Dominican Republic well inside the North Atlantic Ocean.

D) Symbols and Nomenclature:

- [0048]
  A—Point of action and impact of our swaying vectors. Also America’s wind vector **4**.
- [0049]
  B—Second point of action, if needed to finish the job.
- [0050]
  D—Pre-selected calm area destination
- [0051]
  SW-SV—South Western Swaying Vectors
- [0052]
  RV—Resultant Vector
- [0053]
  1—Original path of carrying wind current driving the Hurricane.
- [0054]
  2, **3**, **4**—Intercepting Wind Currents, as shown
- [0055]
  2′, **3**′, **4**′—Opposite sides of parallelogram, as shown
- [0056]
  2″—Vector **2**″ continues direction of vector **2**
- [0057]
  →—Arrow vectors

DETAILED DESCRIPTION OF THE INVENTION

- [0058]

Hurricanes are usually formed over the ocean as described in (f). If the storms are stagnant they will consume all the surplus energy of the area of birth and stop right there. Hurricanes that are steered by wind currents, of moderate speed, go absorbing large amounts of energy as they progress. (See Ref. **2**) The thermodynamic of the storm, storage the newly absorbed energy by growing in size and by increasing its rotating speed. The centrifugal and centripetal forces play a very active role by keeping together the system and causing the cylindrical form. At the same time that the storm grows in size, the initial speed of travelling of the steering wind, gets slower proportionally to the growth of weight and size of the storm. Consequently, favor the absorption of energy of the storm. When going over land the absorption process slows down because there is lesser amount of transferable energy available to absorb. At the same time the storm discharges energy in the form of rain and gusts. This behavior is due to the active function of the thermodynamic of the storm, always seeking to stabilize the system to reach the state of equilibrium. My Method to influence the direction of travel of hurricanes, from here on called, in these specifications, as the Method, takes advantage of the fact that hurricanes does not have, thanks God, forward motion of their own. Also, my Method, reproduce the same actions that wind currents do to each other, when intercepting freely, in space. (See Ref. **1**) My Method does pretend neither to destroy nor to reduce the intensity of the hurricanes. My Method takes advantage also of the fact that the storm rotates fast in a counterclockwise way. Also, that to travel, the storm requires the thrusting vector force of a steering wind pushing at its back, thus creating a thrusting area well immersed inside the storage area of the storm.

- [0059]
My Method pretends to deflect the direction of travel of the hurricanes by way of throwing successive expansive waves of hot gas explosions; blasting inside the thrusting area of the steering wind at the back of the hurricane. These impacts must be aligned as precisely, as possible, in one selected direction to cut in the shortest possible direction thru the range width of the steering wind with the minimum amount of explosions. The spacing between the successive explosions inside the thrusting area must be, as close and frequent as, the availability of the launching equipment permits to use. Thus, the explosions of the next following will join and back up together with the preceding ones due to the effect of 'holding-back' of the impact reaction of the explosions against the current force of the steering wind. The resultant vector of the interception of the explosive vector with the steering wind vector, called R**1** on the drawing of my method, will simultaneously combine with the counterclockwise vector. The resultant of the combination of the counterclockwise vector with the resultant R**1**, produce the resultant called R**2**. The counterclockwise vectors power shall reinforce greatly the initial force of the swaying vectors and speed up the process. But not just one, action line only, will be enough to overcome the initial inertia, of the entire mass of the storm. To succeed we need to act simultaneously with, as many levels of action as possible. We can divide the entire height of the steering wind by twice the diameter length of the typical explosion, to find "N" number of levels of action. Then,

provided we have available all the required missiles and launching equipment that we need, we can engage in action. But first an actual live research is necessary to answer all the questions of what kind of explosive is required, maybe solid form or storable liquid propellant 300 pounds missile, will work. Depending on, when tested in actual live research if the explosion will not be too strong or too fast, that instead of providing us with the thrusting power we need, what we will get is a hole in the clouds.

- [0060]
  Our live research task is to find not only the kind of explosive that will push on winds without going thru them, but to find the optimum amount of explosive that will reduce the total number of blasting. Also, to find the proper missile launching equipment that combined with the lesser amount of units we can get us only the missiles we need, at all levels. That means trying other type of launching equipment and different type of missiles.
- [0061]
  To overcome a lesser inertia of the Storm we can act better against early stages of the storms to start swaying sooner and succeed at a lesser cost. We shall be able to accomplish the task with a lesser number of air-vehicles with a launching capacity of only two missiles each or less.
- [0062]
  In my opinion the early action against storms that may become a threat to islands and continental land that happen in areas of the Caribbean Sea that historically have caused, dangerous hurricanes, is enough justification to act.
- [0063]
  Detailed instructions for implementation of the Method: a live testing of the method should be part of the Federal Sponsored Research and Development. These instructions assume that, if that research happens, we will have a crew of professionals on explosives, missile launchers, and all the proper military facilities and the authorization of the US Government to proceed with the test. Assuming that is the case, I will provide the Plan of Action and instructions, as follows:
- [0064]
  Plan of action: The corresponding governmental offices of meteorology will provide us with the location data and all characteristic information relating to the storm. Also the steering wind data of routing, speed, height and range width of the steering wind at the thrusting area within the hurricane. Also, the Meteorology Office shall provide the location of the impact area between the steering wind current and the back of the Storm. Say, for instance that the steering wind is 12,000 feet high and 8,000 feet wide and the initial explosion diameter of the blast is five hundred feet, hence we need 12,000/(500×2)=12 levels. We have a 2,000 feet of no blasting self-imposed limitation, which is the first lower level and we can neglect blasting at the upper level hence we have remaining 12−2=10 levels of action. Considering the small size of the storm we can use 200 pounds missiles and skip every other level and act on five levels, only. These expansive waves of gases to thrust properly should explode in good

alignment, at the assigned level, inside the thrusting area of the steering wind and the outer edge of the storm. Each Air-Vehicle should be assigned an action level in order, for instance number one plane to act on level 11, number 2 on level 9, number 3 on level 7, number 4 on level 5 and number 5 on level 3.

- [0065]
  The entire three squadrons of twelve air-vehicles each should be stationed at exclusive, well guard, under cover and securely enclosed hangars. We need to be on American island land close to the coming storm ready to act as soon as authorized to proceed. The crews should be trained and rehearsed in simulated shooting exercises and the Navigational Engineer practicing his role of providing the target coordinates adjusted for each of the planes considering the moving target and differences in height and speed for each of the planes.
- [0066]
  Each plane should strike say every 5 seconds and in all strike 6 missiles for a total of 6 times 5=30 missiles of 200 pounds each, equal to 6,000 pounds or otherwise as planned when we get more information and more training we shall be able to refine our calculations and save on the total amount of explosives. We may be able to start with 300 pounds missiles to overcome the initial inertia and finish up with the 200 pounds. Depending on the capacity of each air-vehicle to launch missiles, two, three or six we need to use three, two or just one plane for each round of explosives.
- [0067]
  We will give the coordinates to strike precisely to each of the pilots, or UAV as provided by an Airplane Navigating Engineer, that will be flying over the target area at a prudent distance, also keeping a photographic record of the entire operation specially at the moment of action and immediately after to check if we succeeded and how much we achieved on swaying the storm out of it route.
- [0068]
  Pause and Evaluation: After launching the first 30 missiles we will pause to evaluate the results of the impacts, on the satellite monitor of the action. Check how much displacement of the storm we got, if any, and verify if the missiles exploded correctly inside the thrusting area, or how far away they were, to make the necessary corrections and adjustments to try again. We may decide to continue with a second round of missiles if we have the availability to do so. Also, the Management may decide to continue, if we receive encouraging early results in our monitors.
- [0069]
  If we succeed to overcome the initial inertia of the storm to get moving towards the outside of the range of the steering wind, from that moment on, the new developed inertia of the storm will become our ally. END.

