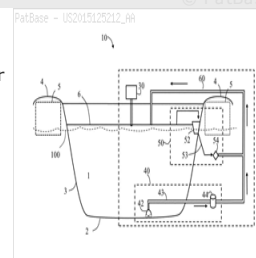


1) Family number: 58640880 (US2015125212A)**FLOATING LAKE SYSTEM AND METHODS OF TREATING WATER WITHIN A FLOATING LAKE**

Abstract: Source: US2015125212A The present invention relates to floating lakes and to the treatment of the water in such lakes. The present invention further relates to large floating lakes that can be installed within a natural or artificial water body to improve water conditions that are unsuitable for recreational uses. The floating lake can be provided with a chemical application system; a filtration system including a mobile suctioning device and filters; a skimmer system, and optionally a coordination system.

Probable Assignee: CRYSTAL LAGOONS CURACAO BV

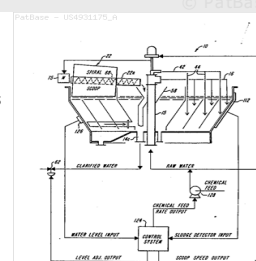
Earliest Publication Date: 20141231

**2) Family number: 8463895** (US4931175A)**WATER CLARIFYING APPARATUS**

Abstract: Source: US4931175A Water clarifying apparatus has a cylindrical tank where particulate contaminants suspended in raw water are separated using flotation techniques. A set of concentric mutually spaced, conical plates are positioned in the flotation tank. The plates rotate about the tank, preferably in unison with a (i) header that distributes equal quantities of raw water to each annular zone in the tank defined by the conical plates and (ii) a scoop for removing the contaminants which form a floated sludge layer. A screw conveyor is located in a discharge pipe of the floated sludge scoop. An infrared sludge detection array in a window in the side wall of the tank senses the sludge-water interface. Air dissolving tubes operating in parallel have common feeds and discharges coupled through three way valves operated to pressurize a closed volume of water with high pressure air in one tube while reloading and discharging the other tube.

Probable Assignee: KROFTA MILOS

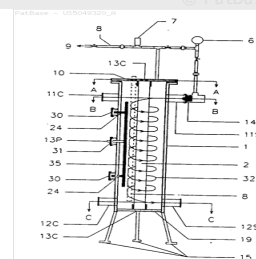
Earliest Publication Date: 19900605

**3) Family number: 11833127** (US5049320A)**GAS DISSOLVING SYSTEM AND METHOD**

Abstract: Source: US5049320A An improved gas dissolving and releasing system involving the use of multistages of porous gas dissolving media at the center and near the wall of a pressure vessel is described. The gas dissolving system includes a liquid pressure pump, a pressure vessel with tangential inlet and outlet, a gas injector, an inlet nozzle assembly, a center gas dissolving tube, one or more wall-mounted gas dissolving plate assembly, a gas compressor, gas regulators, gas flow meter(s), pressure gauge(s), safety valve(s), sight tube(s), a bleed-off point, a pressurized water release unit, and a liquid flow meter. The liquid flow pattern inside of the pressure vessel is controlled to be of either swirling upflow, swirling downflow or swirling horizontal flow at a rotation speed of over 2,500 rpm. A set of special nozzles with different orifices is designated for precise liquid flow control and liquid rotation speed control. More than one gases introduced at different inlets are dissolved simultaneously and efficiently in the pressure vessel under controlled pressure at 2-7 atm. The improved gas dissolving system is compact, simple and cost-effective, and is applied to ozonation, chlorination, recarbonation, oxygenation, nitrogenation, aeration, and flotation processes.

Probable Assignee: INT ENVIRONMENTAL SYSTEMS INC USA

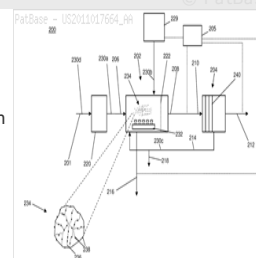
Earliest Publication Date: 19910917

**4) Family number: 47898823** (US2011017664A)**SUSPENDED MEDIA MEMBRANE BIOLOGICAL REACTOR SYSTEM AND PROCESS INCLUDING SUSPENSION SYSTEM AND MULTIPLE BIOLOGICAL REACTOR ZONES**

