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(54) **SYSTEM AND METHOD OF CONTROL OF THE TERRESTRIAL CLIMATE AND ITS PROTECTION AGAINST WARMING AND CLIMATIC CATASTROPHES CAUSED BY WARMING SUCH AS HURRICANES**

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(57) **ABSTRACT**

This system of the control and protection of the terrestrial climate relies mainly on civilian airlines burning (preferably price-subsidized) sun-shading (sun-blocking/sun-reflective) fuels in the high levels of the atmosphere in order to reduce the intensity of the solar radiation reaching the Earth's surface. The use of sun-blocking airline fuels for the protection of the Earth from solar radiation parallels the use of sun-blocking skin-creams for the protection of the individual. The invention parallels the cooling effect on the Earth's climate caused by major volcanic eruptions, collisions of the Earth with asteroids, or the cooling effect one could expect after a major nuclear war. This invention proposes the creation of a controlled mini "nuclear winter", in other words of a cooling caused by the increased refraction of the atmosphere or by the increased shading of the terrestrial surface by particulates in the high levels of the atmosphere.

**SYSTEM AND METHOD OF CONTROL OF
THE TERRESTRIAL CLIMATE AND ITS
PROTECTION AGAINST WARMING AND
CLIMATIC CATASTROPHES CAUSED BY
WARMING SUCH AS HURRICANES**

**CROSS-REFERENCE TO RELATED
APPLICATIONS**

[0001] Application number 60941666, EFS-ID: 1833526, Confirmation Number 2585, "System and Method of Control of the Terrestrial Climate and its Protection against Warming and Hurricanes",

FIELD OF THE INVENTION

[0002] Area of Technology

[0003] This invention touches upon the following areas of science and technology: meteorology, environmental sciences, pollution control, chemistry, physics, biology, fuel composition, crude oil refinement, air-traffic control, air-traffic routing.

BACKGROUND OF THE INVENTION

[0004] Theoretical causes of the warming of the terrestrial climate.

[0005] The most common theory behind the warming of the terrestrial climate is the increased concentration of anthropogenic or greenhouse gasses (mainly of CO₂) in the atmosphere, due to human activities. Other less known claimed causes, are the interaction of cosmic and solar radiation with the atmosphere or increase in solar radiation.

[0006] Current State of the Technology

[0007] Current efforts to control the climate, especially to limit the warming of the Earth's climate due to the release of the greenhouse gasses into the atmosphere have been in these areas:

[0008] Method 1. Limiting the use of all energy

[0009] Method 2. Limiting the fuel consumption of all hydrocarbon-fuel burning vehicles.

[0010] Method 3. Switching from the burning of fossil fuels to other sources of energy: nuclear, wind, water, etc.

[0011] Method 4. Promoting the use of renewable sources of energy, such as bio-fuels, (even though this does not appear to help since the burning of bio-fuels also produces greenhouse gasses.)

[0012] Method 5. The pumping of excess greenhouse gasses into underground storage

[0013] Method 6. Chemical binding, pulverizing and conversion of greenhouse gasses into other compounds

[0014] The History

[0015] In the billions of years of Earth's history with passing eons the climate has also changed. The main contributing factors to warming or cooling of the Earth's climate have been the presence of greenhouse gasses, the intensity of solar radiation, volcanic activity, asteroid collisions and the extent of forests and other CO₂-binding vegetation.

[0016] Asteroid collisions have had generally a cooling effect on the Earth's climate due to the release of large amount of particles (particulates) into the higher levels of the atmosphere. There the particles have prevented a significant amount of sunshine from reaching the Earth's surface and it is suspected that they caused a rapid cooling of the climate which could have contributed to mass extinctions. Such rapid cooling of the climate due to the high amount of dust in the

higher layers of the atmosphere is sometimes referred to as "nuclear winter" since it has been projected that a nuclear war would also release a large amount of particulates and cause rapid cooling of the Earth's atmosphere.

