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(54) INFLUENCING WEATHER PATTERNS BY WAY OF ALTERING SURFACE OR SUBSURFACE OCEAN WATER TEMPERATURES

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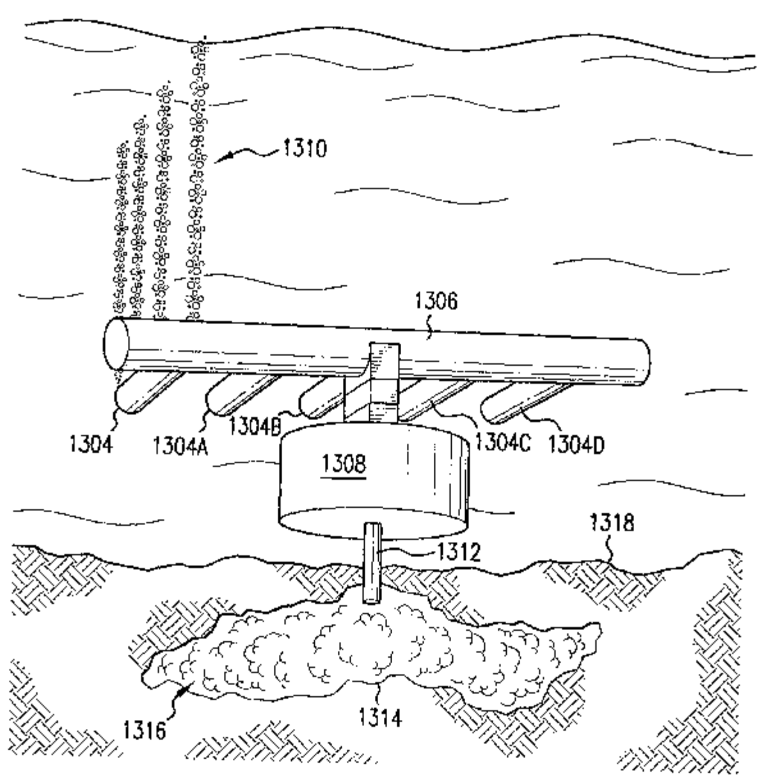
(57) ABSTRACT

An apparatus and method for altering the temperature of a surface of a body of water is disclosed. In an embodiment for the method of the invention, the method includes positioning a conduit below the surface of the body of water (i.e., underwater) substantially perpendicular to naturally occurring ocean currents, dispensing a substance from the conduit, and upwelling water to the surface. In another embodiment, the method includes positioning an upwelling system underwater, the upwelling system having a plurality of valves controllably releasing an upwelling substance, releasing the upwelling substance from a subset of the plurality of valves to upwell water to the surface. In an embodiment for the apparatus of the present invention, the apparatus includes a conduit, disposed underwater, the conduit releasably containing an upwelling substance and including an input and a plurality of outputs. In another embodiment, the apparatus includes an enclosure containing frozen CO_2 and disposed underwater, a water entry valve and a gas release valve mounted on the enclosure, the gas release valve allowing release of gaseous CO_2 into the water after the frozen CO2 has come in contact with water. In yet another embodiment, the apparatus includes an electrolysis cell disposed underwater, a storage vessel coupled to the electrolysis cell, and a gas release valve mounted on the storage vessel, the gas release valve allowing release of electrolysis cell generated gasses into the water. In still another embodiment, the apparatus includes a manifold, disposed underwater, the manifold comprising a plurality of valves each valve coupled to an underwater conduit, and a gas reservoir coupled to the manifold.