Abstract: Source: US2011017664A A wastewater treatment system is provided comprising a biological reactor having a separation subsystem, a suspension system and a membrane operating system. The separation subsystem is constructed and arranged to maintain adsorbent material in the biological reactor with a mixed liquor. The suspension system is positioned in the biological reactor and is constructed and arranged to maintain adsorbent material in suspension with mixed liquor. The membrane operating system is located downstream of the biological reactor and is constructed and arranged to receive treated mixed liquor from the biological reactor and discharge a membrane permeate. In addition, a wastewater treatment system is provided comprising a first biological reaction zone, a second biological reaction zone and a membrane operating system. The first biological reaction zone is constructed and arranged to receive and treat the wastewater. The second biological reaction zone includes a separation subsystem and is constructed and arranged to receive effluent from the first biological reaction zone. A suspension system for adsorbent material is provided in the second biological reaction zone. The membrane operating system is located downstream of the second biological reaction zone and is constructed and arranged to receive treated wastewater from the second biological reaction zone and discharge a membrane permeate.

Probable Assignee: SAUDI ARABIAN OIL CO

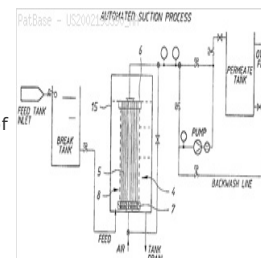
Earliest Publication Date: 20101223

**5) Family number: 10932551** (US2002195390A)**SCOURING METHOD**

Abstract: Source: US2002195390A A method and apparatus for removing fouling materials from the surface of a plurality of porous membranes (9) arranged in a membrane module (4) by providing, from within the module, by means (10) other than gas passing through the pores of said membranes, gas bubbles in a uniform distribution relative to the porous membrane array such that the bubbles move past the surfaces of the membranes (9) to dislodge fouling materials therefrom. The membranes (9) are arranged in close proximity to one another and mounted to prevent excessive movement therebetween. The bubbles also produce vibration and rubbing together of the membranes to further assist removal of fouling materials.

Probable Assignee: EVOQUA WATER TECHNOLOGIES LLC

Earliest Publication Date: 19980702



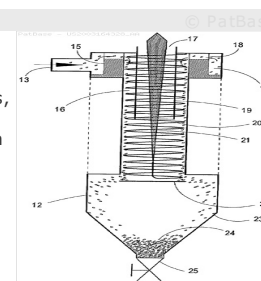
6) Family number: 53290606 (US2003164328A)

APPARATUS FOR MIXING FLUIDS

Abstract: Source: US2003164328A An apparatus is provided for separation of suspended solid particles from fluids, for separation and mixing of fluids, and for dissolving gases in aqueous fluids. The apparatus employs a grooved ring to divide the fluid stream and impart a high velocity on each of the divided or sub-streams. A grooved ring with any number of grooves that may be spiral in shape is used to create a high velocity circular motion on a divided stream for separation of suspended solid particles by centrifugal force in a cyclone filter and for saturation of liquid with gases in a fluid mixer where gases are introduced through a diffuser. A grooved ring with any number of grooves that may be radial is used in a fluid mixer to divide a stream of fluid, produce a high velocity flow through each groove, introduce a second fluid through an orifice into the first fluid flowing through each groove, and direct the fluid mixture to a center impact zone where the various streams collide to complete the mixing.

Probable Assignee: HYDROTREAT INC

Earliest Publication Date: 20030904



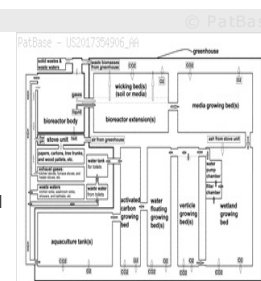
7) Family number: 65381251 (US2017354906A)

BIOREACTOR SYSTEM AND METHOD

Abstract: Source: US2017354906A The present invention is a composting bioreactor system that continually receives biodegradable solid wastes, waste waters and exhaust gases, automatically recycles the biodegradable wastes into nutrients and heat energy, and automatically supplies the nutrients and heat into an integrated hydroponic or aquaponic system. This invention together with integrated food growing system may be installed onsite such as balconies, backyards and premises of restaurants and food factories etc. therefore may lead to zero mileage targets both for recycling wastes and for supplying foods. This invention integrates composting process and aquaponic technology together and may establish a closed-loop recirculation of both water and gases therefore upgrades aquaponics into compoaponics. A compoaponic system has both soil and soilless growing beds and mimics nature recirculating nutrients, carbon and energy among human being, animals, microorganisms and plants by way of photosynthesis, slow burning by cellular respiration and burning by combustion.