US patent #20200187430: Helical artificial generator of tornado, hurricane, yellow dust, and typhoon
Abstract

The present invention provides a spiral artificial generator for the artificial generation of a tornado, a hurricane, yellowdust, or a typhoon, wherein the diameter D of the spiral artificial generator is selected by a basic module formula D=0.382H, a module formula H=2.618D is used when the diameter D of the spiral artificial generator is selected first, funnel-shaped arresters made of silver (Ag) are basically installed at a top of the spiral artificial generator, a solar cell heat collecting plate is installed on the outer wall of the top, and a door configured to be selectively opened and closed by solar cells and wind power generation, a blower configured to blow air to the artificial generator, and a stainless steel plate and heating coil configured to heat the inner walls of the paths are installed on the bottom of the spiral artificial generator. (Source: https://patents.google.com/patent/US20200187430A1/en) Read More

Description

TECHNICAL FIELD

- [0001]
The present invention is a technology that provides artificially generated energy which can reduce or adjust the size and number of tornadoes, hurricanes, typhoons and yellowdust by utilizing air convection, the law of causality, the principle of gears, the Torricelli principle, the Pascal principle, the butterfly effect, the Ekman spiral principle, the Bernoulli's equation, the Boyle Charles' law, the Newton's law, etc. and weakening the generation energy of a tornado, a hurricane, a typhoon and yellowdust which are frequently generated in North America, Asia, and the Three Oceans while artificially dispersing them without interruption by the same generation principle, and a technology regarding a spiral artificial generator that is configured such that three passages are formed coaxially between four spiral cylinders to which stepped spiral blades are attached at an angle of 45° (height=width) according to the spiral principle in order to induce the heating of air, the raising of air, and a raised direction and which is operated and controlled year-round without interruption regardless of season and air mass by solar cells and wind power generation, wherein the size of the spiral artificial generator can be increased or decreased according to the basic module.

BACKGROUND ART

- [0002]
The background art of the present invention is a technology that can generate a small artificial tornado, yellowdust or typhoon, which can artificially weaken the energy generated by the tornado, yellowdust or typhoon while dispersing it without interruption, in accordance with the Butterfly effect, such as the Pascal principle stating that “a flap of the wings of a small butterfly may someday be the cause of a typhoon” in meteorology, the law of causality stating that “even when a cause is very weak, a result comes” and the principle of gears year-round without interruption, and the principle of chimneys that the force by which a chimney sucks air is proportional to the height of the chimney and wind

power energy is proportional to the third power of wind speed, and the wind energy is the chimney principle, which is proportional to the third power of the wind speed, the aerodynamic principle in which air heated by solar energy attempts to maintain a dynamic equilibrium, the principle of gears, the Torricelli principle, the Ekman principle, the Pascal principle (butterfly effect), the Bernoulli’s equation, the Boyle-Charles’ law and the Newton’s law are also the background art. A cyclone rises counterclockwise in the northern hemisphere as shown in FIG. 1 while rising spirally counterclockwise as shown in FIG. 2, an anticyclone rotates clockwise, and a tornado, a hurricane, yellowdust, or a typhoon, which can be exemplified in FIG. 3 showing the section of a typhoon, moves while rotating in a counterclockwise direction, which is the direction of the arrows, and the portion around the eye, which is the center of the typhoon, descends from the top to the bottom.

- [0003]
On the assumption that natural tornadoes, hurricanes, yellowdust, and typhoons can be adjusted if a spiral generator is constructed to function in a manner similar to the above-described manner on land or at sea where it is necessary to reduce the damage of typhoons and then generation energy, which can generate a small artificial tornado, hurricane, yellowdust, or typhoon, can be continuously supplied in the form of powerful wind speed without interruption, the inventors note that powerful rising air such as a tornado, a hurricane, yellowdust, or a typhoon can be implemented using a spiral artificial generator, and air column-shaped rising air such as a small artificial tornado, hurricane, yellowdust, and typhoon can be generated using the spiral artificial generator year-round without interruption by means of the principle of gears of the spiral artificial generator, the Torricelli principle, the Pascal principle, the spiral movement principle, and the principle of chimneys.
- [0004]
A spiral artificial generator is constructed on land or at sea in a westerly wind area where the atmosphere is very unstable or in a trade wind (easterly wind) area where the water temperature is high, and continuously generates artificial rising air in the form of a tornado, yellowdust or typhoon. The upper wind speed that is discharged by continuously passing the surrounding ground air through the spiral artificial generator of the present invention exceeds the wind speed of a tornado, a hurricane, yellowdust, or typhoon that occurs naturally due to an anticyclone drop attributable to the horizontal accumulation of cyclones.
- [0005]
The wind speeds the spiral artificial generator of the present invention that are capable of generating a small artificial tornado, hurricane, yellowdust, or typhoon are calculated by the following formula.
- [0006]
The average minimum atmospheric pressure in terms of meteorological observations is 873 hPa. Accordingly, when the central air pressure of the spiral artificial generator is set to 943 hPa (=(873+1,013)÷2), which is the average of the lowest and standard air pressures, the diameter of the horizontal area of the cylindrical portion of air which

can be continuously sucked by the spiral artificial generator from the ground and the height h of the cylindrical portion is 152 m, the wind speed Vw is calculated as follows:

- [0007]
  In Vw=√{square root over (2P/ρ+2gh)} quoting the Torricelli principle (potential energy) and the Bernoulli's equation $P+\rho gh+\frac{1}{2}=\rho V^2$=Constant, Vw_1=√{square root over (2p/p)} (kinetic energy) and Vw=√{square root over (2gh)} (potential energy; the Torricelli principle) are obtained. In this case, P is the pressure difference, ρ is the density of air (1.2 kg/m^2), g is the acceleration of gravity (9.8 m/s^2), and h is the height. The Bernoulli's equation $P+\rho gh+\frac{1}{2}\rho V^2$=Constant states that the relationship (the relationship between the kinetic energy and the potential energy) forms a constant value, and thus $P_1+\rho_1 g_1 h_1+(\frac{1}{2})\rho_1(v_1)^2=P_2$ $\rho_2 g_2 h_2+(\frac{1}{2})\rho_2(v_2)^2$ at specific two points A1 (somewhere far from the center of a cyclone) and A2 (the center of the cyclone). Accordingly, when the above equation is arranged by transposition or the like in order to calculate the wind speed V_2 of the center point of a cyclone from the above, it can be seen that $(\frac{1}{2})$ $[\rho_2(v_2)^2-\rho_1(v_1)^2]=(P_1-P_2)+(\rho_1 g_1 h_1+\rho_2 g_2 h_2)$. When some assumptions are made and it is assumed that the wind speed v_1 at point A1 at one atmosphere is $v_1\approx 0$ in which the wind speed v_1 is almost zero, the above equation becomes $(\frac{1}{2})$ $[\rho_2(v_2)^2]=(P_1-P_2)+(\rho_1 g_1 h_1-\rho_2 g_2 h_2)$. Furthermore, when it is possible to assume that the air density and the gravity acceleration at two points A1 and A2 are $\rho_1\approx\rho_2=\rho$ and $g_1\approx g_2=g$, respectively, the above equation becomes $(\frac{1}{2})$ $[\rho(v_2)^2]=(P_1-P_2)+(\rho gh_1-\rho gh_2)$, and is rearranged to $v_2=[[2(P_1-P_2)/\rho]+[2g(h_1-h_2)]^{1/2}$. In this case, when the pressure difference $P_1-P_2=P$ at two points and the height difference $h_1-h_2=h$ at two points are applied, $v_2=[[2P/\rho]+[2gh]]^{1/2}\approx V_\omega$ is obtained.
- [0008]
  The difference between the standard atmospheric pressure and the central pressure of the spiral artificial generator is P=1,013 hPa−943 hPa=70 hPa=0.7×10^4 N/m^2. When the height of the spiral generator is 152 m, the air pressure difference is 1 hPa per 10 m. Accordingly, P=152m×0.1 hPa/m=15.2 hPa=1.52×10^3 N/m^2, the maximum wind speeds (Vw) sucked into the spiral generator are calculated as Vw=√{square root over (2×7,000/1.2+2×9.8×152)}≈**121** (m/s) and Vw=√{square root over (2×1,520/1.2+2×9.8×152)}≈**74** (m/s), and the maximum wind speed by the potential energy (the Torricelli principle) is calculated as 55 m/s V_{w2}=√{square root over (2gh)}.
- [0009]
  The wind speed calculated by the air pressure difference is 59˜60% efficient, so the wind speed (Vw) of 152 m high spiral artificial generator is calculated as Vw=0.6×121 (m/s)≈72 (m/s) or 0.6×74 (m/s)≈44 (m/s) when a wind speed efficiency of 60% is applied. When the actual efficiency achievable by the spiral artificial generator is calculated by applying 70% in consideration of the resistance of the spiral motion to the spiral artificial generator, Vw=0.7×V=0.7×72 (m/s)≈60 (m/s) or 0.7×44 (m/s)≈31 (m/s) is obtained.
- [0010]
  The observed data for tornadoes, hurricanes, yellowdust, and typhoons are shown in Table 1:

