

## 25 Documents

| Publication numbers | Title                                                                                                                       | Current assignees              |
|---------------------|-----------------------------------------------------------------------------------------------------------------------------|--------------------------------|
| EP1017482 A1        | Electrochemically assisted <b>ion</b> exchange                                                                              | PIONETICS                      |
| EP1321014 A1        | Device for producing a plasma, <b>ionisation</b> method, use of said method and production processes using said device      | CLARQ INTERNATIONAL            |
| EP-229187 A1        | Jig for aligning <b>electrode</b> plates of an <b>ionization</b> box-type x-ray detector                                    | GE YOKOGAWA MEDICAL SYSTEMS    |
| EP2590750 A2        | Fly ash separation by means of corona discharge                                                                             | EVONIK DEGUSSA, ...            |
| EP2470485 A2        | Ceramic insulator and methods of use and manufacture thereof                                                                | MCALISTER TECHNOLOGIES, ...    |
| KR20180086350 A     | Quantum energy irradiation device equipped with <b>water</b> vapor <b>ionization</b> device                                 | KIM, BU YEOL                   |
| WO2018160727 A1     | Stack of electrochemical cells for wastewater treatment with isolated electrodes                                            | AXINE <b>WATER</b> TECHNOLOGY  |
| KR20080097071 A     | <b>Water</b> -treatment apparatus using an <b>electrode</b> for removing <b>ion</b> pollutant and an <b>ion</b> collector   | CHO, EUN SUP, ...              |
| WO2014190411 A1     | Point of use <b>water</b> treatment system                                                                                  | ESIL <b>WATER</b> TREAT        |
| WO201023712 A1      | <b>Water</b> sterilizing apparatus                                                                                          | YOUJI HAYAKAWA                 |
| EP2287515 A2        | Apparatus for electric treatment of fluids                                                                                  | JINHAENG WATERWAY              |
| EP3218313 A1        | Electrolytic cell with advanced oxidation process and electro catalytic paddle <b>electrode</b>                             | GLOBAL <b>WATER</b> HOLDINGS   |
| JP2012040489 A      | Method and device for generating electrolytic <b>ion water</b>                                                              | E-PLAN                         |
| EP2118004 A1        | Methods of sequestering co2                                                                                                 | ARELAC                         |
| EP1031646 A2        | Method for producing a mixed oxidant gas                                                                                    | PURELINE TREAT SYSTEMS         |
| US20030173233 A1    | Impurity detection device                                                                                                   | CENSAR TECHNOLOGIES, ...       |
| EP1984124 A1        | Method and apparatus for producing humanly-perceptable indicator of electrochemical properties of an output cleaning liquid | TENNANT                        |
| EP2208248 A1        | Electrochemical storage cell                                                                                                | BYD                            |
| JP2001334271 A      | Method for making acidic <b>water</b> and alkaline <b>water</b>                                                             | HOSODA DENKI                   |
| EP2045389 A1        | Washing machine and method of recovering metal <b>ion</b> therein                                                           | SHARP                          |
| WO2006100716 A1     | <b>Water</b> treatment apparatus for fuel cell                                                                              | KURITA <b>WATER</b> INDUSTRIES |
| EP1986959 A2        | Process for producing a disinfectant by electrochemical activation (eca) of <b>water</b>                                    | ACTIDES                        |
| DE10040416 A1       | Waste <b>water</b> treatment plant removes phosphor compounds                                                               | SANYO ELECTRIC                 |

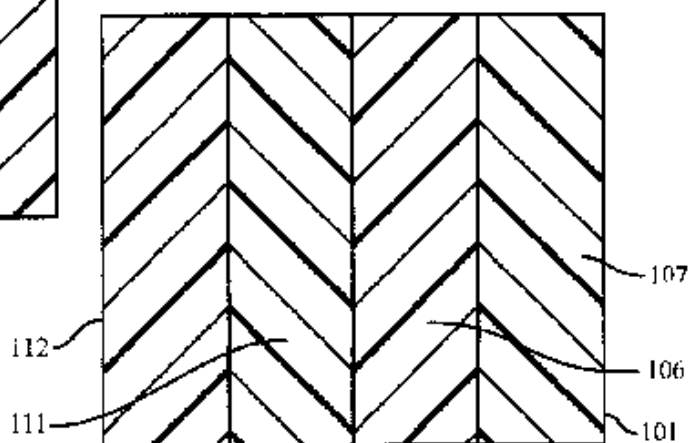
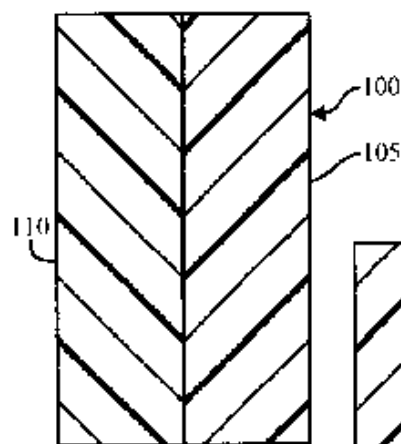
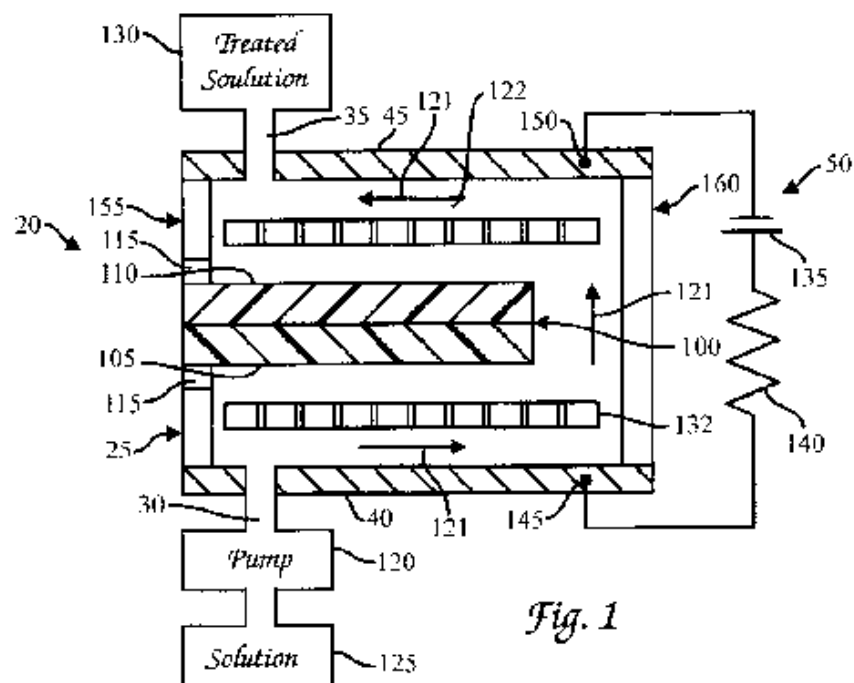
| Publication numbers            | Title                                                       | Current assignees          |
|--------------------------------|-------------------------------------------------------------|----------------------------|
|                                | by coagulation                                              |                            |
| <a href="#">EP1727406 A1</a>   | Plasma generator                                            | FERROTEC                   |
| <a href="#">WO201179276 A1</a> | High-throughput cavitation and electrocoagulation apparatus | CAVITATION<br>TECHNOLOGIES |

Family 1/25 - FAMPAT - ©Questel

**Title**

(EP1017482)

Electrochemically assisted ion exchange

**Images****Publication numbers with kind code & date**

|             |    |            |             |
|-------------|----|------------|-------------|
| JP4044148   | B2 | 2007-11-22 | JP4044148   |
| BRPI9807019 | B1 | 2006-06-20 | BRPI9807019 |
| DE69830662  | T2 | 2006-05-04 | DE69830662  |
| KR100518045 | B1 | 2005-09-30 | KR100518045 |
| DE69830662  | D1 | 2005-07-28 | DE69830662  |



|                               |    |            |               |                                                                                   |                                                                                    |                                                                                     |                                                                                     |
|-------------------------------|----|------------|---------------|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| <a href="#">EP1017482</a>     | B1 | 2005-06-22 | EP1017482     |  |  |  |  |
| <a href="#">CN1110351</a>     | C  | 2003-06-04 | CN1110351C    |  |  |  |  |
| <a href="#">JP2001509074</a>  | A  | 2001-07-10 | JP2001509074  |  |  |  |  |
| <a href="#">KR20000070555</a> | A  | 2000-11-25 | KR20000070555 |  |  |  |  |
| <a href="#">EP1017482</a>     | A1 | 2000-07-12 | EP1017482     |  |  |  |  |
| <a href="#">CN1249697</a>     | A  | 2000-04-05 | CN1249697     |  |  |  |  |
| <a href="#">BR9807019</a>     | A  | 2000-03-14 | BR9807019     |  |  |  |  |
| <a href="#">BRPI9807019</a>   | A1 | 2000-03-14 | BRPI9807019   |  |  |  |  |
| <a href="#">AU5925398</a>     | A  | 1998-08-18 | AU9859253     |  |  |  |  |
| <a href="#">US5788826</a>     | A  | 1998-08-04 | US5788826     |  |  |  |  |
| <a href="#">WO98/32525</a>    | A1 | 1998-07-30 | WO9832525     |  |  |  |  |

## Abstract

(EP1017482)

An electrochemical cell (20) for removing **ions** from a solution stream comprises a housing (25) having first (40) and second (45) electrodes. At least one **water**-splitting **ion** exchange membrane (100) is positioned between the electrodes, the **water**-splitting membrane (100) comprising (i) a cation exchange surface (105) facing the first **electrode** (40), and (ii) an anion exchange surface (110) facing the second **electrode** (45). A solution stream pathway (121) is defined by the **water**-splitting membrane. The solution stream pathway comprises (i) an inlet (30) for influent solution stream, (ii) at least one channel that allows influent solution stream to flow past at least one surface of the **water**-splitting membrane to form one or more treated solution streams, and (iii) a single outlet (35) that combines the treated solution streams to form a single effluent solution. Preferably, the solution stream pathway comprises a unitary and contiguous channel that flows past both the cation and anion exchange surfaces of the **water**-splitting membrane, and more preferably is connected throughout in an unbroken sequence and extends substantially continuously from the inlet to the outlet.