Probable Assignee: XIANGGEN WU

Earliest Publication Date: 20170411



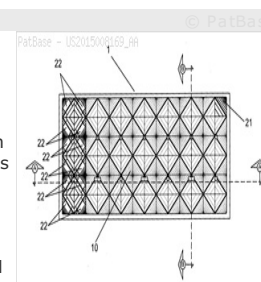
8) Family number: 54705824 (US2015008169A)

COMBINED BIOREACTOR FOR THE TREATMENT OF WASTE WATER, BY MEANS OF ANAEROBIC, AEROBIC AND ANOXIC PROCESSES OF DEGRADATION OF ORGANIC MATTER WITH ZONE SEPARATOR SYSTEM AND COLLECTION OF BIOGASES, SCUM AND SLUDGE

Abstract: Source: US2015008169A A bioreactor for anaerobic, aerobic and anoxic digestion of organic matter from wastewater, having a bottom anaerobic zone where the wastewater is fed where anaerobic bacteria produces biogas and the sludge produced is deposited on the bottom and subsequently extracted. An anoxic middle zone contains denitrifying bacteria which converts nitrates to nitrogen, and an aerobic zone at the upper part where at least one biological contact rotor is disposed, which degrade organic matter remaining in the water. The growth of nitrifying bacteria converts ammonia nitrogen into nitrites and nitrates. The tank has a plurality of rhomboids for biogas, sludge and scum collection that join together form an intermediate polyhedral separator panel. The rhomboids joined together define conical collectors with connecting nozzles of ducts from a capture and conduction network of biogas and funnel-shaped manifolds with connecting nozzles of ducts that define a capture and conduction network of sludge and scum.

Probable Assignee: VALDES SIMANCAS FRANCISCO XAVIER

Earliest Publication Date: 20130906



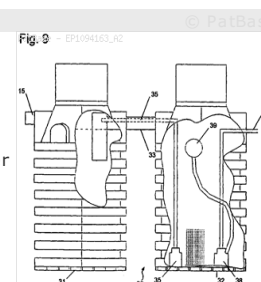
9) Family number: 12603672 (EP1094163A2)

MULTI-USE SHAFT, SMALL-SCALE WATER PURIFICATION PLANT AND WATER TREATMENT METHOD

Abstract: The final breakdown of fresh compost is accelerated by an earthworm colony moving through a steady incoming compost supply on a moving conveyor in a continual process. As in claim DE 3812518-A1, freshly composted material (9) is finally composted by earthworms (19) which feed and migrate progressively to further incoming supplies of fresh compost. Worms migrate horizontally towards fresh compost which is preceded by further fresh incoming compost, maintained as a continual supply in an elongated pile (3) of more than two meters length by a conveyor-fed supply moving towards the worms. The fresh compost and worm-assisted compost heap are positioned on a moving surface e.g. circular, oval or linear conveyor, the speed of which is determined by the current position of the feeding worm colony. The position of the feeding worms is determined by sensors (23,24). The composting material passes over a hot zone (7), under a mechanical hoe (12) and heap inverter (17). The finally composted material is discharged (5) prior to the fresh compost inlet.

Probable Assignee: BEDNARSCH GERD

Earliest Publication Date: 20010425



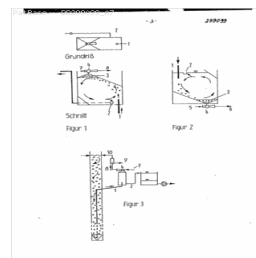
10) Family number: 6143754 (DD299099A)

VERFAHREN UND EINRICHTUNG ZUR REGENERIERUNG UND RUECKFUEHRUNG VON IM ABLAUF BIOLOGISCHER WASSERBEHANDLUNGSANLAGEN BEFINDLICHEM TRAEGERMATERIAL PROCEDURE AND DEVICE FOR THE REGENERATION AND RECYCLING OF SUBSTRATE IN THE PROCESS OF BIOLOGICAL WASTEWATER TREATMENT SYSTEMS (MACHINE TRANSLATION)

Abstract: Source: DD299099A [Source: Claim 1] 1. Einrichtung zur Regenerierung und Rueckfuehrung von im Ablauf biologischer Wasserbehandlungsanlagen befindlichem Traegermaterial, dadurch gekennzeichnet, dass die obere oder untere Begrenzung der Einrichtung von einem Trichter (3) gebildet wird, wobei dessen Spitze mit einem Ejektor zum Abziehen und gleichzeitigen Regenerieren des zugefuehrten Traegermaterials kombiniert ist, und sich diagonal gegenueberliegend ein Zulauf (1) fuer das Wasser aus dem Reaktor und ein Ablauf (2) fuer traegermaterialfreies Wasser befinden. [Source: claim 1] 1 device for the regeneration and recycling in the process of biological wastewater treatment systems carrier material, characterised in that the upper or lower limit of the institution of a funnel (3) is made, where the top with an ejector for pulling and simultaneous replenishment of the substrate is combined, and is diagonally opposite a feed (1) for the water from the reactor and a discharge (2) for carrier material free water are.