TABLE 1

Item	Tornado	Hurricane	Yellowdust	Typhoon
1. Air pressure	cyclone (cumulonimbus)	tropical cyclone	polar cyclone	tropical cyclone
2. Temperature (° C.)	23 or higher	27 or higher	11 or higher	26 or higher
3. Latitude	25 to 55 north latitude	5 to 25 north latitude	20 to 55 north latitude	5 to 20 north latitude
3. Latitude	15 to 45 south latitude	5 to 20 south latitude	30 to 40 south latitude	5 to 15 south latitude
4. Number of occurrences	1 to 1,000	8 to 12	6 to 26	21 to 36
5. Period	January to June	July to October	March to May	June to September
6. Duration	10 to 90 minutes	5 to 20 days	1 to 6 days	4 to 15 days
7. Altitude	3 km	12 km	2 km	6 km
8.Initial wind speed	23 m/s or more	29 m/s or more	9 m/s or more	17 m/s or more

- [0011]
  The wind speeds which generate tornadoes, hurricanes, yellowdust and typhoons range from 9 m/s to 29 m/s, as shown in Table 1 above, and a linear artificial generator can generate maximum wind speeds ranging from 31 m/s to 50 m/s as described above. The introduced air is continuously heated without interruption by means of the principle of chimneys, the principle of gears, the Torricelli principle, the Pascal principle (the butterfly effect), the Bernoulli’s equation, the Boyle-Charles’ law, the Ekman spiral principle, the heat generation of the spiral artificial generator, environmentally-friendly solar cells, and wind power generation. Accordingly, the efficiency of the spiral artificial generator exceeds sensory efficiency (60% and 70%).
- [0012]
  The prior art, which is Korean Patent Application Publication No. 10-2004-0027746 published on Apr. 1, 2004 and entitled a “rising air generating chimney structure for wind power generation and typhoon control” is a technology regarding a steel equilateral triangular chimney which produces wind electricity and an artificial typhoon by using a gas burner and hot and humid air (vapor latent heat) as an energy source. it is assumed that the diameter of a chimney capable of producing an artificial typhoon is at least 100 km and the height of the chimney is at least 10 km. Accordingly, the prior art violates the logic that the size and suction force of a chimney are proportional to the

height of the chimney, and the prior art cannot technically induce an artificial typhoon.

DISCLOSURE Technical Problem

- [0013]
There is a need for a method and structure that can artificially generate a spiral air column in order to artificially and continuously disperse and weaken high-temperature and high-humidity and low-temperature dry generation energy of a tornado and yellowdust generated in a direction opposite to the rotational direction (the clockwise direction) of an anticyclone, i.e., in the rotation direction (the counterclockwise direction) of a cyclone, according to the principle of gears, the Torricelli principle and the Pascal principle (butterfly). There is a need for a generation method and generating structure that can artificially generate a spiral air column year-round in order to weaken while continuously dispersing the generated energy of a hurricane and a typhoon caused by volume expansion attributable to the temperature rise of high-temperature and high-humidity air in the equator region. The same is true of a land tornado and yellowdust.
- [0014]
There is a need for an artificial generating method and structure for powerful updrafts that can continuously adjust generation time without interruption while dispersing the number of generated natural tornadoes, hurricanes, yellowdust, and typhoons by generating an artificial tornado, hurricane, yellowdust and typhoon by sucking air from the ground and raising the air while passing the air through paths between the spiral coaxial generators including four coaxial cylinders and artificially weakening the generated collected low-pressure energy of a natural tornado, hurricane, yellowdust, and typhoon while dispersing them.
- [0015]
The present invention is a technology that can weaken powerful rising air such as a tornado, a hurricane, yellowdust and a typhoon generated in various parts of the world and causing the loss of many a lot of lives and property while artificially dispersing it without interruption, a technology that weakens the generation energy of the low temperature dry whistle wind, which is the generation energy of tornado and yellowdust, and the energy of the high temperature and high humidity trade wind which is the generation energy of hurricane and typhoon while dispersing it without interruption year-round, and a technology related to a spiral artificial generator for the artificial generation of a typhoon, yellowdust and a tornado that can artificially generate a spiral air pillar having a generation form identical to that of a tornado, a hurricane, yellowdust and a typhoon on a small scale in the same direction without interruption, wherein the size of the spiral artificial generator can be increased or decreased according to the basic module.

Technical Solution

- [0016]

A wind, which is a tropospheric air movement, is a phenomenon in which air heated by solar energy attempts to maintain a dynamic equilibrium. Tornadoes, hurricanes, yellowdust and typhoons are meteorologically caused because the atmosphere is very unstable (due to the lapse rate of temperature). Low-temperature dry air is the main generating energy for tornadoes and yellowdust in nature, and high-temperature humid air (latency vapor) is the main generating energy for hurricanes and typhoons. Tornadoes, hurricanes, yellowdust and typhoons generate strong energy irregularly over large areas, but a large amount of observed data on the types and conditions of generation have been arranged.

- [0017]
  In the doldrums of the equator in which the trade winds (floating winds) continue to rush, typhoons are not generated because the turning force is hardly applied. Accordingly, if the trade wind (flying wind) air that flocks strongly from the doldrums of the equator is a cyclone and does not rise up to the sky, it finds a way out. As a means by which a cyclone escapes, low-temperature hot and humid air is gathered to the source of a hurricane or typhoon, generates a hurricane or typhoon, and escapes with enormous wind speed.
- [0018]
  The present invention artificially generates a powerful updraft such as a tornado, a hurricane, yellowdust, or typhoon by means of the spiral movement principle, the Pascal principle and the principle of chimneys without interruption, and the artificial and a small tornado, hurricane, yellowdust, or typhoon of the present invention generates an artificial air column which continuously lifts up air without interruption according to the principle that the force by which a chimney sucks air is proportional to the height of the chimney and wind power energy is proportional to the third power of wind speed. The spiral artificial generator constructed on land or at sea is naturally composed of four coaxial steel cylinders and thus naturally heated by solar heat, and a stainless steel plate and a heating coil installed in the inner circular structure of the spiral artificial generator are heated by environmentally-friendly solar cells and wind power generation. As the air inside the spiral artificial generator expands and continues to rise upward, the spiral movement of an upstream flow is powerfully generated, draws the air around the spiral artificial generator, raises the drawn air upward, and continues to push up the internal air inside the spiral artificial generator.

