

1) Family number: 49809015 (US2011259760A)

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Title: ELECTROLYZING SYSTEM

**Abstract:** An electrolyzing system for electrolyzing a brine solution of water and an alkali salt to produce acidic electrolyzed water and alkaline electrolyzed water is provided. The system includes an internal chamber for receiving the brine solution and two electrolyzer cells immersed in a brine bath. Each electrolyzer cell includes an electrode, at least one ion permeable membrane supported relative to the electrode to define a space communicating between a fresh water supply and a chemical outlet into which brine enters only through the membrane. One of the electrodes is coupled to a positive charging electrical supply and the other to a negative charging electrical supply.

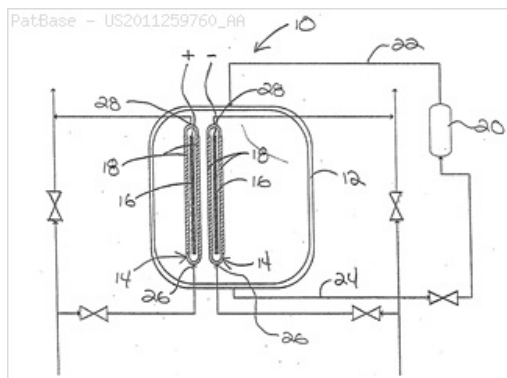
**Classifications:**

**International (IPC 8-9):** C02F C02F1/46 C02F1/461 C02F1/467 C25B C25B1/00 C25B1/04 C25B1/16 C25B1/46 C25B13/00 C25B9/00 C25B9/10 C25B9/18 (Advanced/Invention); C02F1/461 C02F1/467 C25B9/18 (Advanced/Non-invention); C25B1/00 C25B1/16 C25B1/46 (Core/Invention); C02F C25B (Subclass/Invention)

**CPC:** C25B1/00 C25B9/18 C02F1/4618 C02F2001/46185 C02F2001/4619 C02F2201/006 C02F2201/46115 C02F2201/4618 Y02E60/366

**European:** C02F1/467B M02F1/461B6B M02F1/461B6D M02F201/461B12 M02F201/461B4 M02F201/461B6D

**US:** 1/1 204/252 204/253 204/257 204/257S 205/345 205/746 205/748



Family:

| Publication number | Publication date | Application number | Application date |
|--------------------|------------------|--------------------|------------------|
| AU2011242614 AA    | 20111027         | AU20110242614      | 20110422         |
| AU2011242614 BB    | 20140724         | AU20110242614      | 20110422         |
| BR112012027028 A2  | 20160719         | BR20121127028      | 20110422         |
| CA2796904 AA       | 20111027         | CA20112796904      | 20110422         |
| CA2796904 C        | 20181218         | CA20112796904      | 20110422         |
| CL2012002941 A1    | 20130412         | CL20120002941      | 20121019         |
| CL53684 B          | 20161230         | CL20120002941      | 20121019         |
| CN102947490 A      | 20130227         | CN201180031385     | 20110422         |
| CN102947490 B      | 20160413         | CN201180031385     | 20110422         |
| CO6640233 A2       | 20130322         | CO20120210659      | 20121121         |
| DE602011027124 D1  | 20160714         | DE201160027124T    | 20110422         |
| EP2561121 A1       | 20130227         | EP20110772747      | 20110422         |
| EP2561121 A4       | 20141022         | EP20110772747      | 20110422         |
| EP2561121 B1       | 20160601         | EP20110772747      | 20110422         |
| ES2584652 T3       | 20160928         | ES20110772747T     | 20110422         |
| HK1177479 A1       | 20170324         | HK20130104565      | 20130416         |
| HK1177479 A1       | 20130823         | HK20130104565      | 20130416         |
| HK1177479 B        | 20170324         | HK20130104565      | 20130416         |
| IN09032CN2012 A    | 20151218         | IN2012CN09032      | 20121022         |
| IN309740 B         | 20190329         | IN2012CN09032      | 20121022         |
| JP2013525607 T2    | 20130620         | JP20130506318T     | 20110422         |
| JP5761874 B2       | 20150812         | JP20130506318T     | 20110422         |
| KR101861864 B1     | 20180629         | KR20127030037      | 20110422         |
| KR20130062933 A    | 20130613         | KR20127030037      | 20110422         |
| MX2012012252 A1    | 20121217         | MX20120012252      | 20110422         |
| MX343210 B         | 20161027         | MX20120012252      | 20110422         |
| NZ603195 A         | 20140328         | NZ20110603195      | 20110422         |
| PL2561121 T3       | 20170929         | PL20110772747T     | 20110422         |
| SG10201503169S A1  | 20150828         | SG20151003169      | 20110422         |
| SG184969 A1        | 20121129         | SG20120078119      | 20110422         |
| TH134778 A         | 20140611         | TH20121005570      | 20110422         |
| US2011259760 AA    | 20111027         | US20110092278      | 20110422         |
| US2014202872 AA    | 20140724         | US20140225532      | 20140326         |
| US8753489 BB       | 20140617         | US20110092278      | 20110422         |
| US9103043 BB       | 20150811         | US20140225532      | 20140326         |
| WO11133835 A1      | 20111027         | WO2011US33528      | 20110422         |
| ZA201208339 A      | 20130731         | ZA20120008339      | 20121106         |

Priority:

US20100326869P 20100422 EP20110772747 20110422 US20110092278 20110422  
WO2011US33528 20110422 US20140225532 20140326

Probable Assignee: SPRAYING SYSTEMS CO

Assignee(s): (std): MOYER JAMES IRA ; SPRAYING SYSTEMS CO ; SWARTZ GREGORY JOHN ; SWARTZ JAMES B

Assignee(s): SPRAYING SYSTEMS CO WHEATON

**Inventor(s):** (std): GREGORY JOHN SWARTZ ; JAMES B SWARTZ ; JAMES IRA MOYER ; SWART GREGORY JOHN ; MOYER JAMES IRA ; SWARTZ JAMES B ; SWARTZ GREGORY JOHN

**Inventor(s):** SWARTZ JAMES B NOBLESVILLE ; MOYER JAMES IRA KOKOMO ; SWARTZ GREGORY JOHN ANTHEM ; SWARTZ GREGORY JOHN SWARTZ JAMES B MOYER JAMES IRA

**Agent(s):** SHELSTON IP; SHELSTON IP PTY LTD; MACRAE AND CO; CLARKE MODET AND CO CHILE; SILVANA MARIA LOPEZ DIAZ; GILLE HRABAL; MAKOVSKI PRISCILLA MARY; ARIAS JUAN; HONG KONG PATENT REGISTRATIONS CO; DREW AND NAPIER LLC; LEYDIG VOIT AND MAYER LTD; BAYS GREGORY C ET AL

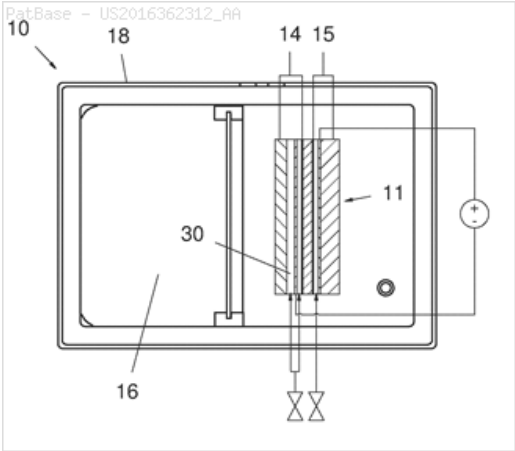
**Designated states:** AE AG AL AM AO AT AU AZ BA BB BE BF BG BH BJ BR BW BY BZ CA CF CG CH CI CL CM CN CO CR CU CY CZ DE DK DM DO DZ EC EE EG ES FI FR GA GB GD GE GH GM GN GQ GR GT GW HN HR HU ID IE IL IN IS IT JP KE KG KM KN KP KR KZ LA LC LI LK LR LS LT LU LV LY MA MC MD ME MG MK ML MN MR MT MW MX MY MZ NA NE NG NI NL NO NZ OM PE PG PH PL PT RO RS RU SC SD SE SG SI SK SL SM SN ST SV SY SZ TD TG TH TJ TM TN TR TT TZ UA UG US UZ VC VN ZA ZM ZW

2) Family number: 64368593 (US2016362312A) © PatBase

**Title:** HIGH VOLUME WATER ELECTROLYZING SYSTEM AND METHOD OF USING

**Abstract:** An electrolyzing system is provided for producing higher quantities of electrolyzed waters within prescribed pH ranges for optimum usage and which can be operated for producing greater quantities of alkaline electrolyzed water than acidic electrolyzed water consistent with a users requirements. The system includes an electrolytic cartridge having cathode and anode cells each comprising a pair of electrodes disposed in laterally spaced coplanar relation to each other, with a respective ion permeable membrane in spaced relation to the pairs of electrodes. The cells are separated with a common separator plate that maintains the ion permeable membranes in parallel relation with the respective electrodes and which facilitates the communication of brine solution from a brine bath to both cells. The cells further can be operate with staggered input currents and the redirection of electrolyzed water between the cells for optimum control of pH levels of the resulting products.

**Classifications:**  
**International (IPC 8-9):** A61L2/18 B01D61/38 B01J47/12 B1D61/38 C01D3/06 C02F1/461 C02F1/469 C25B1/04 C25B11/04 C25B9/18 C25C3/02 (Advanced/Invention); C25B1/04 (Advanced/Non-invention)  
**CPC:** C02F1/4618 C02F2201/46115 C02F2201/4618 C25B1/04 C25B9/08 Y02E60/366 C02F2301/024  
**US:** 204/263



**Family:**

| Publication number | Publication date | Application number | Application date |
|--------------------|------------------|--------------------|------------------|
| AU2016277127 AA    | 20180104         | AU20160277127      | 20160613         |
| BR112017026680 A2  | 20180821         | BR20171126680      | 20160613         |
| CA2988984 AA       | 20171208         | CA20162988984      | 20160613         |
| CN107921372 A      | 20180417         | CN201680047552     | 20160613         |
| CO20180000201 A2   | 20180410         | CO20180000201      | 20180111         |
| EP3307423 A1       | 20180418         | EP20160808517      | 20160613         |
| EP3307423 A4       | 20190227         | EP20160808517      | 20160613         |
| IN201847000707 A   | 20180126         | IN201847000707     | 20180108         |
| MA41663 A1         | 20180531         | MA20160041663      | 20160613         |
| MX2017016123 A1    | 20180619         | MX20170016123      | 20160613         |
| RU2017144081 A     | 20190712         | RU20170144081      | 20160613         |
| RU2017144081 A3    | 20190717         | RU20170144081      | 20160613         |
| US2016362312 AA    | 20161215         | US20160180853      | 20160613         |
| WO16201428 A1      | 20161215         | WO2016US37215      | 20160613         |

**Priority:**  
US20150174791P 20150612 RU20170144081 20160613 US20160180853 20160613  
WO2016US37215 20160613

**Probable Assignee:** SPRAYING SYSTEMS CO

**Assignee(s):** (std): SPRAYING SYSTEMS CO

**Assignee(s):** SPREING SISTEMS KO ; WILLIAMS JOHN TYLER ; ADAMS ROBERT ; CRONCE KEITH L

**Inventor(s):** (std): WILLIAMS JOHN TYLER ; ADAMS ROBERT ; CRONCE KEITH L ; KEITH L CRONCE ; JOHN TYLER WILLIAMS ; ROBERT ADAMS

**Inventor(s):** KRONs KIT L ; VILYAMS DZHON TAJLER

**Agent(s):** SHELSTON IP PTY LTD; MACRAE AND CO; CAROLINA MERCEDES DAZA MONTALVO; BARKER BRETTELL LLP; SCHLEMMER DENNIS R ET AL

**Designated states:** AE AG AL AM AO AT AU AZ BA BB BE BF BG BH BJ BR BW BY BZ CA CF CG CH CI CL CM CN CO CR CU CY CZ DE DK DM DO DZ EC EE EG ES FI FR GA GB GD GE GH GM GN GQ GR GT GW HN HR HU ID IE IL IN IR IS IT JP KE KG KM KN KP KR KZ LA LC LI LK LR LS LT LU LV LY MA MC MD ME MG MK ML MN MR MT MW MX MY MZ NA NE NG NI NL NO NZ OM PA PE PG PH PL PT QA RO RS RU RW SA SC SD SE SG SI SK SL SM SN ST SV SY SZ TD TG TH TJ TM TN TR TT TZ UA UG US UZ VC VN ZA ZM ZW

**Title:** METHOD AND APPARATUS FOR PRODUCING NEGATIVE AND POSITIVE OXIDATIVE REDUCTIVE POTENTIAL (ORP) WATER

**Abstract:** A method and apparatus for electrolytically producing oxidation reduction potential water from aqueous salt solutions for use in disinfection, sterilization, decontamination, wound cleansing. The apparatus includes an electrolysis unit having a three-compartment cell (22) comprising a cathode chamber (18), an anode chamber (16), and a saline solution chamber (20) interposed between the anode and cathode chambers. Two communicating (24, 26) membranes separate the three chambers. The center chamber includes a fluid flow inlet (21 a) and outlet (21 b) and contains insulative material that ensures direct voltage potential does not travel through the chamber. A supply of water flows through the cathode and anode chambers at the respective sides of the saline chamber. Saline solution flows through the center chamber, either by circulating a pre-prepared aqueous solution containing ionic species, or, alternatively, by circulating pure water or an aqueous solution of, e.g., aqueous hydrogen chloride and ammonium hydroxide, over particulate insulative material coated with a solid electrolyte. Electrical current is provided to the communicating membranes separating the chambers, thus causing an electrolytic reaction that produces both oxidative (positive) and reductive (negative) ORP water.