## Inventors

NYBERG ERIC D

## Latest standardized assignees - inventors removed

PIONETICS

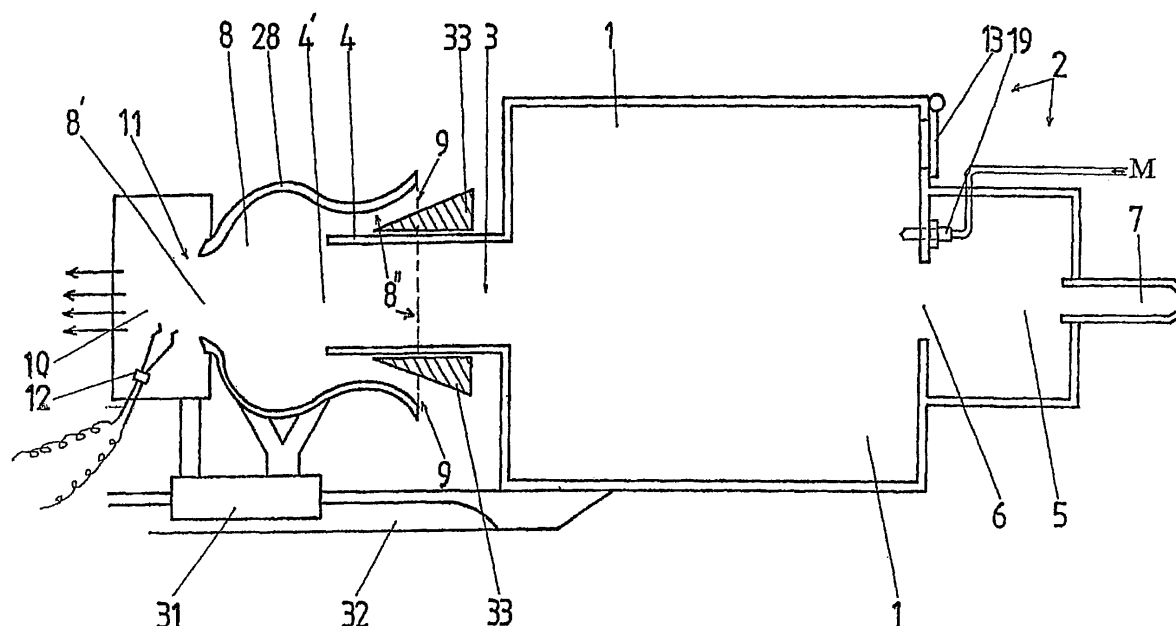
Family 2/25 - FAMPAT - ©Questel

## Title

(EP1321014)

Device for producing a plasma, **ionisation** method, use of said method and production processes using said device

## Images



### Publication numbers with kind code & date

|                   |    |            |                |
|-------------------|----|------------|----------------|
| BRPI0114209       | A2 | 2015-06-23 | BR200114209    |
| EP1321014         | B1 | 2012-12-12 | EP1321014      |
| IN0590/DELNP/2003 | A  | 2010-03-26 | IN2003DN00590  |
| CA2423700         | C  | 2009-12-08 | CA2423700      |
| US7201882         | B2 | 2007-04-10 | US7201882      |
| NZ525433          | A  | 2006-09-29 | NZ-525433      |
| OA12832           | A  | 2006-09-15 | OA--12832      |
| HK1061773         | A1 | 2006-09-01 | HK1061773      |
| AU2001291965      | B2 | 2006-06-08 | AU2001291965   |
| CN1257656         | C  | 2006-05-24 | CN1257656C     |
| EA006412          | B1 | 2005-12-29 | EA---6412      |
| PL360676          | A1 | 2004-09-20 | PL2001360676   |
| MXPA03002470      | A  | 2004-09-10 | MX2003PA002470 |
| US20040096375     | A1 | 2004-05-20 | US20040096375  |
| JP2004509312      | A  | 2004-03-25 | JP2004509312   |
| ZA200302989       | B  | 2004-03-08 | ZA200302989    |
| CN1470152         | A  | 2004-01-21 | CN1470152      |
| SK4852003         | A3 | 2004-01-08 | SK200300485    |
| IL154996          | A  | 2003-10-31 | IL-154996      |
| CZ20031057        | A3 | 2003-09-17 | CZ200301057    |
| EA200300395       | A1 | 2003-08-28 | EA200300395    |
| HU0301674         | A2 | 2003-08-28 | HU200301674    |
| UA75368           | C2 | 2003-07-15 | UA--75368      |
| BR0114209         | A  | 2003-07-01 | BR200114209    |
| BRPI0114209       | A1 | 2003-07-01 | BRPI0114209    |
| EP1321014         | A1 | 2003-06-25 | EP1321014      |
| KR20030051667     | A  | 2003-06-25 | KR20030051667  |
| AP200302769       | A0 | 2003-03-31 | AP200302769    |
| FR2814633         | B1 | 2002-12-06 | FR2814633      |
| AU9196501         | A  | 2002-04-02 | AU200191965    |



[FR2814633](#)

A1 2002-03-29 FR2814633

[CA2423700](#)

A1 2002-03-28 CA2423700

[WO02/26004](#)

A1 2002-03-28 WO200226004

**Abstract**

(EP1321014)

The invention concerns the field of transformation of material and relates to a device for producing a plasma, an method for **ionising** material using said device, uses of the inventive method and production processes using said device. Said device is characterised in that it comprises a resonant chamber (1), an acoustic chamber (5) provided with an acoustic device (7) and a soliton chamber (8) for receiving the treated material coming from the resonant chamber (1) while simultaneously generating a recycling of outside air, said soliton chamber (8) defining, with a pulsating suction member (10) adjacent to the output of said soliton chamber (8), a space (11) producing **ionised** material.

**Inventors**

CESA VALENTIN

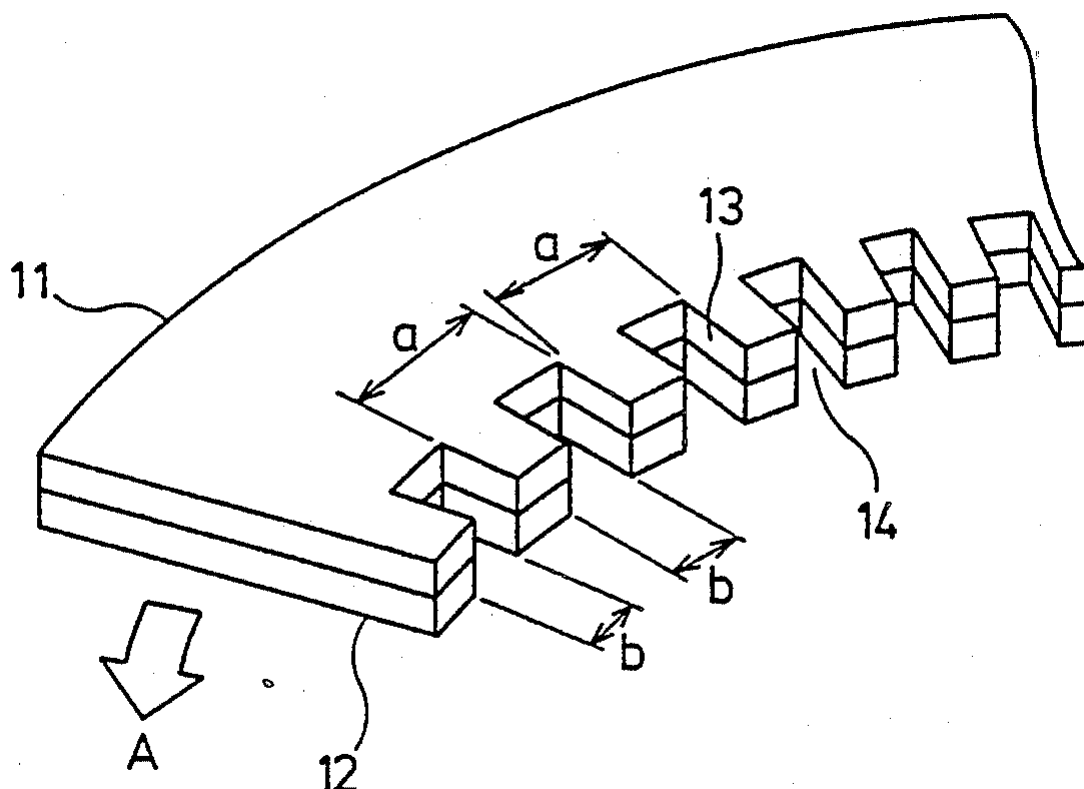
**Latest standardized assignees - inventors removed**

CLARQ INTERNATIONAL

Family 3/25 - FAMPAT - ©Questel

**Title**

(EP-229187)

Jig for aligning **electrode** plates of an **ionization** box-type x-ray detector**Images****Publication numbers with kind code & date**[JP1798382](#)

C 1993-11-12 JP1798382

[JPH055314](#)

B2 1993-01-22 JP93005314

[DE3675523](#)

D1 1990-12-13 DE3675523

[EP0229187](#)

B1 1990-11-07 EP-229187

[US4768765](#)

A 1988-09-06 US4768765

[DE3690685](#)

T1 1988-06-01 DE3690685T



|                            |    |            |            |
|----------------------------|----|------------|------------|
| <a href="#">NO873635</a>   | A  | 1988-01-14 | NO8703635  |
| <a href="#">NO873635</a>   | L  | 1988-01-14 | NO-873635  |
| <a href="#">WO88/00133</a> | A1 | 1988-01-14 | WO8800133  |
| <a href="#">EP0229187</a>  | A4 | 1987-10-22 | EP-229187  |
| <a href="#">NO873635</a>   | D0 | 1987-08-28 | NO8703635  |
| <a href="#">EP0229187</a>  | A1 | 1987-07-22 | EP-229187  |
| <a href="#">WO87/00295</a> | A1 | 1987-01-15 | WO8700295  |
| <a href="#">JP62003682</a> | A  | 1987-01-09 | JP62003682 |

**Abstract**

(EP0229187)

An **electrode** aligning jig features good precision in aligning the **electrode** plates and good operability in manufacturing an array of the **electrode** plates. The **electrode** aligning jig has members (11, 12) of a double structure that have a plurality of grooves to match the pitch of the **electrode** arrangement and can be deviated along the direction of the groove arrangement, and has grooves (13, 14) with a width which is sufficiently large relative to the thickness of the **electrode** plates.

**Inventors**

KUROCHI, HARUO

**Latest standardized assignees - inventors removed**

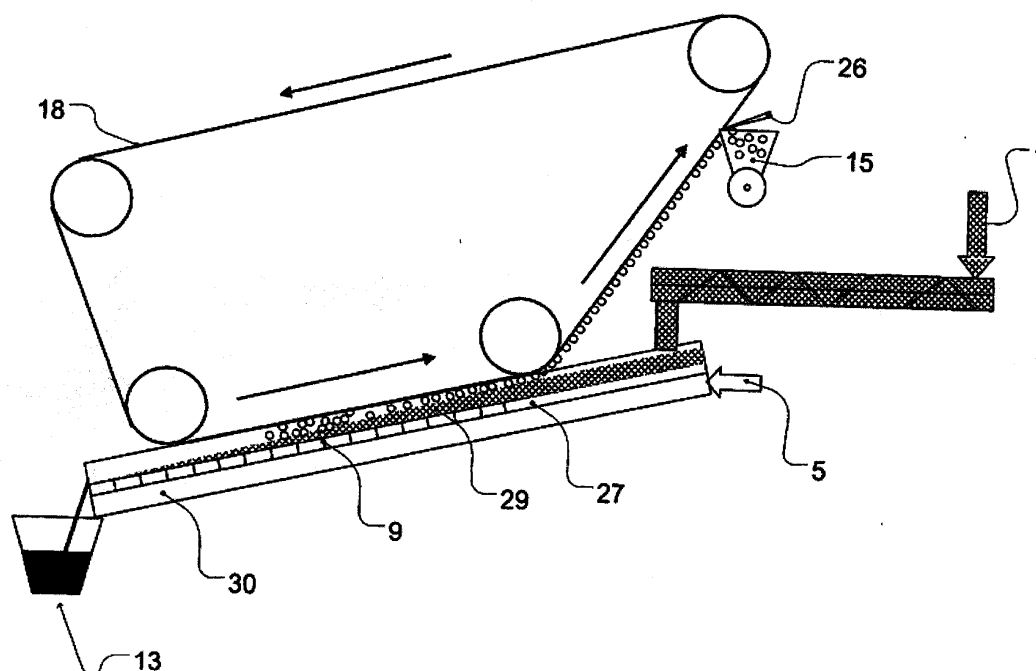
GE YOKOGAWA MEDICAL SYSTEMS

Family 4/25 - FAMPAT - ©Questel

**Title**

(EP2590750)