Advantageous Effects

- [0019]
  According to the present invention, the spiral artificial generator of the present invention that continuously generates the upward movement of air in accordance with the chimney principle, the Ekman spiral principle, the principle of gears, the Torricelli principle, and the Pascal principle, such as the butterfly effect, in a region having a westerly wind and an easterly wind (a trade wind) is constructed, and the air of a low-temperature dry westerly wind and the air of a hot/high-temperature easterly wind (a trade wind) enter the spiral

manipulator of the present invention and continuously generate the upward movement of air in accordance with the chimney principle, the Ekman spiral principle and the Pascal principle such as the Torricelli effect and the butterfly effect without interruption. In this case, the rising high-temperature and high-humidity air and low-temperature dry air continues the upward movement under buoyancy as the temperature of the air is increased and the air is expanded by the spiral motion of the spiral artificial generator, and the air expands and continues its upward movement under buoyancy as latent heat is released by the condensation of water vapor absorbed by low-temperature and dry air and water vapor contained in hot and humid air.

- [0020]
According to the present invention, the spiral artificial generator that can artificially generate the spiral movement of air on land or at sea in a region where temperature is rising while rising air always flows in an area where a low-temperature dry and wet westerly wind and a hot and humid trade wind (an easterly wind) are present is constructed, and the loss of a lot of human lives and property is prevented by artificially distributing artificial small tornadoes, hurricanes, yellowdust and typhoons, and artificially adjusting the number of occurrences in order to artificially disperse the collection of hot and humid air and low-temperature dry air.
- [0021]
When the spiral artificial generator is constructed on land or at sea in an area from which a tornado, a hurricane, yellowdust or a typhoon is originated and generates a small artificial tornado, hurricane, yellowdust or typhoon, ambient high-temperature and high-humidity air and low-temperature dry air enter into the spiral artificial generator, and the energy of the tornado, hurricane, yellowdust, or typhoon around the spiral artificial generator is artificially dispersed and weakened, thereby reducing the scale of the generation of a tornado, a hurricane, yellowdust, or a typhoon because the generation of a tornado, a hurricane, yellowdust, or a typhoon cannot be generated strongly. When the door of the spiral artificial generator is closed and a small artificial tornado, hurricane, yellowdust or typhoon is generated, the small artificial tornado, hurricane, yellowdust or typhoon is continuously generated by opening the door of the spiral artificial generator, and the energy generated by hurricanes, yellowdust and typhoons is artificially weakened while being dissipated, thereby preventing the loss of a lot of lives and property.

DESCRIPTION OF DRAWINGS

- [0022]
FIG. 1 is a perspective view of the present invention;
- [0023]
FIG. 2 is a view showing general low-pressure and high-pressure wind directions;
- [0024]
FIG. 3 is a sectional structural view of a typical typhoon;
- [0025]

FIG. 4 is a sectional view of the present invention;

- [0026]
  FIG. 5 is an air flow diagram of the present invention;
- [0027]
  FIG. 6 is an air flow diagram of FIG. 5 in a plan view;
- [0028]
  FIG. 7 is an enlarged sectional view of the upper part of the present invention;
- [0029]
  FIG. 8 is an enlarged view of main parts of FIG. 7;
- [0030]
  FIG. 9 is a partial sectional view showing the air movement of the present invention,
- [0031]
  FIG. 10 is a sectional view showing a spiral staircase in the spiral artificial generator of the present invention;
- [0032]
  FIG. 11 is a plan view taken along line II of FIG. 10;
- [0033]
  FIG. 12 is a plan view taken along the line II-II of FIG. 10;
- [0034]
  FIG. 13 is a plan view taken along line III-III of FIG. 10;
- [0035]
  FIG. 14 is a plan view taken along the line IV-IV of FIG. 10; and
- [0036]
  FIG. 15 is an explanatory view of an upper air bearing seen in the plan view of the present invention.

MODE FOR INVENTION

- [0037]
  1) The artificial upward air flow of a spiral artificial generator is continuously generated by the spiral motion of air, and the outer diameter D of the spiral artificial generator relative to the outer height H of the spiral artificial generator, determined for the structural safety of the spiral artificial generator against wind force, is calculated by D=0.382H (≈1H≈1.618≈1.618), which is a basic module formula in which the height H of the spiral artificial generator is successively divided twice at a golden ratio of 1.618.
- [0038]
  (e.g., H152 m×D58 m, H199 m×D76 m, and H100 m×D38 m)
- [0039]
  2) The spiral motion for the generation of the artificial upward air flow of the spiral artificial generator is strongly and continuously generated. When the diameter D of the spiral artificial generator, which is determined for the structural safety of the spiral artificial generator against wind force, is determined first, the outer height H of the spiral artificial generator is calculated by H=2.618D (≈1D×1.618×1.618), which is a basic module formula in which the diameter D of the spiral artificial generator is successively multiplied twice at a golden ratio of 1.618.

- [0040]
  (e.g., H152 m×D58 m, H199 m×D76 m, and H100 m×D38 m)
- [0041]
  3) The corresponding heights H_1 and H_2 of the second and third artificial generators B and C, which are the internal coaxial cylindrical structures of the spiral artificial generator, with respect to the determined height H of the spiral artificial generator are calculated by $H_1=0.84H$ and $H_2=0.92H$, which are basic module formulas.
- [0042]
  (e.g., 128 m≈0.84×152 m, and 140 m≈0.92×152 m)
- [0043]
  4) For example, in order to actively induce a thunderstorm, a total of nine arrestors in three sets of three arrestors, which are made of silver (Ag) and in each of which a lightning rod protrudes from a funnel-type base, are installed on the top of the spiral artificial generator which artificially generates a natural tornado, hurricane, yellowdust and typhoon in small scale without interruption.
- [0044]
  5) A separate tank configured to store silver (Ag), silicon, and water is installed separately from the underground structure of the spiral artificial generator underground, and is electrically connected to the arresters.
- [0045]
  6) A stepped spiral blade which is fabricated at an angle of 45° (width=height) to generate the spiral motion of air is installed on the outer wall of the fourth artificial generator E of the spiral artificial generator at an angle of 45° (width=height). In order to supply environmentally friendly electricity to the spiral artificial generator, solar cells are installed on the outer wall of the spiral artificial generator in the south, east and west (in the southern hemisphere, the east, north and west). In case of need, when an inverter configured to generate AC power based on a charge battery voltage via a solar cell is installed, it is favorable for the driving of a generator and the generation of emergency power.
- [0046]
  7) A door which can remotely control the inflow of air while being selectively opened and closed by electricity generated by the solar cells and wind power generation and in which a screen configured to prevent the inflow of garbage is installed to be selectively opened and closed is installed on the bottom of the cylindrical spiral artificial generator E. A door in which a screen is selectively opened and closed is also installed inside the bottom of the spiral artificial generator C. A door is also installed on the bottom of the cylindrical spiral artificial generator B. An entry passage leads to a corresponding passage.
- [0047]
  8) Blowers which are driven by the solar cells and the wind power generation to suck air outside the spiral artificial generator into individual passages inside the second, third and fourth artificial generators B, C and E, which are second, third and fourth coaxial cylindrical structures, and to blow the air upward are installed on the

bottoms of the second, third and fourth artificial generators B, C and E, which are coaxial cylindrical structures.