**Classifications:**

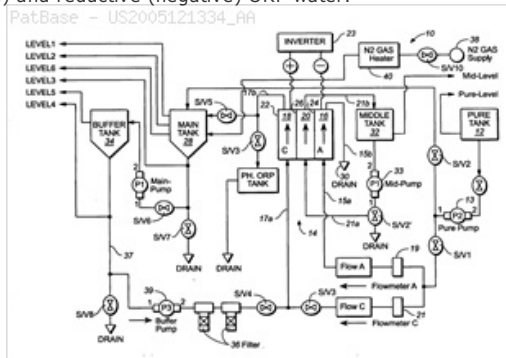
**International (IPC 8-9):** A61L2/03 A61L2/18 C02F1/46 C02F1/461 C25B1/04 C25B9/00 C25C1/02 (Advanced/Invention)

**International (IPC 1-7):** A61L2/03 A61L2/18 C02F1/46 C02F1/461 C25B9/00 C25C1/02

**CPC:** A61L2/186 A61L2/035 A61L2/183 A61L2202/11 C02F1/46104 C02F1/46114 C02F1/4618 C02F2001/46195 C02F2201/4611 C02F2201/46115 C02F2201/4613 C02F2201/46145 C02F2201/4618 C02F2201/46195 C02F2209/04 C02F2209/06 C02F2303/04 Y02E60/366 Y02P10/234

**European:** A61L2/03E A61L2/18L A61L2/18P C02F1/461B C02F1/461B6 K61L202/110 M02F1/461B2B M02F1/461B6F M02F201/461B12 M02F201/461B16 M02F201/461B2 M02F201/461B4 M02F201/461B6B2 M02F201/461B6D M02F209/04 M02F209/06 M02F303/04 Y02E60/36F

**US:** 205/242 205/252 205/263 205/268 205/628 205/742



**Family:**

| Publication number | Publication date | Application number | Application date |
|--------------------|------------------|--------------------|------------------|
| AT535262 E         | 20111215         | AT20020790029T     | 20021205         |
| AU2002353060 AA    | 20030617         | AU20020353060      | 20021205         |
| AU2009203008 AA    | 20090813         | AU20090203008      | 20090724         |
| AU2012201437 AA    | 20120405         | AU20120201437      | 20120309         |
| AU2012201437 BB    | 20121011         | AU20120201437      | 20120309         |
| CA2468856 AA       | 20040531         | CA20022468856      | 20021205         |
| CA2468856 C        | 20110726         | CA20022468856      | 20021205         |
| DE60241680 D1      | 20120209         | DE20026041680      | 20021205         |
| EP1461474 A1       | 20040929         | EP20020790029      | 20021205         |
| EP1461474 A4       | 20051005         | EP20020790029      | 20021205         |
| EP1461474 B1       | 20111130         | EP20020790029      | 20021205         |
| ES2377945 T3       | 20120403         | ES20020790029T     | 20021205         |
| JP2005511280 T2    | 20050428         | JP20030549596T     | 20021205         |
| JP3988827 B2       | 20071010         | JP20030549596T     | 20021205         |
| MXPA03007923 A1    | 20050217         | MX2003PA07923      | 20021205         |
| US2005121334 AA    | 20050609         | US20020496092      | 20021205         |
| US8062500 BB       | 20111122         | US20020496092      | 20021205         |
| WO03048421 A1      | 20030612         | WO2002US38861      | 20021205         |

**Priority:**

US20010338376P 20011205 AU20020353060 20021205 US20020496092 20021205  
EP20020790029 20021205 WO2002US38861 20021205 AU20090203008 20090724  
AU20120201437 20120309

**Probable Assignee:** SONOMA PHARMACEUTICALS INC

**Assignee(s):** (std): MICROMED LAB INC ; MICROMED LABORATORIES INC ; OCULUS INNOVATIVE SCIENCES INC ; SUMITA OSAO

**Assignee(s):** OCULUS INNOVATIVE SCIENCES INC PETALUMA ; SONOMA PHARMACEUTICALS INC ; VENTURE LENDING AND LEASING V INC ; VENTURE LENDING AND LEASING VI INC ; OCULUS INNOVATIVE SCIENCE INC

**Inventor(s):** (std): OSAO SUMITA ; SUMITA OSAO

**Inventor(s):** SUMITA OSAO ARAKAWA KU

**Agent(s):** FISHER ADAMS KELLY; FISHER ADAMS KELLY PTY LTD; FISHER ADAMS KELLY CALLINANS; SPRUSON AND FERGUSON; SMART AND BIGGAR; HOEGER STELLRECHT AND PARTNER PATENTANWAELTE MBB; HOEGER STELLRECHT AND PARTNER PATENTANWAELTE; JOHNSON AND STAINBROOK LLP; LEYDIG VOIT AND MAYER LTD

**Designated states:** AE AG AL AM AT AU AZ BA BB BE BF BG BJ BR BY BZ CA CF CG CH CI CM CN CO CR CU CY CZ DE DK DM DZ EC EE ES FI FR GA GB GD GE GH GM GN GQ GR GW HR HU ID IE IL IN IS IT JP KE KG KP KR KZ LC LI LK LR LS LT LU LV MA MC MD ME MG MK ML MN MR MW MX MZ NE NL NO NZ OM PH PL PT RO RU SD SE SG SI SK SL SN SZ TD TG TJ TM TN TR TT TZ UA UG US UZ VN YU ZA ZM ZW

**Title:** METHOD FOR PRODUCING ELECTROLYZED WATER

**Abstract:** A method for producing of electrolyzed water comprising, using an electrolyzing apparatus of water having a structural feature to divide an electrolyzer to an anode chamber (D) and a cathode chamber (E) by a diaphragm (1) and arranging an anode plate (3) in the anode chamber and a cathode plate (4) in the cathode chamber and to carry out the electrolysis by filling the water to which electrolyte is previously added, wherein the flow rate of water to be provided to the cathode chamber is restricted to 40 mL/min. per 1A (ampere) of loading electric current or less, and softening previously the water provided to the cathode chamber (10) alone. It is possible to divide the electrolyzer to three chambers by 2 diaphragms, filling up aqueous solution of electrolysis in the center chamber and to provide the electrolysis by

electrophoresis.

**Classifications:**

**International (IPC 8-9):** C01B5/00 C02F C02F1/42 C02F1/46

C02F1/461 C25B1/10 (Advanced/Invention);

C02F1/42 C02F9/00 (Advanced/Non-invention);

C01B5/00 C02F1/42 C02F1/46 C02F1/461 C25B1/00 (Core/Invention);

C02F1/42 C02F9/00 (Core/Non-invention);

C02F (Subclass/Invention)

**International (IPC 1-7):** C02F1/42 C02F1/46 C02F1/461 C25B1/10

**CPC:** C02F1/42 C02F1/4618 C02F9/00 C02F2001/4619

C02F2201/46115 C02F2201/46145 Y02E60/366

**European:** C02F1/461B6 M02F1/42 M02F1/461B6D M02F201/461B4

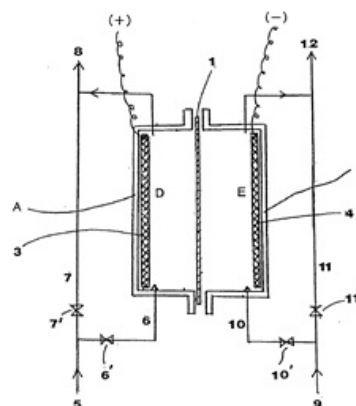
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**US:** 205/628 205/746 205/748 205/755 423/580.1 423/580.100P

PatBase - US2004020787\_AA

Patent Application Publication Feb. 5, 2004 Sheet 1 of 3 US 2004/0020787 A1

Fig.1



**Family:**

| Publication number | Publication date | Application number | Application date |
|--------------------|------------------|--------------------|------------------|
| DE60308281 D1      | 20061026         | DE20036008281T     | 20030731         |
| DE60308281 D1      | 20061026         | DE20036008281      | 20030731         |
| DE60308281 T2      | 20070906         | DE20036008281T     | 20030731         |
| EP1386887 A1       | 20040204         | EP20030016652      | 20030731         |
| EP1386887 B1       | 20060913         | EP20030016652      | 20030731         |
| HK1061225 A1       | 20061117         | HK20040104311      | 20040615         |
| HK1061225 A1       | 20040910         | HK20040104311      | 20040615         |
| HK1061225 A3       | 20040910         | HK20040104311      | 20040615         |
| HK1061225 B        | 20061117         | HK20040104311      | 20040615         |
| JP2004058006 A2    | 20040226         | JP20020223208      | 20020731         |
| US2004020787 AA    | 20040205         | US20030629165      | 20030729         |
| US2008292537 AA    | 20081127         | US20080082816      | 20080414         |
| US2010187129 AA    | 20100729         | US20100695535      | 20100128         |

**Priority:**

JP20020223208 20020731 US20030629165 20030729 US20080082816 20080414  
US20100695535 20100128

**Probable Assignee:** FIRST OCEAN CO LTD

**Assignee(s):** (std): ECOLAB INC ; FIRST OCEAN CO LTD ; FIRST OCEAN KK

**Assignee(s):** SANO YOICHI ; FIRST OCEAN CO LTD ACROSS OFFICE 3F 1 36 HINODE MACHI NAKA KU ; FIRST OCEAN CO

**Inventor(s):** (std): SANO YOICHI

**Inventor(s):** YOICHI SANO

**Agent(s):** JOHNSON STOKES AND MASTER 19 FL PRINCE S BUILDING 10 CHATER ROAD HONG KONG; JOHNSON STOKES AND MASTER; MIYAMOTO HARUMI; FLYNN THIEL BOUTELL AND TANIS PC; ECOLAB USA INC

**Designated states:** DE FR GB

**5) Family number: 46814482 (WO10087823A1)**

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**Title:** LOW-ENERGY ELECTROCHEMICAL BICARBONATE ION SOLUTION

**Abstract:** A low-energy electrochemical method and system of forming bicarbonate ion solutions in an electrochemical cell utilizing carbon dioxide in contact with an electrolyte contained between two ion exchange membranes in an electrochemical cell. On applying a low voltage across an anode and cathode in electrical contact with the ion exchange membranes, bicarbonate ions form in the electrolyte without forming a gas, e.g., chlorine or oxygen at the electrodes.

**Classifications:**

**International (IPC 8-9):** B01D53/32 B01D61/44 C25B1/00 C25B1/18

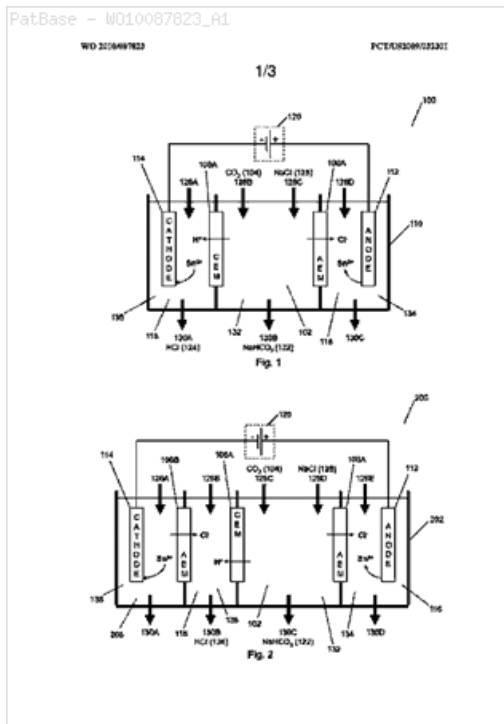
C25B1/22 C25B11/00 (Advanced/Invention);

B01D53/32 C25B1/00 C25B11/00 (Core/Invention)

**International (IPC 1-7):** C25B1/00

**CPC:** B01D61/44 C25B1/00 C25B1/14 C25B1/22

**European:** C25B1/00 C25B1/14 C25B1/22

**Family:**

| Publication number | Publication date | Application number | Application date |
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| CA2696075 AA       | 20100728         | CA20092696075      | 20090128         |
| CN101878328 A      | 20101103         | CN200980101161     | 20090128         |
| EP2240629 A1       | 20101020         | EP20090822881      | 20090128         |
| EP2240629 A4       | 20130424         | EP20090822881      | 20090128         |
| IN02428CN2010 A    | 20101015         | IN2010CN02428      | 20100426         |
| WO10087823 A1      | 20100805         | WO2009US32301      | 20090128         |

**Priority:**

WO2009US32301 20090128

**Probable Assignee:** CALERA CORP**Assignee(s):** (std): BOGGS BRYAN ; CALERA CORP ; DECKER VALENTIN ; GILLIAM RYAN**Inventor(s):** (std): GILLIAM RYAN ; BOGGS BRYAN ; DECKER VALENTIN ; BRYAN BOGGS ; RYAN GILLIAM ; VALENTIN DECKER**Agent(s):** BROUGHTON JON PHILIP; WITT ERIC ET AL

**Designated states:** AE AG AL AM AO AT AU AZ BA BB BE BF BG BH BJ BR BW BY BZ CA CF CG CH CI CM CN CO CR CU CY CZ DE DK DM DO DZ EC EE EG ES FI FR GA GB GD GE GH GM GN GQ GR GT GW HN HR HU ID IE IL IN IS IT JP KE KG KM KN KP KR KZ LA LC LI LK LR LS LT LU LV LY MA MC MD ME MG MK ML MN MR MT MW MX MY MZ NA NE NG NI NL NO NZ OM PG PH PL PT RO RS RU SC SD SE SG SI SK SL SM SN ST SV SY SZ TD TG TJ TM TN TR TT TZ UA UG US UZ VC VN ZA ZM ZW

**6) Family number: 42440278 (US2010200425A)**

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**Title:** ELECTROLYZED WATER MANUFACTURING DEVICE, ELECTROLYZED WATER MANUFACTURING METHOD, AND ELECTROLYZED WATER

**Abstract:** Disclosed is an electrolyzed water manufacturing method and electrolyzed water manufacturing device capable of producing efficiently weakly acidic through weakly alkaline electrolyzed water, and capable of producing said electrolyzed water on a large scale. The electrolyzed water manufacturing device 10 comprises: an anode chamber 20 that is provided with an anode electrode 22; a cathode chamber 30 that is provided with a cathode electrode 32; a middle chamber 40 for containing an aqueous electrolytic solution, disposed between the anode chamber 20 and the cathode chamber 30; an anion exchange membrane 24 for partitioning between the anode chamber 20 and the middle chamber 40; and a cation exchange membrane 34 for partitioning between the cathode chamber 30 and the middle chamber 40. The anode chamber 20 and the cathode chamber 30 are connected by a connecting hole 52 provided in a partitioning wall 50.

**Classifications:****International (IPC 8-9):** B01D61/46 C02F1/46 C02F1/461

C25B15/08 C25B9/08 (Advanced/Invention);

B01D61/42 C02F1/46 C02F1/461 C25B15/00

C25B9/06 (Core/Invention)

**CPC:** B01D61/46 B01D2313/18 C02F1/4618 C02F2001/46119

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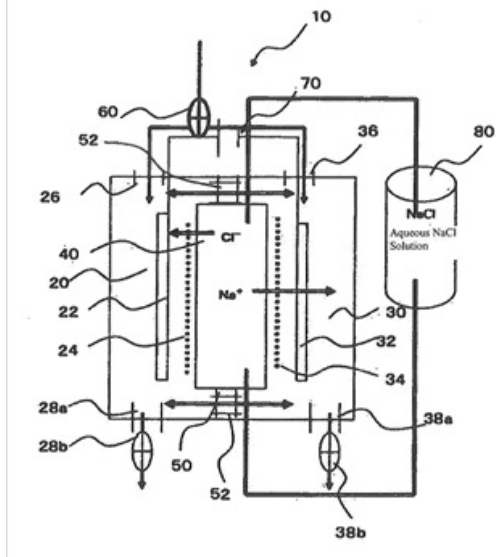
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M02F201/461B6D

**US:** 204/232 204/232S 204/253 204/253S 204/267 204/267S

204/269 204/269S 205/742

**Family:**

| Publication number | Publication date | Application number | Application date |
|--------------------|------------------|--------------------|------------------|
| EP2179971 A1       | 20100428         | EP20080740607      | 20080411         |
| EP2179971 A4       | 20120620         | EP20080740607      | 20080411         |
| JP2009072755 A2    | 20090409         | JP20070341587      | 20071231         |
| JP2009072778 A2    | 20090409         | JP20080264683      | 20081010         |
| JP4216892 B1       | 20090128         | JP20070341587      | 20071231         |
| US2010200425 AA    | 20100812         | US20080595804      | 20080411         |
| WO08130016 A1      | 20081030         | WO2008JP57550      | 20080411         |

**Priority:**

|               |          |               |          |               |          |
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| JP20070105751 | 20070413 | JP20070156920 | 20070613 | JP20070175680 | 20070703 |
| JP20070200159 | 20070731 | JP20070227213 | 20070831 | JP20070341587 | 20071231 |
| WO2008JP57550 | 20080411 | JP20080264683 | 20081010 |               |          |

**Probable Assignee:** ARAI YUSHO**Assignee(s):** (std): ARAI MASAOKI ; ARAI YUSHO**Inventor(s):** (std): ARAI YUSHO ; ARAI MASAOKI**Agent(s):** FORSTMEYER DIETMAR; DAVIS WRIGHT TREMAINE LLP/LOS ANGELES; DAVIS WRIGHT TREMAINE LLP LOS ANGELES; OHNO TOKIYASU

**Designated states:** AE AG AL AM AO AT AU AZ BA BB BE BF BG BH BJ BR BW BY BZ CA CF CG CH CI CM CN CO CR CU CY CZ DE DK DM DO DZ EC EE EG ES FI FR GA GB GD GE GH GM GN GQ GR GT GW HN HR HU ID IE IL IN IS IT KE KG KM KN KP KR KZ LA LC LI LK LR LS LT LU LV LY MA MC MD ME MG MK ML MN MR MT MW MX MY MZ NA NE NG NI NL NO NZ OM PG PH PL PT RO RS RU SC SD SE SG SI SK SL SM SN SV SY SZ TD TG TJ TM TN TR TT TZ UA UG US UZ VC VN ZA ZM ZW

**7) Family number: 17958722 (US5595641A)**

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**Title:** Apparatus and process for electrochemically decomposing salt solutions to form the relevant base and acid

**Abstract:** PCT No. PCT/EP92/01442 Sec. 371 Date Dec. 8, 1993 Sec. 102(e) Date Dec. 8, 1993 PCT Filed Jun. 26, 1992 PCT Pub. No. WO93/00460 PCT Pub. Date Jan. 7, 1993 Electrolyzer comprising at least one elementary cell divided into electrolyte compartments by cation-exchange membranes, said compartments are provided with a circuit for feeding electrolytic solutions and a circuit for withdrawing electrolysis products, said cell is equipped with a cathode and a hydrogen-depolarized anode assembly forming a hydrogen gas chamber fed with a hydrogen-containing gaseous stream, characterized in that said assembly comprises a cation-exchange membrane, a porous, flexible electrocatalytic sheet, a porous rigid current collector having a multiplicity of contact points with said electrocatalytic sheet, said membrane, sheet and current collector are held in contact together by means of pressure without bonding.