Fly ash separation by means of corona discharge

**Images****Publication numbers with kind code & date**

|                                   |    |            |                |
|-----------------------------------|----|------------|----------------|
| <a href="#">BR112013000336</a>    | A2 | 2016-05-31 | BR112013000336 |
| <a href="#">IN0885/CHENP/2013</a> | A  | 2016-05-27 | IN2013CN00885  |



|                                |    |            |                |                                                                                    |                                                                                     |                                                                                      |                                                                                      |
|--------------------------------|----|------------|----------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|
| <a href="#">RU2013105285</a>   | A  | 2014-08-20 | RU2013105285   |   |   |                                                                                      |   |
| <a href="#">CU23990</a>        | B1 | 2014-04-24 | CU--23990      |   |   |                                                                                      |   |
| <a href="#">KR20140002599</a>  | A  | 2014-01-08 | KR20140002599  |   |   |   |   |
| <a href="#">JP2013537475</a>   | A  | 2013-10-03 | JP2013537475   |   |   |   |   |
| <a href="#">CU20130006</a>     | A7 | 2013-09-27 | CU20130006     |   |   |                                                                                      |   |
| <a href="#">MA34452</a>        | B1 | 2013-08-01 | MA--34452      |   |   |   |   |
| <a href="#">US20130175371</a>  | A1 | 2013-07-11 | US20130175371  |   |   |   |   |
| <a href="#">CN103189143</a>    | A  | 2013-07-03 | CN103189143    |   |   |   |   |
| <a href="#">BR112013000336</a> | A1 | 2013-07-02 | BR112013000336 |   |   |   |   |
| <a href="#">EA201390072</a>    | A1 | 2013-06-28 | EA201390072    |   |   |   |   |
| <a href="#">MX2013000167</a>   | A  | 2013-06-05 | MX2013000167   |   |   |                                                                                      |   |
| <a href="#">CO6670527</a>      | A2 | 2013-05-15 | CO6670527      |   |   |                                                                                      |   |
| <a href="#">EP2590750</a>      | A2 | 2013-05-15 | EP2590750      |   |   |   |   |
| <a href="#">EP2590751</a>      | A1 | 2013-05-15 | EP2590751      |   |   |   |   |
| <a href="#">AU2011276137</a>   | A1 | 2013-01-31 | AU2011276137   |   |   |   |   |
| <a href="#">WO2012/004179</a>  | A3 | 2012-04-19 | WO201204179    |   |   |   |   |
| <a href="#">CA2804208</a>      | A1 | 2012-01-12 | CA2804208      |   |   |   |   |
| <a href="#">DE102010026445</a> | A1 | 2012-01-12 | DE102010026445 |   |   |   |   |
| <a href="#">WO2012/003935</a>  | A1 | 2012-01-12 | WO201203935    |   |   |   |   |
| <a href="#">WO2012/004179</a>  | A2 | 2012-01-12 | WO201204179    |  |  |  |  |

## Abstract

(EP2590750)

The invention relates to a method for separating fly into a mineral fraction and into a non-residual carbon fraction. The aim of the invention is to provide a concept by means of which a mineral fraction, which is low in residual carbon, fulfilling in particular EN 450, can be economically separated from a large amount of fly ash. Said aim is achieved due to the method consisting of the following steps: a) fly ash containing mineral particles and non-mineral particles is provided; b) the fly ash is subjected to pneumatic pressure for producing fluidised fly ash; c) air is **ionised** equidirectionally by means of at least one corona **electrode** surrounded by the air which is to be **ionised**; d) the **ionised** air is mixed with the fluidised fly ash to obtain equidirectional **ionised**, fluidised fly ash; e) mineral particles from the **ionised**, fluidised fly ash are condensed on a collecting **electrode** moving in relation to the **ionised**, fluidised fly ash, said collecting **electrode** being earthed or being charged counter to the corona **electrode**; f) the mineral particles adhering to the collecting **electrode** are removed for forming a mineral fraction; g) the non-mineral fraction formed from the **ionised**, fluidised fly ash not-adhering to the collecting **electrode** is collected.

## Inventors

SCHAACK SENADA  
BENSCHIEDT NICOLA  
BORCHERS FRANK  
BERGHAHN MATTHIAS  
NORDHOFF STEFAN

## Latest standardized assignees - inventors removed

EVONIK DEGUSSA  
STEAG POWER MINERALS

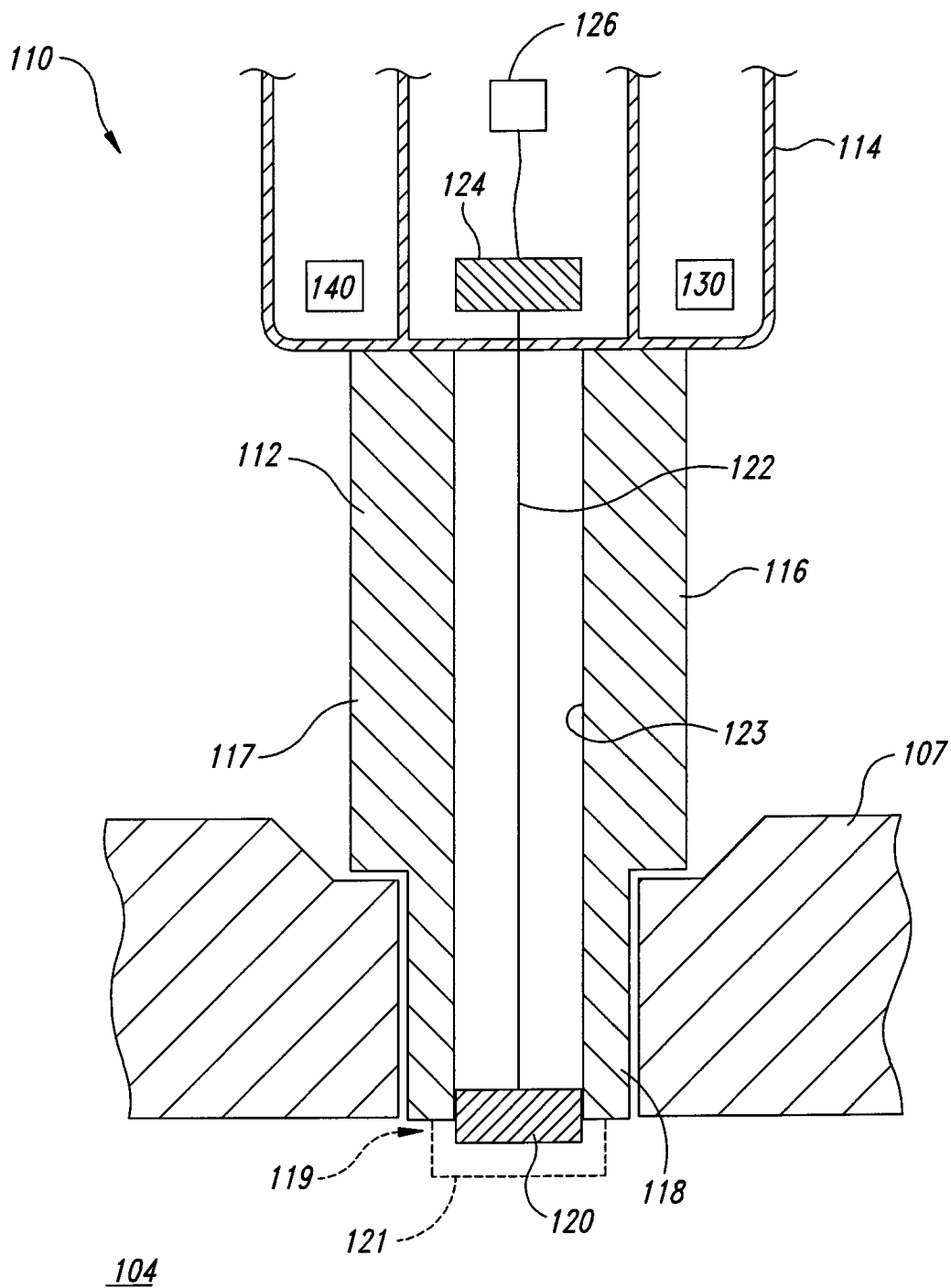
Family 5/25 - FAMPAT - ©Questel

## Title

(EP2470485)

Ceramic insulator and methods of use and manufacture thereof

## Images



### Publication numbers with kind code & date

|                |    |            |                |
|----------------|----|------------|----------------|
| BR112012004064 | A2 | 2019-09-24 | BR112012004064 |
| BR112012004092 | A2 | 2018-05-22 | BR112012004092 |
| BR112012004106 | A2 | 2018-05-22 | BR112012004106 |
| US9581116      | B2 | 2017-02-28 | US9581116      |
| CA2771996      | C  | 2016-04-26 | CA2771996      |
| JP5901806      | B2 | 2016-03-18 | JP5901806      |
| BR112012004067 | A2 | 2016-03-08 | BR112012004067 |
| CN102713242    | B  | 2016-01-20 | CN102713242B   |
| EP2470764      | B1 | 2015-12-16 | EP2470764      |
| EP2470774      | A4 | 2015-12-16 | EP2470774      |