- [0048]
  9) Stepped spiral blades which are fabricated at an angle of 45° (width=height) according to the Ekman spiral principle inside the second to fourth artificial generators B, C, and E are installed on the inner and outer walls of the second to fourth artificial generators at an angle of 45° (width=height), and artificially and strongly generate air bearings without interruption. Furthermore, the widths of the stepped spiral blades are calculated as 4% to 5% of the radius of the spiral artificial generator determined according to the basic form of the present invention by a basic module formula (e.g., D58 m≈2×4%≈1.2m), and are used for the installation work and maintenance of the spiral artificial generator.
- [0049]
  10) For the air suction of the second to fourth artificial generators and the continuous spiral movement of the sucked air, a stepped spiral blade continuous upward is attached to opposite passage walls between the first and second artificial generators A and B, which are the first and second cylindrical structures of the spiral artificial generator. A stainless steel plate and a heating coil (which may be replaced with one of a carbon heater and a carbon mat, which are heating means) in which the height of a basic form is maintained at 36 m (≈152 m×24%; ranging from 12 m above the ground to 48 m above the ground), which is 24% of the height of the generator (H) of a spiral chimney, and which are heated by the supply of power generated by the solar cells and the wind power generation are installed, and act to expand while artificially heating incoming air, thereby strongly sucking and raising internal air. The reason for installing the stainless steel plate and the heating coil from 12 m of the basic form above the ground and limiting the upper installation limit to 48 m is that heating efficiency is deteriorated in that case.
- [0050]
  11) Spiral motion blades which induce spiral wind directions in the same counterclockwise direction as the rotation directions of a tornado, a hurricane, yellowdust and a typhoon are installed in the inner passages of the second and fourth cylindrical generators B and E, which are second and fourth cylindrical structures. A spiral motion blade which induces a spiral wind direction in the same counterclockwise direction according to the principle of gears and Newton’s law is installed in the inner passage of the third artificial generator C. The counterclockwise wind speeds of the second and fourth artificial generators B and E react with the clockwise wind speeds at the upper end of the third artificial generator C, thereby accelerating the counterclockwise wind speeds of the second and fourth artificial generators B and E according to the principle of gears and the air bearings. The reason for this is that the height of the third artificial generator C is set to the center of the height of the second and fourth artificial generators B and E, so that the halves of a clockwise wind direction passing over the top of the spiral artificial generator (C) are extinguished on both sides by accelerated wind directions passing over the tops of the second and

fourth artificial generators B and E and the wind directions of the second and fourth artificial generators B and E are combined together according to the spiral motion principle and the principle of gears.

- [0051]
  12) When the spiral artificial generator is constructed in the southern hemisphere of the earth, the stepped blade installed in the counterclockwise or clockwise direction on the inner wall of the spiral artificial generator forming the passage thereof is installed in the direction opposite to that in the northern hemisphere.
- [0052]
  13) In order to prevent the cause of yellowdust, water spray equipment and tanks are installed in passages between the second, third and fourth artificial generators B, C and E, which are the basic second, third and fourth cylindrical structures, and the fine dust particles of yellowdust are collected and removed by water mist. Furthermore, the water supplied to the spraying equipment is purified and reused.
- [0053]
  14) For a basic type of wind power generation, the main body of a wind power generator is installed on the inner circumference of the first artificial generator A having a combined wind power generator and regulator function, which is the first cylindrical structure, and the windmills of the wind generator are installed in the passages of the artificial generators B and C, which are the second and third cylindrical structures so that they are rotated by wind power.
- [0054]
  15) A construction tower crane is installed inside the first artificial generator A, which is a basic cylindrical structure, for construction work and maintenance, an elevator is installed for the purpose of maintenance after construction, and dry air is dispersed over the air to predict the occurrence of a tornado, a hurricane, yellowdust, and a typhoon.
- [0055]
  16) For the structural reinforcement of the spiral artificial generator, the retaining wall of the first artificial generator A, which is a cylindrical structure, is installed up to one fifth of the height H of the spiral artificial generator RC by using a reinforced concrete construction (RC), and the walls of the first generator A, which is a chimney-type structure, and the second, third and fourth artificial generators B, C and E, which are coaxial cylindrical structures, are reinforced to 24 m above the ground by using steel frames.
- [0056]
  In connection with the descriptions in conjunction with FIGS. 4 to 9, when the outer height H is set to 152 m, the diameter D of the basic-type fourth artificial generator E is calculated as about 58 m (≈152 m×0.382) which is 0.382 (≈1.618≈1.618) times 152 m.
- [0057]
  The present invention includes:
- [0058]
  a first artificial generator **100** which has a second path inner staircase **612** configured to induce a counterclockwise wind direction on the outer surface thereof in order to correspond to a second path outer staircase

610, i.e., a screw-type spiral staircase (in the southern hemisphere, a right-handed screw-type spiral staircase), on the inner surface of the second artificial generator **200** which is coaxial with the basic-type fourth artificial generator E and provides a second path **600**, which forms a chimney-shaped first path **500** therein, and in which a combined wind power generator and regulator is installed;

- [0059]
  the second artificial generator **200** which is lower than the first artificial generator **100**, which provides the second path **600** configured to suck external air from the outer side of the lower end of a fourth artificial generator **400** through the lower end of a third artificial generator **300** and raise the external air in a counterclockwise direction, which has a screw-type spiral second path outer staircase **610** on the inner wall thereof, and which induces rising while performing counterclockwise rotation on a plane, as indicated by the directions of the arrows of FIG. **8**;
- [0060]
  the third artificial generator **300** which has a diameter larger than and is coaxial with the second artificial generator **200**, which has a height higher than the second artificial generator **200**, which has a spiral third path outer staircase **710** along the wall surface of the inner circumferential portion thereof such that external air is sucked from the outer side of the lower end of the third artificial generator **400** to be isolated from the second path **600** and the third path **700** and is raised through the third path **700** between the outer surface of the second artificial generator **200** and the inner surface of the third artificial generator **300** in a clockwise screw direction, and which induces rising while performing clockwise rotation on a plane;
- [0061]
  a fourth artificial generator **400** which has a diameter larger than and is coaxial with the third artificial generator **300**, which has a height higher than the third artificial generator **300**, which has the height as the first artificial generator **100**, which has a fourth path outer staircase **810** on the inner circumferential portion thereof such that external air is sucked from the outer side of the lower end of the fourth artificial generator **400** to a fourth path **800** between the outer surface of the third artificial generator **300** and the inner surface of the fourth artificial generator **400** and is raised in a counterclockwise screw direction, and which induces rising while performing counterclockwise rotation on a plane; and
- [0062]
  a base frame **970** which fastens the lower ends of the first to fourth artificial generators **100**, **200**, **300** and **400** to the ground surface; wherein the paths **931**, **941** and **951** of the second to fourth artificial generators **200**, **300** and **400** are configured to suck external air in the state of being isolated from each other in the lower end of the fourth artificial generator **400**.
- [0063]
  FIG. 8(*a*) is an enlarged view of the important portion of FIG. 7 in a plan view, FIG. 8(*b*) is an enlarged view of portion (b) of FIG. 7, and FIG. 8(*c*) is an enlarged view of portion (c) of FIG. 7.