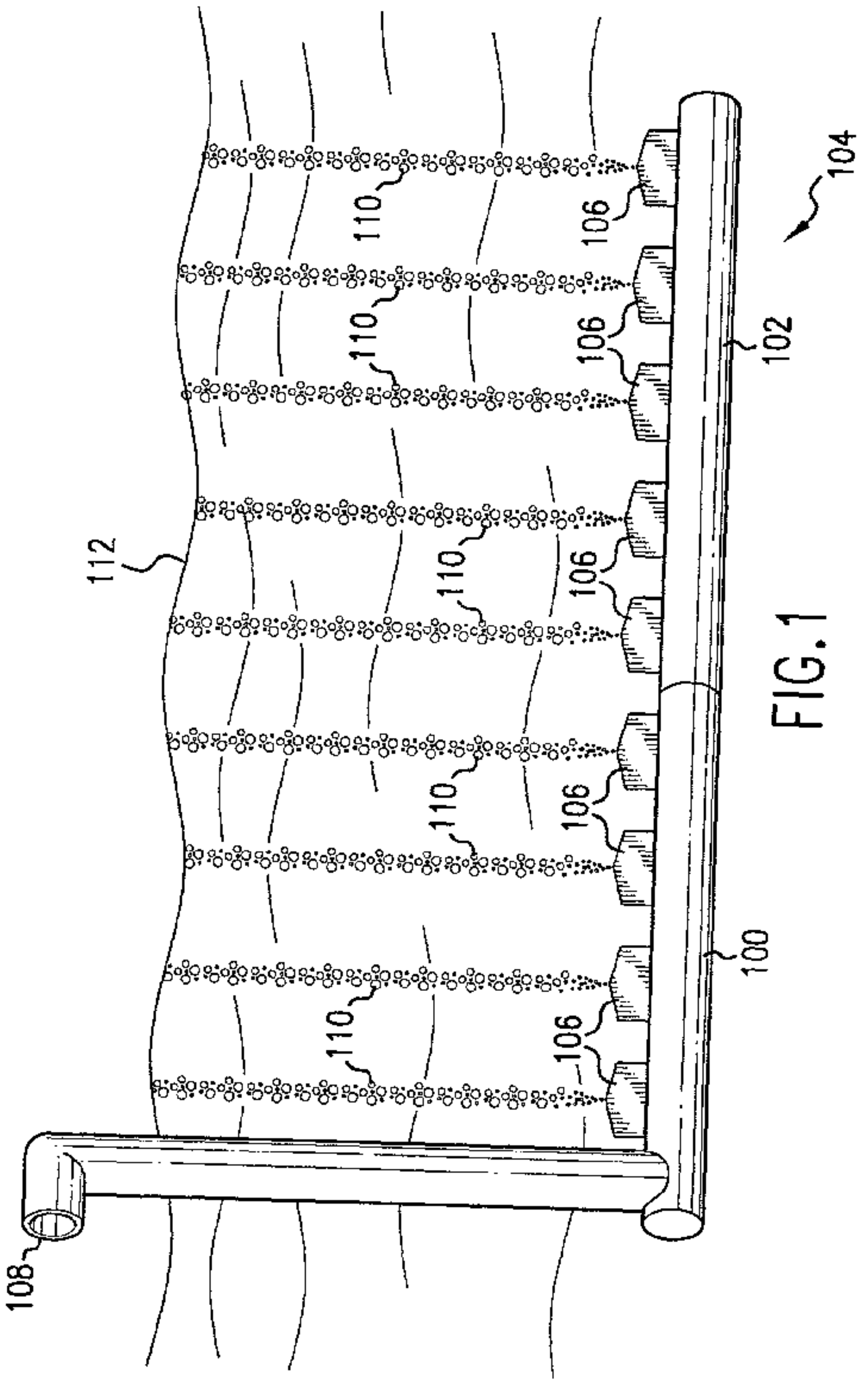


FIG. 1

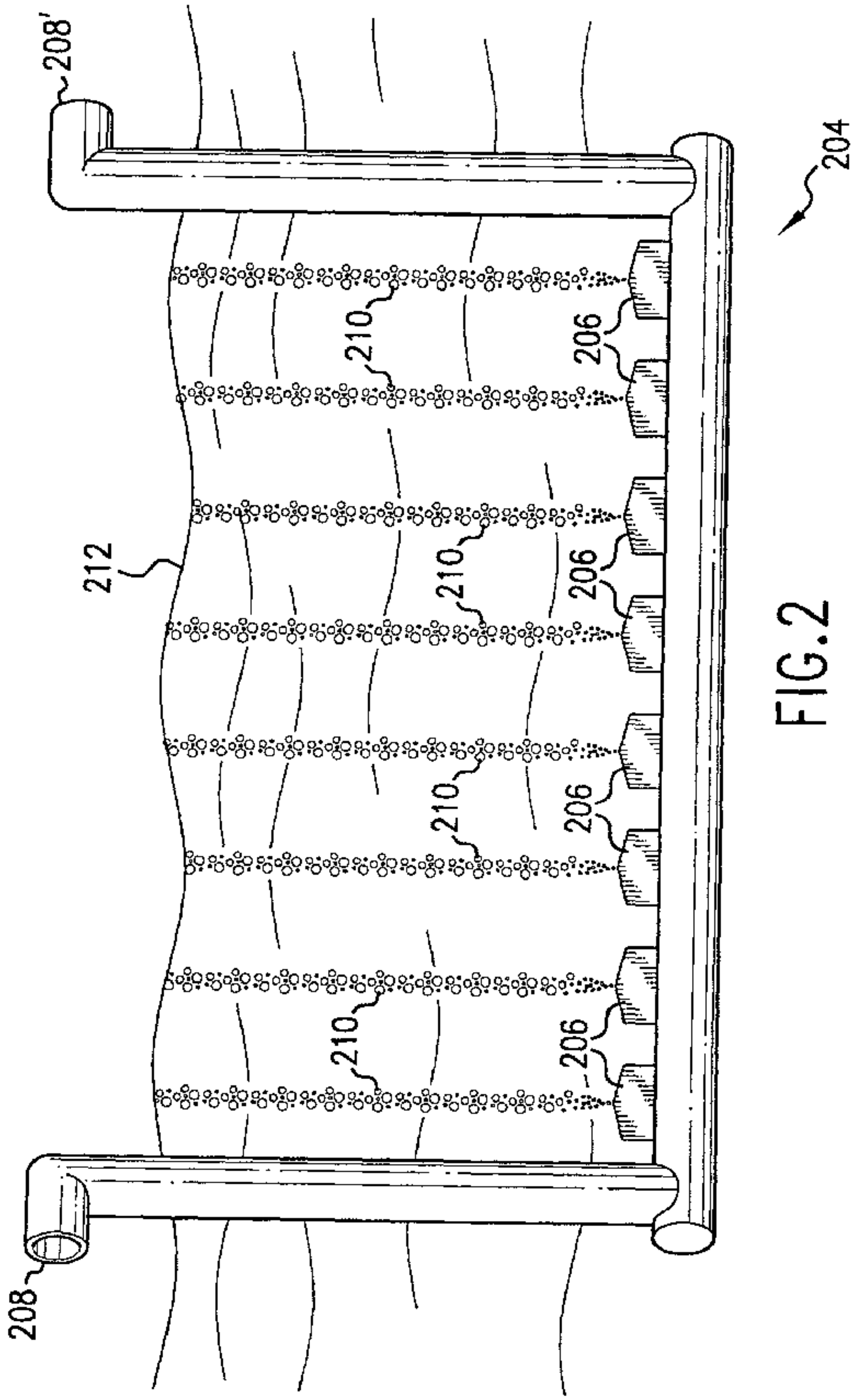


FIG.2

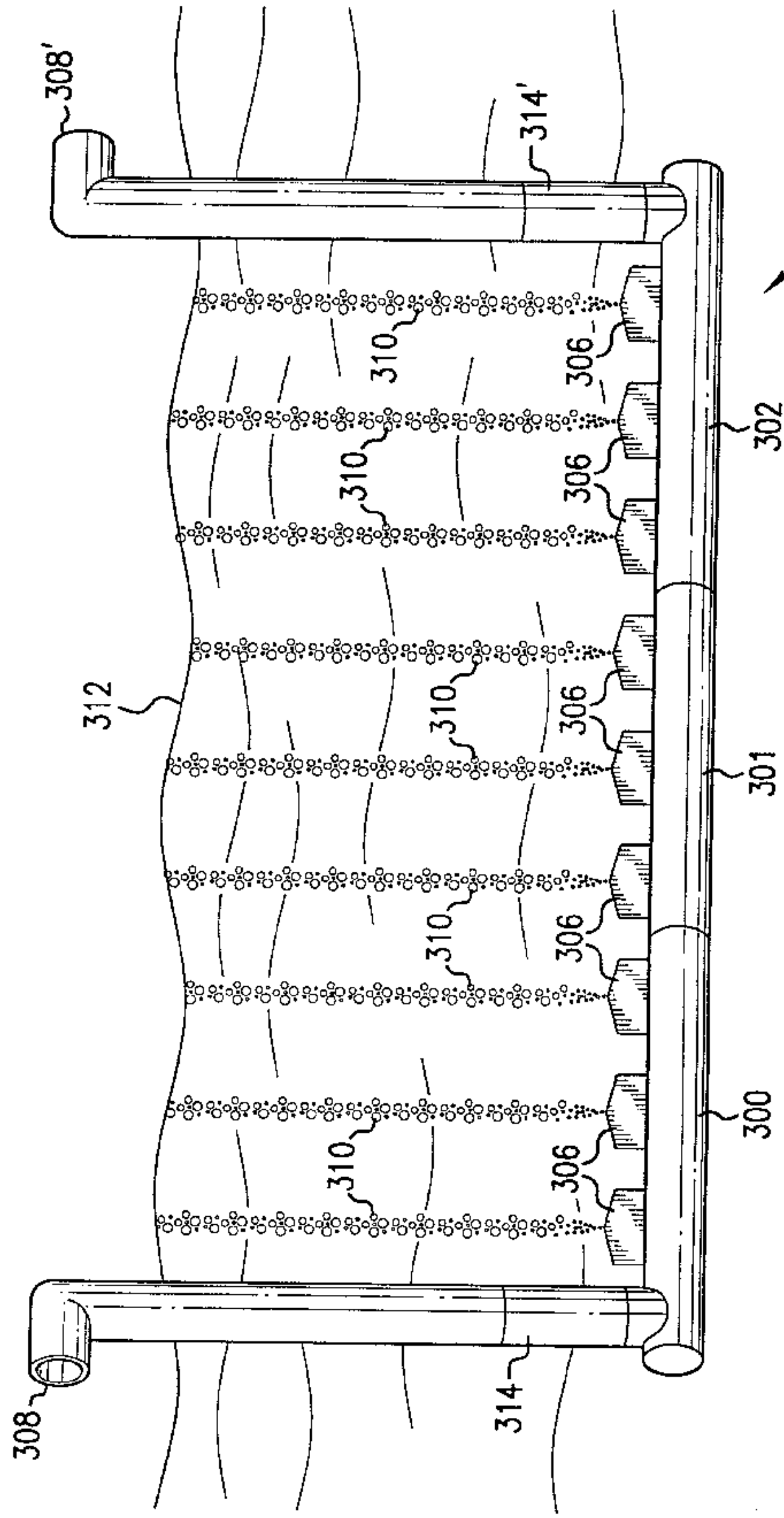


FIG. 3

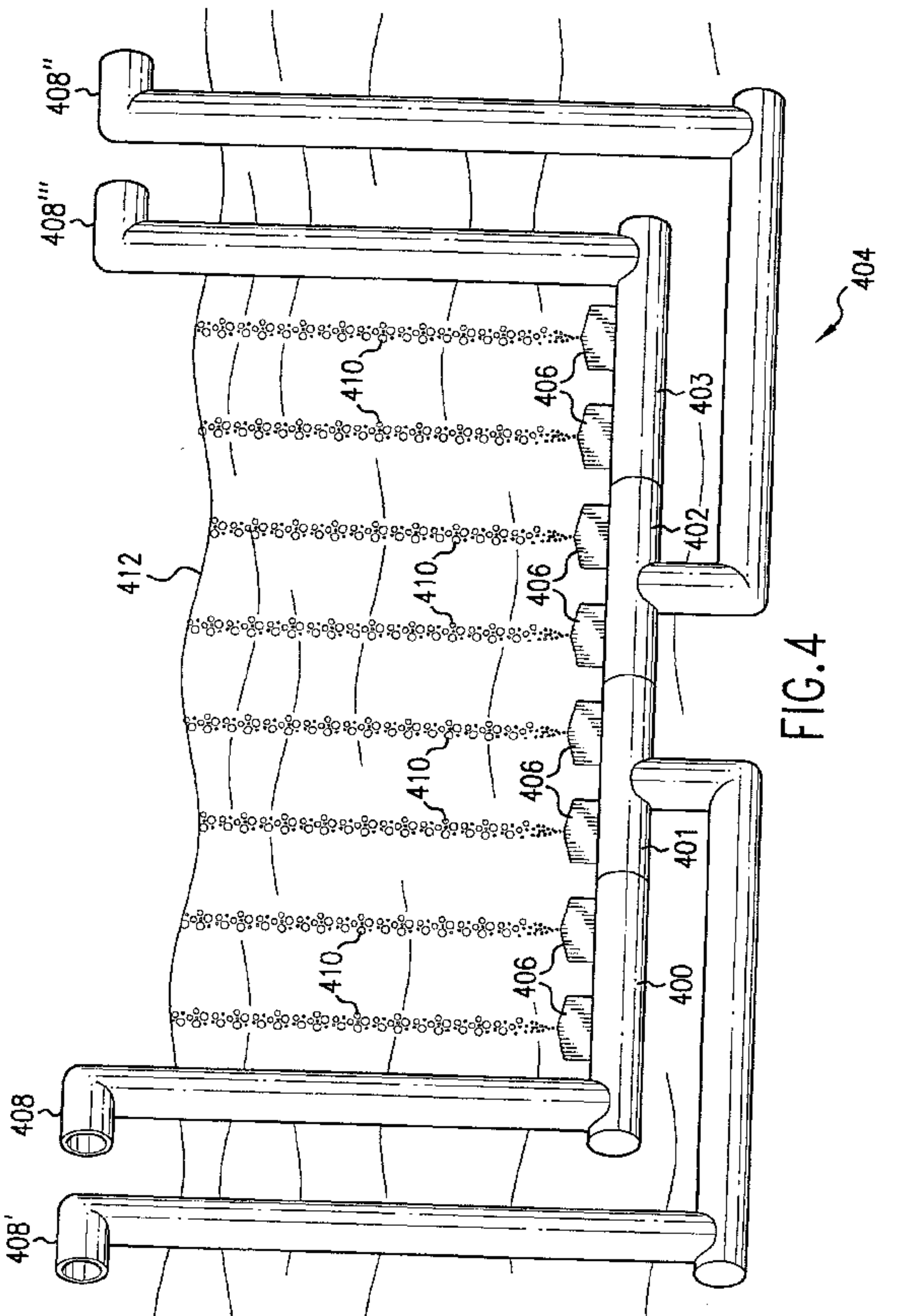


FIG. 4

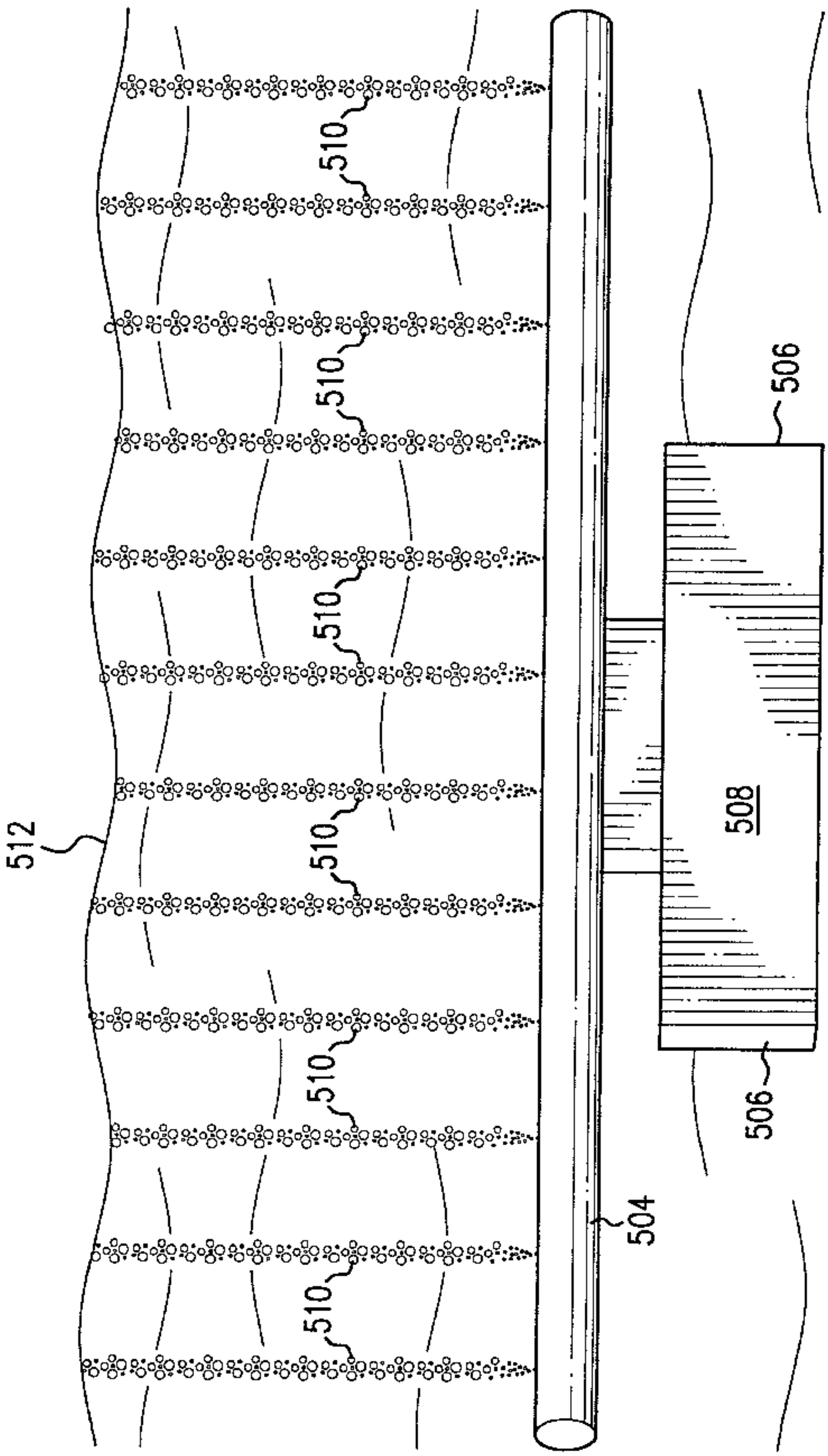


FIG.5

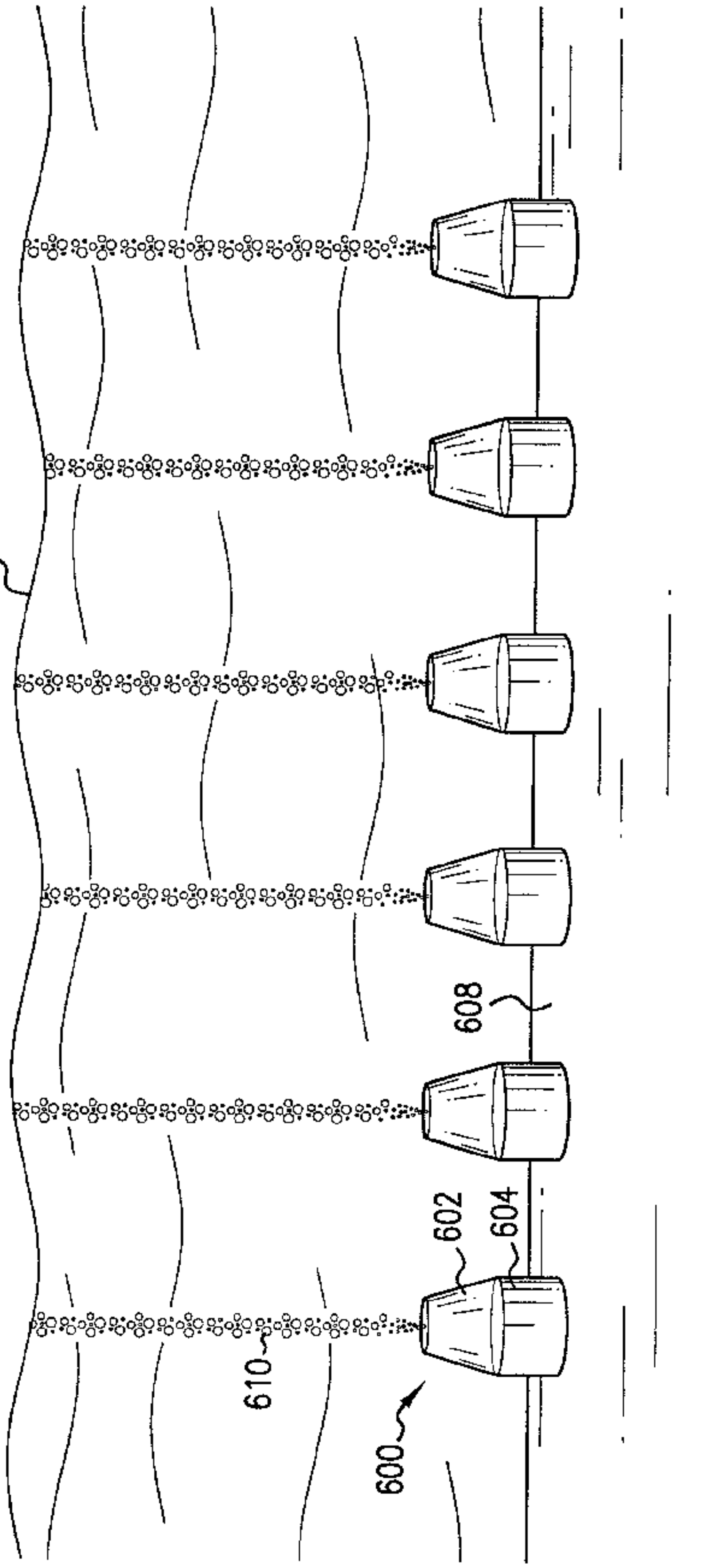