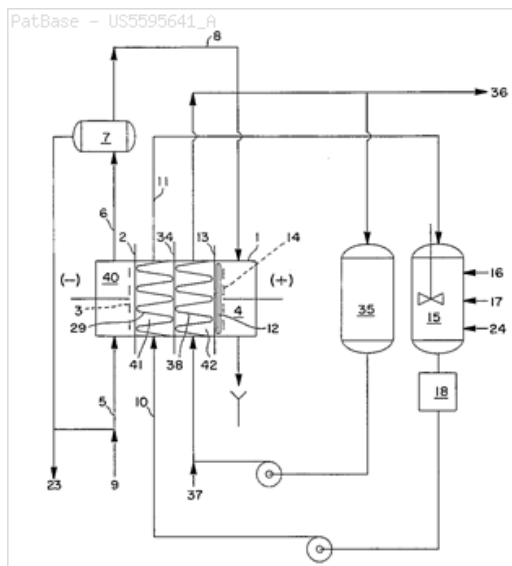
**Classifications:**

**International (IPC 8-9):** B23D19/08 B23D23/04 C25B1/16 C25B1/22 C25B1/26 C25B1/34 C25B1/46 C25B11/02 C25B11/03 C25B13/02 C25B15/08 C25B9/00 C25B9/04 C25B9/06 C25B9/08 C25B9/10 D01D5/06 F16C29/02 (Advanced/Invention); C25B9/00 C25B9/04 C25B9/06 D01D5/06 (Advanced/Non-invention); B23D19/00 B23D23/00 C25B1/00 C25B9/00 F16C29/00 (Core/Invention); B01J C25B (Subclass/Invention)

**International (IPC 1-7):** B01J C25B1/00 C25B1/02 C25B1/10 C25B1/16 C25B1/22 C25B1/26 C25B1/34 C25B1/46 C25B11/02 C25B11/03 C25B11/20 C25B13/02 C25B15/08 C25B9/00 C25B9/10 D01D5/06

**CPC:** C25B1/16 C25B1/22 C25B9/04 C25B9/08**European:** C25B1/16 C25B1/22 C25B9/04 C25B9/08

**US:** 204/257 204/258 204/263 204/265 204/283 204/290.13 204/290.14 205/464 205/508 205/510 205/514 205/531 205/535 205/554 205/555 205/638



#### Family:

| Publication number | Publication date | Application number | Application date |
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| AR246560 A1        | 19940831         | AR19920322643      | 19920620         |
| AT145018 E         | 19961115         | AT19920913603T     | 19920626         |
| AU199221655 A1     | 19930125         | AU19920021655      | 19920626         |
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| BRPI9206192 A      | 19941108         | BR1992PI06192      | 19920626         |
| CA2112100 AA       | 19931221         | CA19922112100      | 19920626         |
| CN1067931 A        | 19930113         | CN19921005160      | 19920626         |
| CZ9302891 A3       | 19940413         | CS19930002891      | 19920626         |
| DE69215093 D1      | 19961212         | DE19926015093      | 19920626         |
| DE69215093 T2      | 19970612         | DE19926015093T     | 19920626         |
| EP0522382 A1       | 19930113         | EP19920110897      | 19920626         |
| EP0591350 A1       | 19940413         | EP19920913603      | 19920626         |
| EP0591350 B1       | 19961106         | EP19920913603      | 19920626         |
| FI935818 A         | 19931223         | FI19930005818      | 19931223         |
| FI935818 A0        | 19931223         | FI19930005818      | 19931223         |
| HU212211 B         | 19960429         | HU19930003700      | 19920626         |
| HU66157 A2         | 19940928         | HU19930003700      | 19920626         |
| HU9303700 A0       | 19940428         | HU19930003700      | 19920626         |
| IL102247 A1        | 19960618         | IL19920102247      | 19920618         |
| IN178332 A         | 19970329         | IN1992CA00422      | 19920615         |
| IT1248564 B        | 19950119         | IT1991MI01765      | 19910627         |
| ITMI911765 A0      | 19910627         | IT1991MI01765      | 19910627         |
| ITMI911765 A1      | 19921228         | IT1991MI01765      | 19910627         |
| JP3182216 B2       | 20010703         | JP19920169386      | 19920626         |
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| KR19947001466 A    | 19940528         | KR19937004025      | 19920626         |
| KR940701466 A      | 19940528         | KR19930704025      | 19931224         |
| MX9203527 A1       | 19921201         | MX19920003527      | 19920626         |
| NO934779 A         | 19940210         | NO19930004779      | 19931222         |
| NO934779 A0        | 19931222         | NO19930004779      | 19931222         |
| NO934779 L         | 19940210         | NO19930004779      | 19931222         |
| NZ243305 A         | 19940627         | NZ19920243305      | 19920625         |
| RU2107752 C1       | 19980327         | RU19930058574      | 19920626         |
| SK145893 A3        | 19940706         | SK19930001458      | 19931221         |
| TR26992 A          | 19940913         | TR19920000637      | 19920626         |
| TW230226 B         | 19940911         | TW19920104802      | 19920619         |
| US5595641 A        | 19970121         | US19930157180      | 19931208         |
| US5776328 A        | 19980707         | US19960653628      | 19960524         |
| WO9300460 A1       | 19930107         | WO1992EP01442      | 19920626         |
| ZA9204771 A        | 19930331         | ZA19920004771      | 19920626         |

#### Priority:

IT1991MI01765 19910627 IN1992CA00422 19920615 WO1992EP01442 19920626  
US19930157180 19931208 US19960653628 19960524

**Probable Assignee:** PERMELEC ELECTRODE LTD

**Assignee(s):** (std): DE NORA PERMELEC SPA ; NORA PERUMEREU DE SPA ; DE NORA SPA ; NORA PERMELEC S P A ; NORA PERMELENE SPA DE ; NORA PERMELEC DE ; NORA PERMELEC S P A ORA DE NORA S P A DE ; PERMELEC NORA SPA ; NORA S P A DE ; PERMELEC SPA NORA ; NORA PERUMEREU SPA DE

**Assignee(s):** TRAINI CARLO ; PERMELEC ELECTRODE LTD ; DE NORA S P A ; DE NORA S P A MAILAND MILANO IT ; FAITA GIUSEPPE ; DENORA PERMELEC SPA ; DE NORA PERUMEREU SPA ; DENORA PERMELEC S P A ; DE NORA PERMELENE SPA ; DE NORA PERMELEC ; DE NORA PERMELEC S P A ; DE NORA PERMELEC S P A ORA DE NORA S P A

**Inventor(s):** (std): TRAINI CARLO ; FAITA GIUSEPPE ; FAITA GUISEPPE ; GIUSEPPE FAITA ; CARLO TRAINI ; JIYUSETSUPE FUAITA ; DZHUZEPPE FAITA ; KARLO TRAINI ; KARURO TORAINI ; GUISEPPE FAITA ; FAITA GUISEPPE

**Inventor(s):** GUISEPPE FAITA ; TRAINI CARLO I 20100 MILAN IT ; FAITA GIUSEPPE I 28100 NOVARA IT

8) Family number: 22211269 (US4252628A)

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Title: Membrane cell

**Abstract:** A monopolar filter press electrolytic cell suitable for use in the electrolysis of an aqueous alkali metal halide brine to produce (cell liquor, halogen and hydrogen, the cell comprising a plurality of flexible anode plates and flexible cathode plates and a cation perm-selective membrane positioned between each adjacent anode plate and cathode plate, and comprising a non-conducting flexible spacing plate positioned between each anode plate and adjacent membrane and between each cathode plate and adjacent membrane, the anode plates, cathode plates and spacing plates each having openings which define four separate compartments lengthwise of the cell and which provide respectively an inlet for brine, an inlet for water or alkaline water, an outlet for brine and halogen and an outlet for cell liquor and hydrogen the spacing plates being provided with passages which connect the compartments providing an inlet for brine and an outlet for brine and halogen with the anolyte compartments and which connect the compartments providing an inlet for water or alkali water and an outlet for cell liquor and hydrogen with the cathode compartments, the anode plates and cathode plates being made in part of a non-conducting material so that the compartments are electrically insulated from one another.

**Classifications:**

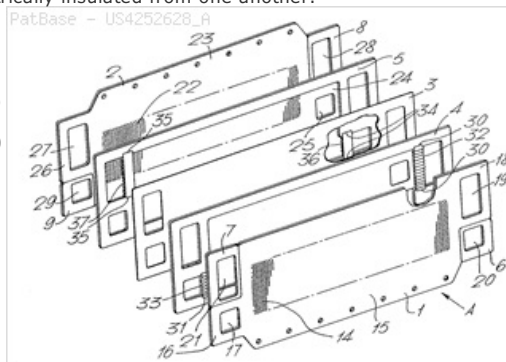
**International (ipc 8-9):** C25B1/46 C25B11/10 C25B9/00 C25B9/08 C25B9/18 C25B9/20 (Advanced/Invention); C25B9/00 C25B9/18 (Advanced/Non-invention); C25B1/00 C25B11/00 C25B9/00 C25B9/06 C25B9/18 (Core/Invention)

**International (ipc 1-7):** B01K1/00 C25B1/02 C25B1/08 C25B1/34 C25B1/46 C25B11/00 C25B11/02 C25B11/03 C25B11/10 C25B13/00 C25B13/08 C25B9/00 H01M6/00

**CPC:** C25B9/20

**European:** C25B9/20

**US:** 204/257 204/258 204/279 204/284 204/290.12 204/290.13 204/296



**Family:**

| Publication number | Publication date | Application number | Application date |
|--------------------|------------------|--------------------|------------------|
| AR214775 A1        | 19790731         | AR19780271304      | 19780303         |
| AT157678 A         | 19790715         | AT19780001576      | 19780306         |
| AT355049 B         | 19800211         | AT19780001576      | 19780306         |
| AU197833782 A1     | 19790906         | AU19780033782      | 19780302         |
| AU513686 B2        | 19801218         | AU19780033782      | 19780302         |
| BE864364 A         | 19780828         | BE19780185523      | 19780227         |
| BR7801319 A        | 19780926         | BR19780001319      | 19780303         |
| CA1107682 A1       | 19810825         | CA19780298175      | 19780303         |
| CH632530 A         | 19821015         | CH19780002423      | 19780306         |
| DD134124 C         | 19790207         | DD19780203993      | 19780306         |
| DE2809332 A1       | 19781012         | DE19782809332      | 19780303         |
| DE2809332 C2       | 19861016         | DE19782809332      | 19780303         |
| ES467550 A1        | 19781016         | ES19780467550      | 19780303         |
| FR2382518 A1       | 19780929         | FR19780006152      | 19780303         |
| FR2382518 B1       | 19820625         | FR19780006152      | 19780303         |
| GB1595183 A        | 19810812         | GB19770009190      | 19770304         |
| IT1092983 A        | 19850712         | IT19780020816      | 19780301         |
| IT7820816 A0       | 19780301         | IT19780020816      | 19780301         |
| JP1166575 C3       | 19830908         | JP19780024069      | 19780304         |
| JP53108899 A2      | 19780922         | JP19780024069      | 19780304         |
| JP57056556 B4      | 19821130         | JP19780024069      | 19780304         |
| MY8300020 A        | 19831231         | MY19830000020      | 19831230         |
| NL189679 B         | 19930118         | NL19780002373      | 19780303         |
| NL189679 C         | 19930616         | NL19780002373      | 19780303         |
| NL7802373 A        | 19780906         | NL19780002373      | 19780303         |
| NO151423 B         | 19841227         | NO19780000708      | 19780301         |
| NO151423 C         | 19850410         | NO19780000708      | 19780301         |
| NO780708 A         | 19780905         | NO19780000708      | 19780301         |
| NO780708 L         | 19780905         | NO19780000708      | 19780301         |
| PL124996 B1        | 19830331         | PL19780205060      | 19780303         |
| PL205060 A1        | 19781106         | PL19780205060      | 19780303         |
| PT67737 A          | 19780401         | PT19780067737      | 19780303         |
| RU1773265 C        | 19921030         | SU19782589346      | 19780303         |
| SE449375 B         | 19870427         | SE19780002386      | 19780302         |
| SE449375 C         | 19870806         | SE19780002386      | 19780302         |
| SE7802386 A        | 19780905         | SE19780002386D     | 19780302         |
| SU1773265 D        | 19921030         | SU19782589346      | 19780303         |
| US4252628 A        | 19810224         | US19780880493      | 19780223         |
| ZA7801137 A        | 19790228         | ZA19780001137      | 19780227         |

**Priority:**

GB19770009190 19770304 CA19780298175 19780303

**Probable Assignee:** ICI LTD

**Assignee(s):** (std): ICI LTD ; ICI PLC ; IMP CHEMICAL IND LTD ; IMPERIAL CHEMICAL INDUSTRIES LIMITED TE LONDEN GRO

**Assignee(s):** IMPERIAL CHEMICAL INDUSTRIES LIMITED ; IMPERIAL CHEMICAL INDUSTRIES LTD ; IMPERIAL

CHEMICAL IND LTD ; IMPERIAL CHEMICAL INDUSTRIES LTD GB ; IMPERIAL CHEM IND LTD ; IMPERIAL CHEMICAL INDUSTRIES LTD TE LONDEN ; IMPERIAL CHEMICAL INDUSTRIES LTD LONDON GB ; IMPERIAL CHEMICAL INDUSTRIES LIMITED TE LONDEN GROOT BRITTANNIE ; IMPERIAL CHEMICAL INDUSTRIES PLC ; BOULTON THOMAS W ; DARWENT BRIAN J

**Inventor(s):** (std): BOULTON THOMAS WELEY ; BRAJAN DZHON DARVENT GB ; BRIAN JOHN DARWENT ; BURIAN JIYON DAAUENTO ; DARWENT B ; B J DARWENT ; BJ DARWENT ; THOMAS WESLEY BOULTON ; TW BOULTON ; TOOMASU UESUREE BORUTON ; TOMAS VESLI BOULTON GB ; T W BOULTON ; DARWENT BRIAN JOHN ; DARWENT BRIAN J ; DARWENT B J ; BOULTON THOMAS WESLEY ; BOULTON THOMAS W ; BOULTON T W ; BOULTON T ; DARVENT BRAJAN DZHON ; BOULTON TOMAS VESLI

**Inventor(s):** Y BOULTON THOMAS WESLE ; BOULTON T W AND DARWENT B J ; DARWENT BRIAN JOHN RUNCORN CHESHIRE GB ; JOHN DARWENT BRIAN

**Agent(s):** PO ; PHILLIPS ORMONDE FITZPATRICK ; DROUIN GUY

**9) Family number: 29069201** (US2005126928A)

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**Title:** METHOD AND APPARATUS FOR ELECTROLYZING WATER

**Abstract:** Feed water comprising an aqueous salt solution is supplied to an anode chamber and to a cathode chamber. The feed water is cathodically electrolyzed in the cathode chamber to produce alkaline electrolyzed water (catholyte) and is anodically electrolyzed in the anode chamber to produce electrolyzed water (anolyte) whose pH is modified. A portion of alkaline catholyte from the cathode chamber is recycled back to the feed water during continuous electrolysis to provide a blend of feed water and alkaline catholyte to the anode chamber to control pH of the anodically electrolyzed water therein to provide more stable bactericidal activity thereof over time.