- [0064]
  As shown in FIG. 9, on the base frame **970** are installed a first door **930** which is installed in an entrance path connected to the second path **600** in the lower end of the fourth artificial generator **400** and which supplies external air to the second path **600** counterclockwise when it is opened;
- [0065]
  a second door **940** which is installed in a second floor entrance path connected to the third path **700** at a second floor location of the lower end of the fourth artificial generator **400** isolated from the entrance path of the first door **930** and which supplies air rotating clockwise in the third path **700** so that the air is raised; and
- [0066]
  a third door **950** which is installed in a third floor entrance path connected to the fourth path **800** at a third floor location of the lower end of the fourth artificial generator **400** isolated from the second floor entrance path **941** of the second door **940** and which supplies external air such that air rotating clockwise in the fourth path **800** is raised; and
- [0067]
  the isolated entrance path, second floor entrance path and third floor entrance path are radially spaced apart from each other in the lower ends of the corresponding second artificial generator **200**, third artificial generator **300** and fourth artificial generator **400**, and the first door **930** is installed in the entrance path **931**, the second door **920** is installed in the second floor entrance path **941**, and the third door **950** is installed in the third floor entrance path **951**.
- [0068]
  A stainless plate **900** which is a metal plate heated by a heating coil **902** in order to generate strong raising force by heating introduced air in an early stage is installed on the outer surface of the lower portion of the first artificial generator **100** and the inner surface of the lower portion of the second artificial generator **200** which form the second path **600**.
- [0069]
  The body **962** of the wind power generator **960** is installed in the first path **500** which is the inner circumferential portion of the first artificial generator **100**, as shown in FIG. 4;
- [0070]
  the wind power generator **960** further includes: a rotating shaft **964** which extends from the body **962** to the second path **600** and the third path **700**, which is equipped with a rotating blade **966**, and which is rotated to operate a wind power generator **96**; and
- [0071]
  a rotating blade **966** which receives rising air having passed through the second path **600** and the third path **700** and is rotated in order to provide rotating force to the rotating shaft **964**.
- [0072]
  Spray nozzles **920** each having a water spraying function for the prevention of yellowdust are added to the bottoms of the second path **600** to the fourth path **800**.

- [0073]
  The second path outer staircase **610**, the third path outer staircase **710**, and the fourth path outer staircase **810** are formed in spiral shapes and are installed on the outer side walls of the second to fourth paths **600**, **700** and **800** between the first to fourth artificial generators **100**, **200**, **300** and **400**, and the second path inner staircase **612**, the third path inner staircase **712**, and the fourth path inner staircase **812** are formed in spiral shapes and are installed inner side walls functioning to form the second to fourth paths **600**, **700** and **800** between the first to fourth artificial generators **100**, **200**, **300** and **400**; and
- [0074]
  The inner staircase **612** of the second path, the inner staircase **712** of the third path, and the inner staircase **812** of the fourth path corresponding to the second path outer staircase **610**, the third path outer staircase **710**, and the fourth path outer staircase **810** are installed on inner walls over separated distances in the spatial widthwise directions of the corresponding second to fourth paths **600**, **700** and **800**, and the heights and bottoms of the staircases are the same and configured to form an inclination of 45°, as shown in FIG. 8(*b*).
- [0075]
  In the present invention, basically, the second to fourth generators **200**, **300** and **400** are coaxial with the first artificial generator **100** around the first artificial generator **100** while having increasing diameters, the second to fourth paths **600**, **700** and **800** corresponding to the respective second to fourth artificial generators **200**, **300** and **400** suck ambient air in the ground surface portions, air is introduced from a portion around the bottom of the fourth artificial generator **400** to the center thereof by suction force rotating simultaneously in the clockwise or counterclockwise direction along spiral stairs, simultaneous raising is performed on the second to fourth paths **600**, **700** and **800**, and the speed of rotationally raised wind is increased due to an increase in temperature and the expansion of air in an upward direction because the forces which cause accelerated spiral raising are added together by air bearing action attributable to the principle of gears, shown in FIG. 8(*b*), based on the widths and heights of the spiral staircases.
- [0076]
  This increases the wind speed from the ground through the coaxial configuration, the height difference configuration and the spiral staircase configuration of the first to fourth artificial generators in an upward direction from the ground, thereby providing the generation of a tornado, a hurricane, yellowdust, or a typhoon similar the above process.
- [0077]
  The second path **600** between the first artificial generator **100** and the second artificial generator **200** has a small rotation radius but a wide space, and thus high-speed rotation is induced by using the first artificial generator **100** as a rotating axis.
- [0078]
  The radius of rotation of the third path **700** between the second artificial generator **200** and the third artificial generator **300** is

larger than that of the second path **600**, and thus causes raising and high-speed rotation by means of air bearing action attributable to the principle of gears of the third path outer staircase **710** and the third path inner staircase **712** in a left-handed screw direction (a clockwise direction) in a plane while inducing high-speed rotation. However, since the fourth path **800** is higher than the third path **700**, the rotation direction of the high-speed rotational air attributable to the fourth passage **800** is changed on the upper end of the third artificial generator **300**, the air is accelerated by means of external gear action and air bearing action, the direction of the air becomes the same as high-speed rotating air in the second path, and the air generates internal gear action, is accelerated, and acts to be subjected to double acceleration action to combine counterclockwise coaxial rotations having passed through the second path **600** and the fourth path **800** into one.

- [0079]
  The fourth path **800** between the third artificial generator **300** and the fourth artificial generator **400** has a narrower spatial width than the second path **600** and has a larger radius of rotation than the third path **700**, and thus causes raising and high-speed rotation in a counterclockwise direction by means of the internal gear action of the fourth path outer staircase **810** and the fourth path inner staircase **812** while inducing high-speed rotation. Since the height of the fourth artificial generator **400** is higher than that of the second artificial generator **200** and corresponding air is air rotating in the same counterclockwise direction, combination is performed by means of internal gear action and strong air movement occurs in the counterclockwise direction in the plane on the top of the second artificial generator **200**, which strongly influences an ambient wind direction and an ambient wind speed in accordance with the law of causality, the spiral principle, the Torricelli principle, the butterfly effect, and the Pascal principle.
- [0080]
  In addition, as shown in FIG. 14, although rotation in a counterclockwise and raising are performed in the second path **600** and rotation in the clockwise direction and raising are performed in the third path **700**, the boundary surfaces of the upper end portions of the second path **600** and the third path **700** acts to accelerate counterclockwise rotation in the second path **600** while causing rotation in the clockwise direction, i.e., a different rotation direction, by means of external gear action and air bearing action. The reason for this is that the width of the third path **700** is narrower than that of the second path **600**, and thus clockwise rotation in the third path **700** performs lubrication action and acceleration action while performing rotation in the opposite direction on the boundary surface of the upper end due to external gear action and air bearing action.
- [0081]
  Although rotation in a counterclockwise direction and raising are performed in the fourth path **600** and rotation in the clockwise direction and raising are performed in the third path **700**, the boundary surfaces of the upper end portions of the second path **600** and the third path **700** act to accelerate the counterclockwise rotation of the second path **600**

while performing rotation in a different rotation direction by means of external gear action and air bearing action. The reason for this is that the width of the third path **700** is narrower than that of the second path **600** and the height of the fourth artificial generator **400** is lower than that of the third artificial generator **300**, and thus clockwise rotation in the third path **700** performs lubrication action and acceleration action while performing rotation in the opposite direction on the boundary surface of the upper end portion by means of external gear action and air bearing action.

- [0082]
  The rotational energy in the counterclockwise direction through the second path **600** via lubrication action attributable to external gear action and air bearing action through the third path **700** and the rotational energy of the counterclockwise rotating air through the fourth path **600** via lubrication action and acceleration action attributable to external gear action and air bearing action through the upper end of the third path **700** are combined on the top without resistance and decrease to function to increase rotational energy. **102** is an outlet configured to perform discharge from the lower end of the first path **500** to the second path **600**, is opened when necessary such that high-pressure air ascending from the upper end of the first path **500** to the lower end thereof may enhance the function of the second path **600**.