[0017] Volcanic activity has a dual effect on the climate. The initial volcanic explosion ejects large amounts of particulates (dust) into the atmosphere and thus has a cooling effect, as has been observed after several large volcanic explosions. However along with dust, volcanic explosions also release large amounts of CO₂, which has a warming effect. So the initial cooling effect of the volcanic explosion is followed by the warming effect due to the released CO₂ into the atmosphere.

[0018] Amount of land vegetation, such as forests, has also a significant effect upon the Earth's climate. It is suspected that the drastic reduction of the population in Europe after the black plague epidemic has resulted in a lower wood consumption and reforestation of the European continent. This reforestation has decreased the levels of CO₂ in the atmosphere and could have triggered the sudden cooling of the European continent in the decades after the black plague.

[0019] In the early years of the third millennium the Earth's climate is under influence from several factors which lead to the rapid warming of the climate and to the melting of glaciers and polar ice caps. To this drastic climate change contribute mainly: massive fossil fuel burning and deforestation.

DESCRIPTION OF RELATED ART

[0020] Not applicable.

SUMMARY OF THE INVENTION

[0021] This system of the control of the terrestrial climate and for the protection of the terrestrial climate relies mainly on civilian airlines burning preferably price-subsidized sun-shading fuel in the high levels of the atmosphere in order to reduce the intensity of the solar radiation reaching the Earth's surface. This regulated burning of fuels having sun-shading, sun-reflecting exhaust creates a controlled mini "nuclear winter", or mini "ice-age" and cools the terrestrial climate to the desired level. This invention has a quick and practically immediate effect upon the Earth's climate and gives us more time to put into effect other measures to control the production of anthropogenic gasses and to reduce the CO₂ levels in the atmosphere. In comparison to other proposals, this invention can be put into effect within months and show practically immediate result—with minimal cost. The difference in cost between die burning of regular or sun-shading fuels is minimal, and thus the main advantage of this method is that it costs practically nothing. The minimal increase in costs to the airline industry could be easily compensated with minor subsidies. All the other known proposals for the control of the terrestrial climate rely on massive subsidies which could bankrupt many economies and lead to a recession. This invention gives us a chance to save the terrestrial climate and give us time to develop other sources of energy, such as fusion. In fact this invention is the only viable alternative between sustained growth and environmental control, or the melting of glaciers and polar ice fields combined with a world recession and environmental catastrophe. This invention touches upon the following areas of science and research: meteorology,

environmental sciences, pollution control, chemistry, physics, biology, fuel composition, crude oil refinement, air-traffic control, air-traffic routing.

BRIEF DESCRIPTION OF THE DRAWINGS

[0022] Not applicable

DETAILED DESCRIPTION OF THE INVENTION

[0023] The Fundamentals of this Invention

[0024] The main idea behind this invention is the compulsory and regulated use of such types of aircraft fuels whose emissions have an increased ability to shade or reflect solar radiation and to prevent a part of the solar radiation from reaching and warming of the Earth's surface. Since by using sun-shading air-craft fuels airlines would be solving the warning of the Earth's climate caused not only by air-traffic but by all industries, such sun-shading aircraft fuels should be price-subsidized. Apart from the use of sun-shading aircraft fuels as an alternative this invention also proposes direct dispersal of other non-fuel sun-shading compounds in the high reaches of the atmosphere by high flying aircraft using similar equipment as is being used by agricultural aircraft. Regulatory organs would pay the full price of sun-shading compounds, subsidy the cost of installation of spraying equipment as well as the cost of all air-flights during which such aerial dispersal takes place. This relatively costly dispersal of sun-shading aerosols in the atmosphere should be taken only in the extreme case. The preferable method is the use of sun-shading fuels, which has only minimal costs.

[0025] All fossil fuel vehicles through their release of anthropogenic gasses (such as CO₂) into the atmosphere contribute to the warming of the Earth's climate. High-flying jets eject into the higher layers of the atmosphere not only CO₂ but also other pollutants and particulates. It has been observed that airplane exhaust, due to its shading effect, somewhat lowers the intensity of the solar radiation reaching the surface and counterbalances the warming effects of the CO₂ pollution and if properly used and formulated could be a powerful tool against the warming of the Earth's climate. So airplane traffic, instead of being a big problem due to its production of CO₂ and of other pollutants, could become the solution to the warming of the Earth's climate.