|                   |    |            |                |                                                                                     |                                                                                      |                                                                                       |                                                                                       |
|-------------------|----|------------|----------------|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| JP5833165         | B2 | 2015-11-06 | JP5833165      |    |    |    |    |
| EP2927475         | A1 | 2015-10-07 | EP2927475      |    |    |    |    |
| EP2924148         | A1 | 2015-09-30 | EP2924148      |    |    |    |    |
| EP2921691         | A1 | 2015-09-23 | EP2921691      |    |    |    |    |
| CN102713243       | B  | 2015-09-16 | CN102713243B   |    |    |    |    |
| JP2015135116      | A  | 2015-07-27 | JP2015135116   |    |    |    |    |
| CN102713217       | B  | 2015-07-22 | CN102713217B   |    |    |    |    |
| RU2556152         | C2 | 2015-07-10 | RU2556152      |    |    |    |    |
| CN104728001       | A  | 2015-06-24 | CN104728001    |    |    |    |    |
| EP2470773         | B1 | 2015-04-29 | EP2470773      |    |    |    |    |
| EP2470775         | B1 | 2015-04-29 | EP2470775      |    |    |    |    |
| JP5734294         | B2 | 2015-04-24 | JP5734294      |    |    |    |    |
| JP2015078699      | A  | 2015-04-23 | JP2015078699   |    |    |    |    |
| JP5718921         | B2 | 2015-03-27 | JP5718921      |    |    |    |    |
| CN102713236       | B  | 2015-03-11 | CN102713236B   |    |    |    |    |
| EP2470770         | B1 | 2015-02-18 | EP2470770      |    |    |    |    |
| JP5695050         | B2 | 2015-02-13 | JP5695050      |    |    |    |    |
| JP5684810         | B2 | 2015-01-23 | JP5684810      |    |    |    |    |
| CN102712540       | B  | 2014-12-17 | CN102712540B   |    |    |    |    |
| US20140345563     | A1 | 2014-11-27 | US20140345563  |   |   |   |   |
| JP2014193805      | A  | 2014-10-09 | JP2014193805   |  |  |  |  |
| US8851046         | B2 | 2014-10-07 | US8851046      |  |  |  |  |
| JP5563660         | B2 | 2014-06-20 | JP5563660      |  |  |  |  |
| US8635985         | B2 | 2014-01-28 | US8635985      |  |  |  |  |
| CA2772043         | C  | 2014-01-07 | CA2772043      |  |  |  |  |
| RU2500652         | C1 | 2013-12-10 | RU2500652      |  |  |  |  |
| EP2470768         | A4 | 2013-11-13 | EP2470768      |  |  |  |  |
| RU2012111670      | A  | 2013-10-10 | RU2012111670   |  |  |  |  |
| RU2012111672      | A  | 2013-10-10 | RU2012111672   |  |  |  |  |
| EP2470775         | A4 | 2013-09-04 | EP2470775      |  |  |  |  |
| EP2470764         | A4 | 2013-05-22 | EP2470764      |  |  |  |  |
| EP2470773         | A4 | 2013-05-22 | EP2470773      |  |  |  |  |
| CA2772044         | C  | 2013-04-16 | CA2772044      |  |  |  |  |
| EP2470770         | A4 | 2013-02-27 | EP2470770      |  |  |  |  |
| JP2013506072      | A  | 2013-02-21 | JP2013506072   |  |  |  |  |
| US20130043323     | A1 | 2013-02-21 | US20130043323  |  |  |  |  |
| JP2013503294      | A  | 2013-01-31 | JP2013503294   |  |  |  |  |
| JP2013503295      | A  | 2013-01-31 | JP2013503295   |  |  |  |  |
| JP2013503297      | A  | 2013-01-31 | JP2013503297   |  |  |  |  |
| JP2013503445      | A  | 2013-01-31 | JP2013503445   |  |  |  |  |
| EP2470485         | A4 | 2012-12-26 | EP2470485      |  |  |  |  |
| IN1762/CHENP/2012 | A  | 2012-11-02 | IN2012CN01762  |  |  |  |  |
| IN1763/CHENP/2012 | A  | 2012-11-02 | IN2012CN01763  |  |  |  |  |
| IN1820/CHENP/2012 | A  | 2012-11-02 | IN2012CN01820  |  |  |  |  |
| BR112012004064    | A1 | 2012-10-30 | BR112012004064 |  |  |  |  |
| BR112012004067    | A1 | 2012-10-30 | BR112012004067 |  |  |  |  |
| BR112012004092    | A1 | 2012-10-30 | BR112012004092 |  |  |  |  |
| BR112012004106    | A1 | 2012-10-30 | BR112012004106 |  |  |  |  |

|                   |    |            |               |                                                                                     |                                                                                      |                                                                                       |                                                                                       |
|-------------------|----|------------|---------------|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| CN102712540       | A  | 2012-10-03 | CN102712540   |    |    |    |    |
| CN102713217       | A  | 2012-10-03 | CN102713217   |    |    |    |    |
| CN102713236       | A  | 2012-10-03 | CN102713236   |    |    |    |    |
| CN102713242       | A  | 2012-10-03 | CN102713242   |    |    |    |    |
| CN102713243       | A  | 2012-10-03 | CN102713243   |    |    |    |    |
| CN102713244       | A  | 2012-10-03 | CN102713244   |    |    |    |    |
| US8267063         | B2 | 2012-09-18 | US8267063     |    |    |    |    |
| KR101179798       | B1 | 2012-09-04 | KR101179798   |    |    |    |    |
| IN0474/MUMNP/2012 | A  | 2012-08-31 | IN2012MN00474 |    |    |    |    |
| CA2770415         | C  | 2012-08-28 | CA2770415     |    |    |    |    |
| EP2470485         | A2 | 2012-07-04 | EP2470485     |    |    |    |    |
| EP2470764         | A1 | 2012-07-04 | EP2470764     |    |    |    |    |
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| CA2832055         | A1 | 2011-03-24 | CA2832055     |  |  |  |  |
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## Abstract

(EP2470485)

One embodiment of the present disclosure is directed to an insulator comprising a ceramic composition, wherein the ceramic composition comprises about 25-60% SiO<sub>2</sub>; 15-35% R<sub>2</sub>O<sub>3</sub>, wherein the R<sub>2</sub>O<sub>3</sub> is 3-15% B<sub>2</sub>O<sub>3</sub> and 5-25% Al<sub>2</sub>O<sub>3</sub>; 4- 25% MgO+0-7% Li<sub>2</sub>O, wherein the total of MgO+Li<sub>2</sub>O is between about 6-25%; 2-20% R<sub>2</sub>O, wherein the R<sub>2</sub>O is 0-15% Na<sub>2</sub>O, 0-15% K<sub>2</sub>O, 0-15% Rb<sub>2</sub>O; 0-15% Rb<sub>2</sub>O; 0-20% Cs<sub>2</sub>O; and 4-20% F; crystalline grains, wherein the crystalline grains are substantially oriented to extend in a first direction to provide improved insulating properties in a direction perpendicular to the first direction, wherein the first direction is circumferential and the direction perpendicular to the first

direction is radial; and a first zone and a second zone, wherein the first zone is in compression and the second zone is in tension.

### Inventors

MCALISTER ROY E

### Latest standardized assignees - inventors removed

MCALISTER TECHNOLOGIES

ADVANCED GREEN INNOVATIONS

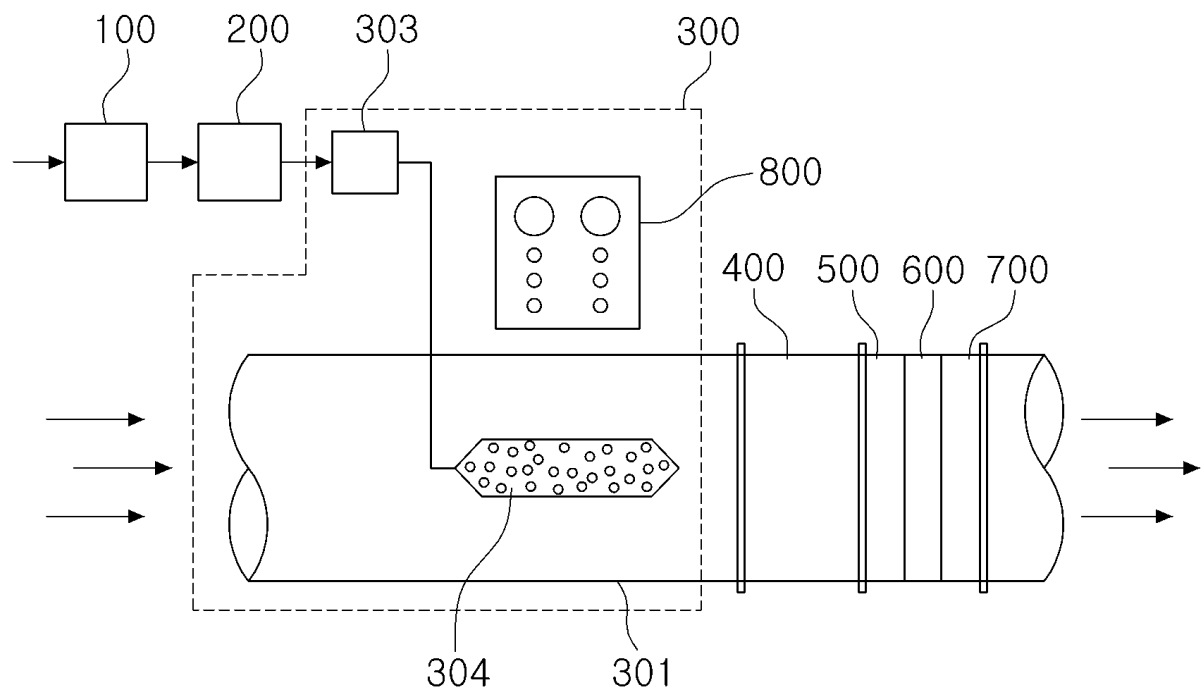
Family 6/25 - FAMPAT - ©Questel

### Title

(KR20180086350)

Quantum energy irradiation device equipped with water vapor ionization device

### Images



### Publication numbers with kind code & date

KR20180086350 A 2018-07-31 KR20180086350



### Abstract

(KR20180086350)

The present invention relates to a quantum energy irradiation device having a water vapor ionization device embedded therein, capable of efficiently performing fumigation disinfection of crops and disinfection of bacteria in floating air. According to the present invention, the quantum energy irradiation device having a water vapor ionization device embedded therein comprises: a water vapor generation unit evaporating tap water supplied inside a flow path to produce dry vapor; a first ion generator applying field electron energy generated by high voltage discharge to the produced dry vapor to generate a hydrogen cation ( $H^+$ ) and a hydroxyl ion ( $OH$  radical) through an electrochemical reaction of a water molecule of the dry vapor; a pressurizer to press the generated hydrogen cation ( $H^+$ ) and hydroxyl ion ( $OH$  radical); a mixer injecting the pressed hydrogen cation ( $H^+$ ) and hydroxyl ion ( $OH$  radical) into a gas including air or a liquid including water in a pipe to start a first oxidation/reduction and disinfection process; a second ion generate applying the field electron energy generated by high voltage discharge to the air including air or liquid including water completing the first oxidation/reduction and disinfection process to start a second contaminant purification and disinfection process through a dissolution, ionization, excitation, oxidation, reduction, and electrochemical reaction of gaseous and liquid contaminant molecules; and a multistage quantum energy generator irradiating quantum energy to the air including air or liquid including water completing the second contaminant purification and disinfection process to start a contaminant purification and disinfection process.

**Inventors**

KIM, BU YEOL

Family 7/25 - FAMPAT - ©Questel

**Title**

(WO2018160727)

Stack of electrochemical cells for wastewater treatment with isolated electrodes

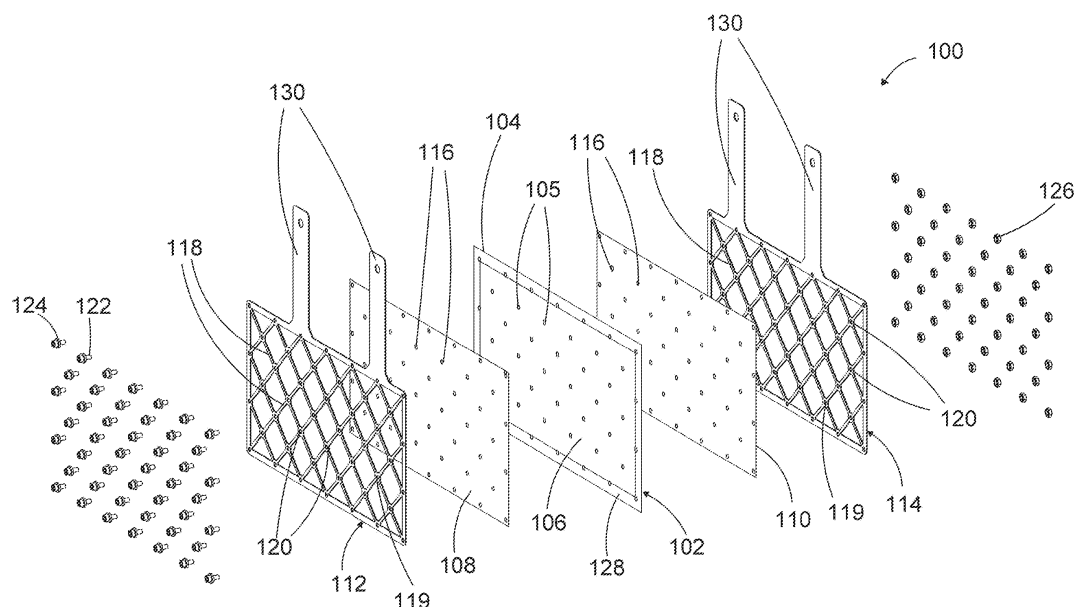
**Images**

Figure 1

**Publication numbers with kind code & date**

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| <a href="#">IN201917034498</a>    | A  | 2019-10-18 | IN201917034498 |
| <a href="#">AU2018229330</a>      | A1 | 2019-08-08 | AU2018229330   |
| <a href="#">CA3051456</a>         | A1 | 2018-09-07 | CA3051456      |
| <a href="#">WO2018/160727</a>     | A1 | 2018-09-07 | WO2018160727   |

**Abstract**

(WO2018/160727)

A stack of electrochemical cells for wastewater treatment is disclosed comprising at least one electrochemical cell having a solid polymer membrane, an **anode** catalyst layer and a **cathode** catalyst layer adjacent to each side of the membrane, an open pore mesh placed next to each of the catalyst layers and a compression frame placed next to each open pore mesh. A cover is placed between the compression frames of two neighbouring electrochemical cells in the stack thereby forming an enclosure which spans the distance between the two neighbouring electrochemical cells thereby isolating the **cathode** catalyst layer or the **anode** catalyst layer from the solution in the reactor tank in which the stack is immersed.