US patent #20200315104: Propagating sound through bodies of water, to generate and direct wind, for the purpose of moderating and affecting weather patterns

Abstract

This invention claims a patent on the process of propagating soundwaves through bodies of water, such as oceans, to produce and direct winds, for the purpose of managing aerial weather systems. Propagating soundwaves within water can generate and direct wind for many purposes. One purpose is to effectively weaken storms, by directing wind-shear against a storm’s momentum, and stripping it of precipitation. Another purpose is to guide atmospheric rivers, and manually re-direct clouds in the precipitation cycle. This inventive process grants methods to mitigate dangerous weather patterns, such as droughts and hurricanes. The invention introduces a new subject matter that distinguishes it from other inventions relevant to underwater acoustics: manual processes to moderate weather. (Source: https://patents.google.com/patent/US20200315104A1/en) Read More

Description

CROSS-REFERENCE TO RELATED APPLICATIONS

- [0001]
  This substitute specification applies towards the nonprovisional application Ser. No. 16/373,609 (Apr. 2, 2019), which claims filing date of the provisional application 62/823,823 (Mar. 26, 2019)

STATEMENT REGARDING FEDERALLY SPONSORED RESEARCH OR DEVELOPMENT/STATEMENT REGARDING PRIOR DISCLOSURES BY THE INVENTOR

- [0002]
Applicant inventor Olatunbosun Osinaike disclosed the invention to 21st Century Fox, and the Walt Disney Company on Oct. 10, 2018, for partnership with the Advocate Aurora Venture Fund, and the Catholic Church.
- [0003]
If an invention is in public use or publicly disclosed, an inventor is granted a grace period of 1 year to file for a patent on his invention.
- [0004]
The government would have manufactured parts and sponsored development in order to put the invention to use. Mr. Osinaike has not been formally contracted since disclosing the invention.
- [0005]
This patent is being filed to protect the inventors' rights as afforded to him by United States Patent Law, USPTO and international patent treaty law.
- [0006]
The inventor, Mr. Osinaike, is willing to enter a licensing deal for the use of his invention.

BACKGROUND OF THE INVENTION

- [0007]
This is a utility patent, pertaining to the use of soundwaves, to moderate, adjust and control weather patterns. The subject matter of the invention groups underwater acoustics, aerodynamics and weather.
- [0008]
It is a well-known scientific principle that sound travels faster in compressed liquids than in air. This is a natural law of physics, which is not patentable. However, there are many principle uses of sound in the field of underwater acoustics, that are patentable subject matter: radar, seismic exploration, and data collection to name a few. US Patent Law allows an inventor to patent newly discovered processes, and considers success against long felt but unsolved needs, sufficient consideration to justify patenting an invention.
- [0009]
The US is one of many countries that has long struggled to find a solution to weaken hurricanes. Additionally, climate change has made drought a considerable problem for many regions. This invention grants a process to mitigate both hurricanes and droughts, by directing wind, guiding precipitation, and affecting weather patterns.
- [0010]
This patent claims the invention of a process that propagates soundwaves underwater, to direct wind(s), and moderate weather patterns.
- [0011]
Mr. Osinaike's invention requires a crucial, necessary inventive step, which is not described in any prior art. Mr. Osinaike's invention depends on the choice to propagate soundwaves underwater, in order to

shift and carry the air above the water. This is an inventive, non-obvious step, that distinguishes the inventor’s concept from prior art. Patent Law requires that for prior art to prevent an invention from being patentable, it must sufficiently describe the claimed invention in such a manner that the invention would be obvious to a person with ordinary skill in the subject matter. Mr. Osinaike claims there is no prior art that makes the claimed processes obvious. Furthermore, the many failed attempts to weaken hurricanes demonstrate the new, useful, and non-obvious nature of the invention.

- [0012]
  The original inventor, Olatunbosun Osinaike, disclosed the invention on Oct. 10, 2018, to 21st Century Fox, now Fox Corporation, and the Walt Disney Company, for partnership with the Advocate-Aurora Venture Fund (Foxconn, Johnson Controls, Northwestern Mutual, and Advocate-Aurora Health Care), the Catholic Church, and a number of additional companies, listed in the first transmittal form.

BRIEF SUMMARY OF THE INVENTION

- [0013]
  Sound travels at a much faster speed within a liquid than within gas.
- [0014]
  Simply propagating sound through air, against a cloud or storm system, would not be as effective at mitigating and moderating weather patterns, as the claimed invention. Sound is less capable of shifting the molecules of air, as the molecules are further apart, and less compressed, than a liquid. It would take a tremendously loud, and possibly unbearable, propagation of sound in air, to have an effect on the weather.
- [0015]
  The propagation of sound under water takes advantage of the compressed nature of the liquid. By propagating the sound within a body of water, the liquid medium is able to transfer the energy of the sound more rapidly, and efficiently. Sound causes water to move in the direction the sound is being propagated. The propagation of sound in water causes motion, forming compressions and rarefactions through the liquid. These waves are capable of shifting pockets of air between their peaks and troughs. Additionally, as sound is propagated through the liquid body of water, additional water evaporates, inheriting momentum from the propagation of sound, and creating a larger gust of wind to affect the weather.
- [0016]
  The transfer of the sound’s momentum through the water is sufficient to direct wind shear powerful enough to weaken storms, guide clouds and precipitation, and affect various other weather patterns.

BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWING

- [0017]
  FIG. 1: The first drawing demonstrates the first claimed process of the patent, propagating sound through a body of water to generate wind. The figure demonstrates how propagating sound within a body of water, shifts

pockets of air between the waves of water, as well as causes water to evaporate, forming ‘directed wind(s),’ which can be used to affect weather patterns.

- 1) Process to produce, propel and direct wind(s), by propagating sound within a body of water, for the purpose of affecting weather patterns:
  - a. By propagating sound within a body of water, the sound forces the water to move in the direction(s) the sound is being applied.
  - b. The propagation of sound creates compressions and rarefactions in the water, waves, which subsequently shift pockets of air in the direction they travel.
  - c. Additional water evaporates due to the propagation of sound through the water. This vapor travels in the same direction the sound is applied, and creates a larger gust of wind to affect weather.
  - d. The shifting pockets of air, and the evaporating water, behave as directional winds, produced and guided by the propagation of sound. This wind can be utilized to affect weather patterns, as lower winds shift higher air systems. The second and third drawings combine to illustrate the second claim, that propagating sound underwater can generate sufficient wind shear to weaken a storm system.

- [0023]
  FIG. 2: The second drawing illustrates the second claim from a horizontal view, how directed winds can be utilized as wind shear, to strip precipitation from a storm system.
- [0024]
  FIG. 3: The third drawing, also demonstrates the second claim, from an aerial view, demonstrating the propagation of sound in directions counter-current to a storm’s angular momentum, as well as outward from the eye of the storm.
  - 2) Process to produce and direct wind shear, for the purpose of weakening storm systems, by propagating sound within bodies of water:
    - a. Wind propelled by propagating sound within a body of water (claim **1**), can be directed against a storm system, such as a hurricane.
    - b. Directing winds against a storm can weaken the storm system, by stripping the storm of clouds and precipitation, preventing the storm from maintaining precipitation/rain.
    - c. The best method is to apply the sound and wind counter-current to the storm’s torque and rotation. Another method is to apply the sound and wind outward from the center of the storm.
    - d. Although the best method may be to apply the sound in a direction counter-current to the storm’s rotation, the sound may be propagated in any direction(s) necessary to strip the storm of precipitation, based on various geographical and meteorological factors around the storm,

like for example, simultaneous storms.

- [0030]
  FIG. 4: The fourth drawing illustrates the third claim, how propagating sound through a body of water, can produce winds, which are used to shift and guide precipitation systems. The drawing illustrates the concept from a horizontal view. In the image, the winds carry the precipitous clouds from the ‘left’ side of the water, to the ‘right,’ to demonstrate the effect of the propagation of sound under water.
    - 3) Process to transport water vapor, clouds, precipitation, and atmospheric rivers in a desired direction(s), by propagating sound within the body of water beneath:
        - a. Propagating sound within water can generate and direct wind (claim **1**) that affects weather patterns. These winds carry their own moisture.
        - b. The lower winds being directed by the propagation of sound, then also shift clouds and air systems higher in the atmosphere, or along the same altitude.
        - c. This process may be utilized to guide precipitation systems, and adjust precipitation cycles.
- [0035]
  FIG. 5: The fifth drawing illustrates the fourth claim, that propagating sound underwater can be used to slow waters, and mitigate winds, propelled by prior propagation of sound.
    - 4) Process to slow waters, and mitigate directed winds, propelled by prior propagation of sound.