**Classifications:**

**International (IPC 8-9):** A23L1/48 A23L3/32 A23L35/00 A61L2/03 A61L2/18 C02F1/46 C02F1/461 C02F1/467 C25B9/00

C25D17/00 (Advanced/Invention);

C25B9/00 (Advanced/Non-invention);

A23L1/48 A23L3/32 (Core/Invention)

**International (IPC 1-7):** C02F1/461 C25B C25B1/00 C25B9/00 C25D17/00

**CPC:** C02F1/4674 C02F2209/04 C02F2209/06 C02F2303/04

Y02A40/946 A61L2/035 A23B4/015 A23B4/023 A23B4/20 A23B4/24

A23B4/26 A23B7/015 A23B7/154 A23B7/157 A23L3/325 A23L3/358

A61L2/0088 A61L2/18 C02F1/4618 C02F1/4672 C02F2001/46142

C02F2001/46185 C02F2001/4619 C02F2001/46195 C02F2201/46115 C02F2201/46145 C02F2201/46185

**European:** A23B4/015 A23B4/023 A23B4/20 A23B4/24 A23B4/26 A23B7/015 A23B7/154 A23B7/157 A23L3/32D A23L3/358 A61L2/00P4A A61L2/03E A61L2/18 C02F1/461B6 C02F1/467B C02F1/467B2 M02F1/461B2J2B M02F1/461B6 M02F1/461B6B M02F1/461B6D M02F1/461B6F M02F1/467B2 M02F201/461B12B M02F201/461B4 M02F201/461B6D M02F209/04 M02F209/06 M02F303/04

**US:** 204/252 204/252S 204/263 204/263S 205/701 205/746 426/237 426/237P 426/589 426/589S 426/654 426/654S

**Family:**

| Publication number | Publication date | Application number | Application date |
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| AU2003213711 AA    | 20030922         | AU20030213711      | 20030303         |
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| EP1579037 A2       | 20050928         | EP20030711399      | 20030303         |
| EP1579037 A4       | 20080213         | EP20030711399      | 20030303         |
| US2005126928 AA    | 20050616         | US20040927924      | 20040827         |
| US2009017174 AA    | 20090115         | US20080220315      | 20080723         |
| US8211288 BB       | 20120703         | US20040927924      | 20040827         |
| WO03076688 A2      | 20030918         | WO2003US06586      | 20030303         |
| WO03076688 A3      | 20061109         | WO2003US06586      | 20030303         |

**Priority:**

US20020361694P 20020306 WO2003US06586 20030303 US20040927924 20040827  
US20070962091P 20070726 US20080220315 20080723

**Probable Assignee:** OF GEORGIA RESEARCH FOUNDATION INC UNIV

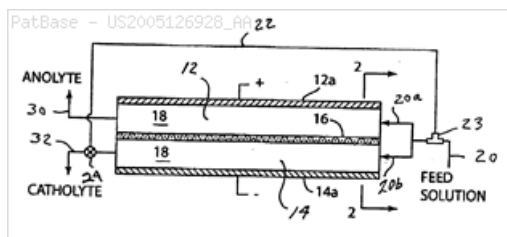
**Assignee(s):** (std): CHUNG DONGHWAN ; HUNG YEN CON ; THE UNIVERSITY OF GEORGIA RESEARCH FOUNDATION INC ; UNIV GEORGIA RES FOUNDATION IN ; UNIV GEORGIA RES FOUND ; UNIV GEORGIA

**Assignee(s):** UNIVERSITY OF GEORGIA RESEARCH FOUNDATION INC ; OF GEORGIA RESEARCH FOUNDATION INC UNIV ; GEORGIA RESEARCH FOUNDATION INC UNIV

**Inventor(s):** (std): DONGHWAN CHUNG ; YEN CON HUNG ; CHUNG DONGHWAN ; HUNG YEN CON

**Agent(s):** EDWARD J TIMMER ; MR EDWARD J TIMMER ; THOMAS KAYDEN HORSTEMEYER AND RISLEY LLP

**Designated states:** AE AG AL AM AT AU AZ BA BB BE BF BG BJ BR BY BZ CA CF CG CH CI CM CN CO CR CU CY CZ DE DK DM DZ EC EE ES FI FR GA GB GD GE GH GM GN GQ GR GW HR HU ID IE IL IN IS IT JP KE KG KP KR KZ LC LI LK LR LS LT LU LV MA MC MD MG MK ML MN MR MW MX MZ NE NL NO NZ OM PH PL PT RO RU SC SD SE SG SI SK SL SN SZ TD TG TJ TM TN TR TT TZ UA UG US UZ VC VN YU ZA ZM ZW



**10) Family number: 33812595** (US2006260931A)

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**Title:** ELECTRODE FOR WATER ELECTROLYSIS

**Abstract:** In an apparatus for producing acidic electrolyzed water, the use of a protection membrane having slits or other discontinuities allows the protection of a permeable membrane, such as an anion-permeable or anion-selective membrane, from chlorine generated by the electrolysis. The protection membrane further preserves the electrical conductivity of the membrane and electrode assembly, because of a venting action of trapped gas and fluid through the slits. The protection membrane is useful both in three chambered electrolyzers and in two chambered electrolyzers. The preferred protection membrane has slits formed by overlapping strips of fabric or the like. The preferred fabric is a non-woven fabric.

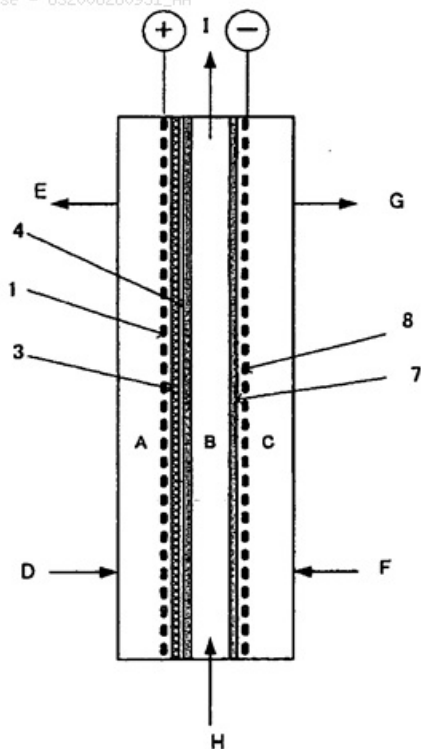
**Classifications:**

**International (IPC 8-9):** B01D61/00 B01D69/00 C02F1/46

C02F1/461 C23F13/00 C25B1/26 C25B11/03 C25B9/00 C25B9/10

C25C7/00 C25D17/00 C25D17/10 (Advanced/Invention);

C02F1/46 C02F1/461 C23F13/00 C25B1/00 C25B11/00 C25B9/00

**Family:**

| Publication number | Publication date | Application number | Application date |
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| EP1926842 A2       | 20080604         | EP20060760275      | 20060522         |
| JP2006322053 A2    | 20061130         | JP20050147482      | 20050520         |
| JP2006346672 A2    | 20061228         | JP20060132601      | 20060511         |
| JP4024278 B2       | 20071219         | JP20060132601      | 20060511         |
| JP4091062 B2       | 20080528         | JP20050147482      | 20050520         |
| US2006260931 AA    | 20061123         | US20060438552      | 20060522         |
| US2006260954 AA    | 20061123         | US20060438454      | 20060522         |
| US7967958 BB       | 20110628         | US20060438552      | 20060522         |
| US8858765 BB       | 20141014         | US20060438454      | 20060522         |
| WO06127633 A2      | 20061130         | WO2006US19793      | 20060522         |
| WO06127633 A3      | 20070118         | WO2006US19793      | 20060522         |

**Priority:**

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| JP20050147482 | 20050520 | JP20050175654 | 20050520 | JP20060132601 | 20060511 |
| WO2006US19793 | 20060522 | US20060438552 | 20060522 | US20060438454 | 20060522 |

**Probable Assignee:** ECOLAB USA INC**Assignee(s):** (std): ECOLAB INC ; ECOLAB USA INC ; ELECTROLYSER CORP ; ELECTROLYZER CORP ; TAYLOR BARRY R ; SANO YOICHI**Inventor(s):** (std): SANO YOICHI ; TAYLOR BARRY R**Inventor(s):** TAYLOR BARRY**Agent(s):** HUTCHINSON GLENN STANLEY ET AL; MIYAMOTO HARUMI; FRANCIS H KIRKPATRICK ELECTROLYZER CORP; FRANCIS KIRKPATRICK ELECTROLYZER CORP; ANDREW D; SHAONI L; MCKEE VOORHEES AND SEASE**Designated states:** AE AG AL AM AT AU AZ BA BB BE BF BG BJ BR BW BY BZ CA CF CG CH CI CM CN CO CR CU CY CZ DE DK DM DZ EC EE EG ES FI FR GA GB GD GE GH GM GN GQ GR GW HR HU ID IE IL IN IS IT JP KE KG KM KN KP KR KZ LC LI LK LR LS LT LU LV LY MA MC MD MG MK ML MN MR MW MX MZ NA NE NG NI NL NO NZ OM PG PH PL PT RO RU SC SD SE SG SI SK SL SM SN SY SZ TD TG TJ TM TN TR TT TZ UA UG US UZ VC VN YU ZA ZM ZW**11) Family number: 32097348** (US2005161343A)

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**Title:** APPARATUS AND METHOD FOR BRINE SEPARATION AND REUSE**Abstract:** According to one embodiment, an electrolytic membrane separation (EMS) subsystem is configured to remove one or more impurities from a contaminated reject solution and to recycle the reusable reject solution for subsequent use in regenerating ion exchange resins. According to another embodiment of the invention, the EMS subsystem is configured to concentrate the impurities recovered from the contaminated brine solution for subsequent disposal or treatment.**Classifications:****International (ipc 8-9):** B01D61/46 C02F1/46 C02F1/461 C02F1/469

C25B15/08 C25C7/00 C25D17/00 (Advanced/Invention);

C02F101/10 C02F101/12 C02F101/20 (Advanced/Non-invention);

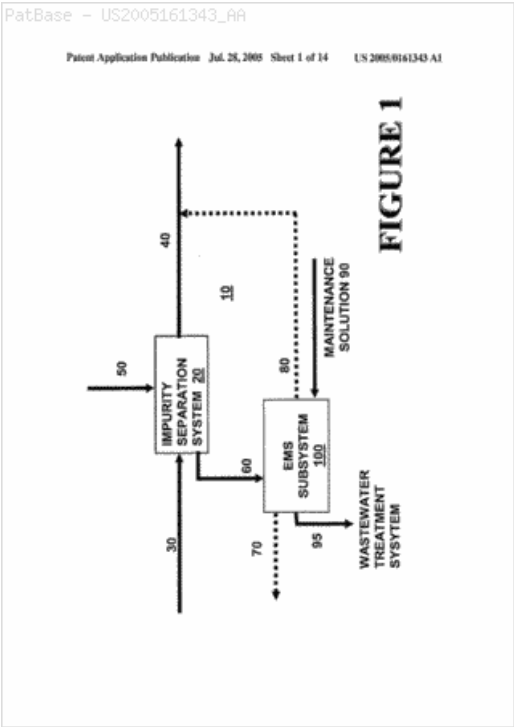
C02F1/461 C02F1/469 C25C7/00 C25D17/00 (Core/Invention)

**International (ipc 1-7):** C02F1/461 C25C7/00 C25D17/00**CPC:** C02F1/469 C02F1/4693 C02F1/4695 C02F2101/103

C02F2101/12 C02F2101/20 C02F2201/46115 C02F1/461

C02F2201/46185 C02F2303/22 C25B15/08

European: C02F1/469 M02F1/469D M02F1/469D2 M02F101/10B  
M02F101/12 M02F101/20 M02F201/461B4  
US: 204/232 204/252 204/252S 204/263 204/630 204/633 205/746



Family:

| Publication number | Publication date | Application number | Application date |
|--------------------|------------------|--------------------|------------------|
| US2005161343 AA    | 20050728         | US20040763691      | 20040122         |
| US2013098756 AA    | 20130425         | US20120652401      | 20121015         |
| US9017538 BB       | 20150428         | US20120652401      | 20121015         |
| US9809470 BA       | 20171107         | US20150694956      | 20150423         |

Priority:

US20040763691 20040122      US20120652401 20121015      US20150694956 20150423

Probable Assignee: EXERGY TECHNOLOGIES CORP

Assignee(s): (std): EXERGY TECH CORP ; EXERGY TECHNOLOGIES CORP

Assignee(s): REINHARD FRED P ; BLAKELY SOKOLOFF TAYLOR AND ZAFMAN LLP

Inventor(s): (std): REINHARD FRED P

Inventor(s): REINHARD FRED

Agent(s): BLAKELY SOKOLOFF TAYLOR AND ZAFMAN; BLAKELY SOKOLOFF TAYLOR AND ZAFMAN LLP; RUTAN AND TUCKER LLP

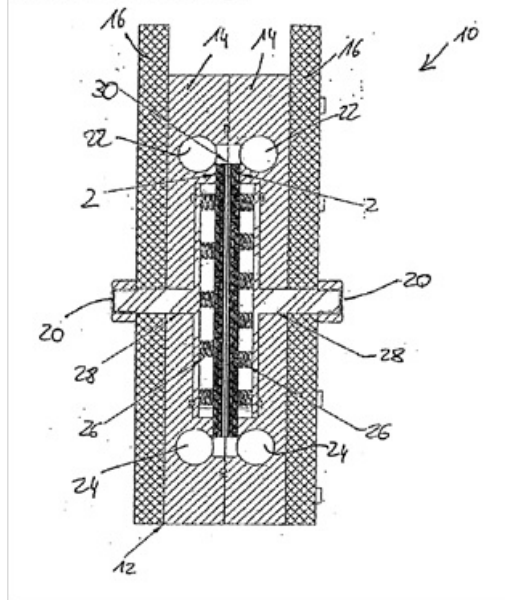
12) Family number: 60171907 (US2016362310A) © PatBase

Title: METHOD FOR ELECTROCHEMICALLY PRODUCING ELECTROLYZED WATER

Abstract: The invention relates to a method for electrochemically producing electrolyzed water in an electrode arrangement (10) which has an anode chamber and a cathode chamber that are separated by an ion-selective membrane (30). The anode chamber is delimited on at least one side by at least one anode (2), and the cathode chamber is delimited on at least one side by at least one cathode (2). In the method: a) water, in particular distilled water or ultra purified water, in which an electrolyte is located, is conducted through the anode chamber, b) water, in particular distilled water or ultra purified water, is conducted through the cathode chamber, c) the water, in particular the distilled water or the ultra-purified water, is mixed and in particular set into a turbulent flow in the anode chamber and/or cathode chamber, and d) an electric voltage is applied to the anode and the cathode such that electrolyzed water is produced in the cathode chamber.