**Inventors**

HARVEY DAVID

WOOD BRENDAN

JAYASANKAR BARATH

BELLEMARE-DAVIS ALEXANDER

Latest standardized assignees - inventors removed

## AXINE WATER TECHNOLOGY

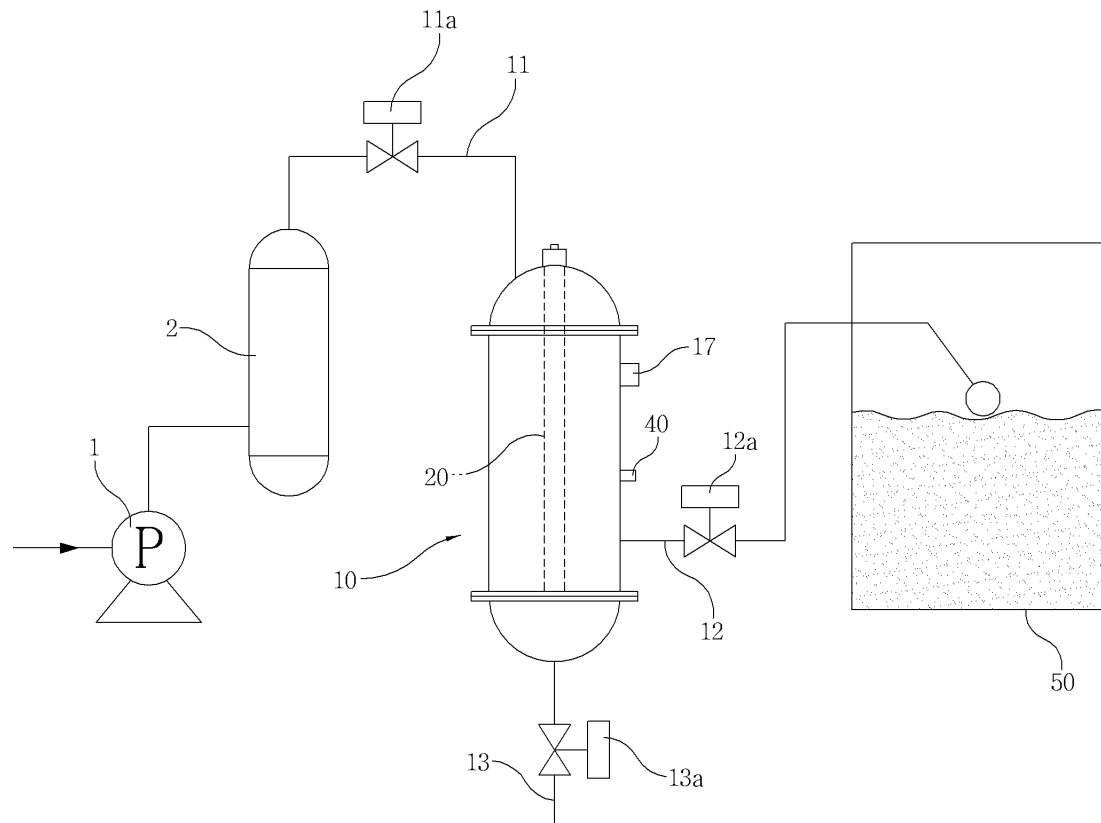
Family 8/25 - FAMPAT - ©Questel

## Title

(KR100875523)

Water-treatment apparatus using an electrode for removing ion pollutant and an ion collector

## Images



## Publication numbers with kind code &amp; date

|               |    |            |               |
|---------------|----|------------|---------------|
| KR100875523   | B1 | 2008-12-23 | KR100875523   |
| KR20080097071 | A  | 2008-11-04 | KR20080097071 |



## Abstract

(KR20080097071)

PURPOSE: A water-treatment apparatus using an electrode for removing ion pollutant and an ion collector is provided to treat consecutively water polluted in subsurface water or industrial water due to the ion pollutant by using a water treatment tank including an anode and a cathode.

CONSTITUTION: A water treatment tank(10) Includes a subsurface water supply tube which is opened and closed by a valve, a treated water exhausting pipe and a washing water exhausting pipe. The first electrode(20) is combined inside the water treatment tank and generates one electrode of a positive electrode and a negative electrode. The ion collector is filled inside the water treatment tank and collects the ion from the subsurface water which is supplied from the water treatment tank. The second electrode(40) is mounted to a circumference of the first electrode inside the water treatment tank and generates electrode different from the first electrode rod. The control unit converts electrodes applied in the first and the second electrode material.

(C) KIPO 2009

## Inventors

CHO, HEUY NAM

CHO, EUN SUP

Family 9/25 - FAMPAT - ©Questel

**Title**

(WO2014190411)

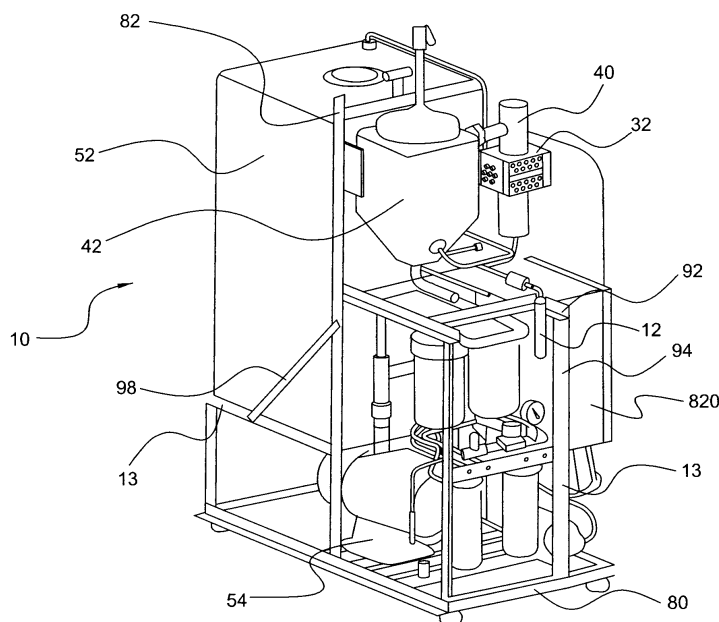
Point of use **water** treatment system**Images**

FIG. 3

**Publication numbers with kind code & date**

WO2014/190411 A1 2014-12-04 WO2014190411

**Abstract**

(WO2014/190411)

A point of use **water** treatment system comprises a **water** treatment chamber having a fluid inlet, and a fluid outlet, and at least one permeable electrolytic cell disposed therebetween. The electrolytic cell comprises a non-sacrificial **anode** and a perforated **cathode** coaxially disposed with respect to one another and having a gap therebetween. A **water** holding tank in is fluid connection with the **water** treatment chamber for holding **water** activated by passage through the electrolytic cell. A post settling filtration means is provided for removal of flocculent residue not settled from the **water** while in the **water** holding tank. The non-sacrificial **anode** comprises a core plated with platinum. The point of use **water** treatment system has, in fluid connection with the **water** treatment chamber, a catalytic hydrogen trap comprising a main body defining a multiplicity of openings therethrough, and all exposed surfaces thereof comprising platinum.

**Inventors**

COOK BRIAN G

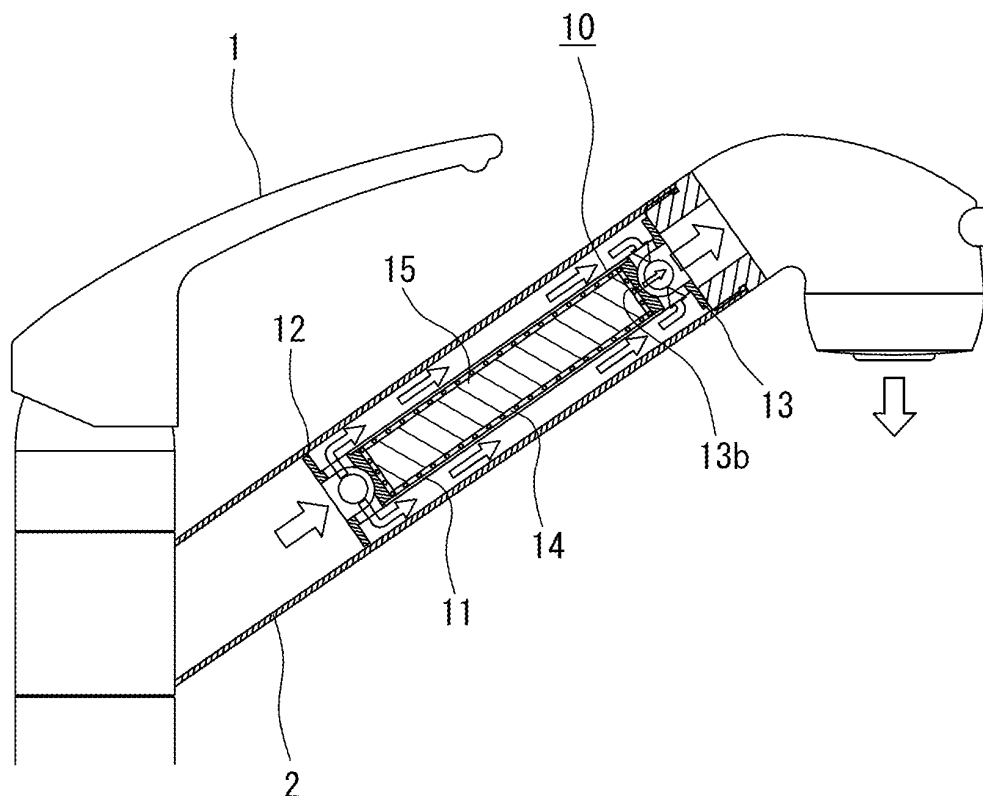
**Latest standardized assignees - inventors removed**ESIL **WATER** TREAT

Family 10/25 - FAMPAT - ©Questel

**Title**

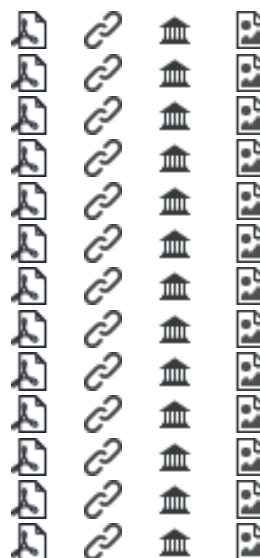
(WO201023712)

**Water** sterilizing apparatus**Images**



#### Publication numbers with kind code & date

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#### Abstract

(WO2010/023712)

A **water** sterilizing apparatus that applies sterilizing / antibiotic / antifungal / insect proofing capabilities, etc. to passing **water**, or flowing **water**, or stored **water** for a prolonged period of time. The **water** sterilizing apparatus has a sterilizing unit comprising a base metal element and noble metal element coaxially piled on each other with a space holding member interposed therebetween. The sterilizing unit is disposed in passing **water**/flowing **water**, or immersed in stored **water**, so that a battery reaction is induced in a uniform interstitial space between the base metal element and the noble metal element through the medium of **water**. Thus, metal **ions** in completely **ionized** form are leached from the base metal element to thereby apply sterilizing capability to the **water**.