FIG.6

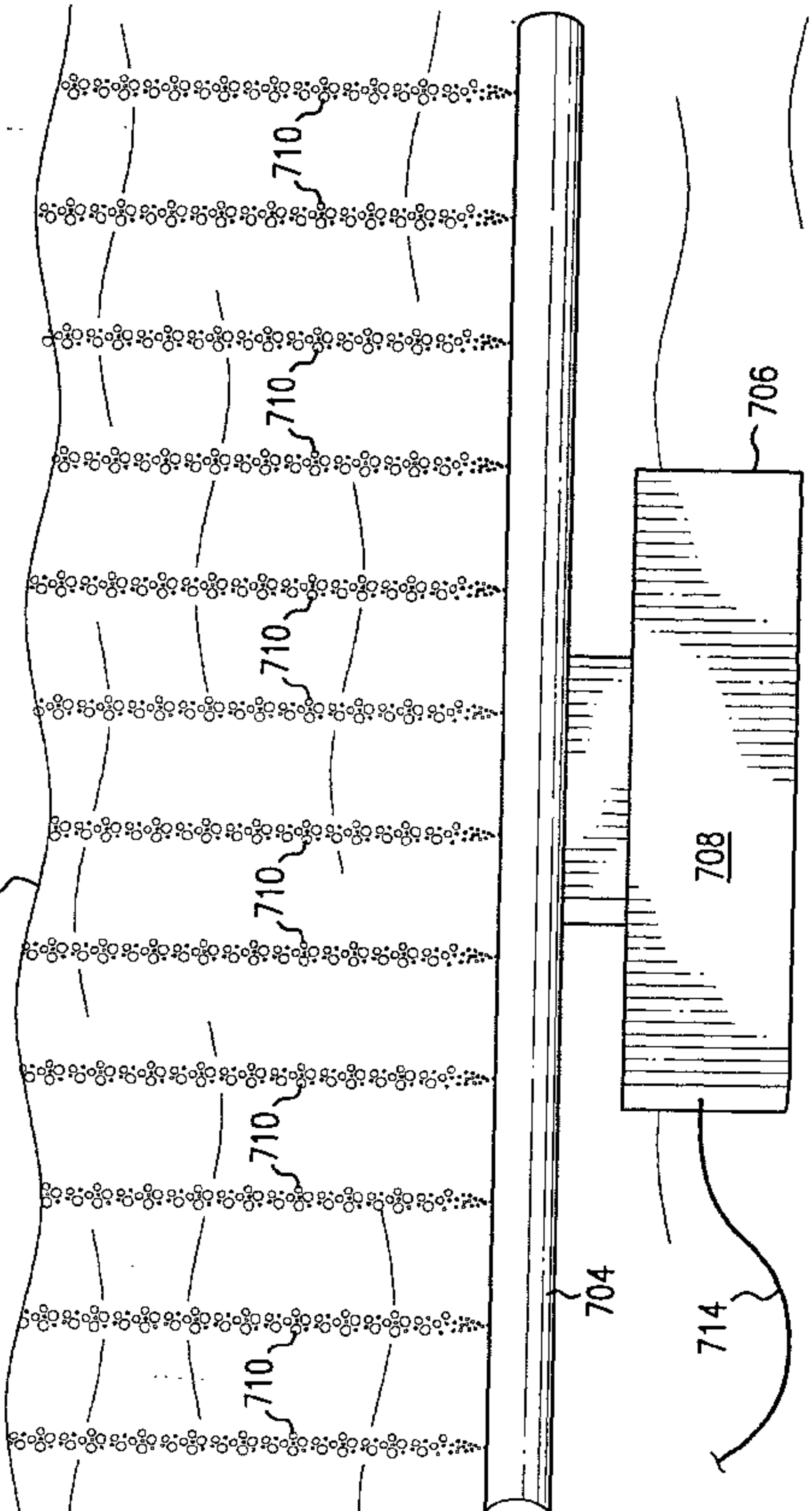


FIG. 7

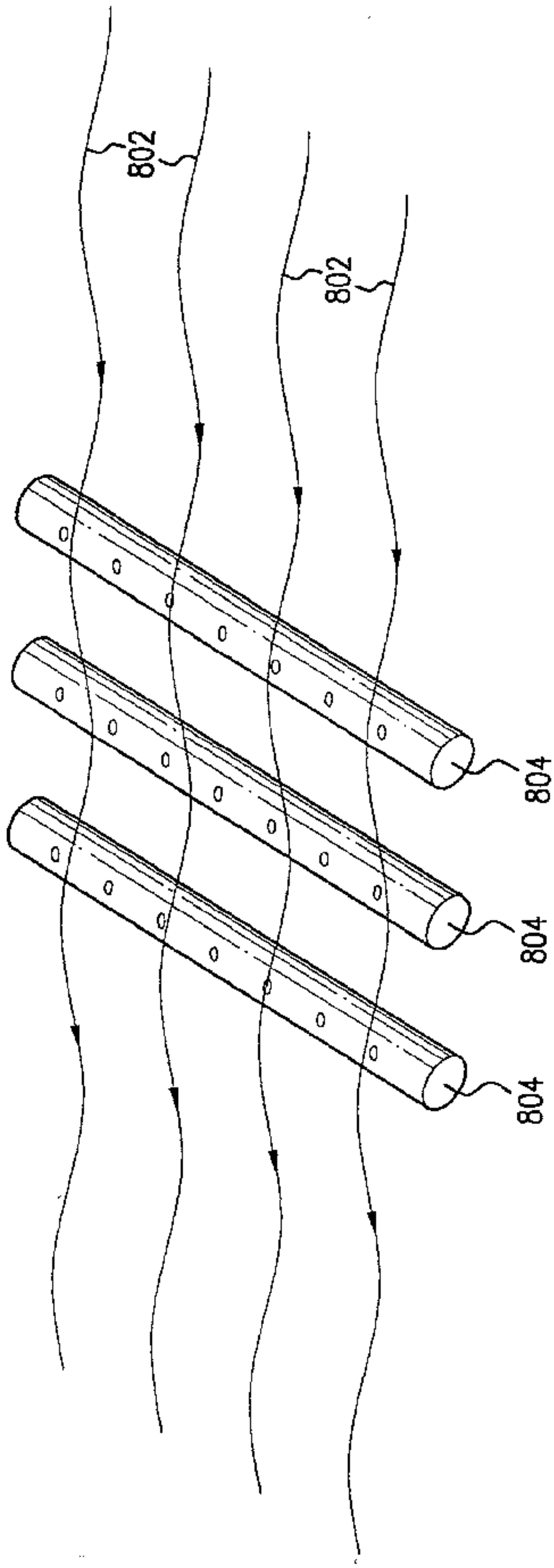


FIG.8

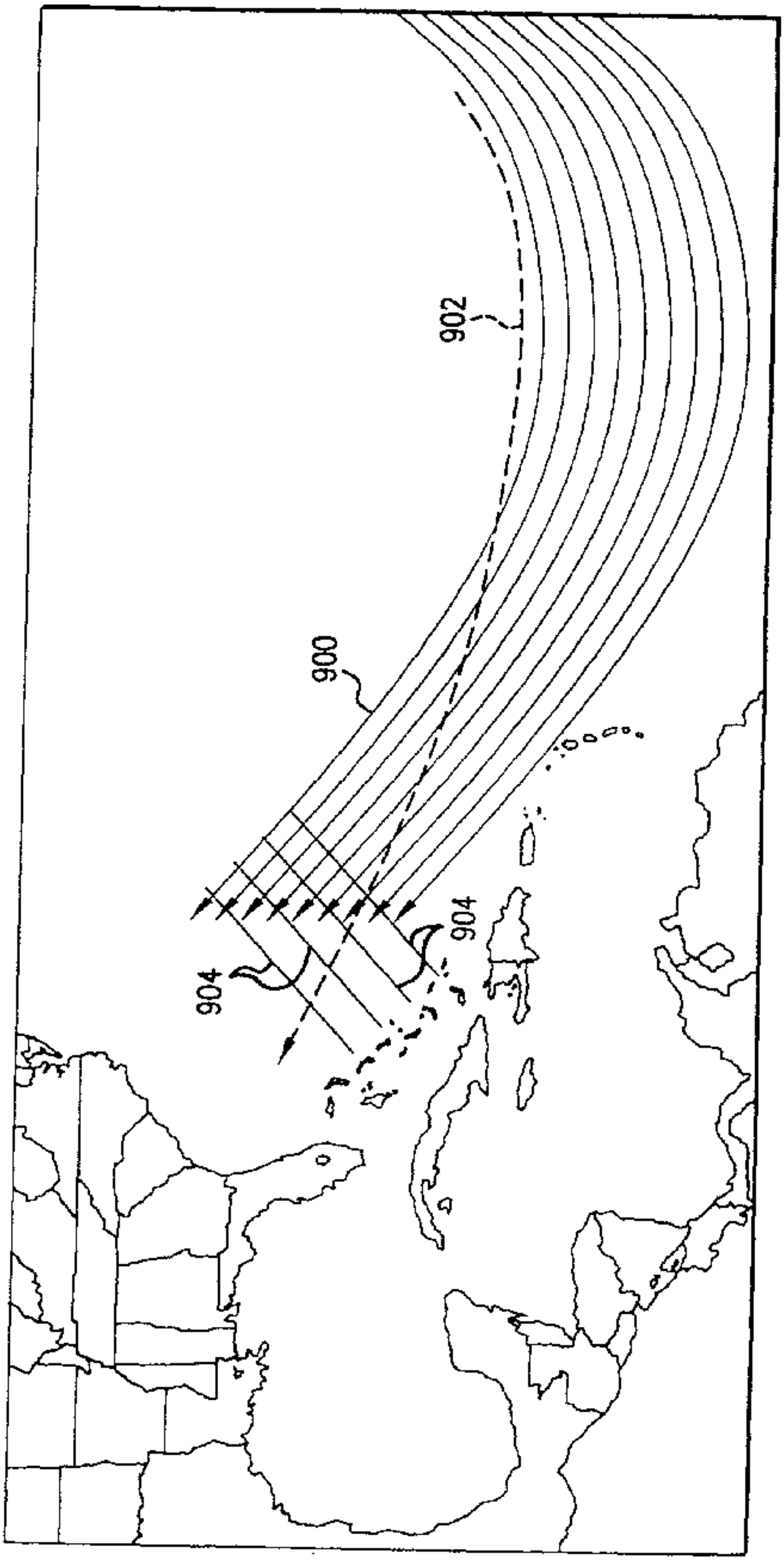


FIG.9

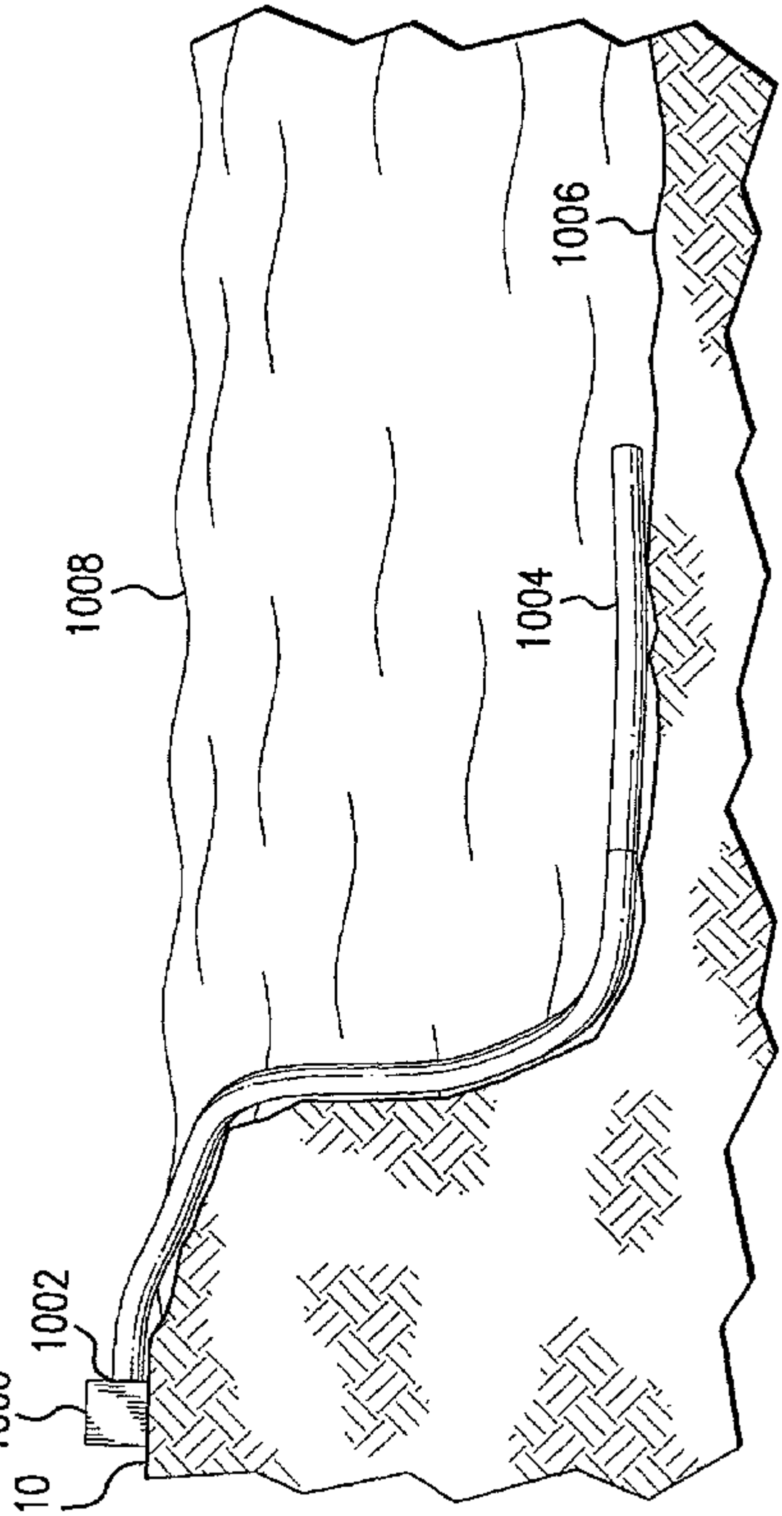


FIG.10

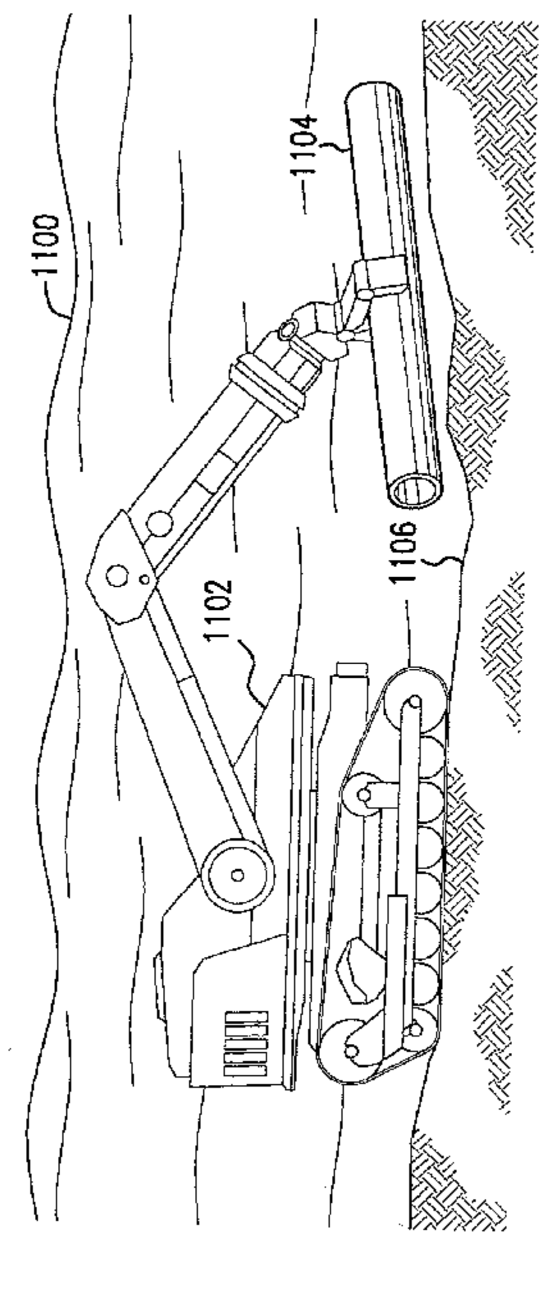


FIG. 11

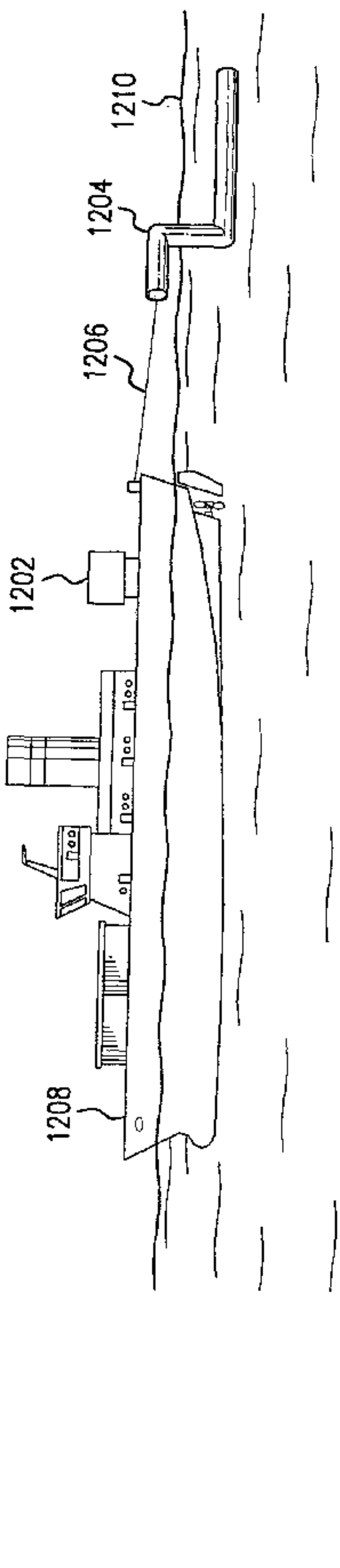