Classifications:

International (IPC 8-9): C02F1/461 C02F1/467 C02F1/78  
C02F9/06 (Advanced/Invention)  
CPC: C02F1/4672 C02F1/46109 C02F1/4618 C02F2001/46147  
C02F2001/4619 C02F2201/4611 C02F2201/46115 C02F2301/024  
US: 205/746

**Family:**

| Publication number | Publication date | Application number | Application date |
|--------------------|------------------|--------------------|------------------|
| DE102014203374 A1  | 20150827         | DE201410203374     | 20140225         |
| DE102014203374 B4  | 20180503         | DE201410203374     | 20140225         |
| KR20160124873 A    | 20161028         | KR20167026071      | 20150224         |
| US2016362310 AA    | 20161215         | US20150121052      | 20150224         |
| WO15128076 A1      | 20150903         | WO2015EP00414      | 20150224         |

**Priority:**

DE201410203374 20140225 WO2015EP00414 20150224

**Probable Assignee:** CONDIAS GMBH**Assignee(s):** (std): CONDIAS GMBH**Inventor(s):** (std): HEESCH LINDA ; SCHMIDT ANDREA ; FRYDA MATTHIAS ; BEHRENDT FRYDA BARBARA ; MATTHEE THORSTEN**Agent(s):** FRIEDRICH ANDREAS

**Designated states:** AE AG AL AM AO AT AU AZ BA BB BE BF BG BH BJ BN BR BW BY BZ CA CF CG CH CI CL CM CN CO CR CU CY CZ DE DK DM DO DZ EC EE EG ES FI FR GA GB GD GE GH GM GN GQ GR GT GW HN HR HU ID IE IL IN IR IS IT JP KE KG KM KN KP KR KZ LA LC LK LR LS LT LU LV LY MA MC MD ME MG MK ML MN MR MT MW MX MY MZ NA NE NG NI NL NO NZ OM PA PE PG PH PL PT QA RO RS RU RW SA SC SD SE SG SI SK SL SM SN ST SV SY SZ TD TG TH TJ TM TN TR TT TZ UA UG US UZ VC VN ZA ZM ZW

**13) Family number: 63123421 (US2018016164A)**

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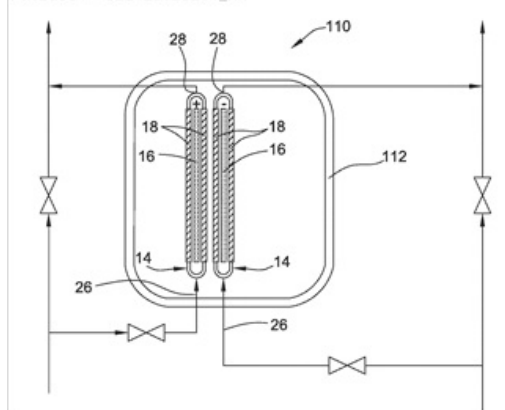
**Title:** ELECTROLYTIC CARTRIDGE, SYSTEMS AND METHODS OF USING SAME

**Abstract:** Electrolytic cartridges for, systems for, and methods of electrolyzing a brine solution of water and an alkali salt to produce acidic electrolyzed water and alkaline electrolyzed water are provided. The system includes an internal chamber for receiving the brine solution and at least two electrolytic cartridges immersed in a brine bath. Each electrolytic cartridge includes an electrode, an ion selective membrane disposed on a side of the electrode so as to define a space adjacent to at least a portion of the electrode, a permeable insert covering the ion selective membrane on a side opposite the space, and a bonding plate disposed on the permeable insert on a side opposite the side facing the ion selective membrane. The methods recycle at least a portion of alkaline electrolyzed water into the feed of a cartridge having a positively charged electrode.

**Classifications:**

**International (IPC 8-9):** C02F1/46 C02F1/461 C02F1/467 C02F1/469 C25B1/00 C25B3/00 C25B9/08 (Advanced/Invention); C02F1/467 C02F1/469 C02F1/66 C25B9/08 (Advanced/Non-invention); C02F1/461 (Core/Invention)  
**CPC:** C02F1/4693 C02F2201/46115 C02F1/4618 C02F1/4674 C25B9/08 C02F2001/46157 C02F2201/004 C02F2201/006 C02F2201/007 C02F2201/4618 C02F1/66

PatBase - US2018016164\_AA

**Family:**

| Publication number | Publication date | Application number | Application date |
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| AU2016215195 AA    | 20170817         | AU20160215195      | 20160204         |
| AU2016215195 AA    | 20160811         | AU20160215195      | 20160204         |

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| CL2017002008 A1   | 20180223 | CL20170002008  | 20170804 |
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| CO20170008869 A2  | 20171121 | CO20170008869  | 20170830 |
| EP3253716 A1      | 20171213 | EP20160747268  | 20160204 |
| EP3253716 A4      | 20181226 | EP20160747268  | 20160204 |
| IN201747030475 A  | 20170908 | IN201747030475 | 20170829 |
| JP2018504270 T2   | 20180215 | JP20170540181T | 20160204 |
| KR20170110134 A   | 20171010 | KR20177024714  | 20160204 |
| MX2017009999 A1   | 20171019 | MX20170009999  | 20160204 |
| SG11201706073V A1 | 20170830 | SG20171106073  | 20160204 |
| TH180360 A        | 20181011 | TH20171004341  | 20160204 |
| US2018016164 AA   | 20180118 | US20160548513  | 20160204 |
| WO16126940 A1     | 20160811 | WO2016US16563  | 20160204 |

**Priority:**

US20150111980P 20150204 US20160548513 20160204 WO2016US16563 20160204

**Probable Assignee:** SPRAYING SYSTEMS CO

**Assignee(s):** (std): SPRAYING SYSTEMS CO

**Assignee(s):** SWARTZ JAMES B ; HAZELWOOD JOHN ; MOYER JAMES I ; ROSSOM JAMES D

**Inventor(s):** (std): HAZELWOOD JOHN ; MOYER JAMES I ; ROSSOM JAMES D ; SWARTZ JAMES B ; JOHN HAZELWOOD ; JAMES B SWARTZ ; JAMES D ROSSOM ; JAMES I MOYER

**Agent(s):** SHELSTON IP PTY LTD; MACRAE AND CO; ESTUDIO CLARKE MODET AND CO CHILE LIMITADA; CAROLINA MERCEDES DAZA MONTALVO; MAKOVSKI PRISCILLA MARY; SCHLEMMER DENNIS R ET AL

**Designated states:** AE AG AL AM AO AT AU AZ BA BB BE BF BG BH BJ BN BR BW BY BZ CA CF CG CH CI CL CM CN CO CR CU CY CZ DE DK DM DO DZ EC EE EG ES FI FR GA GB GD GE GH GM GN GQ GR GT GW HN HR HU ID IE IL IN IR IS IT JP KE KG KM KN KP KR KZ LA LC LI LK LR LS LT LU LV LY MA MC MD ME MG MK ML MN MR MT MW MX MY MZ NA NE NG NI NL NO NZ OM PA PE PG PH PL PT QA RO RS RU RW SA SC SD SE SG SI SK SL SM SN ST SV SY SZ TD TG TH TJ TM TN TR TT TZ UA UG US UZ VC VN ZA ZM ZW

**14) Family number: 49244370 (US2012012466A)**

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**Title:** MODULAR CARTRIDGE SYSTEM FOR APPARATUS PRODUCING CLEANING AND/OR SANITIZING SOLUTIONS

**Abstract:** The presently disclosed subject matter comprises a method and system for producing cleaning and/or sanitizing solutions using a replaceable cartridge system. Particularly, the consumables needed to electrochemically or chemically produce the cleaning and/or sanitizing solutions can be supplied in a cartridge in a quantity measured to last for the chosen design life of the cartridge. Alternatively, the cartridge can comprise cleaning and/or sanitizing precursors that can be pre-prepared and supplied in a highly concentrated form.

**Classifications:**

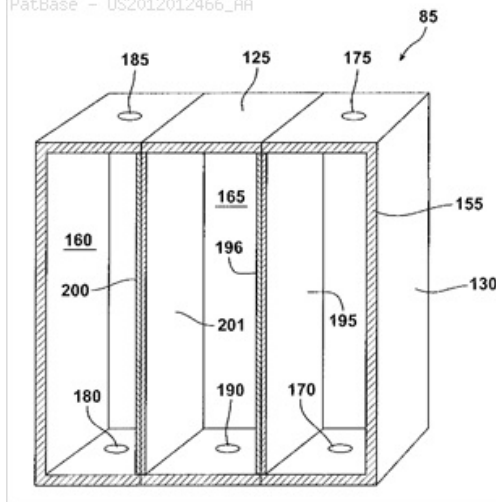
**International (IPC 8-9):** C02F1/461 C02F1/467 C02F1/68 C25B15/08 C25B9/00 C25B9/08 (Advanced/Invention)

**CPC:** Y02A20/212 C02F1/4618 A61L2202/11 C02F1/283 C02F1/4674 C02F1/685 C02F1/686 C02F2001/425 C02F2001/46161 C02F2001/46185 C02F2001/4619 C02F2201/006 C02F2201/009 C02F2201/46115 C02F2201/4615 C02F2209/40 C02F2209/42 C02F2303/04

**European:** C02F1/461B6 C02F1/467B2 C02F1/68P2 K61L202/110 M02F1/28D M02F1/42D M02F1/461B2L2B M02F1/461B6B M02F1/461B6D M02F1/68P M02F201/00D8 M02F201/00P M02F201/461B4 M02F201/461B6F M02F209/40 M02F209/42 M02F303/04

**US:** 204/242 204/242S 204/252 204/252S 205/334

PatBase - US2012012466\_AA



**Family:**

| Publication number | Publication date | Application number | Application date |
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| WO11085171 A2      | 20110714         | WO2011US20478      | 20110107         |
| WO11085171 A3      | 20110915         | WO2011US20478      | 20110107         |

**Priority:**

US20100335473P 20100107 US20110986248 20110107 WO2011US20478 20110107

**Probable Assignee:** DIVERSEY INC

**Assignee(s):** (std): SCOTT SUZANNE M ; PIUCCI VINCENT A ; SEALED AIR CORP ; SMITH STEPHEN D ; SPERRY CHARLES R ; PIUCCI JR VINCENT A ; SPERRY C R ; KOKE JOHN ; MCNAMARA JR DENNIS F

**Assignee(s):** MCNAMARA DENNIS F ; SEALED AIR US CORP ; DIVERSEY INC

**Inventor(s):** (std): SCOTT SUZANNE M ; PIUCCI VINCENT A ; KOKE JOHN ; MCNAMARA DENNIS F ; SMITH STEPHEN D ; SPERRY CHARLES R ; PIUCCI JR VINCENT A ; MCNAMARA JR DENNIS F

**Agent(s):** DAVIES COLLISON CAVE; DAVIES COLLISON CAVE PTY LTD; JACKSON MARTIN PETER; WILSON ASHLEY D ET AL

**Designated states:** AE AG AL AM AO AT AU AZ BA BB BE BF BG BH BJ BR BW BY BZ CA CF CG CH CI CL CM CN CO CR CU

**15) Family number: 7061869 (US4048030A)**

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**Title:** Electrolytic cell for treatment of water

**Abstract:** The specification describes an electrolytic cell for the treatment of water, comprising a closed container with a lower inlet opening and an upper outlet opening for the water and a cathode and an anode. In the interior of the electrolytic cell particles are located whose density is higher than that of water and which are prevented from leaving the electrolytic cell by gratings adjacent to the inlet and the outlet.

**Classifications:**

**International (ipc 8-9):** C02F1/00 C02F1/46 C02F1/461 C02F1/463 C02F1/465 C02F1/467 C02F1/469 (Advanced/Invention); C02F1/00 C02F1/42 C02F1/46 C02F1/463 C02F1/469 (Advanced/Non-invention);

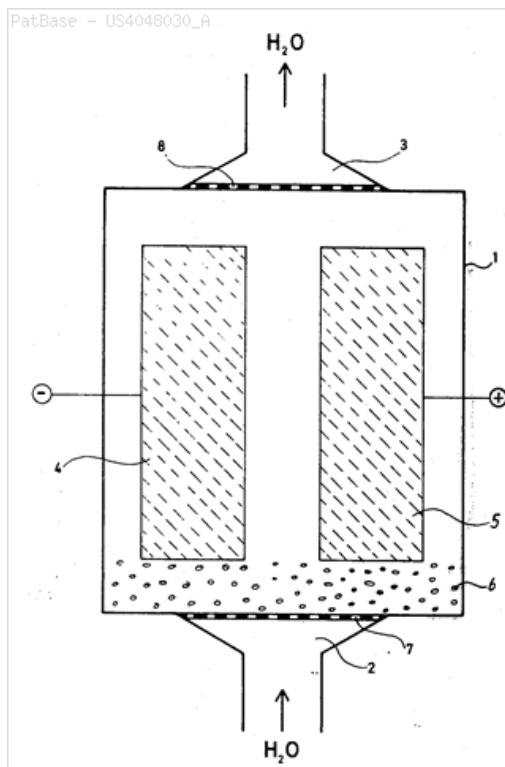
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**International (ipc 1-7):** B01D13/02 B01K3/00 C02B1/82 C02B3/00 C02B3/02 C02C5/12 C02F1/46 C10G17/00 C25B9/00

**CPC:** C02F1/4602 C02F1/4606 C02F1/46104 C02F1/46114 C02F1/463 C02F1/4672 C02F1/4674 C02F2001/46119 C02F2001/46138 C02F2001/46152 C02F2103/42 C02F2201/4611 C02F2201/46115 C02F2201/46185 C02F2301/024 C02F2303/04 C02F1/42 C02F1/46109 C02F2001/46128 C02F2201/4613 C02F2201/003

**European:** C02F1/461B C02F1/461B2 C02F1/461B2B C02F1/467B2 M02F1/00R2D M02F1/42 M02F1/461B M02F1/461B2B M02F1/461B2D M02F1/461B2H M02F1/461B2J2 M02F1/461B2L M02F1/463 M02F1/467B M02F1/467B2 M02F1/46C M02F1/46H M02F103/42 M02F201/00D2 M02F201/461B12B M02F201/461B2 M02F201/461B4 M02F201/461B6B2 M02F301/02D M02F303/04

**US:** 204/149 204/257 204/260 204/263 204/272 204/273 204/275.1 204/289 204/292 205/701 205/753



**Family:**

| Publication number | Publication date | Application number | Application date |
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| NO762273 L         | 19770118         | NO19760002273      | 19760630         |
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**Priority:**

DE19752531850 19750701 DE19752531850 19750716 US19750627192 19751030  
DE19762607906 19760226 CA19760256956 19760714

**Probable Assignee:** HANS EINHELL FA GMBH

**Assignee(s):** (std): EINHELL HANS GMBH ; HANS EINHELL FA GMBH ; HANS EINHELL GMBH ; EINHELL H ; HANS EINHELL G M B H FA ; HANS EINHELL G M B H ; HANSU EINHELL GMBH FA ; HANS EINHELL INH JOSEF THANNHU ; HANSU EINHELL GMBH ; MILLER JORGE

**Assignee(s):** HANSU AINHERU GMBH ; HANS EINHELL GMBH TE LANDAU BONDSREPUBLIC DUTSLA ; HANS EINHELL GMBH TE LANDAU BONDSREPUBLIC DUTSLAND ; STUMMER FRANZ ; HANS KINDELL GMBH ; HANS EINHELL GMBH FA ; EINHELL H GMBH ; FIRMA HANS EINHELL GMBH INDUSTRIEGELANDE ; FA HANS EINHELL INH JOSEF THANNHUBER ; FIRMA HANS EINHELL G M B H ; EINHELL GMBH HANS

**Inventor(s): (std):** STUMMER FRANZ ; MILLER J ; STUMMER F ; YORUGEE MIRAA ; FURANTSU SHIYUTSUMUMAA ; MILLER JORGE ; STUMMER FRANZ ING ; MILLER JORGE DR

**Inventor(s):** F STUMMER ; J MILLER ; FRANZ STUMMER ; JORGE MILLER ; DR JORGE MILLER ; MILLER J AND STEMMER F ; JORGE MILLER ET FRANZ STUMMER

**Agent(s):** HA; GRIFFITH HACK; MARKS AND CLERK; DR YITZHAK HESS AND PARTNERS

**16) Family number: 11053557 (US5674365A)**

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**Title:** Electrode composition for electrolysis of water

**Abstract:** This invention relates an electrode composition for electrolysis of water, which is comprised of a panel of which one surface is made from electric conductive material and another surface is made from non electric conductive material. Plural holes are bored through said panel, and two said panels are arranged so as to hold a diaphragm between the surface of non-electric conductive material of each panel. And electrolysis reaction occurs at outer side of an anode and cathode of said electrode composition.