#### Inventors

HAYAKAWA YOUJI  
HAYAKAWA AKIHIRO  
HAYAKAWA SHINJI

Family 11/25 - FAMPAT - ©Questel

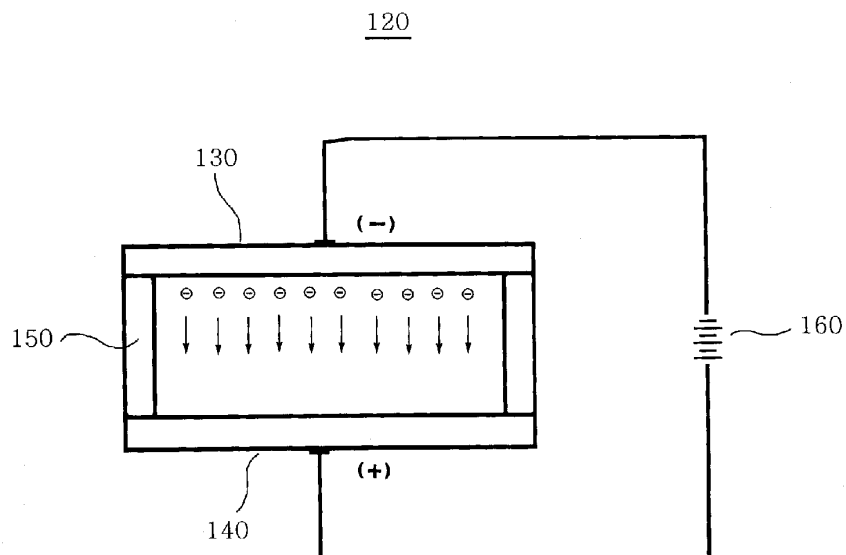
**Title**

(EP2287515)

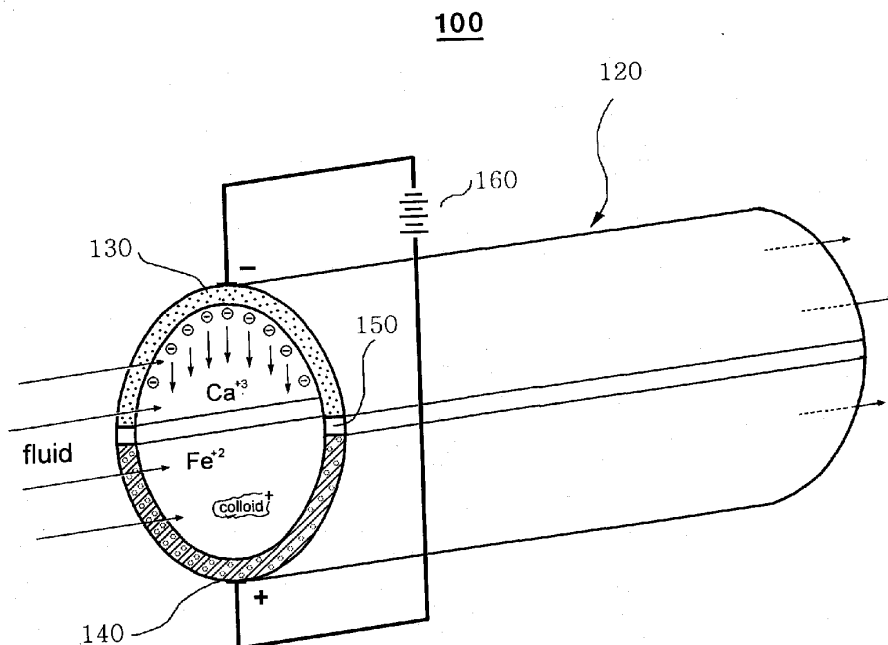
Apparatus for electric treatment of fluids

**Images**

[Fig. 1]



[Fig. 2]

**Publication numbers with kind code & date**[EP2287515](#)

A4 2012-04-04 EP2287515

[US20110297548](#)

A1 2011-12-08 US20110297548

[CN102099611](#)

A 2011-06-15 CN102099611



|                               |    |            |               |                                                                                   |                                                                                    |                                                                                     |                                                                                     |
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| <a href="#">KR20090118713</a> | A  | 2009-11-18 | KR20090118713 |  |  |  |  |

### Abstract

(EP2287515)

An apparatus for electric treatment of fluid is provided. When heavy metal **ions** or a colloid carrying a positive charge is present in fluid traveling through metal pipework, a negative **electrode** is formed using a metal component having high **ionization** tendency, a positive **electrode** is formed using a metal component having **ionization** tendency lower than that of hydrogen, and an insulating layer is formed between the positive and negative electrodes. When conductive fluid passes through the positive **electrode** and the negative **electrode**, direct electrical power is applied to make the negative **electrode** emit electrons, which react with heavy metal **ions** present in the conductive fluid, thereby reducing the heavy metal **ions**. The metal component of the negative **electrode** emits electrons when **ionized** based on its **ionization** tendency and via an electrostatic action. Much more electrons are emitted compared to existing fluid treatment systems, and positive charges are removed more efficiently.

### Inventors

SHIM HAK-SUB

LEE DEOK-SU

### Latest standardized assignees - inventors removed

JINHAENG WATERWAY

Family 12/25 - FAMPAT - ©Questel

### Title

(EP3218313)

Electrolytic cell with advanced oxidation process and electro catalytic paddle **electrode**

### Images

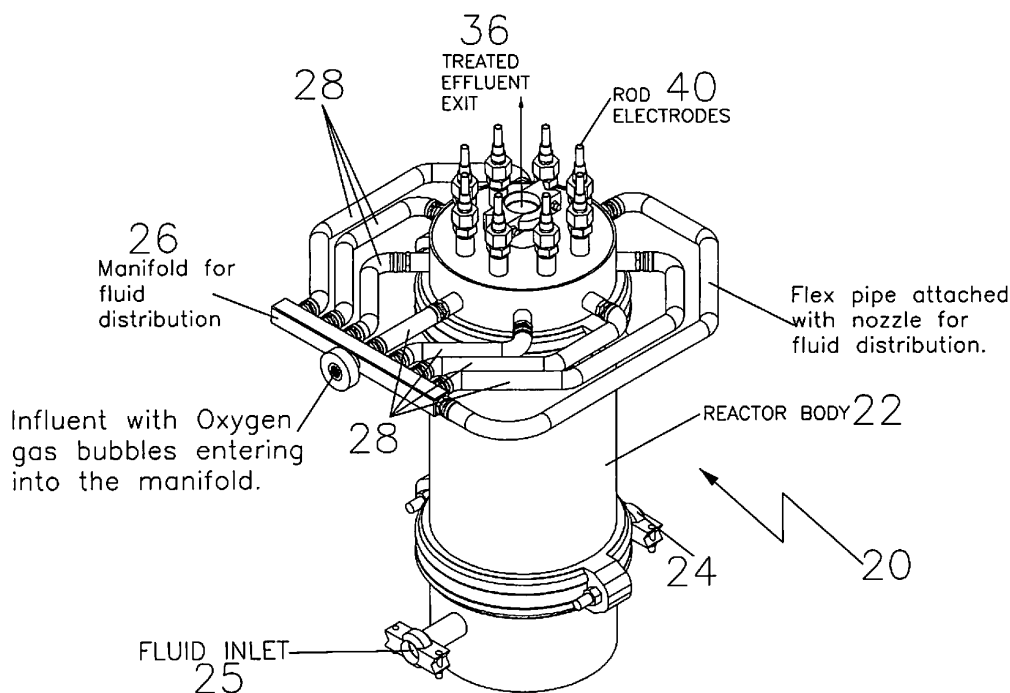


FIG.1  
ELECTRO-CHEMICAL  
CELL REACTOR

#### Publication numbers with kind code & date

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|----------------|----|------------|----------------|
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#### Abstract

(EP3218313)

Electrolytically treating **water** through influent inlet arrangements for cavitation and one or more pairs of electrodes. The electrodes can provide continuous anodic and cathodic operation for treating **water**. The pressurized influent premixed with oxidant gas can be pumped into the reactor vessel through the mixing nozzles arranged radially along the circumference. The polarity of the **current** to the **electrode** can be periodically reversed at a set interval. An electro-catalytic paddle **electrode** can be used for the treatment of flowback and produced **water**. The paddle **electrode** can consist of alternate pentagonal flat plate electrodes separated by adjustable variable distance Teflon spacers. The paddle **electrode** is provided with a chemical coating capable of switching/reversing the polarity of anodes and cathodes at ultra high frequencies under very high **current** flowing conditions thus making it more efficient, stable and durable under demanding field conditions.