FIG. 12

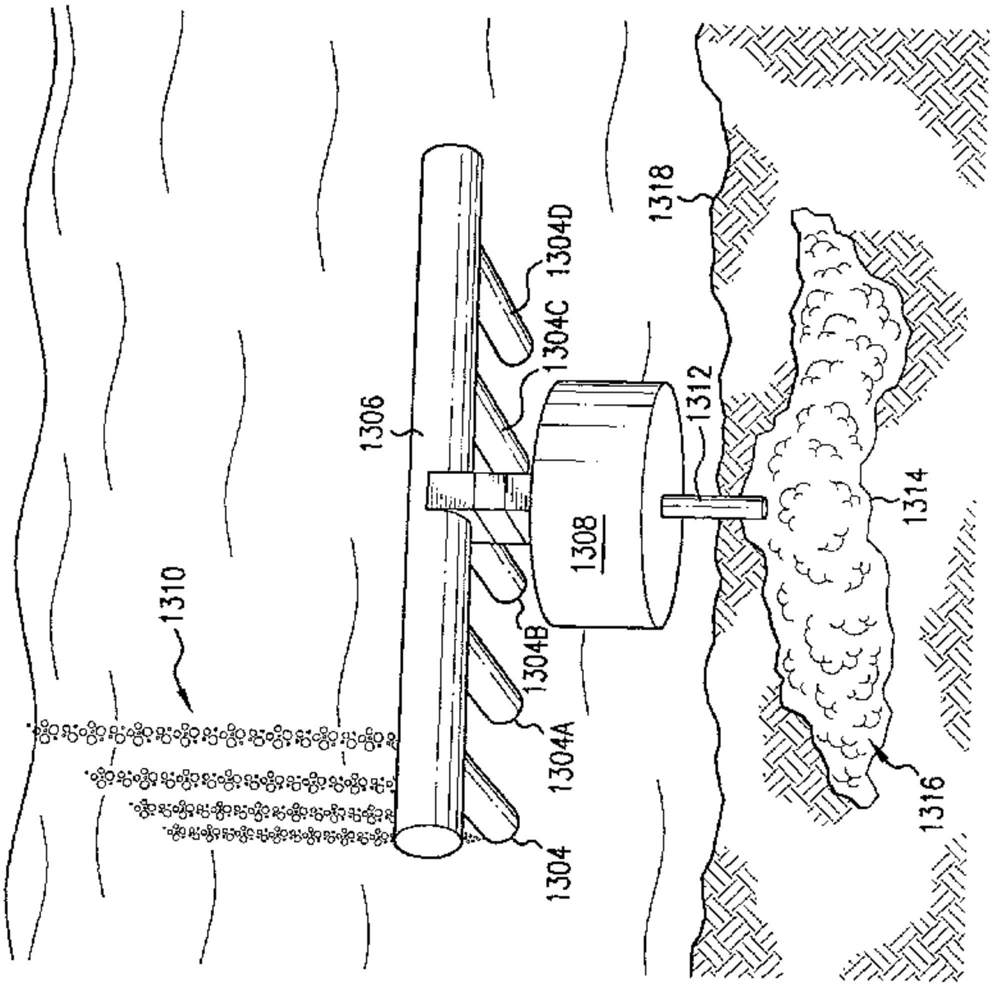

1310
1306
1304D
1304C
1308
1312
1318
1304B
1304A
1304
1314
1316

FIG. 13

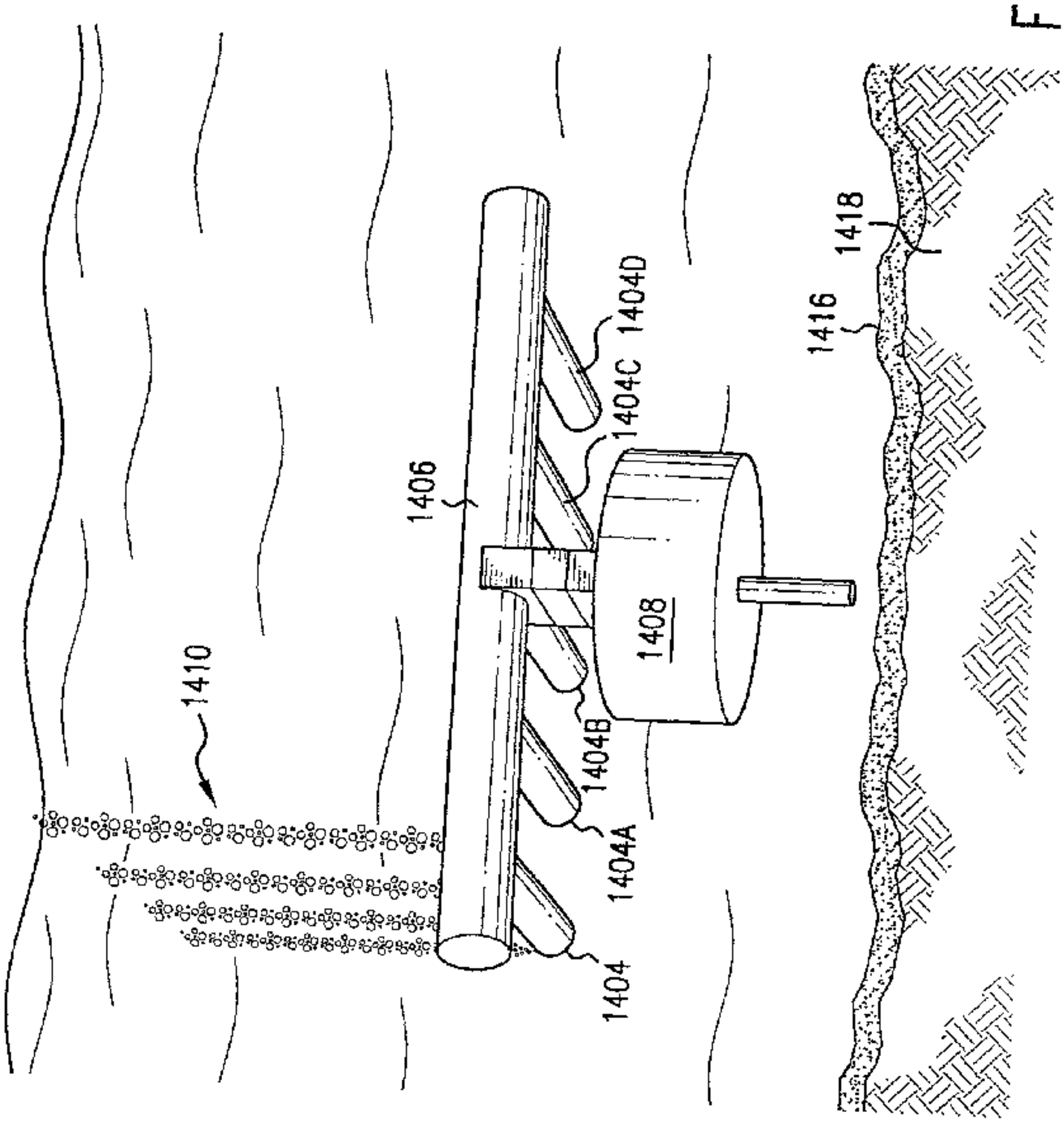


FIG.14

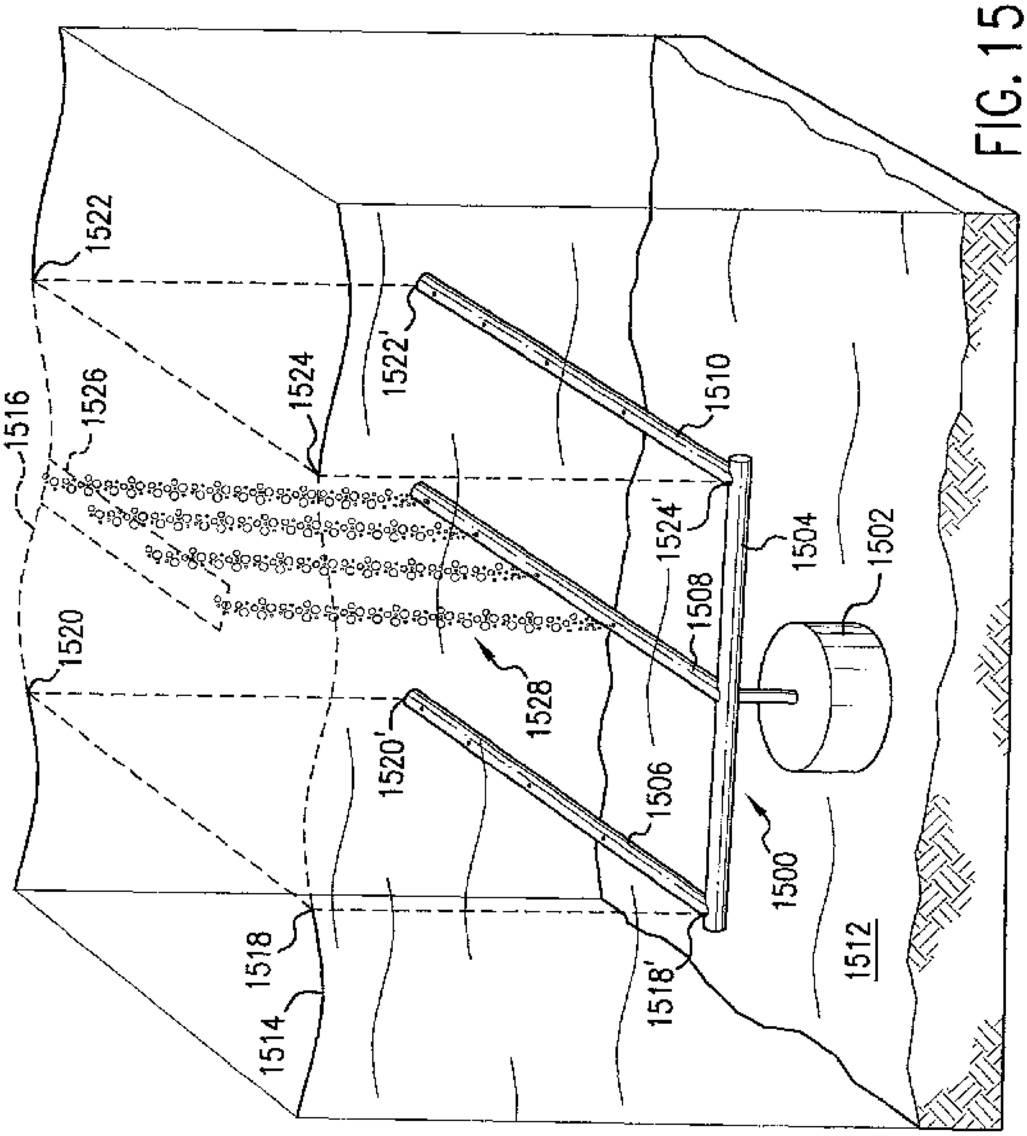

1522
1516
1526
1524
1522'
1510
1520
1528
1524'
1504
1502
1508
1520'
1506
1500
1518
1514
1518'
1512

FIG. 15

INFLUENCING WEATHER PATTERNS BY WAY OF ALTERING SURFACE OR SUBSURFACE OCEAN WATER TEMPERATURES

[0001] This application claims priority from U.S. patent application Ser. No. 60/171,609, filed on Dec. 23, 1999, which is incorporated herein in its entirety by reference.