[0026] The evidence for the sun-shading (cooling) effect of the airplane exhaust is widely available in the literature. The most obvious effects of the sun-shading power of the airplane exhaust have been observed before, during and after sudden massive grounding of airplanes due to labor stoppages, strikes or other reasons. At those times it was possible to measure the difference between the presence and absence of the sun-shading effect of the airplane exhaust. This difference was obvious even with the usage of normal non-shading airplane fuels and it can be expected that this difference would be massive with the compulsory usage of such hi-factor sun-shading airplane fuels. For example while the United States government stopped the airplane traffic in die U.S. for several days after the terrorist attack on the New York World Trade Center, it was accompanied by a measurable increase in temperatures and solar radiation in the continental United States, due to the absence of die airplane exhaust in the upper levels of the atmosphere. While even the use of normal airplane fuels has shown itself to have drastic and powerful influence upon the temperatures on tie Earth's surface, the effect of the

regulated use of sun-shading/sun-reflecting airplane fuels (having sun-shading/sun-reflecting exhaust fumes) would be several times higher.

[0027] While in most parts of the Earth there has been a significant warming trend, the central areas of the United States during the winter of 2006-2007 have observed a cooling trend. This confirms and supports this invention, since the cooling trend in the central areas of the United States, which is in direct contrast to the rest of the planet was most likely caused by the presence of high levels of airplane exhaust in the upper layers of the atmosphere. The upper layers of the atmosphere above the central areas of the United States have some of the largest concentrations of airplane exhaust on Earth.

[0028] The recent trend in the formulation of airplane fuels has been in the direction of clean burning fuels, while it is believed that it would be the best for the environment. However the negative effects of the pollutants and of CO₂ in the airplane exhaust can be more than offset by the positive sun-shading effects of properly formulated airplane exhaust. This invention proposes the production and planned use of sun-shading airplane fuels and the dispersal of other sun-shading components in the upper layers of the atmosphere by high-flying civilian and military aircraft.

[0029] The Practical Application

[0030] In praxis this method looks like this: Sun-shading properties of all airplane fuels would be measured and all airplane fuels would be classified upon their sun-shading effects, each having its own sun-shading factor, in the same way as sun-shading creams have today. An international inter-governmental agency would regulate the use of various types of airplane fuels on various routes. On routes with extremely high airplane traffic, such as the central United States, the airplanes would use fuels with a low sun-shading factor. On other routes, such as die coastal areas of the United States, the oceans, and areas with low density of air-traffic would be mandated the use of airplane fuels with a high sun-shading factor. This kind of regulated and mandated use of airplane fuels with high/medium/low sun-shading (or sun-reflecting) factors would achieve within a few months (!) a significant normalization of the Earth's climate, stop and even reverse the warming of the terrestrial climate. One could even create a mini "nuclear winter" or a mini ice-age.

[0031] Other Uses

[0032] Sun-shading aircraft fuels and aerial sprays could be also used for the control of tropical storms, hurricanes typhoons, cyclones and other weather catastrophes. By using sun-shading aircraft fuels and dispersing sun-shading sprays in the areas of and around tropical storms (or potential storms) as well as in the areas of their path we could reduce their intensity and their destructive force. Just a simple reduction of storm intensity would drastically reduce storm-related damage and pay for all expenses.

[0033] Classification of Sun-Shading/Sun-Reflecting Airplane Fuels

[0034] There are many possible compositions of airplane fuels. Airplane fuels vary in chemical composition and in the composition and quality of the resulting exhaust. Apart from standard airplane fuels with sun-shading properties, other airplane fuels could be developed which contain other non-standard additives which increase the sun-shading properties (factor) of the airplane fuel exhaust. Should it be necessary, in addition to the use of sun-shading airplane fuels, civilian and

military aircraft could be mandated to disperse directly other sun-shading/sun-reflecting compounds in the upper reaches of the atmosphere.