#### Inventors

FRAIM MICHAEL

JAKHETE SANJEEV

## Latest standardized assignees - inventors removed

GLOBAL WATER HOLDINGS

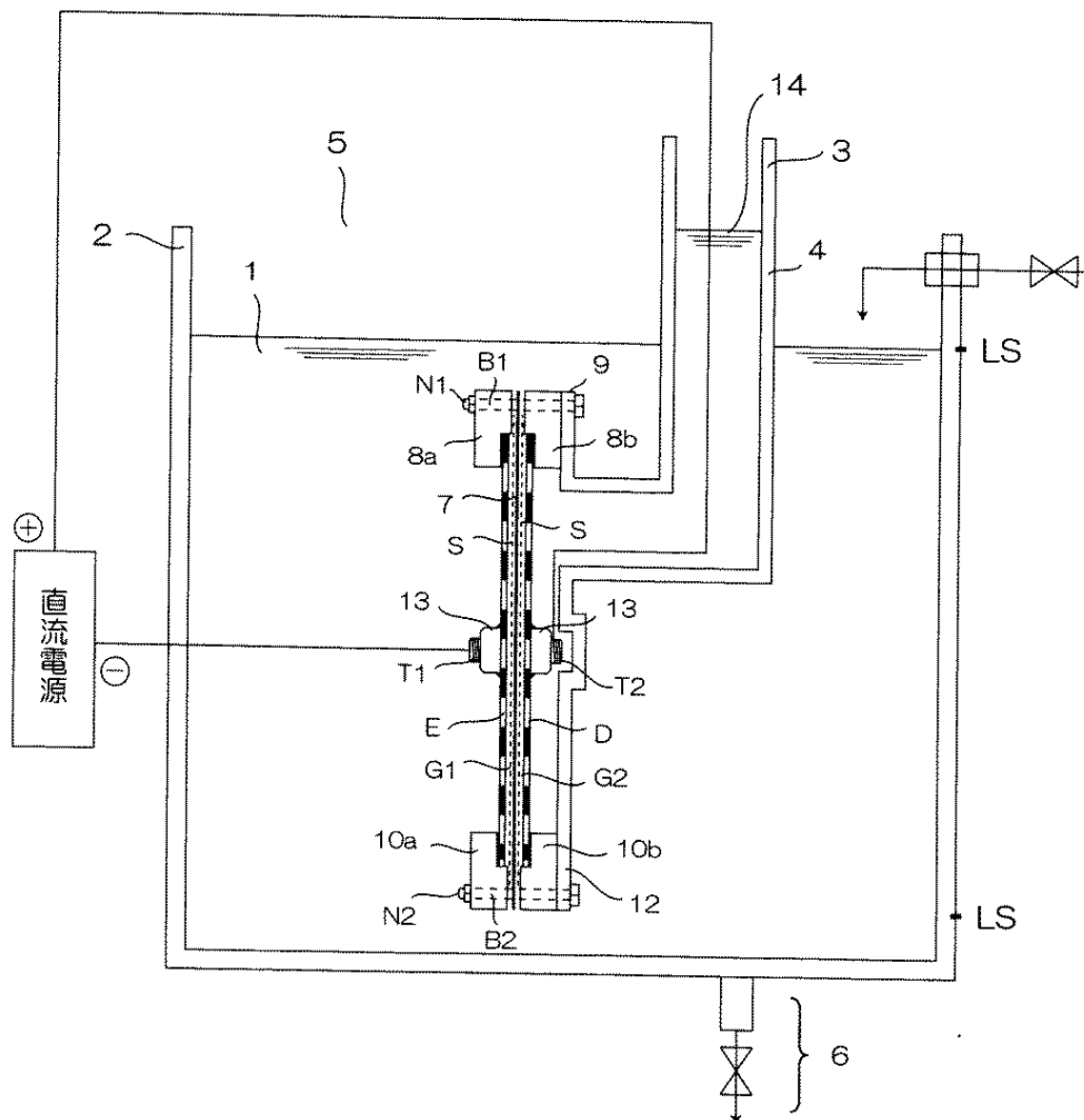
Family 13/25 - FAMPAT - ©Questel

## Title

(JP2012040489)

Method and device for generating electrolytic ion water

## Images



## Publication numbers with kind code &amp; date

|                              |    |            |              |
|------------------------------|----|------------|--------------|
| <a href="#">CN102372341</a>  | B  | 2014-02-26 | CN102372341B |
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| <a href="#">JP2012040489</a> | A  | 2012-03-01 | JP2012040489 |



## Abstract

(JP2012040489)

PROBLEM TO BE SOLVED: To provide a method and device for generating electrolytic ion water, capable of efficiently generating an alkaline electrolytic water having a desired pH value at low cost.

**SOLUTION:** The device for generating the electrolytic **ion water** includes a generation tank capable of storing a raw **water**, an electrolyte tank provided with an electrolyte-storing chamber capable of storing an aqueous electrolyte solution, an **ion-exchange** membrane, and the **anode** and **cathode** plates sandwiching the **ion** exchange membrane. The electrolyte tank can be immersed into the raw **water** in the generation tank, and the **ion** exchange membrane partitions the raw **water** in the generation tank and the electrolyte solution in the electrolyte storing chamber of the electrolyte tank. The **anode** plate is arranged at the side of the electrolyte storing chamber to enable contact with the electrolyte solution in the electrolyte storing chamber, and the **cathode** plate is arranged at a raw **water** side to enable contact with the raw **water** in the generation tank, thus isolating the generation tank from the electrolyte tank immersed in the raw **water**.

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#### Inventors

MATSUZAWA TAMIO

**Latest standardized assignees - inventors removed**

E-PLAN

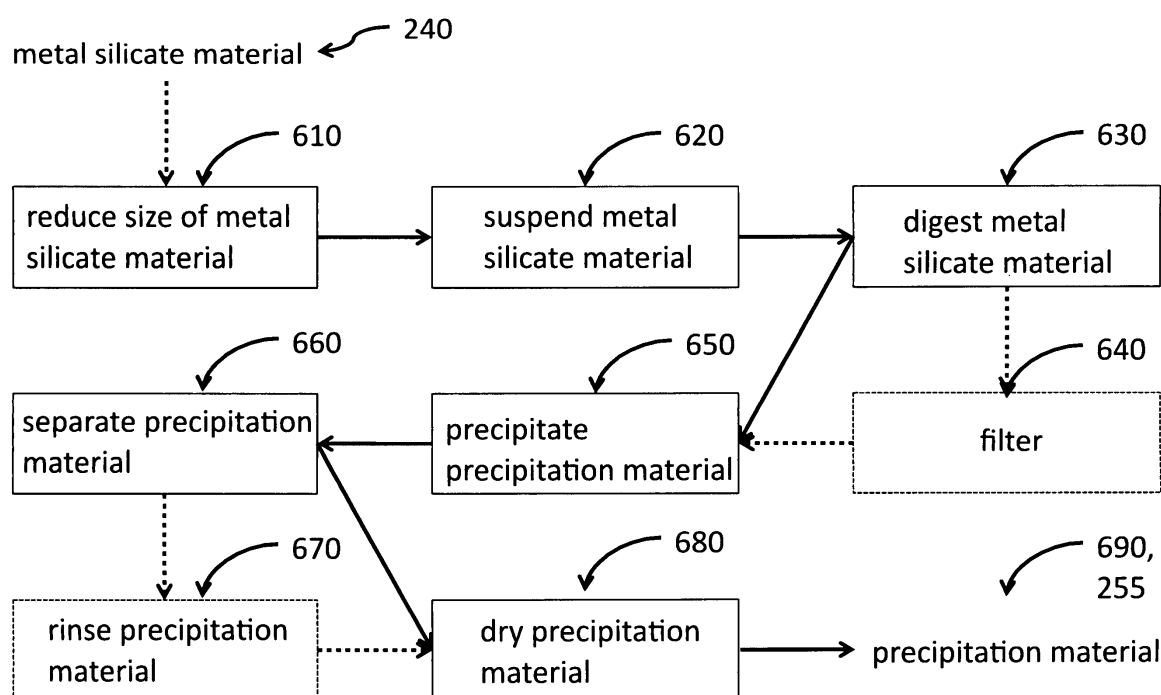
Family 14/25 - FAMPAT - ©Questel

#### Title

(EP2118004)

Methods of sequestering co2

#### Images



#### Publication numbers with kind code & date

|               |    |            |               |
|---------------|----|------------|---------------|
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| KR20100105860     | A  | 2010-09-30 | KR20100105860 |  |  |  |  |
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| US20100239467     | A1 | 2010-09-23 | US20100239467 |  |  |  |  |
| US7790012         | B2 | 2010-09-07 | US7790012     |  |  |  |  |
| EP2207753         | A1 | 2010-07-21 | EP2207753     |  |  |  |  |
| GB2467019         | A  | 2010-07-21 | GB2467019     |  |  |  |  |

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|-------------------|----|------------|---------------|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| GB2460910         | A8 | 2010-07-14 | GB2460910     |    |    |    |    |
| GB2460910         | B8 | 2010-07-14 | GB2460910     |    |    |    |    |
| US7754169         | B2 | 2010-07-13 | US7754169     |    |    |    |    |
| US7749476         | B2 | 2010-07-06 | US7749476     |    |    |    |    |
| WO2010/074686     | A1 | 2010-07-01 | WO201074686   |    |    |    |    |
| WO2010/074687     | A1 | 2010-07-01 | WO201074687   |    |    |    |    |
| EP2200732         | A1 | 2010-06-30 | EP2200732     |    |    |    |    |
| US20100155258     | A1 | 2010-06-24 | US20100155258 |    |    |    |    |
| CA2696088         | A1 | 2010-06-23 | CA2696088     |    |    |    |    |
| GB2460910         | B  | 2010-06-23 | GB2460910     |    |    |    |    |
| US20100144521     | A1 | 2010-06-10 | US20100144521 |    |    |    |    |
| IN7070/CHENP/2009 | A  | 2010-05-21 | IN2009CN07070 |    |    |    |    |
| GB201005476       | D0 | 2010-05-19 | GB201005476   |    |    |                                                                                       |    |
| GB201004571       | D0 | 2010-05-05 | GB201004571   |    |    |                                                                                       |    |
| TW201016599       | A  | 2010-05-01 | TW201016599   |    |    |    |    |
| TW201016600       | A  | 2010-05-01 | TW201016600   |    |    |    |    |
| TW201012755       | A  | 2010-04-01 | TW201012755   |    |    |    |    |
| CN101687648       | A  | 2010-03-31 | CN101687648   |    |    |    |    |
| EP2118004         | A4 | 2010-03-31 | EP2118004     |    |    |    |    |
| AR070056          | A1 | 2010-03-10 | AR--70056     |   |   |                                                                                       |   |
| AU2010200225      | A1 | 2010-02-11 | AU2010200225  |  |  |  |  |
| CA2666147         | A1 | 2010-02-02 | CA2666147     |  |  |  |  |
| AU2008278301      | B2 | 2010-01-21 | AU2008278301  |  |  |  |  |
| AU2009268397      | A1 | 2010-01-14 | AU2009268397  |  |  |  |  |
| CA2700765         | A1 | 2010-01-14 | CA2700765     |  |  |  |  |
| WO2010/006242     | A1 | 2010-01-14 | WO201006242   |  |  |  |  |
| GB2461622         | A  | 2010-01-13 | GB2461622     |  |  |  |  |
| US20100000444     | A1 | 2010-01-07 | US20100000444 |  |  |  |  |
| AU2009260036      | A1 | 2009-12-23 | AU2009260036  |  |  |  |  |
| CA2700715         | A1 | 2009-12-23 | CA2700715     |  |  |  |  |
| GB2460910         | A  | 2009-12-23 | GB2460910     |  |  |  |  |
| WO2009/155378     | A1 | 2009-12-23 | WO2009155378  |  |  |  |  |
| AU2009240866      | B1 | 2009-12-10 | AU2009240866  |  |  |  |  |
| US20090301352     | A1 | 2009-12-10 | US20090301352 |  |  |  |  |
| WO2009/146436     | A1 | 2009-12-03 | WO2009146436  |  |  |  |  |
| CA2670049         | A1 | 2009-11-29 | CA2670049     |  |  |  |  |
| EP2118004         | A1 | 2009-11-18 | EP2118004     |  |  |  |  |
| TW200946210       | A  | 2009-11-16 | TW200946210   |  |  |  |  |
| GB0911440         | D0 | 2009-08-12 | GB200911440   |  |  |                                                                                       |  |
| AU2008278301      | A1 | 2009-07-16 | AU2008278301  |  |  |  |  |
| WO2009/086460     | A1 | 2009-07-09 | WO200986460   |  |  |  |  |
| CA2652803         | A1 | 2009-06-28 | CA2652803     |  |  |  |  |
| GB0901413         | D0 | 2009-03-11 | GB200901413   |  |  |                                                                                       |  |
| GB0901414         | D0 | 2009-03-11 | GB200901414   |  |  |                                                                                       |  |

**Abstract**

(EP2118004)

Methods of sequestering carbon dioxide (CO<sub>2</sub>) are provided. Aspects of the methods include precipitating a storage stable carbon dioxide sequestering product from an alkaline-earth-metal-containing **water** and then disposing of the product, e.g.,

by placing the product in a disposal location or using the product as a component of a manufactured composition. Also provided are systems for practicing methods of the invention.