FIELD OF THE INVENTION

[0002] The invention relates to the field of influencing weather patterns.

BACKGROUND

[0003] It is known in science that the earth's ocean temperatures have a direct influence upon the earth's weather. For example, a 0.5 to 8.0 degrees Celsius on average, for six consecutive months, elevation of the ocean's surface temperature found off the coast of South America, more specifically Ecuador and Peru, is known to indicate a weather condition known as El Niño. Further a 0.5 to 8.0 degrees Celsius on average, for six consecutive months, reduction of the ocean's surface temperature again located off the coast of South America and more specifically Ecuador and Peru is known to indicate a weather condition known as La Niña. Generally, in an El Niño year the weather patterns cause flooding in Peru, drought in Indonesia and Australia, and drought in the Southwestern United States, flooding and mud slides in the Western United States, and flooding in the Southeastern United States. In a La Niña year, the weather patterns cause droughts in South America, heavy rain falls and floods in Eastern Australia and heavy rainfalls in the Southwestern United States, drought in the Western United States, and drought in the Southeastern United States.

[0004] Each of these weather effects can have a disastrous effect on life and property worldwide. For example, it is estimated that in 1987 the El Niño weather effects killed 2,000 people and created $15 billion of property damage worldwide.

[0005] Furthermore, it is well known that hurricanes strengthen in regions of the ocean where the water is warm. Also, it is well known that either cold water or a cold weather front substantially dissipates or reduces the strength of a hurricane. In the case of a hurricane, reducing the surface water temperature by approximately 2¾ degrees Celsius will substantially impact a hurricane in a positive way by reducing or diffusing its strength.

[0006] The concept of man-made alterations of weather patterns to the benefit of society is not new. For example, the seeding of clouds by airplanes using crystallites such as silver iodide particles to catalyze rainfall is well known. This technique has been used, with mixed results, for years in an attempt to mitigate long-term drought and to counter widespread forest fires. However, this and other previous attempts at weather alteration address very localized weather patterns.

[0007] It is well understood that the Earth's weather patterns are due to complex, interactions between the oceans and the atmosphere; changes in one affect changes in the other. In particular, many patterns such as hurricanes and the Southern Oscillation appear to be closely correlated with, and driven by, the temperature of surface water in the oceans. Specifically, in a hurricane, warm surface ocean water leads to enhanced evaporation, which supplies energy that drives wind speed. In fact, when the eye of a hurricane reaches landfall, it is deprived of this energy feed mechanism for the most part and quickly downgrades to a tropical storm or is mitigated completely. Cooling the surface waters would decrease evaporation and limit the hurricane's energy supply. This is one reason hurricanes rarely form in the winter season, when ocean surfaces are cooler.

[0008] In the interplay between El Niño and the Southern Oscillation (ENSO), ocean surface temperature also plays a direct role. The thermocline is a level below the ocean surface where the warm surface waters meet the colder deep water, typically around 17° C. In equatorial Pacific waters, the thermocline is typically at a depth of 10 to 50 meters in the east (near South America) and more than 100 meters in the west (near Indonesia). The difference is due to the trade winds blowing warm surface water in a westerly direction, causing warm water to "pile-up" in the western Pacific.

[0009] In an El Niño situation, these trade winds abate and warm water remains in the eastern Pacific, depressing the thermocline to as much as 150 m. This warming in the eastern Pacific affects rainfall throughout regions of North and South America and is the cause of major deviations of normal water patterns. Thus, if one desires to mitigate these weather phenomena, a likely scenario would be to cool warm surface waters over large areas of the ocean. This appears to be a daunting task in view of the volume of water involved and the high heat capacity of water.

SUMMARY OF THE INVENTION

[0010] In accordance with the present invention, an apparatus and method is presented for altering the temperature of a surface of a body of water. In an embodiment for the method of the invention, the method includes positioning a conduit below the surface of the body of water, positioning the conduit substantially perpendicular to naturally occurring ocean currents, dispensing a substance from the conduit, and upwelling water through the action of the substance rising from the conduit to the surface of the body of water. In another embodiment for the method of the invention, the method includes positioning a plurality of upwelling systems below the surface of the body of water, each upwelling system in the plurality of upwelling systems substantially parallel to each of the other upwelling systems in the plurality of upwelling systems, and a projection of the plurality of upwelling systems upon the surface of the body of water defining an operative area of the plurality of upwelling systems, positioning the plurality of upwelling systems substantially perpendicular to naturally occurring ocean currents, dispensing a substance from a subset of the plurality of upwelling systems, the subset beneath a sub-area of the operative area of the plurality of upwelling systems, the substance rising from the plurality of upwelling systems to the surface of the body of water, and upwelling the water.

[0011] In an embodiment for the apparatus of the present invention, the apparatus includes a conduit, disposed below the surface of a body of water, the conduit releasably containing an upwelling substance and including an input and a plurality of outputs.

[0012] In another embodiment for the apparatus of the present invention, the apparatus includes an enclosure, containing frozen CO_2 and disposed underwater, a water entry valve mounted on the enclosure, the water entry valve allowing a volume of water to enter said enclosure, and a gas release valve mounted on the enclosure, the gas release valve allowing release of gaseous CO_2 into the water, after the frozen CO_2 has come in contact with water.

[0013] In yet another embodiment for the apparatus of the present invention, the apparatus includes an electrolysis cell, the electrolysis cell dissociating hydrogen and oxygen from water in an underwater environment, a storage vessel coupled to the electrolysis cell, the storage vessel collecting the dissociated hydrogen and oxygen, and a gas release valve mounted on the storage vessel, the gas release valve allowing release of the dissociated hydrogen and oxygen into the water.

[0014] In still another embodiment for the apparatus of the present invention, the apparatus includes a manifold, disposed below the surface of a body of water, wherein the manifold comprises a plurality of valves each valve coupled to an underwater aerator conduit, and a gas reservoir coupled to the manifold.

BRIEF DESCRIPTION OF THE DRAWINGS

[0015] **FIG. 1** is a schematic diagram of an embodiment of an aerator conduit;

[0016] **FIG. 2** is a schematic diagram of an alternate embodiment of an aerator conduit;

[0017] **FIG. 3** is a schematic diagram of a third alternate embodiment of an aerator conduit;

[0018] **FIG. 4** is a schematic diagram of a fourth alternate embodiment of an aerator conduit;

[0019] **FIG. 5** is a schematic diagram of a fifth alternate embodiment of an aerator conduit;

[0020] **FIG. 6** is a schematic diagram of weighted compressed CO_2 capsules spaced and located on the ocean floor;

[0021] **FIG. 7** is a schematic diagram of an aerator conduit having an electrolysis cell as a source of upwelling bubbles;

[0022] **FIG. 8** illustrates a series of aerator conduits positioned in accordance with the principles of the present invention;

[0023] **FIG. 9** is a chart illustrating normal ocean water currents, hurricane alley, and a series of lines or arrays of aerator conduits positioned in accordance with the principles of the present invention;

[0024] **FIG. 10** is an illustration of one possible deployment of an aerator conduit in accordance with the principles of the present invention;

[0025] **FIG. 11** is an illustration of an apparatus for placing or re-positioning aerator conduits in accordance with the present invention;

[0026] **FIG. 12** is an illustration of another possible deployment of an aerator conduit in accordance with the principles of the present invention;

[0027] **FIG. 13** is a schematic diagram of an upwelling system;

[0028] **FIG. 14** is a schematic diagram of an alternate upwelling system; and

[0029] **FIG. 15** illustrates operation of an upwelling system in a sub-area within the operating area of the upwelling system.

DETAILED DESCRIPTION OF AN EMBODIMENT OF THE INVENTION

[0030] The present invention is used to weaken or mitigate the negative effects of such large-scale phenomena as hurricanes, El Niño/La Niña, and the Southern Oscillation. As stated previously, this application claims priority from U.S. patent application Ser. No. 60/171,609, filed on Dec. 23, 1999, which is incorporated herein in its entirety by reference. What was not previously known, and what is disclosed in patent application Ser. No. 60/171,609 (the '609 application), and this application, is how to alter the ocean's water temperature in a manner that is practical, safe, predictable, and affordable. The invention disclosed in the '609 application is not intended to be limiting in scope and, by way of example only, while it may be easier to implement the present inventive method and/or inventive physical system for weakening or diffusing a hurricane than altering El Niño, the present invention can be scaled up to impact any and all weather patterns that are influenced by earth water temperature including specifically El Niño or La Niña.

[0031] The invention disclosed herein provides a practical, safe, efficient method, as well as, a physical system for weakening weather patterns that are typified by hurricanes, El Niño/La Niña, and the Southern Oscillation. The invention may include a conduit, which releases a gas or liquid from the cool depths of the ocean (see **FIGS. 1-5, 7-8, 13-15**). The invention may include encapsulated compressed gasses, which bubble up upon being released from their encapsulant (see **FIG. 6**). The gas or liquid is cooled by ocean depths and rises to the surface, cooling it. Moreover, the drag between rising gas bubbles, from for example gaseous CO_2, or rising liquid, from for example liquid CO_2 or any liquid lighter than the surrounding ocean water, and the deep ocean water transports colder deep water to the surface, the thermocline rises, and the ocean surface cools. Alternatively, a solid structure(s) could be released, such as for example, from the conduit which, when it floats up to the surface of the water, causes cold water to well up to the surface of the water, thus cooling the ocean surface. The solid could be comprised of, for example, non-toxic plastic or ice, which could be removed from the surface of the water after they float to the surface or, in the case of ice, melts in the warmer waters. Thus, the present invention is capable of utilizing naturally occurring cold water in the depths of the ocean or other body of water to cool the surface of the water.

[0032] The present invention utilizes the normal ocean currents to move surface and subsurface water across a line or a series of lines, or arrays of conduits, or other upwelling systems. Conduits, or other upwelling systems, are spaced and located beneath the ocean surface such that they are positioned substantially perpendicular to the ocean surface currents. By positioning the conduits or other upwelling systems substantially perpendicular to the ocean surface currents, the invention substantially increases both the effectiveness and efficiency of the aeration while at the same time reduces the aeration system's cost. Thus, the invention allows the surface and subsurface water currents to, under naturally occurring conditions, move water across the aerator conduits or other upwelling systems.

[0033] In some cases, it may be desirable to warm surface water. In this case, warm gas or liquid might be released at a depth just at or near the thermocline, warming the ocean's surface. Thus, by being able to control the temperature and depth of release of the gas or liquid, it is possible to tune the ocean's surface and subsurface water temperature.