[0035] Examples of Sun-Shading/Sun-Reflecting Airplane Fuels

[0036] Unlike the current trend which aims to reduce the particulate emissions from the burning of hydrocarbon fuels by using carbonate and other additives, airplane fuels with a high sun-shading factor would be those which contain a high level of particulate emissions, sulfur and similar sun-reflecting/sun-shading components. Other non-standard additives could be added to the airplane fuels to increase their sun-shading (sun-dimming) properties even further. Attention has to be paid to the inertness of the airplane exhaust upon the ozone layer. Fuels and additives which have a destructive effect upon the ozone layer should not be used.

[0037] Examples of Practical Use of this Invention

[0038] Example 1: All existing aircraft fuels, most importantly turbine fuels, would be tested and classified according to their abilities to shade/block solar radiation. An international inter-governmental organization would regulate the use of different types of aircraft fuels on different airline routes. Ideally, in order to reduce the negative effects of this method upon the environment to the minimum, airplanes would have two types of fuels: standard fuel for take-off and landing, and sun-shading fuel for high-altitude flights.

[0039] Example 2: In areas of very high density of airplane traffic, such as the central areas of the United States, aircraft would use fuels with relatively low sun-shading factor. This would prevent such unusually cold winters as was the winter of 2006-2007 in that area.

[0040] Example 3: In coastal areas which have the influx of fresh air from the oceans, on the oceans and in other areas with relatively low density of airplane traffic, would be mandated the use of aircraft fuels with a high sun-factor, i.e. with a high ability to block/shade/reflect/reduce the intensity of the solar radiation (solar energy) reaching the Earth's surface. This type of regulated use of aircraft fuels or even atmospheric sprays with low/medium/high ability to block/shade/reflect the solar radiation could, in a relatively short time of several months, accomplish the normalization of the terrestrial climates and stop or even reverse the warming of the Earth.

[0041] Example 4: To make the use of sun-shading aircraft fuels and sun-shading atmospheric sprays financially feasible for commercial airlines, regulatory organs would determine the extent to which such sun-shading aircraft fuels would be subsidized or to which extent they would subsidize those flights which would not only use sun-shading aircraft fuels but which would, in addition to that, also spray-dust sun-shading atmospheric sprays. It is necessary that such fuels and flights be subsidized since they would solve not only the climatic problems caused by the air-transport industry but by all industries.

[0042] Example 5: Sun-shading of the terrestrial surface could be used also to dampen/weaken tropical storms (cyclones, hurricanes, typhoons...) and other weather-related catastrophes. Tropical storms gain their energy from sun and any, even moderate reduction of the solar radiation (solar energy) in the area of the storm and in its path through the use of high-factor sun-shading aircraft fuels and atmospheric sprays could significantly dampen its strength.

[0043] Example 5: This method of control of the terrestrial climate could be compared to a controlled and induced mini

nuclear winter, or a mini ice-age, i.e. the cooling effects caused by the release of high amounts of sun-shading/sun-blocking/sun-reflecting particulates into the higher layers of the atmosphere as could be caused also by a nuclear war, collision of Earth with an asteroid or a major volcanic eruption. Unlike a volcano, asteroid or a nuclear war, the gradual and controlled release of particulates by high-flying aircraft can be regulated and controlled. While aircraft have to use one or another type of fuel, choosing fuels which produce sun-shading/sun-reflecting exhaust does not cost significantly more than using other aircraft fuels. Thus the most revolutionary contribution of this invention, unlike other proposals costing hundreds of billions of Euro/Dollars, is the low cost of control of the terrestrial climate. This low-cost yet very quick and effective method of control of the terrestrial warming cannot be compared to other massively expensive methods which would take decades to achieve any significant changes in the climate, bankrupt economies and cause wide-spread recessions.

[0044] Industrial Use

[0045] This method of control of terrestrial climate and the protection of the terrestrial climate from warming is applicable in the entire world, in all countries of the world, on all airports, for all airplanes for which exist or for which will be developed sun-shading aircraft fuels. Contrary to other proposed methods of the control of terrestrial climate, this method of regulation of the terrestrial climate supports all industrial development and growth, and massively supports the air-transportation and airplane manufacturing industries while solving one of the most acute problems of our times. While most scientists suspect the increased presence of the greenhouse gases to be the main cause of the warming of the Earth's atmosphere, there are also other, even diametrically different opinions on this matter. This method works independent of the real causes of the warming of the Earth's climate. By reducing the damage caused by storms and other weather-related catastrophes, it would be a significant benefit for the insurance industry.