Probable Assignee: INST F WASSERTECHNOLOGIE GMBH

Earliest Publication Date: 19920402



11) Family number: 71366122 (IN201731009971A)

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MOVING BED HYBRID BIOREACTOR (MBHBR) FOR BIOLOGICAL TREATMENT OF INDUSTRIAL WASTEWATER

Abstract: Source: IN201731009971A Industrial wastewater can cause numerous environmental hazards, arising out of its high COD, nitrogen and TSS together with varying amount of toxic/inhibitory substances. Although there is a number of biological methods available for the treatment of industrial wastewater, most of them can remove the carbonaceous content mainly and sometimes, not up to satisfactory level. Therefore, untreated nitrogen, residual organic matters are still present in the effluent, which may cause severe pollution upon disposal into fresh water ecosystem. The conventional process available for abatement of such industrial water pollution area is found to be expensive and also not eco-friendly. Under such circumstance, a Moving bed hybrid bio-reactor (MBHBR) has been developed as a techno-economically viable option for industrial wastewater treatment. In Moving bed hybrid bioreactor aerobic, anoxic and also anaerobic environment can be maintained with significant amount of effective biomass by employing both suspended and attached growth micro-organisms.

Probable Assignee: DEBABRATA MAZUMDER

Earliest Publication Date: 20180928

12) Family number: 50509774 (DE202011105186U1)

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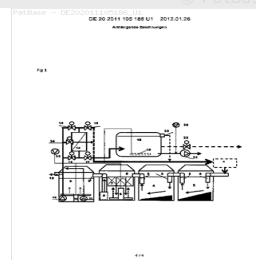
KONSTRUKTION ZUR BIOLOGISCHEN REINIGUNG, FILTRIERUNG UND BELEBUNG VON FAHRZEUGWASCHWASSER NACH ABWV ANHANG 49 DESIGN FOR BIOLOGICAL CLEANING, FILTRATION AND REVIVAL OF WATER AFTER VEHICLE ABWV APPENDIX 49 (MACHINE TRANSLATION)

Abstract: Source: DE202011105186U1 Konstruktion zur biologischen Reinigung, Filtrierung und Belebung von Fahrzeugwaschwasser zum Zwecke der Wiederverwendung, dadurch gekennzeichnet dass die Schlammfaenge mit Tauchroehren im Einlauf und Auslauf ausgefuehrt werden um Treibstoffe oder oel rueckzuhalten und die Sedimentation von Sand, Schlamm und Schlick zu verbessern.

Machine translation: Construction of biological treatment, filtration and recovery of vehicle wash water for reuse, characterized in that the Schlammfaenge executed with dip tubes in the inlet and outlet are to fuels or oel rueckzuhalten and to improve the sedimentation of sand, silt and mud. ' / p>

Probable Assignee: KURTZE INGOLF

Earliest Publication Date: 20120126



13) Family number: 15369291 (DE10001107A1)

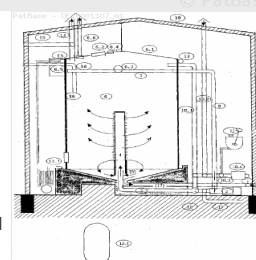
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SLUDGE-THICKENING DIGESTER CAPABLE OF DENITRIFICATION AND BIOGAS PRODUCTION, COMPRISES VESSEL WITH PROVISIONS FOR RECIRCULATION, MIXING, AND GAS OFF TAKE