**Classifications:**

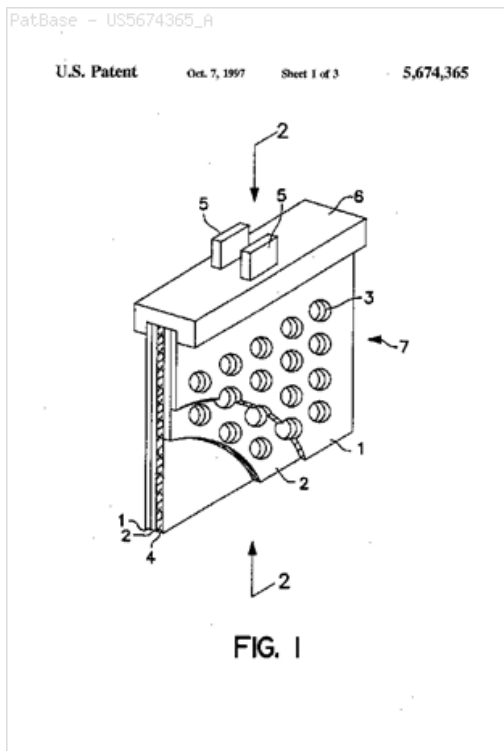
**International (IPC 8-9):** C02F1/46 C02F1/461 C25B11/02 C25B11/03 (Advanced/Invention); C02F1/46 C25B11/00 (Core/Invention)

**International (IPC 1-7):** C02F1/46 C25B11/02 C25B11/03

**CPC:** C02F1/46109 C02F1/4618 C02F2001/46157 C02F2201/46115 C02F2303/04 C25B11/02

**European:** C02F1/461B2 C25B11/02 M02F1/461B2L2 M02F1/461B6 M02F201/461B4 M02F303/04

**US:** 204/252 204/283



**Family:**

| Publication number | Publication date | Application number | Application date |
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**Priority:**

JP19950031848 19950130 JP19960010737 19960125

**Probable Assignee:** ELECTROLYZER CORP

**Assignee(s): (std):** FIRST OCEAN CO ; FIRST OCEAN CO LTD ; SANO YOICHI

**Assignee(s):** ELECTROLYZER CORP ; FIRST OCEAN CO LTD TOKIO TOKYO JP

**Inventor(s): (std):** SANO YOICHI

**Inventor(s):** SANO YOICHI ZUSHI SHI KANAGAWA KEN JP

**Designated states:** DE FR GB

**17) Family number: 11196960 (US5897757A)**

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**Title:** ELECTRODE STRUCTURE FOR ELECTROLYSIS OF WATER AND A METHOD FOR STERILIZATION OF WATER THEREBY

**Abstract:** An electrode structure for electrolysis of water comprising a sheet formed from an electrically non-conductive material whose both sides are laminated with a sheet formed from an electrically conductive material, and a plurality of holes having been bored through said laminated sheet. A net shape sheet of an electrically non-conductive material or an electrically conductive material can be used as the electrically non-conductive sheet or as the electrically conductive sheet. After setting one said electrically conductive sheet as an anode and another one as a cathode, the sterilization of water by electrolysis is carried out by immersing at least a portion of the electrode structure into water, and applying an electric

voltage across the anode and the cathode.

**Classifications:**

**International (IPC 8-9):** C02F1/46 C02F1/461 C25B11/02

C25B11/03 (Advanced/Invention);

C02F1/46 C02F1/461 C25B11/00 (Core/Invention)

**International (IPC 1-7):** C02F1/46 C02F1/461 C25B11/00

C25B11/02 C25B11/03

**CPC:** C02F1/46109 C02F2001/46133 C02F2001/46157 C02F2303/04

C25B11/02

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M02F303/04

**US:** 204/284

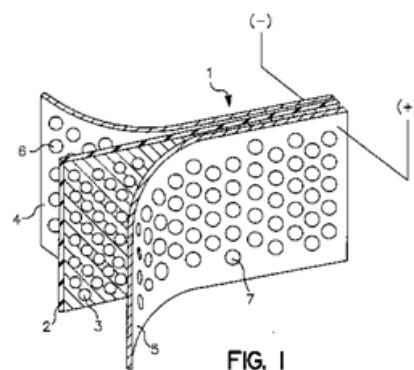
PatBase - US5897757\_A

U.S. Patent

Apr. 27, 1999

Sheet 1 of 6

5,897,757



**Family:**

| Publication number | Publication date | Application number | Application date |
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| US5897757 A        | 19990427         | US19970906149      | 19970805         |

**Priority:**

JP19960207146 19960806

**Probable Assignee:** ELECTROLYZER CORP

**Assignee(s):** (std): FIRST OCEAN CO LTD ; FIRST OCEAN KK

**Assignee(s):** ELECTROLYZER CORP ; FIRST OCEAN CO

**Inventor(s):** (std): SANO YOICHI

**Designated states:** DE FR GB

**18) Family number: 9097065 (US5401367A)**

© PatBase

**Title:** Chlor-alkali diaphragm electrolysis process and relevant cell

**Abstract:** In a process of chlor-alkali electrolysis carried out in a diaphragm cells comprising pairs of interleaved anodes and cathodes, the cathodes being provided with openings and coated with a porous diaphragm resistant to corrosion, at least part of the said anodes being provided with hydrodynamic circular to produce circulation of the anodic brine, the cell having inlets for feeding the fresh brine, and outlets for the removal of produced chlorine, hydrogen and caustic, the improvement comprising controlling the oxygen content in the chlorine and chlorate concentration in the caustic independently from the the fresh brine introduced and the concentration of the the brine by adding an aqueous solution of hydrochloric acid to the brine in the anodic compartment of the cell through a distributor positioned over the hydrodynamic circulator.

**Classifications:**

**International (IPC 8-9):** C25B1/34 C25B1/46 C25B15/08 C25B9/00

C25B9/08 (Advanced/Invention);

C25B1/00 C25B15/00 C25B9/00 C25B9/06 (Core/Invention);

B01J (Subclass/Invention)

**International (IPC 1-7):** B01J C25B C25B1/16 C25B1/24 C25B1/34

C25B1/46 C25B11/20 C25B13/00 C25B15/08 C25B9/00 C25C3/16

H01M

**CPC:** C25B9/08 C25B15/08

**European:** C25B15/08 C25B9/08

**US:** 204/128 204/129 204/232 204/237 204/266 204/98 205/525

205/537

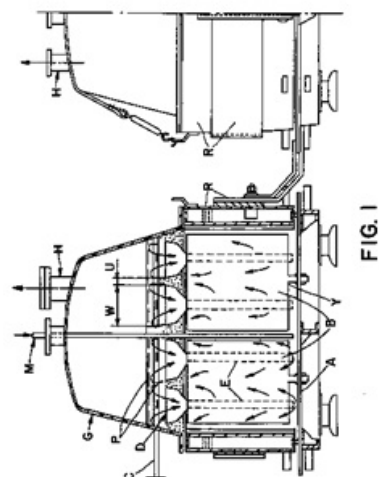


FIG. 1

**Family:**

| Publication number | Publication date | Application number | Application date |
|--------------------|------------------|--------------------|------------------|
| AT166114 E         | 19980515         | AT19940102149T     | 19940211         |
| BG62009 B1         | 19981230         | BG19940098450      | 19940210         |
| BG98450 A          | 19950531         | BG19940098450D     | 19940210         |
| BRPI9400552 A      | 19940823         | BR1994PI00552      | 19940210         |
| CA2114758 AA       | 19940813         | CA19942114758      | 19940202         |
| CN1054893 C        | 20000726         | CN19931018586      | 19931023         |
| CN1090892 A        | 19940817         | CN19931018586      | 19931023         |
| DE69410142 D1      | 19980618         | DE19946010142      | 19940211         |
| DE69410142 T2      | 19990211         | DE19946010142T     | 19940211         |
| EP0612865 A1       | 19940831         | EP19940102149      | 19940211         |
| EP0612865 B1       | 19980513         | EP19940102149      | 19940211         |
| IL108488 A0        | 19940530         | IL19940108488      | 19940131         |
| IT1263899 B        | 19960905         | IT1993MI00256      | 19930212         |
| ITMI930256 A0      | 19930212         | IT1993MI00256      | 19930212         |
| ITMI930256 A1      | 19940813         | IT1993MI00256      | 19930212         |
| JP6340992 A2       | 19941213         | JP19940015009      | 19940209         |
| MX9401113 A1       | 19940831         | MX19940001113      | 19940211         |
| NO309103 B1        | 20001211         | NO19940000459      | 19940210         |
| NO940459 A         | 19940815         | NO19940000459      | 19940210         |
| NO940459 A0        | 19940210         | NO19940000459      | 19940210         |
| NO940459 L         | 19940815         | NO19940000459      | 19940210         |
| PL302211 A1        | 19940822         | PL19940302211      | 19940211         |
| RU2126461 C1       | 19990220         | RU19940003819      | 19940210         |
| SA393 B1           | 20050706         | SA19940140574      | 19940226         |
| US5401367 A        | 19950328         | US19940189108      | 19940131         |
| ZA9400914 A        | 19940822         | ZA19940000914      | 19940210         |

**Priority:**

IT1993MI00256 19930212

**Probable Assignee:** DE NORA ELETTRODI SPA

**Assignee(s):** (std): DE NORA ELETTRODI SPA ; DE NORA SPA ; NORA ELETTRODI DE SPA ; NORA PERMELEC S P A ORA DE NORA S P A DE ; DE NORA TECNOLOGIE ELETTROCHIMICHE S P A ; PERMELEC NORA SPA ; NORA PERUMEREU DE SPA ; NORA PERUMEREU SPA DE ; NORA ELETTRODI SPA DE

**Assignee(s):** DE NORA TECNOLOGIE ELETTROCHIMICHE S P A ; NORA PERMELEC SPA DE ; DE NORA TECNOLOGIE ELETTROCHIMICHE SPA ; NORA PERMELEC DE SPA ; DE NORA S P A ; DE NORA S P A MAILAND MILANO IT ; DE NORA PERMELEC S P A ; DE NORA PERMELEC S P A ORA DE NORA S P A ; DE NORA PERMELEC SPA ; DE NORA PERUMEREU SPA

**Inventor(s):** (std): KARLO TRAINI ; MENEGHINI GIOVANNI ; MENNINGANA GIOVANNI ; TRAINI CARLO ; TRAJNA CARLO ; DZHOVANNI MENEGINI ; KARURO TORAIINI ; JIYOBANNI MENEGIINI ; GIOVANNI MENEGHNI ; CARLO TRAINI

**Inventor(s):** MENEGHNI GIOVANNI ; GIOVANNI MENEGHINI ; TRAINI CARLO I 20100 MILAN IT ; MENEGHINI GIOVANNI I 20100 MILAN IT

**Designated states:** AT BE CH DE DK ES FR GB GR IE IT LI LU MC NL PT SE

**Abstract:** Provided is an electrolytic apparatus including an electrolytic tank. The electrolytic tank includes a cathode chamber provided therein with a negative electrode and an anode chamber provided therein with a positive electrode. The cathode and anode chambers are separated by an electrolytic diaphragm unit which only allows ions to pass therethrough. The electrolytic apparatus further includes electrolyte and generated water circulating pipelines. Electrolyte is provided inside the electrolyte circulating pipeline, and is circulated in the electrolyte circulating pipeline and the anode chamber which are communicated. Generated water is circulated in the generated water circulating pipeline and the cathode chamber which are communicated. The generated water circulating pipeline includes a water supply port configured to continuously supply raw water into the generated water circulating pipeline, and a water discharge port configured to discharge finally generated water out, where both of the water supply and discharge ports are provided valves thereon.

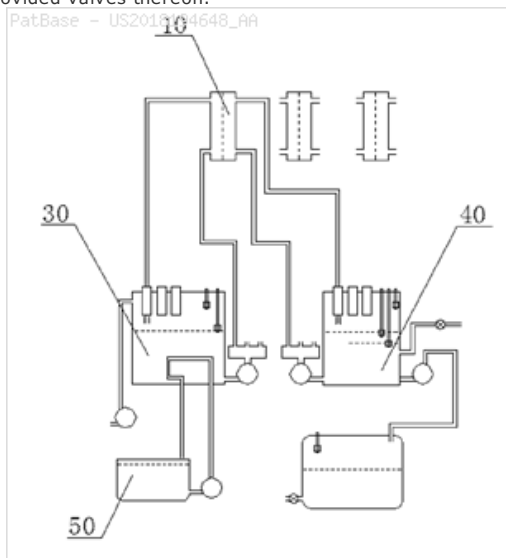
**Classifications:**

**International (IPC 8-9):** C02F1/461 C25B1/14 (Advanced/Invention)

**CPC:** C25B1/14 C02F1/4618 C02F2001/4619 C02F2201/46155

C02F2201/46145 C02F2201/46115 C02F2201/46185 C02F2209/42

**US:** 204/239



**Family:**

| Publication number | Publication date | Application number | Application date |
|--------------------|------------------|--------------------|------------------|
| ■ CN106757132 A    | 20170531         | CN201710021807     | 20170112         |
| ■ CN206477035 U    | 20170908         | CN201720036656U    | 20170112         |
| ■ US2018194648 AA  | 20180712         | US20170482398      | 20170407         |

**Priority:**

CN201710021807 20170112 CN201720036656U 20170112

**Probable Assignee:** JDM HEALTH AND MEDICAL TECH CO LTD

**Assignee(s):** (std): JDM HEALTH AND MEDICAL TECH CO LTD ; JDM HEALTH MEDICAL TECH CO LTD

**Assignee(s):** JDM HEALTH MEDICAL TECHNOLOGY CO LTD ; JDM HEALTH MEDICAL TECHNOLOGY CO ; JDM HEALTH AND MEDICAL TECHNOLOGY CO ; DIMIN HEALTH MEDICAL TECHNOLOGY CO LTD

**Inventor(s):** (std): YANG DAN

**20) Family number: 61913902 (US2016215402A)**

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**Title:** ELECTROLYTIC APPARATUS, ELECTRODE UNIT AND ELECTROLYZED WATER PRODUCTION METHOD

**Abstract:** According to one embodiment, an electrolytic apparatus includes a diaphragm of a porous membrane having a water permeability of 0.0024 to 0.6 mL/min per cm<sup>2</sup> at a differential pressure of 20 kPa, a first electrode provided to oppose the diaphragm, and a second electrode opposing the first electrode via the diaphragm, and the difference between the hydraulic pressures applied onto both sides of the porous membrane is within plus or minus 20 kPa.