[0034] In an inventive embodiment, the invention includes a large conduit or pipeline, which is placed at an appropriate depth and location in the ocean. **FIG. 1** illustrates exemplary conduit sections **100**, **102**, which may, for example, be aerator conduits to release gasses. **FIG. 1** additionally illustrates that individual conduit sections **100**, **102** may be coupled to form a conduit **104** of greater length than the individual conduit sections **100**, **102**. It is understood that **FIG. 1** is used for example only and that conduits may be made up of any number of conduit sections. The conduit **104** may have vents, holes, or valves **106**, which may or may not be remotely controllable to open or close them. Vents, holes, or valves **106** may be placed periodically along the length of the conduit **104**, allowing gas, liquid, or solids inside the conduit to escape into the surrounding water. In **FIG. 1**, gas, liquid, or solids escaping from the vents, holes, or valves **106** in the conduit **104** is represented by the substantially vertical flow paths **110**. An input **108** for gas, liquid, or solid may be positioned above the ocean surface **112** to allow for, for example, connections to sources of gas, liquid, or solid to be pumped to the conduit **104** below the ocean surface **112**.

[0035] In an alternate embodiment, **FIG. 2** illustrates a single conduit **204** having two inputs **208**, **208'** for gas, liquid, or solids. Upon release from vents, holes, or valves **206**, the gas, liquid, or solids may travel substantially upon flow paths **210** to the ocean surface **212**. In the illustration of **FIG. 2**, inputs **208**, **208'** are placed at opposite ends of the conduit **204**.

[0036] In a third alternate embodiment, **FIG. 3** illustrates a conduit **304** including three conduit sections **300**, **301**, **302**. In the illustration of **FIG. 3**, the center conduit section **301** has no input that directly reaches the surface; instead, the inputs **308**, **308'** to a leftmost conduit section **300** and to a rightmost conduit section **302**, respectively, are coupled to the center conduit section **301** through, for example, valves (not shown) between the conduit sections **300**, **301**, **302**. Upon release from vents, holes, or valves **306**, the gas, liquid, or solids may travel substantially upon flow paths **310** to the ocean surface **312**. Also illustrated in **FIG. 3** are expandable or retractable vertical coupling sections **314**, **314'** that may, for example, be used to adjust the depth of the conduit **304** beneath the ocean surface **312**. The depth of the conduit **304** can be adjusted manually or by remote control.

[0037] In a fourth alternate embodiment, **FIG. 4** illustrates a conduit **404** including four conduit sections **400**, **401**, **402**, **403**. Each of the four conduit sections **400**, **401**, **402**, **403** is coupled to an input **408**, **408'**, **408''**, **408'''**, respectively. Upon release from vents, holes, or valves **406**, the gas, liquid, or solids may travel substantially upon flow paths **410** to the ocean surface **412**.

[0038] In a fifth embodiment, **FIG. 5** illustrates a schematic diagram of a conduit **504** using frozen CO_2 as a source of upwelling bubbles. In the embodiment of **FIG. 5**, the conduit **504** is coupled to a reservoir **508**. The conduit **504** and/or reservoir **508** may be filled with either frozen or cold compressed CO_2 gas, which becomes further compressed and remains extremely cold or frozen at certain ocean depths. In this embodiment, the conduit can be deployed in advance of a hurricane and may remain in a non-active state until such time as it is activated by, for example, allowing ocean water to contact the frozen CO_2. This can be done either manually, or by remote control, by way of opening a vent or vents **506** on the conduit **504** or on the reservoir **508**. Upon release from the conduit **504**, the CO_2, now in a gaseous state, may travel substantially upon flow paths **510** to the ocean surface **512**.

[0039] In a sixth embodiment, **FIG. 6** illustrates a schematic diagram of an upwelling system to effecting upwelling in accordance with the principles of the present invention, that includes weighted compressed CO_2 capsules **600** spaced and located on the ocean floor **608**. In this exemplary embodiment, frozen or cold and compressed CO_2 is encapsulated in a capsule **602** and weighed down with a weight **604** so that it will sink. A plurality of these weighted CO_2 capsules **600** may be dropped in a line extending, by way of example only, one hundred miles. The weighted CO_2 capsules **600** are placed every, by way of example only, ten feet apart. The encapsulation material, e.g., a non-toxic biodegradable plastic, is designed to dissolve by way of the ocean water or to crack open under pressure in certain depths of the ocean, and thus, cause the release of CO_2 to rise by way of bubbles in flow path **610** to the ocean surface **606**. This again will cause an upwelling of cool water, which will reduce the ocean surface water temperature.

[0040] In a seventh embodiment, **FIG. 7** illustrates a schematic diagram of a conduit **704** having an electrolysis cell **708** as a source of upwelling bubbles, which may travel along flow paths **710** to the ocean surface **712**. In the embodiment of **FIG. 7**, an electrolysis cell or cells **708** may be placed at certain depths and at certain intervals. The electrolysis cells **708** break down ocean water into hydrogen and oxygen gas, which will rise to the ocean surface **712** again causing an upwelling of cool water and cooling the ocean's surface water temperature. Electrolysis of ocean water in an electrolysis cell **708** may be accomplished by admitting ocean water through an input valve or valves **706** and may require the application of electrical power to be delivered by, for example, cable **714** to the electrolysis cell **708**. In the inventive embodiment using electrolysis cell or cells **708**, conduits **704** may or may not be utilized to distribute the gases.

[0041] **FIG. 8** illustrates a series of conduits **804** spaced and located beneath the ocean surface such that they are positioned substantially perpendicular to the ocean surface currents **802**. Substantially perpendicular positioning to the ocean surface currents may increase both the effectiveness and efficiency of the release of upwelling substances by allowing the surface and subsurface water currents to move water across the conduits **804** or other upwelling systems (not shown).

[0042] Any of the disclosed embodiments for conduits **104**, **204**, **304**, **404**, **504**, **704**, **804** can be grouped into arrays of conduits by laying a series of conduits **104**, **204**, **304**, **404**, **504**, **704**, **804** approximately parallel to each other. Multiple types of conduits **104**, **204**, **304**, **404**, **504**, **704**, **804** may be grouped together within one array. In addition, weighted compressed CO_2 capsules **600** may also be included in arrays. Any of these combinations of conduits and/or CO_2 capsules, or any individual conduit or individual CO_2 capsule may be described as an upwelling system. These exemplary combinations are not intended to limit the types or combinations of apparatus that may be included in an upwelling system. By forming arrays of conduits, gas, liquid, or solids could be injected into a wide area of the ocean. Each conduit might be from 1 to 1,000 miles in length, but they are not limited to this range. The conduits **104**, **204**, **304**, **404**, **504**, **704**, **804** might be, but are not limited to, 10 meters to over a kilometer in spacing between adjacent conduit sections. Thus, several thousand square miles of ocean could be aerated and surface temperature altered by this method and apparatus. It is believed, however, that through the proper placement of the conduit or conduits, it is possible to maximize the impact and minimize the length of the conduit(s).

[0043] **FIG. 9** is a chart illustrating normal ocean water currents **900**, hurricane alley **902**, and a series of lines or arrays **904** of conduits or other upwelling systems. For example only, by placement of either a single conduit or a series of conduits off of the Bahamas, it is possible to greatly influence the ocean surface and subsurface water temperature of a region of the ocean where most Atlantic hurricanes pass should they target the coastline of Florida and North and South Carolina. By way of example only, an array **904** of conduits could be permanently placed or temporarily positioned along hurricane alley **902** north of the Caribbean Islands, and the ocean surface temperature cooled to change a Category 4 hurricane into a Category 2 hurricane, or a Category 2 into a mere tropical storm. The cost of deploying this invention is a small fraction of the damage in property cost of a single season of hurricanes in the Atlantic, to say nothing of the saving in the loss of lives due to hurricanes. For example only, in 1992 hurricane Andrew caused $26 billion in damages and killed 65 people (39 indirect deaths).

[0044] The upwelling substance in conduits **104**, **204**, **304**, **404**, **504**, **704**, **804** could be air or some other gas, an air/other gas mixture, a liquid, or a liquid/gas mixture. The gas, liquid, or solid could be delivered to the vents, holes, or valves of a conduit **104**, **204**, **304**, **404**, **504**, **704**, **804**, by way of example only, by a compressor, or in the case of a liquid by a pump, or in the case of a solid by a motor. Vents, holes, or valves may be opened or closed either manually or by remote control. In this way, either complete lengths of conduit or selected sections of each conduit could be vented, under manual control or automatic control. By way of example only, this control could allow one to target a fixed area of ocean, for example the ocean area directly under the hurricane's eye, without attempting to alter the temperature of larger ocean areas unnecessarily.

[0045] The array of conduits could be deployed at various depths, depending on the effect to be created. Additionally, and as illustrated in **FIG. 3**, the depth of a conduit can be adjusted manually or by remote control by expandable or retractable sections **314**, **314'**.

[0046] The deployment of the conduits could be accomplished in several ways and the present invention is not limited to any particular methodology or deployment system. For example, **FIG. 10** illustrates that a conduit **1004** could be laid on the ocean floor **1006** and terminate on-shore **1010**, with a mechanical compressor, pump, or other machinery **1000** located on land near the conduit terminus **1002**.

[0047] Alternatively, **FIG. 11** illustrates that remote, unmanned robots **1102** under the ocean surface **1100**, could place and relocate conduits **1104**, on the floor of the ocean **1106**, in anticipation of an approaching hurricane.

[0048] Additionally, **FIG. 12** illustrates that a compressor/pump **1202** could be placed onboard a ship **1208**, which could deploy a length of conduit **1204** on-site to change ocean surface **1210** temperature. In this embodiment, a fleet of such ships **1208** could be deployed to affect large areas of the ocean, each controlling a length of conduit **1204**. The ships **1208** may tow the conduits **1204** to position using a tow line **1206**, or any other suitable methodology.

[0049] The rate of flow or movement of gas and/or liquid and/or solid, the rate of release through the vents, and the distance between adjacent venting sites may be controlled, manually or remotely, to tailor the surface heating or cooling to address the specific effect dictated by the desired weather pattern.

[0050] Each of the disclosed inventive embodiments can be individually modified in part or total or combined, to create the needed effect. Therefore, the scope of the present invention includes any and all ways of producing an upwelling of cool water in order to cool the surface water of the ocean, by way of gases, liquids, or solids. The invention is not limited to a conduit, but includes any method or device that will allow for a gas, liquid, or solid to be released from underwater and rise to the surface to cause the upwelling of water.

[0051] Furthermore, in the event that it is desirable to warm the ocean surface water, this can be accomplished within the scope of the invention, by way of the utilization of warm gases, liquids, or solids released at an appropriate depth.

[0052] In the previously disclosed embodiments, large volumes of gases may be required to be either transported to certain ocean depths from outside the ocean or created at certain ocean depths through electrolysis or other means. These gases may then be utilized to cause an upwelling of cold ocean water when released. While this inventive method works well, the energy needed to transport these gases could be substantial and, in certain cases, could become a difficulty in commercial implementation.

[0053] The following inventive embodiments provide alternatives to the previously disclosed embodiments and for the mentioned issue of energy consumption. In these embodiments, geological and non-geological gas deposits are tapped that are deposited on or trapped beneath the ocean floor.