DETAILED DESCRIPTION OF THE INVENTION

- [0037]
  Invention: Propagating sound through bodies of water, to generate and direct wind, for the purpose of moderating and affecting weather patterns.
  These are the invention’s claims:
    - 1) Process to produce, propel and direct wind(s), by propagating sound within a body of water, for the purpose of affecting weather patterns:
        - a. By propagating sound within a body of water, the sound forces the water to move in the direction(s) the sound is being applied.
        - b. The propagation of sound creates compressions and rarefactions in the water, waves, which subsequently shift pockets of air in the direction they travel.
        - c. Additional water evaporates due to the propagation of sound through the water. This vapor travels in the same direction the sound is applied, and creates a larger gust of wind to affect weather.
        - d. The shifting pockets of air, and the evaporating water, behave as directional winds, produced and guided by the propagation of sound. This wind can be utilized to affect weather patterns, as lower winds shift higher air systems.
    - 2) Process to produce and direct wind shear, for the purpose of

weakening storm systems, by propagating sound within bodies of water:
    - a. Wind propelled by propagating sound within a body of water (claim **1**), can be directed against a storm system, such as a hurricane.
    - b. Directing winds against a storm can weaken the storm system, by stripping the storm of clouds and precipitation, preventing the storm from maintaining precipitation/rain.
    - c. The best method is to apply the sound and wind counter-current to the storm's torque and rotation. Another method is to apply the sound and wind outward from the center of the storm.
    - d. Although the best method may be to apply the sound in a direction counter-current to the storm's rotation, the sound may be propagated in any direction(s) necessary to strip the storm of precipitation, based on various geographical and meteorological factors around the storm, like for example, simultaneous storms.
  - 3) Process to transport water vapor, clouds, precipitation, and atmospheric rivers in a desired direction(s), by propagating sound within the body of water beneath:
    - a. Propagating sound within water can generate and direct wind (claim **1**) that affects weather patterns. These winds carry their own moisture.
    - b. The lower winds being directed by the propagation of sound, then also shift clouds and air systems higher in the atmosphere, or along the same altitude.
    - c. This process may be utilized to guide precipitation systems, and adjust precipitation cycles.
  - 4) Process to slow waters, and mitigate directed winds, propelled by prior propagation of sound.
- [0053]
  It is a known scientific concept that propagating sound in water generates motion: rarefactions and compressions. Patent Law allows inventors to patent new, inventive uses for known scientific processes. The invention utilizes sound's quicker and more efficient energy transfer in compressed liquids, and claims a new use for the principle.
- [0054]
  The invention introduces a new subject matter compared to prior art in underwater acoustics: moderating weather patterns. By propagating sound within sea water, the invented processes grant an opportunity for humanity to guide and alter weather patterns, by generating and directing the wind(s).
- [0055]
  Hurricanes are known to decrease in strength if enough wind shear effects a storm, opposite of their momentum. However, wind shear is often a factor of chance, and the intersection of uncontrolled weather patterns, which determine whether a storm will become stronger or weaker. This invention gives humanity a manual process of generating wind, so that practitioners can produce wind shear to strip a storm of

its momentum and precipitation. Directing waters and wind with soundwaves grants a method to interfere in hazardous weather events.

- [0056]
  For stripping a hurricane of its precipitation, the best mode involves directing the sound in a direction counter to the hurricane's spin. So, in the Northern Hemisphere, where hurricanes spin counter-clockwise, you would apply the sound to direct the water and wind at a clock-wise tangent against the storm. Another method might apply the soundwaves in multiple direction away from the eye, in effect, pushing the precipitation out from the center of the storm, in 360 degrees. However, depending on various meteorological and geographic factors, the sound might be propagated in directions that are not necessarily counter-current to the hurricane's rotation, to weaken a storm.
- [0057]
  This invention also grants a process to direct moist air and precipitation to preferential regions, rather than relying on the natural precipitation cycle. For example, while East of the US is susceptible to hurricanes and storms, the West is more at risk of drought. Using soundwaves to direct the movement of clouds and precipitation can mitigate risk of drought in the Western States, by shifting rain clouds from the Western Pacific Ocean to the Eastern Pacific Ocean, (towards the Western United States). The invention grants a manual process to direct atmospheric rivers and precipitation.
- [0058]
  Utilizing soundwaves to guide wind(s) and affect weather patterns is a novel, useful, and non-obvious invention.
- [0059]
  The invention is novel because no prior invention, to Mr. Osinaike's knowledge, disclosed an invention purposed to control aerial weather patterns, by applying soundwaves under water. The United States has experimented with multiple other research initiatives and experiments in attempts to weaken hurricanes. Project Cirrus, Project Baton, and Project Storm-Fury were all attempts to weaken hurricanes that eventually were canceled. Project Cirrus attempted to weaken hurricanes by dropping crushed dry ice into the clouds. Project Baton seeded storms with other chemicals and dry ice. Project Storm-fury attempted to use silver iodide. These projects were also novel attempts to solve a complex problem. Unfortunately, they failed, but they demonstrated an understanding of the necessity to defend the country from a dangerous force of nature.
- [0060]
  This invention is novel because it capitalizes on a law of physics in an inventive way, to give our country and other nations, a manual way to weaken storms.
- [0061]
  The invention is also useful. Weakening hurricanes and resolving drought are both issues of priority. Both storms and drought have a tremendous effect on agriculture and infrastructure. Hurricanes can damage infrastructure at a dangerous rate in their peak seasons, which leads to tremendous construction and repair costs. On the other hand, drought can also be damaging to infrastructure. If a city, suffering from drought,

draws too much water from underground aquifers, this reliance can cause soil to sink, which poses risk to infrastructure. So, there are risks on both sides of changing precipitation cycles. This invention is useful because it helps mitigate risks due to climate change.

- [0062]
  The invention is non-obvious as well. Prior art had not described the invention in a manner that the inventive nature of this patent was obvious, prior to Mr. Osinaike's disclosure.
- [0063]
  Mr. Osinaike's provisional patent application, and nonprovisional patent application, are submitted within the grace period for inventors to file patents, after disclosing their invention for public use. Mr. Osinaike believes his invention has already been utilized to weaken storm systems and mitigate drought.

Do any of these inventions relate to weather occurrences you've heard about? May the reader arrive at his or her own conclusions.

As you can see, some of the inventions where designed to weaken storms, and others to ***enhance*** storms! US patent #20030085296: Hurricane and tornado control device.
A method is disclosed for affecting the formation and/or direction of a low atmospheric weather system. Audio generators are positioned to project sound waves toward a peripheral area of a weather system. The sound waves are generated at a frequency to affect the formation of the weather system in a manner to disrupt, **enhance or direct the formation**.

For more information about weather manipulation which is also known as geoengineering, please see the videos on Dane Wigington's YouTube channel, and also see his website on www.geoengineeringwatch.org.

I'm glad to have substantial and credible documentation which I hope will cause the public to think and not accept what the mainstream media is saying at face value. As Denzel Washington says, "If you don't read the newspaper you are uninformed, If you do read the newspaper you are misinformed." And Thomas Jefferson said: "The man who reads nothing at all is better educated than the man who reads nothing but newspapers." Who controls the Press in America? My scientist friend thinks it's the Jews. I believe it's the Vatican, the Jesuits and their connection with secret societies in America. The Pope and Jesuit Superior General are clearly promoting the Climate Change Scam.