**Classifications:**

**International (IPC 8-9):** C02F1/46 C02F1/461 C25B1/46 C25B11/03

C25B13/02 C25B13/04 C25B15/02 C25B9/00

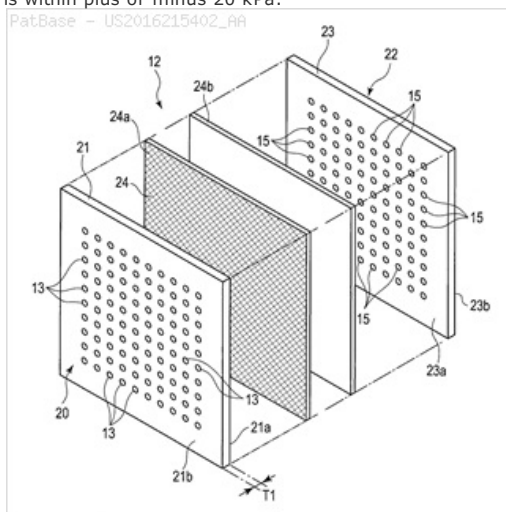
C25B9/10 (Advanced/Invention)

**CPC:** C25B11/035 C02F1/461 C25B1/46 C25B9/10 C25B13/02

C25B13/04 C02F1/4618 C02F2001/46185 C02F2201/46115

C25B9/08

**US:** 205/351



**Family:**

| Publication number | Publication date | Application number | Application date |
|--------------------|------------------|--------------------|------------------|
| ■ CN105612273 A    | 20160525         | CN201580001705     | 20150904         |
| ■ CN105612273 B    | 20180420         | CN201580001705     | 20150904         |
| ■ JP2016043072 A1  | 20170427         | JP20160503474T     | 20150904         |

|                 |          |                |          |
|-----------------|----------|----------------|----------|
| JP6062597 B1    | 20170118 | JP20160503474T | 20150904 |
| US2016215402 AA | 20160728 | US20160057539  | 20160301 |
| WO16043072 A1   | 20160324 | WO2015JP75242  | 20150904 |

**Priority:**

JP20140191567 20140919 WO2015JP75242 20150904

**Probable Assignee:** TOSHIBA KK

**Assignee(s):** (std): TOSHIBA CORP ; TOSHIBA KK

**Inventor(s):** (std): MATSUDA HIDEMI ; YOSHINAGA NORIHIRO ; MORITA SHUSUKE ; MEI WU ; NAITO KATSUYUKI ; YAGI RYOSUKE ; YOKOTA MASAHIRO ; CHIGUSA HISASHI ; TOMIMATSU NORIHIRO ; TAKAHASHI KEN ; OOTA HIDEO

**Agent(s):** S AND S INT PPC

**Designated states:** AE AG AL AM AO AT AU AZ BA BB BE BF BG BH BJ BN BR BW BY BZ CA CF CG CH CI CL CM CN CO CR CU CY CZ DE DK DM DO DZ EC EE EG ES FI FR GA GB GD GE GH GM GN GQ GR GT GW HN HR HU ID IE IL IN IR IS IT JP KE KG KM KN KP KR KZ LA LC LK LR LS LT LU LV LY MA MC MD ME MG MK ML MN MR MT MW MX MY MZ NA NE NG NI NL NO NZ OM PA PE PG PH PL PT QA RO RS RU RW SA SC SD SE SG SI SK SL SM SN ST SV SY SZ TD TG TH TJ TM TN TR TT TZ UA UG US UZ VC VN ZA ZM ZW

**21) Family number: 67375532 (WO17186980A1)**

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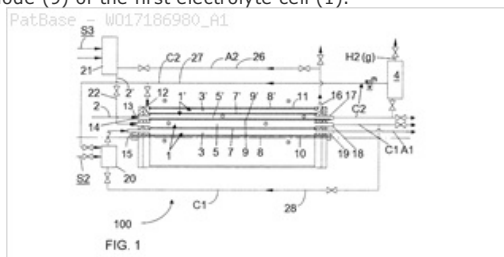
**Title:** ELECTROLYTE REACTOR FOR PRODUCING DISINFECTED WATER AND DISINFECTANT

**Abstract:** The invention relates to an electrolyte reactor for producing disinfected water and disinfectant. The electrolyte reactor is a portable device for producing disinfected water and disinfectant and comprises two consecutive electrochemical cells (1, 1'): the first electrochemical cell comprises a first anolyte chamber (3) and a first catholyte chamber (5) that are concentric and separated by a first semipermeable membrane (7), the anode (8) of the first electrochemical cell being disposed in the centre (10) of the reactor (100) and the cathode (9) thereof being disposed in a concentric metal part; and the second electrochemical cell (1') comprises at least one second anolyte chamber (3') and at least one second catholyte chamber (5') that are concentric with respect to each other and separated from each other by a second semipermeable membrane (7'), the anode (8') of the second electrochemical cell being disposed in an external metal part (11') of the electrolyte reactor (100) and the cathode (9') coinciding with the cathode (9) of the first electrolyte cell (1).

**Classifications:**

**International (IPC 8-9):** C02F1/461 C02F1/467 (Advanced/Invention)

**CPC:** C02F1/461 C02F1/467



**Family:**

| Publication number | Publication date | Application number | Application date |
|--------------------|------------------|--------------------|------------------|
| WO17186980 A1      | 20171102         | WO2016ES70335      | 20160429         |

**Priority:**

WO2016ES70335 20160429

**Probable Assignee:** CUEVAS CUADRADO ANTONIO

**Assignee(s):** (std): CUEVAS CUADRADO ANTONIO

**Inventor(s):** (std): CUEVAS CUADRADO ANTONIO

**Agent(s):** ESPIELL VOLART EDUARDO MARIA

**Designated states:** AE AG AL AM AO AT AU AZ BA BB BE BF BG BH BJ BN BR BW BY BZ CA CF CG CH CI CL CM CN CO CR CU CY CZ DE DK DM DO DZ EC EE EG ES FI FR GA GB GD GE GH GM GN GQ GR GT GW HN HR HU ID IE IL IN IR IS IT JP KE KG KM KN KP KR KZ LA LC LK LR LS LT LU LV LY MA MC MD ME MG MK ML MN MR MT MW MX MY MZ NA NE NG NI NL NO NZ OM PA PE PG PH PL PT QA RO RS RU RW SA SC SD SE SG SI SK SL SM SN ST SV SY SZ TD TG TH TJ TM TN TR TT TZ UA UG US UZ VC VN ZA ZM ZW

**22) Family number: 12528511 (US5891328A)**

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**Title:** MEMBRANE-FRAME FOR PROCESSES INCLUDING ELECTRODIALYSIS

**Abstract:** An integral, monolithic frame-membrane is disclosed, such frame-membrane having a semi-permeable membrane portion and integral therewith a frame portion, the frame portion having one or more cavities, each cavity juxtaposed to the membrane portion, each cavity having at least one fluid entrance conduit communicating with an entrance manifold aperture and at least one fluid exit conduit communicating with an exit manifold aperture. The integral, monolithic frame-membrane may be used in apparatus for carrying out gas-separation; microfiltration; ultrafiltration; nanofiltration; reverse osmosis (i.e. hyperfiltration); diffusion dialysis; Donnan dialysis; electrodialysis (including filled-cell electrodialysis; i.e. electrodeionization); pervaporation; piezodialysis; membrane distillation; osmosis; thermo osmosis; and electrolysis with membranes. Also disclosed are pillows prepared from ion exchanging films or fabrics (which may be porous or non-porous), the pillows filled with ion exchange structures such as beads, fibers, fabrics or rods. The pillows may be used with the integral, monolithic frame-membranes, with separate frames and membranes or with frames only.

**Classifications:**

**International (IPC 8-9):** B01D25/12 B01D39/16 B01D53/22

B01D61/46 B01D61/48 B01D61/50 B01D63/08 B01D69/10

B01J47/08 C25D13/02 (Advanced/Invention);

B01D39/16 B01D53/22 B01D61/42 B01D63/08

B01J47/00 (Core/Invention)

**International (IPC 1-7):** B01D15/04 B01D17/06 B01D25/12

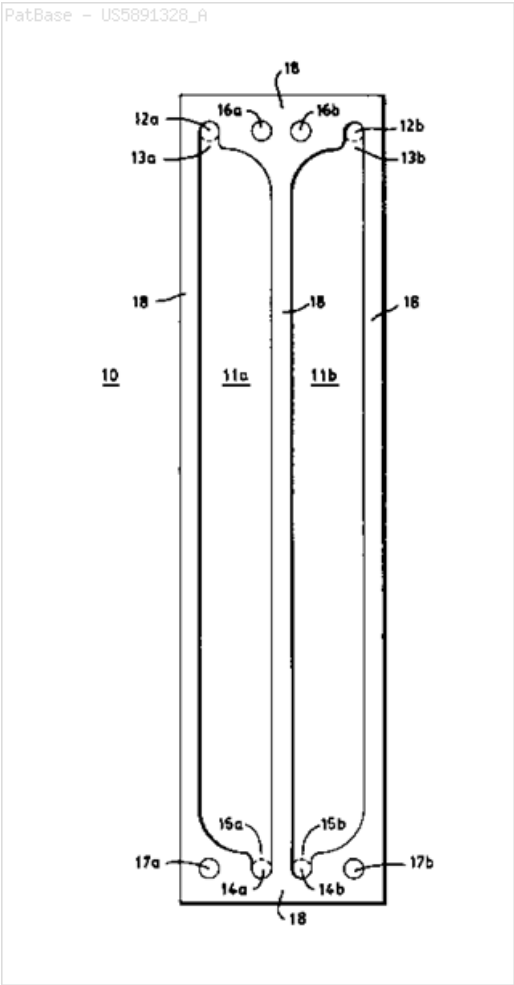
B01D25/22 B01D39/16 B01D61/42 B01D61/44 B01D61/46

B01D61/48 B01D61/50 B01D61/52 B01D63/00 B01D63/08

B01D69/10 B01D71/00 C02F1/46 C25D13/02

**CPC:** B01D2313/14 B01D53/228 B01D61/48 B01D61/50 B01D63/081

B01D63/084 B01J47/08 C02F1/4693  
**European:** B01D53/22M B01D61/48 B01D61/50 B01D63/08B  
B01D63/08D10 B01J47/08 M02F1/469D  
**US:** 204/627 204/630 204/632 204/633 204/638 204/639 210/231  
210/321.6 210/321.72 210/321.75 210/321.84 210/638 210/660



Family:

| Publication number | Publication date | Application number | Application date |
|--------------------|------------------|--------------------|------------------|
| CA2215977 AA       | 19970919         | CA19962215977      | 19960319         |
| EP0814884 A1       | 19980107         | EP19960909757      | 19960319         |
| EP0814884 A4       | 20000105         | EP19960909757      | 19960319         |
| JP11502764 T2      | 19990309         | JP19960528550T     | 19960319         |
| US5891328 A        | 19990406         | US19970888151      | 19970703         |
| US6117297 A        | 20000912         | US19990283742      | 19990401         |
| WO9629133 A1       | 19960926         | WO1996US03700      | 19960319         |

Priority:

US19950410423 19950323 WO1996US03700 19960319 US19970888151 19970703  
US19990283742 19990401

Probable Assignee: IONICS

Assignee(s): (std): IONICS

Assignee(s): UBS AG ; IONICS INC ; UBS STAMFORD BRANCH COLLATERAL AGENT AG AS ; GOLDSTEIN ARTHUR L

Inventor(s): (std): GOLDSTEIN ARTHUR L

Agent(s): RICHES MCKENZIE AND HERBERT LLP

Designated states: AT BE BR CA CH CN DE DK ES FI FR GB GR IE IT JP KR LI LU MC MX NL PT SE SG

23) Family number: 66946854 (US2019055142A) © PatBase

Title: PORTABLE ELECTROLYZING SYSTEM

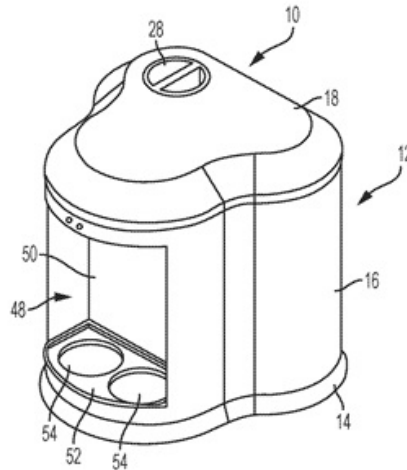
**Abstract:** An electrolyzing system for electrolyzing a brine solution is provided that includes a housing defining a brine compartment and a fresh water compartment. A first electrolytic cartridge is arranged in the brine compartment and includes an electrically charged electrode. The first electrolytic cartridge includes an inlet in fluid communication with the fresh water compartment and an outlet that is fluid communication with a dispensing system. An electrically powered pump directs fresh water from the fresh water compartment to the inlet of the cartridge. A control system is configured to direct electric power from a power supply to the pump when flow of fresh water from the fresh water compartment to the inlet of the cartridge is detected and configured to stop supplying electric power to the pump when flow of fresh water from the fresh water compartment to the inlet of the cartridge is not detected.

Classifications:

**International (IPC 8-9):** C02F1/461 C02F1/467 C02F1/469 C25B1/00 C25B1/04 C25B1/46 C25B15/02 C25B15/08 C25B9/00 C25B9/08 C25B9/10 C25B9/18 (Advanced/Invention)

**International (IPC 1-7):** C02F1/461 C02F1/467 C25B1/00 C25B1/04 C25B9/18

**CPC:** C25B9/08 C02F1/4618 Y02E60/366 C02F1/46104 C25B15/08 C25B9/10 C02F1/461 C02F1/4693 C25B1/46 C25B15/02

**Family:**

| Publication number | Publication date | Application number | Application date |
|--------------------|------------------|--------------------|------------------|
| AU2017229975 AA    | 20180823         | AU20170229975      | 20170310         |
| BR112018067823 A2  | 20190102         | BR20181167823      | 20170310         |
| CA3013664 AA       | 20180802         | CA20173013664      | 20170310         |
| CN108779558 A      | 20181109         | CN201780016368     | 20170310         |
| EP3426823 A1       | 20190116         | EP20170764220      | 20170310         |
| IN201847031226 A   | 20180831         | IN201847031226     | 20180821         |
| JP2019509397 T2    | 20190404         | JP20180541705T     | 20170310         |
| KR20180123022 A    | 20181114         | KR20187025430      | 20170310         |
| US2019055142 AA    | 20190221         | US20170079611      | 20170310         |
| WO17156445 A1      | 20170914         | WO2017US21885      | 20170310         |

**Priority:**

US20160307002P 20160311      US20170079611 20170310      WO2017US21885 20170310

**Probable Assignee:** SPRAYING SYSTEMS CO

**Assignee(s):** (std): SPRAYING SYSTEMS CO

**Assignee(s):** SWARTZ JAMES B ; THORPE JULIE ; HAZELWOOD JOHN ; MOYER JAMES I ; SHANE KEVIN

**Inventor(s):** (std): SHANE KEVIN ; THORPE JULIE ; SWARTZ JAMES B ; HAZELWOOD JOHN ; MOYER JAMES I ; JAMES I MOYER ; JAMES B SWARTZ ; JOHN HAZELWOOD ; KEVIN SHANE ; JULIE THORPE

**Agent(s):** SHELSTON IP PTY LTD; MACRAE AND CO; BARKER BRETTELL LLP; BAYS GREGORY C

**Designated states:** AE AG AL AM AO AT AU AZ BA BB BE BF BG BH BJ BN BR BW BY BZ CA CF CG CH CI CL CM CN CO CR CU CY CZ DE DJ DK DM DO DZ EC EE EG ES FI FR GA GB GD GE GH GM GN GQ GR GT GW HN HR HU ID IE IL IN IR IS IT JP KE KG KH KM KN KP KR KW KZ LA LC LI LK LR LS LT LU LV LY MA MC MD ME MG MK ML MN MR MT MW MX MY MZ NA NE NG NI NL NO NZ OM PA PE PG PH PL PT QA RO RS RU RW SA SC SD SE SG SI SK SL SM SN ST SV SY SZ TD TG TH TJ TM TN TR TT TZ UA UG US UZ VC VN ZA ZM ZW

**24) Family number: 30267481 (US2002112314A)**

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**Title:** System and method to clean and disinfect carpets, fabrics, and hard surfaces using electrolyzed alkaline water produced from a solution of NaCl

**Abstract:** A system and method for cleaning and disinfecting soft surfaces such as carpets, fabrics and the like and for cleaning and disinfecting hard surfaces such as plaster, drywall, concrete, linoleum, counter tops, wood, metal, tile and the like is disclosed. The system and method uses electrolyzed alkaline water produced by an electrolysis process using a standard electrolyte solution of water and an electrolyte, wherein the electrolyte includes sodium chloride (NaCl) at a concentration between about 1 percent and 50 percent. In a preferred embodiment about a 20 percent concentration of sodium chloride is used. The electrolyzed alkaline water produced by this method is effective in cleaning and disinfecting both soft and hard surfaces.