[0054] In one embodiment, **FIG. 13** illustrates a schematic diagram of an upwelling system, comprising a series of conduits **1304**, **1304A**, **1304B**, **1304C**, **1304D** coupled to a storage/release conduit **1306**, a gas reservoir **1308**, and a drilled and tapped hole **1312** adapted for penetration of a gas source **1314** below the ocean floor **1318**. In one embodiment, drilling rigs (not shown) may be placed over known gas deposits **1316** such as, by way of example only, methane gas, and holes may be drilled through the ocean floor to access the gases. Taps are put in place to control the release of the gases and are connected to large reservoirs **1308** placed, for example, on the ocean floor. In this way, valves in the taps can be opened on demand to release the trapped gases into the reservoirs **1308** and pressurized for greater trapped volume. The pressurizing mechanism may be manufactured pumps or the actual release pressure of trapped gases from the gas sources **1314** forcing their way into the reservoir **1308**.

[0055] These reservoirs **1308** may also be connected to long distribution pipes **1306** and storage/release conduits **1304A**, **1304B**, **1304C**, **1304D** under the ocean, which contain many release valves (not shown) that allow the gas to bubble to the surface over a selected wide area, as in the previous embodiments. For example, in the illustration of **FIG. 13**, upwelling substance may be released from distribution pipe **1306** to the leftmost conduit **1304**, while the release valves (not shown) supplying gas to other conduits **1304A**, **1304B**, **1304C**, **1304D** may not be opened, thus allowing upwelling gas to bubble, along a flow path **1310**, to the surface only over the selected area substantially above the leftmost conduit **1304**.

[0056] In times of hurricane threat, the gases in the reservoirs **1308** are opened to the distribution pipelines **1306** and conduits **1304**, **1304A**, **1304B**, **1304C**, **1304D** and released into the ocean, which then causes an upwelling of cool ocean water thus cooling the surface. The pressurized reservoir **1308** is replenished by allowing additional subfloor trapped gases **1316** to enter the reservoir **1308** during or after the release of gas to the surface. Whereas only one reservoir **1308** and distribution pipeline **1306** are illustrated in **FIG. 13**, it is to be understood that multiple reservoirs **1308** and distribution pipelines **1306** could be utilized.

[0057] In another embodiment of an upwelling system, **FIG. 14** illustrates a schematic diagram of a series of conduits **1404**, **1404A**, **1404B**, **1404C**, **1404D** coupled to a storage/release conduit **1406**, and a gas reservoir **1408**. In the embodiment of **FIG. 14**, deposits **1416** of sources of gas, which are at or above the ocean floor **1418**, are collected and converted to a gaseous state. By way of example only, methane ice or methane hydrate (ice clatherate of methane) $CH_4(H_2O)_6$, which in many cases is deposited on the ocean floor **1418**, is collected and converted to a gaseous state by way of increasing its temperature, reducing the external environmental pressure, or both. In either case, this can be done in numerous ways, one of which, by way of example only, would be to simply raise the collected methane hydrate to a certain ocean depth above the ocean floor, thus both increasing the temperature and reducing the external pressure. In this case the methane hydrate will dissociate into its components of methane and water. The dissociated gas may be stored in a reservoir **1408** for use in an embodiment of the invention. Again, whereas only one reservoir **1408** and distribution pipeline **1406** are illustrated in **FIG. 14**, it is to be understood that multiple reservoirs **1408** and distribution pipelines **1406** could be utilized in this embodiment, or any other alternative embodiment contemplated.

[0058] By employing either of these two embodiments, as well as any other means to liberate gases from a geological formation or entrapment, it is possible to substantially reduce the energy needed to fill the conduits **1304**, **1304A**, **1304B**, **1304C**, **1304D**, **1404**, **1404A**, **1404B**, **1404C**, **1404D**, distribution pipeline **1306**, **1406**, and/or reservoir **1308**, **1408** with gases. Gases located or trapped at the bottom of the ocean, once liberated, will rise to where they can be collected with far less external energy consumption needed than if a gas has to be pumped from a source external to the ocean to a location under the ocean.

[0059] **FIG. 15** illustrates an upwelling system **1500** with an upwelling substance rising along flow paths **1528** to the surface **1514** in a sub-area (i.e., a selected wide area) **1526** within an operating area **1516** of the upwelling system **1500**. In **FIG. 15**, the upwelling system **1500**, comprises a storage reservoir **1502**, a manifold or storage/release conduit **1504**, and three conduits **1506**, **1508**, **1510** each having multiple release valves (not shown). The release valves on the conduits **1506**, **1508**, **1510** may be individually controlled or controlled in groups. The upwelling system **1500** is depicted as resting on the ocean floor **1512**, however, as discussed previously, conduits **1506**, **1508**, **1510** may be raised or lowered to any depth below the surface of the ocean **1514** in accordance with the principles of the present invention. **FIG. 15** illustrates that the operating area **1516** of the upwelling system **1500** may be bounded by a polygon whose vertices **1518**, **1520**, **1522**, **1524** are projected onto the surface **1514** from the endpoints **1518'**, **1520'**, **1522'**, **1524'**, respectively, of the outermost conduits **1506**, **1510**. As illustrated in **FIG. 15**, the upwelling system may release an upwelling substance into the sub-area **1526** within the operating area **1516** of the upwelling system **1500**. The sub-area **1526** may be moved, enlarged, or reduced to any area within the operating area **1516**. Movement and/or change in size of the sub-area is undertaken by control of the multiple release valves (not shown) on each of the conduits **1506**, **1508**, **1510** of the upwelling system **1500**.

[0060] As described previously, the inventions disclosed herein may utilize the forces of nature. As previously disclosed and illustrated in **FIG. 9**, upwelling systems may be placed in an array **904** such that they are positioned substantially perpendicular to the path of the ocean currents **900**, as well as that of an approaching hurricane **902**, when possible. This allows for nature's own forces of ocean currents to move the body of surface water across the line or lines of conduits. Further, the gases naturally will find their way to the surface. Also, the gases, which have been transported in most cases from above the ocean surface, are cooled by nature's ocean depths. In alternative embodiments, nature may be again called on to provide naturally deposited gases, thus, substantially reducing energy needs.

[0061] Finally, during an off season (a non-hurricane season) or also when hurricanes are not anywhere in the forecast period, the collected methane gas, by way of example only, could be diverted, by the present invention, to be used as an energy source to power any number of energy consuming machines or devices, by way of example only, factories, power stations, automobiles, homes, etc.

[0062] The disclosed embodiments are illustrative of the various ways in which the present invention may be practiced. Other embodiments can be implemented by those skilled in the art without departing from the spirit and scope of the present invention.

What is claimed is:

1. A method for altering the temperature of a surface of a body of water, comprising:

positioning a conduit below the surface of the body of water;

positioning the conduit substantially perpendicular to naturally occurring ocean currents;

dispensing a substance from said conduit; and

upwelling water through the action of said substance rising from the conduit to the surface of the body of water; and

altering the temperature of the surface of the body of water by said upwelling water.

2. The method of claim 1, wherein the temperature of the surface of the body of water is decreased.

3. The method of claim 1, wherein the temperature of the surface of the body of water is increased.

4. The method of claim 1, wherein the dispensed substance is a gas.

5. The method of claim 1, wherein the dispensed substance is a liquid.

6. The method of claim 1, wherein the dispensed substance is a solid.

7. A method for upwelling water to a sub-area within an operating area of an upwelling system, comprising:

positioning said upwelling system below a surface of a body of water, said upwelling system having a valve controllably releasing an upwelling substance;

releasing said upwelling substance from said valve;

upwelling water by said step of releasing; and

altering the temperature of the surface of the body of water by said upwelling water.

8. The method of claim 7, wherein said valve releases said upwelling substance beneath a sub-area within an operating area of said upwelling system.

9. The method of claim 7, wherein the upwelling system includes a conduit.

10. The method of claim 7, wherein the upwelling system includes a weighted CO_2 capsule.

11. The method of claim 7, wherein the upwelling system includes an electrolysis cell.

12. The method of claim 7, wherein the temperature of the surface of the body of water is decreased.

13. The method of claim 7, wherein the temperature of the surface of the body of water is increased.

14. The method of claim 7, wherein the upwelling substance is a gas.

15. The method of claim 7, wherein the upwelling substance is a liquid.

16. The method of claim 7, wherein the upwelling substance is a solid.

17. An apparatus for altering the temperature of a surface of a body of water, comprising:

a conduit, disposed below the surface of the body of water, the conduit releasably containing an upwelling substance and including:

an input; and

a plurality of outputs.

18. The apparatus of claim 17, wherein the input protrudes above the surface of the body of water.

19. The apparatus of claim 18, wherein the input includes an adjustable section, said adjustable section allowing the conduit to be positioned at a selectable depth below the surface of body of water.

20. The apparatus of claim 17, wherein the input is coupled to an underwater source of one of a gas and a liquid and a solid.

21. The apparatus of claim 17, wherein the plurality of outputs comprises a plurality of valves.

22. The apparatus of claim 17, wherein the conduit comprises a plurality of conduit sections.

23. The apparatus of claim 22, wherein each conduit section is coupled to at least on other conduit section.

24. The apparatus of claim 17, wherein the conduit includes at least two inputs, wherein the inputs are at opposite ends of the conduit.

25. The apparatus of claim 17, wherein the conduit is a substantially linear conduit.

26. An apparatus for altering the temperature of a surface of a body of water, comprising:

an enclosure, containing an upwelling substance and disposed below the surface of the body of water;

a water entry valve mounted on said enclosure, said water entry valve allowing a volume of water to enter said enclosure; and

a gas release valve mounted on said enclosure, said gas release valve allowing release of a gaseous state of the upwelling substance into the water, after the upwelling substance has come in contact with water.

27. The apparatus of claim 26, wherein the upwelling substance is frozen CO_2.

28. The apparatus of claim 26, further comprising a weight coupled to said enclosure.

29. An apparatus for altering the temperature of a surface of a body of water, comprising:

an electrolysis cell disposed below the surface of the body of water, said electrolysis cell dissociating hydrogen and oxygen from water in an underwater environment;

a storage vessel coupled to said electrolysis cell, said storage vessel collecting the dissociated hydrogen and oxygen; and

a gas release valve mounted on said storage vessel, said gas release valve allowing release of the dissociated hydrogen and oxygen into the water, the released dissociated hydrogen and oxygen causing an upwelling of water thereby altering the temperature of the surface of the body of water.

30. An apparatus for altering the temperature of a surface of a body of water, comprising:

a manifold, disposed below the surface of the body of water, wherein said manifold comprises a plurality of valves each valve coupled to an underwater conduit; and

a gas reservoir releasably containing a gas, coupled to said manifold, released gas causing an upwelling of water thereby altering the temperature of the surface of the body of water.

31. The apparatus of claim 30, wherein the gas reservoir is disposed above the surface of the body of water.

32. The apparatus of claim 30, wherein the gas reservoir is disposed below the surface of the body of water.

33. The apparatus of claim 30, further comprising a source of gas trapped beneath the ocean floor, wherein said source of gas is controllably coupled to said gas reservoir.

34. The apparatus of claim 30, wherein each valve on said manifold is independently operable.

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