[0046] Possible Side-Effects

[0047] This invention proposes the use of sun-shading aircraft fuels and sprays which would be burned, respectively sprayed, in high levels of the atmosphere to reduce the amount of solar radiation and heat reaching the Earth's surface. Since the burning of aircraft fuels causes only a small fraction of all the CO₂ release due to the burning of fossil fuels and air-pollution, concerns that the usage of sun-shading aircraft fuels would increase the pollution are not warranted. Compared to the huge contribution to the control of the Earth's climate, the pollution caused by sun-shading aircraft fuels and atmospheric sprays is insignificant. Of course by the formulation of sun-shading aircraft fuels we should only attempt to increase the content of inert sun-shading components in the emissions while keeping any ozone threatening pollutants to a minimum. Furthermore, in order to reduce the negative effects of this method upon the environment to the minimum, airplanes would have two types of fuels: standard fuel for take-off and landing, and sun-shading fuel for high-altitude flights.

1. Method of control of the terrestrial climate by using a system of formulation and use of sun-shading aircraft fuels, formulation and spray-dusting of sun-shading aerial sprays from aircraft, the regulated distribution of sun-shading dust, spray and exhaust fumes in the upper reaches of the atmosphere mainly by commercial or civilian aircraft;

the use of aircraft and aircraft fuels to reduce the amount of solar radiation reaching the Earth's surface, to stop or slow down the warming of the Earth's climate, to cool the Earth's climate and to neutralize the effect of greenhouse gasses and other factor upon the warming of the Earth's climate;

the goal-oriented formulation of aircraft fuels in such a way that their burning will produce sun-shading/sun-reflecting exhaust;

apart from the reformulation of aircraft fuels using standard ingredients in new proportions, the addition of non-standard ingredients into aircraft fuels, in order to increase the sun-shading/sun-reflecting of their exhaust;

the use of civilian, commercial, private and military aircraft for the aerials spray-dusting of other compounds with sun-shading qualities;

the installation of spray-dusting equipment on commercial, civilian, private and military aircraft in order to use them for atmospheric spray-dusting of sun-shading/sun-reflecting compounds

the mandatory use of sun-shading aircraft fuels and atmospheric sprays for just about all aircraft;

the regulated use of various types of sun-shading/sun-reflecting aircraft fuels and atmospheric sprays in such a way that the ones with stronger sun-shading properties would be used in areas of low airplane traffic and those with lower sun-shading properties in the areas of high airplane traffic;

quantification and assigning a sun-factor number to each airplane fuel and sun-shading atmospheric spray

depending upon their abilities to shade sunlight, in a parallel way to skin-creams being assigned a sun-factor number;

viewing and using sun-shading aircraft fuels and sun-shading atmospheric sprays as a "sun-cream" or "sun-block" for the planet Earth, parallel to sun-shading/sun-blocking skin-creams,

the use of aircraft and of sun-shading aircraft fuels and atmospheric sprays for the reduction of die amount of sunlight reaching the Earth's surface—not only to stop warming of die Earth's climate but also to moderate and regulate tropical storms and to dampen the destructive force of tropical storms such as hurricanes, cyclones or typhoons;

the controlled and regulated burning of aircraft fuels whose exhaust fumes increase the refraction of the atmosphere or the sun-shading of the terrestrial surface and lead to a controlled mini "nuclear winter", in other words to the regulated cooling of the terrestrial surface;

the regulated scheduling of the use of various types of sun-shading or non-sun-shading aircraft fuels on different routes, in different regions and at different times, according to the weather conditions, season and the density of air traffic in any particular area;

to equip all high-flying aircraft with two separate fuel-holding areas, one for non-sun-shading fuels, used during take-offs and landings, and another for highly sun-shading fuels, used for flight in high levels of the atmosphere.

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