Abstract: A 10-150 m<3> acid-resistant vessel is 3-6 m in diameter and 3-8 m high. It includes a plastic flat conical roof (6.1) and a conical base in metal or concrete. Also included are an upper working platform at the upper edge (6.5) internal lighting (6.4), level sight glass (6.3), inspection ports (6.2), and a pressure relief valve (6.6). Centrally in the lower half, 10 cm above the base is a tube (4) causing an injection recirculation flow (5). This is closed at the top and has side holes for the 80-95 percent liquid waste, promoting good mixing between floating foam and suspended matter, under pumped (2) recirculation. High in the tank there is a transverse channel overflow unit (7). A downcomer (8) outside the vessel is connected to the pump, to break up floating and suspended matter entrained. By closing the oxygen supply line (102) to form a closed circuit, operation is converted from aerobic to anaerobic. This creates in effect, a small biogas production plant. The single external pump with suitable drive, is operated at intervals. A gas off take line is connected to the top of the vessel. This can be used for venting or flaring-off weak gas. A gas mixture recirculation line (10.1) is connected at the top of the vessel and to the liquid recirculation line (3, 8). A hot air system (10.4) is connected to the injector (10.3) and gas recycle system, or directly into the venturi system. All solids are mixed into the fluid by the venturi injector (10). Provision is made for fluid additive preparation, and to pump liquid away from the base of the vessel. An overflow line from about 2/3 of the filling height, enters at 9/10 of the filling height in the next vessel. A methane gas line is connected to a block power generator. A 38 deg C warm water wetting system is installed, for the entire outer wall of the vessel, and has a lower interception channel connected to a pump and heat exchanger (131) for temperature equalization and upward recirculation.

Probable Assignee: BOEDECKER KNUTH

Earliest Publication Date: 20010719

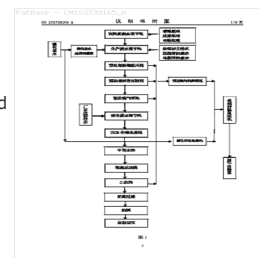


14) Family number: 56272485 (CN103739165A)

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RECYCLING TREATMENT METHOD FOR AUTOMOBILE COATING WASTEWATER

Abstract: Source: CN103739165A The invention provides a recycling treatment method for automobile coating wastewater. The recycling treatment method comprises the following steps: adjusting wastewater, pre-treating, carrying out microbiological treatment, carrying out cohesion treatment, carrying out fiber filtering, carrying out nano filtering and carrying out sludge floating slag treatment; in a cohesion process, the pH (Potential of Hydrogen) value is controlled to 10.0-10.5 so that hydroxyapatite $[\text{Ca}_5(\text{OH})(\text{PO}_4)_3]$ and zinc hydroxide sediment are generated by a phosphate radical and zinc ions. The pre-treating step adopts secondary coagulation treatment; solid-liquid separation after a cohesion reaction respectively adopts an inclined tube settler and an air floating tank, namely an inclined plate sedimentation basin is used for removing heavy metal compound sediment with the great specific gravity and the air floating tank is used for removing organic matters with the light specific gravity. The microbiological treatment adopts an HCR which is an efficient jet bioreactor so that the biological reaction efficiency in the reactor is greatly improved. Desalting treatment adopts a nano filtering device with a low operation cost to remove a lot of salts and fine impurities, so that output water can be recycled to afforest and irrigate.



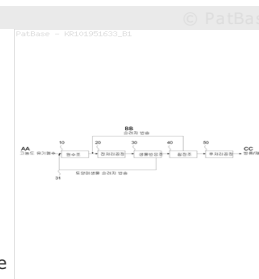
Probable Assignee: XINJIANG DE AN ENVIRONMENTAL PROT TECHNOLOGY CO LTD

Earliest Publication Date: 20140423

15) Family number: 73309528 (KR101951633B)

A TREATMENT APPARATUS OF HIGH CONCENTRATION ORGANIC WASTEWATER USING ODOR REMOVAL MICROORGANISM

Abstract: Source: KR101951633B The present invention relates to a high-concentration organic waste water treatment method using a malodor-removing microorganism. An object of the present invention is to provide a method for reducing the generation of malodor, as well as for increasing the treatment efficiency of organic substances, nitrogen, and phosphorus by mixing the odor, which is inevitably generated in the treatment process of high-concentration organic wastewater, with soil microorganisms having high malodor-removing efficiency at an inflow point of the treatment process so that the organic substances are decomposed by or bio-adsorbed to the soil microorganisms. In order to activate the soil microorganisms, a soil microorganism activation apparatus having a filling material obtained by blending a precursor of a corrosion inhibitor with a silicate is installed in a bioreactor. The soil microorganisms are dominantly formed, and the soil microorganisms are retransferred to an air floating mixing tube of an inflow section.



Probable Assignee: NURI CO LTD

Earliest Publication Date: 20190225