**Classifications:**

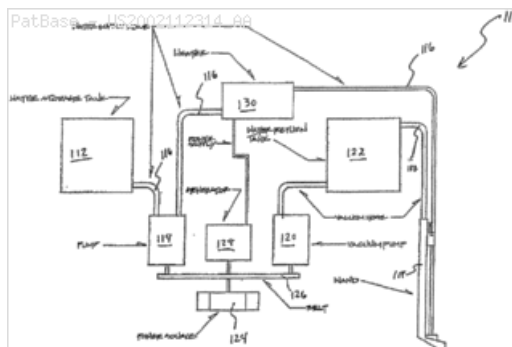
**International (IPC 8-9):** A47L11/34 A61L2/03 A61L2/18 A61L2/26 (Advanced/Invention)

**International (IPC 1-7):** A47L7/00 A47L9/02 A61L9/00

**CPC:** A47L11/34 A47L11/4083 A61L2/035 A61L2/183 A61L2/186 A61L2/26 A61L2202/11 A61L2202/17

**European:** A47L11/34 A47L11/40N2 A61L2/03E A61L2/18L A61L2/18P A61L2/26 K61L202/110 K61L202/170

**US:** 134/21 15/320 15/321 15/321P 422/300 422/300S

**Family:**

| Publication number | Publication date | Application number | Application date |
|--------------------|------------------|--------------------|------------------|
| US2002112314 AA    | 20020822         | US20010947121      | 20010905         |

**Priority:**

US20000231017P 20000908 US20010947121 20010905

**Probable Assignee:** ELECTRIC AQUAGENICS UNLIMITED**Assignee(s):** (std): ELECTRIC AQUAGENICS UNLTD**Assignee(s):** HARKINS GENE ; ELECTRIC AQUAGENICS UN LTD ; ELECTRIC AQUAGENICS UNLIMITED**Inventor(s):** (std): HOPKINS JOHN M ; HARKINS GENE**25) Family number: 15862359** (JP2001259643A)

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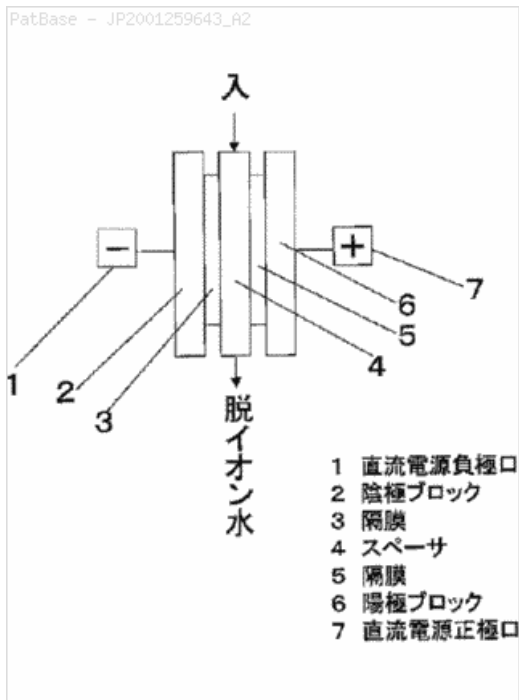
**Title:** DEIONIZED WATER PRODUCER, ALKALINE WATER PRODUCER AND ACIDIC WATER PRODUCER

**Abstract:** PROBLEM TO BE SOLVED: To improve the treating performance of a deionized water producer, an acidic water producer or an alkaline water producer having conventional constitution. SOLUTION: By using a cathode 2 or an anode 6 composed of a slit shaped or a mesh shaped conductive material, water can be passed through the inside of electrode, and also by fast sticking respective parts in order of the cathode 2, a membrane 3, a spacer 4, a membrane 5 and the anode 6, and laminating them, while a space between the cathode 2 and the anode 6 is kept very small, the water path can be made wide, so that a large amount of water is efficiently treated.

**Classifications:**

**International (IPC 8-9):** C02F1/469 C25B1/14 C25B11/02 C25B9/00 C25B9/08 (Advanced/Invention);  
C02F1/469 C25B1/00 C25B11/00 C25B9/00  
C25B9/06 (Core/Invention)

**International (IPC 1-7):** C02F1/469 C25B1/14 C25B11/02 C25B9/00

**Family:**

| Publication number | Publication date | Application number | Application date |
|--------------------|------------------|--------------------|------------------|
| JP2001259643 A2    | 20010925         | JP20000074035      | 20000316         |

**Priority:**

JP20000074035 20000316

**Probable Assignee:** MATSUSHITA ELECTRIC IND CO LTD**Assignee(s):** (std): MATSUSHITA ELECTRIC IND CO LTD**Assignee(s):** MATSUSHITA ELECTRIC INDUSTRIAL CO LTD**Inventor(s):** (std): MORIYA YOSHIFUMI ; NAWAMA JUNICHI ; NUKINA YASUYUKI ; TOKUMITSU SHUZO**26) Family number: 42195488** (US2010270172A)

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**Title:** ELECTROLYZER CELL FOR PRODUCING ACIDIC OR ALKALINE ELECTROLYZED WATER

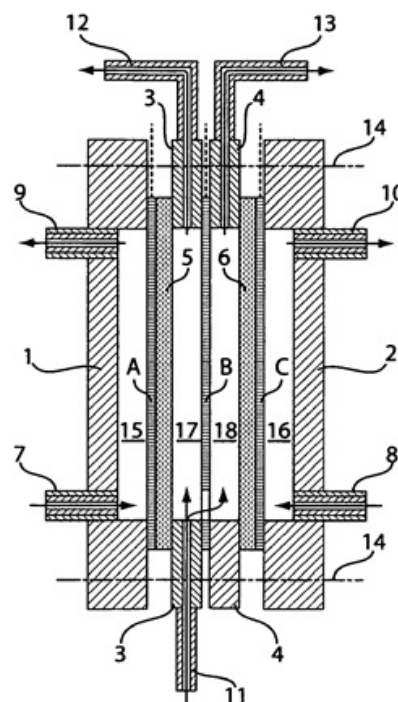
**Abstract:** A three-electrode electrolyzer cell is described that can produce either alkaline water or acid water, by selecting polarity and ion exchange membrane type. The cell has a middle chamber and two side electrolysis chambers bordering the middle chamber. Each of the side electrolysis chambers is separated from the middle chambers by a membrane, which is the same on both sides. Porous electrodes are placed on the electrolysis side of each membrane. The electrolysis chamber electrodes are placed next to the membranes, and they are both charged with either positive or negative polarity at the same time. The electrode in the middle chamber is charged with the opposite polarity to the electrolysis chamber electrodes. Each of the electrolysis chambers has inlets and outlets for flowing a solution to be electrolyzed through the cells. The electrolyte solution is in the middle chamber. It is not circulated, or is only circulated to replenish electrolytes or remove gases. The electrolyzer of the invention is significantly more efficient than prior art electrolyzers, when only one type of water (acid or alkaline) is required.

**Classifications:**

**International (IPC 8-9):** C02F1/46 C02F1/461 C25B9/00 C25B9/10 C25B9/18 (Advanced/Invention);  
C02F1/46 C02F1/461 (Core/Invention)

**CPC:** C02F2201/46115 C02F2001/4619 C02F2001/46185 C02F2001/46161 C02F1/4674 C02F1/4618

**European:** C02F1/461B6 M02F1/461B2L2B M02F1/461B6B M02F1/461B6D M02F1/467B2 M02F201/461B4

**Family:**

| Publication number | Publication date | Application number | Application date |
|--------------------|------------------|--------------------|------------------|
| EP22222607 A2      | 20100901         | EP20080852713      | 20081119         |
| EP22222607 A4      | 20120307         | EP20080852713      | 20081119         |
| EP22222607 B1      | 20180425         | EP20080852713      | 20081119         |
| JP3139159 U        | 20080131         | JP20070008959U     | 20071120         |
| US2010270172 AA    | 20101028         | US20080743785      | 20081119         |
| US8491771 BB       | 20130723         | US20080743785      | 20081119         |
| WO09067213 A2      | 20090528         | WO2008US12921      | 20081119         |
| WO09067213 A3      | 20090820         | WO2008US12921      | 20081119         |

**Priority:**

JP20070008959 20071120

JP20070008959U 20071120

WO2008US12921 20081119

**Probable Assignee:** QIAGEN INSTRUMENTS AG**Assignee(s):** (std): ECOLAB INC ; ECOLAB USA INC ; ELECTROLYZER CORP ; SANO YOICHI**Assignee(s):** FAST OCEAN CO LTD ; QIAGEN INSTRUMENTS AG**Inventor(s):** (std): SANO YOICHI**Agent(s):** MICHALSKI HUETTERMANN AND PARTNER PATENTANWALTE; MICHALSKI HUETTERMANN AND PARTNER PATENTANWALTE MBB; MIYAMOTO HARUMI; ECOLAB USA INC; ANDREW D; SHAONI L; KIRKPATRICK FRANCIS H**Designated states:** AE AG AL AM AO AT AU AZ BA BB BE BF BG BH BJ BR BW BY BZ CA CF CG CH CI CM CN CO CR CU CY CZ DE DK DM DO DZ EC EE EG ES FI FR GA GB GD GE GH GM GN GQ GR GT GW HN HR HU ID IE IL IN IS IT JP KE KG KM KN KP KR KZ LA LC LI LK LR LS LT LU LV LY MA MC MD ME MG MK ML MN MR MT MW MX MY MZ NA NE NG NI NL NO NZ OM PG PH PL PT RO RS RU SC SD SE SG SI SK SL SM SN ST SV SY SZ TD TG TJ TM TN TR TT TZ UA UG US UZ VC VN ZA ZM ZW**27) Family number: 12467669 (US5615764A)**

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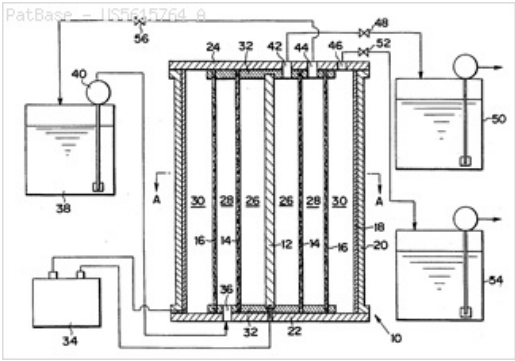
**Title:** Electrolytic ionized water producer

**Abstract:** A positive electrode made of titanium having its surface electrolytically plated with platinum is disposed at the central position of an electrolytic ionized water producer. A cylindrical anion membrane is annularly arranged spaced from the positive electrode, a cylindrical cation membrane is annularly arranged spaced from the anion membrane, and a cylindrical negative electrode is annularly arranged spaced from the cation membrane. The opposite ends of the positive electrode, the anion membrane, the cation membrane and the negative electrode are watertightly closed with a base cover and a top cover, and a cylindrical first space is formed inside of the anion membrane. An annular second space is defined between the anion membrane and the cation membrane and an annular third space is defined between the cation membrane and the negative electrode. Water is introduced into the second space. Acidic ionized water permeates through the cation membrane to reach the first space where the positive electrode is located, and alkaline ionized water permeates through the cation membrane to reach the third space where the negative electrode is located. Acidic ionized water and alkaline ionized water are separately taken from the electrolytic ionized water producer.

**Classifications:****International (IPC 8-9):** B01D61/44 B01D61/46 C02F1/46 C02F1/461 C02F1/469 (Advanced/Invention)**International (IPC 1-7):** C02F1/46 C02F1/461 C02F1/469**CPC:** B01D61/46 B01D61/44 C02F1/4618 C02F1/469

C02F2001/46133 C02F2001/46138 C02F2001/46152 C02F2201/4611 C02F2201/46115

**European:** B01D61/44 B01D61/46 C02F1/461B6 C02F1/469 M02F1/461B2J M02F1/461B2J2 M02F1/461B2L M02F201/461B2



Family:

| Publication number | Publication date | Application number | Application date |
|--------------------|------------------|--------------------|------------------|
| JP2857334 B2       | 19990217         | JP19940277198      | 19941018         |
| JP8112593 A2       | 19960507         | JP19940277198      | 19941018         |
| US5615764 A        | 19970401         | US19950544671      | 19951018         |

Priority:

JP19940277198 19941018

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Assignee(s): (std): SATO YUKIMASA ; SATOH YUKIMASA  
Inventor(s): (std): SATOH YUKIMASA ; SATO YUKIMASA

28) Family number: 54305449 (US8486236B)

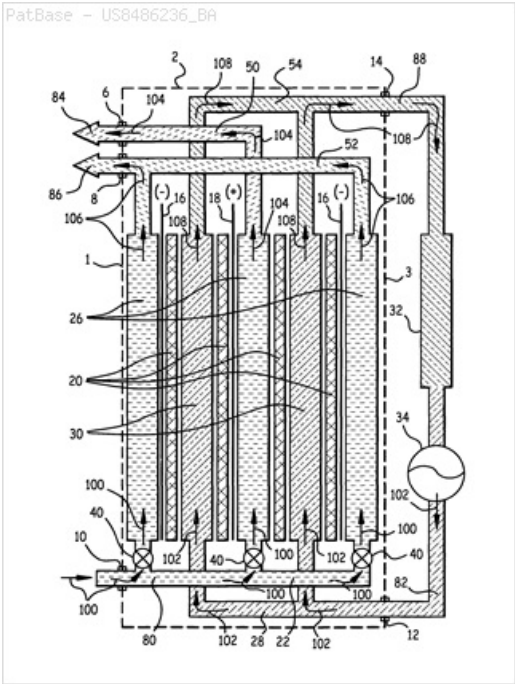
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Title: ELECTROLYSIS CHAMBER

Abstract: A electrolysis chamber. The electrolysis chamber has first initial product sub-chambers, second initial product sub-chambers, at least one positive electrode, at least one negative electrode, and electrolysis membranes. The first initial product sub-chambers and second initial product sub-chambers communicate with respective manifolds, which in turn communicates with an exterior of the electrolysis chamber through respective ports. Flow control valves set the flow into the first initial product sub-chambers. First, second and third end product manifolds communicate with an exterior of the electrolysis chamber through respective ports. The ports and manifold configuration provides for simple and easy connection and installation of the electrolysis chamber.

Classifications:

International (IPC 8-9): C25B1/26 C25B9/20 (Advanced/Invention)  
CPC: C25B15/08 C25B9/18  
US: 204/253 205/500



Family:

| Publication number | Publication date | Application number | Application date |
|--------------------|------------------|--------------------|------------------|
| US8486236 BA       | 20130716         | US20100802982      | 20100617         |

Priority:

US20100802982 20100617

Probable Assignee: WARNING WALTER B  
Assignee(s): (std): WARNING WALTER B  
Inventor(s): (std): WARNING WALTER B