### Inventors

CONSTANTZ BRENT

YOUNGS ANDREW

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DECKER VALENTIN

KIRK DONALD W

WAY J DOUGLAS

BARD ALLEN J

DANZIGER ROBERT

RYAN CECILY

FERNANDEZ MIGUEL

### Latest standardized assignees - inventors removed

ARELAC

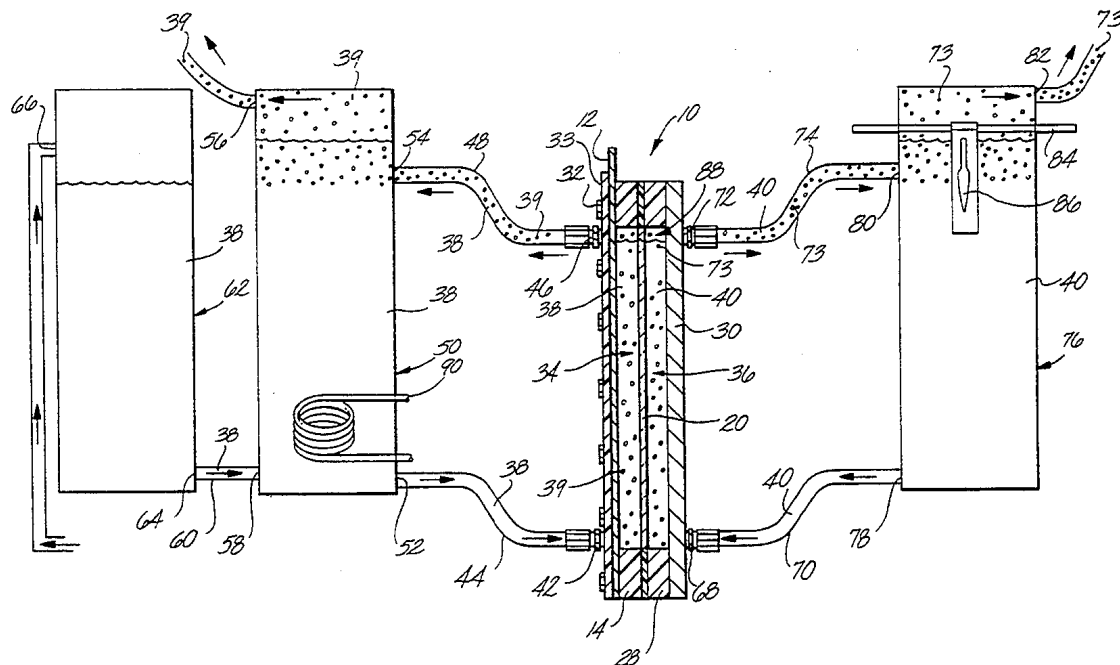
Family 15/25 - FAMPAT - ©Questel

### Title

(EP1031646)

Method for producing a mixed oxidant gas

### Images



### Publication numbers with kind code & date

|                             |    |            |             |
|-----------------------------|----|------------|-------------|
| <a href="#">CA2174545</a>   | C  | 2005-12-27 | CA2174545   |
| <a href="#">JP3428998</a>   | B2 | 2003-07-22 | JP3428998   |
| <a href="#">CN1101861</a>   | C  | 2003-02-19 | CN1101861C  |
| <a href="#">KR100351311</a> | B1 | 2002-11-13 | KR100351311 |
| <a href="#">DE69429531</a>  | T2 | 2002-08-01 | DE69429531  |
| <a href="#">DE69429531</a>  | D1 | 2002-01-31 | DE69429531  |
| <a href="#">EP0725845</a>   |    |            |             |



|                               |    |            |               |                                                                                   |                                                                                    |                                                                                     |                                                                                     |
|-------------------------------|----|------------|---------------|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|                               | B1 | 2001-12-19 | EP-725845     |  |  |  |  |
| <a href="#">EP1031646</a>     | A3 | 2001-01-03 | EP1031646     |  |  |  |  |
| <a href="#">TW406140</a>      | B  | 2000-09-21 | TW-406140     |  |  |  |  |
| <a href="#">EP1031646</a>     | A2 | 2000-08-30 | EP1031646     |  |  |  |  |
| <a href="#">PL176918</a>      | B1 | 1999-08-31 | PL-176918     |  |  |  |  |
| <a href="#">US5736016</a>     | A  | 1998-04-07 | US5736016     |  |  |  |  |
| <a href="#">AU686267</a>      | B2 | 1998-02-05 | AU-686267     |  |  |  |  |
| <a href="#">JPH09512861</a>   | A  | 1997-12-22 | JP09512861    |  |  |  |  |
| <a href="#">EP0725845</a>     | A4 | 1997-10-29 | EP-725845     |  |  |  |  |
| <a href="#">PL318500</a>      | A1 | 1997-06-23 | PL94318500    |  |  |  |  |
| <a href="#">CN1152341</a>     | A  | 1997-06-18 | CN1152341     |  |  |  |  |
| <a href="#">KR19960705960</a> | A  | 1996-11-08 | KR19967005960 |  |  |  |  |
| <a href="#">KR960705960</a>   | A  | 1996-11-08 | KR19960705960 |  |  |  |  |
| <a href="#">EP0725845</a>     | A1 | 1996-08-14 | EP-725845     |  |  |  |  |
| <a href="#">US5458743</a>     | A  | 1995-10-17 | US5458743     |  |  |  |  |
| <a href="#">US5427658</a>     | A  | 1995-06-27 | US5427658     |  |  |  |  |
| <a href="#">AU8084894</a>     | A  | 1995-05-08 | AU9480848     |  |  |  |  |
| <a href="#">CA2174545</a>     | A1 | 1995-04-27 | CA2174545     |  |  |  |  |
| <a href="#">WO95/11326</a>    | A1 | 1995-04-27 | WO9511326     |  |  |  |  |

**Abstract**

(EP1031646)

The invention relates to a method for generating a mixed oxidant gas for treating bodies of **water** by maintaining an anolyte within a specific gravity range comprising the steps of: circulating the anolyte having a first specific gravity to an **anode** chamber of an electrolytic cell from an anolyte reservoir external from the **anode** chamber; circulating the anolyte having the first specific gravity through the **anode** chamber; circulating the anolyte now having a second specific gravity from the **anode** chamber to the anolyte reservoir, wherein the first specific gravity is greater than the second specific gravity; and circulating an anolyte having a third specific gravity to the anolyte reservoir from an anolyte make-up tank external from both the anolyte reservoir and **anode** chamber, wherein the third specific gravity is greater than the first specific gravity.

**Inventors**

ALLEN JEFFREY D

**Latest standardized assignees - inventors removed**

PURELINE TREAT SYSTEMS

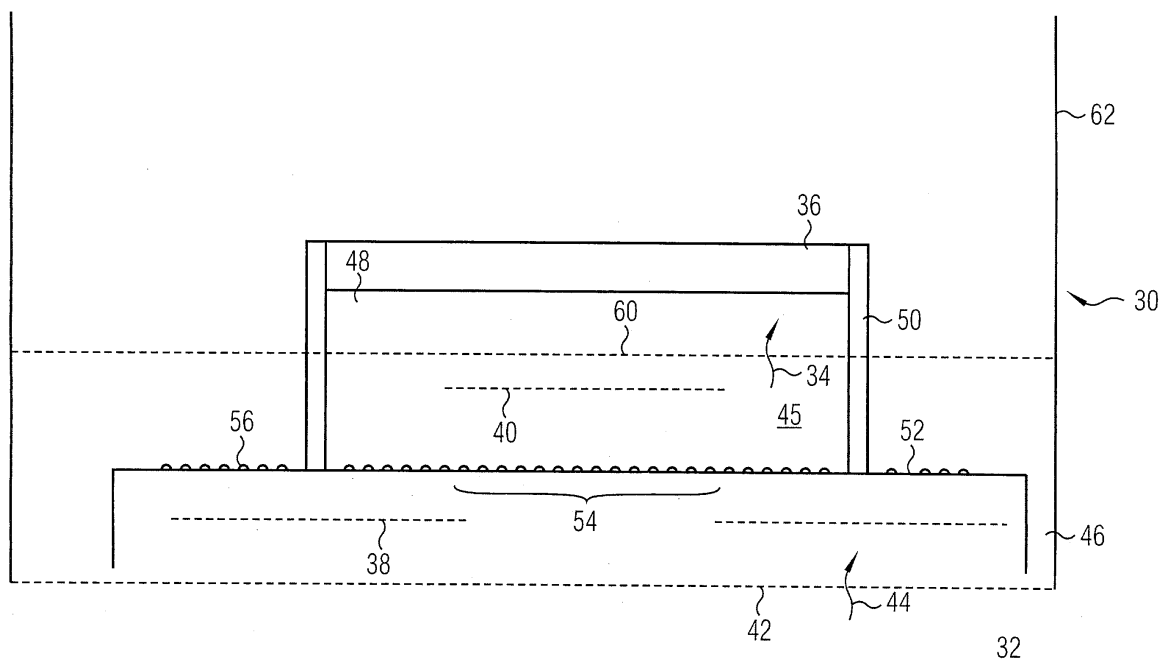
Family 16/25 - FAMPAT - ©Questel

**Title**

(US7201831)

Impurity detection device

**Images**



#### Publication numbers with kind code & date

|                               |    |            |               |
|-------------------------------|----|------------|---------------|
| <a href="#">US8900429</a>     | B2 | 2014-12-02 | US8900429     |
| <a href="#">US20120067744</a> | A1 | 2012-03-22 | US20120067744 |
| <a href="#">US8080142</a>     | B2 | 2011-12-20 | US8080142     |
| <a href="#">US20070138029</a> | A1 | 2007-06-21 | US20070138029 |
| <a href="#">US7201831</a>     | B2 | 2007-04-10 | US7201831     |
| <a href="#">FR2836551</a>     | B1 | 2005-07-01 | FR2836551     |
| <a href="#">DE10307982</a>    | A1 | 2003-09-25 | DE10307982    |
| <a href="#">US20030173233</a> | A1 | 2003-09-18 | US20030173233 |
| <a href="#">FR2836551</a>     | A1 | 2003-08-29 | FR2836551     |



#### Abstract

(US20030173233)

There is provided a sample preparation device and method for preparing a sample of liquid for detection of impurities. First ( 40 ) and second ( 38 ) electrodes are provided, located for immersion in a liquid under test. A semipermeable membrane ( 42 ) is positioned to protect the first **electrode** ( 40 ) from a body of liquid under test ( 32 ). The semipermeable membrane allows the liquid under test to pass therethrough to reach the first **electrode**, while preventing solids carried in the liquid from reaching the first **electrode**, the first **electrode** being positioned to affect the liquid under test in the vicinity of a sensor ( 36 ). Particular embodiments feature a hydrophilic membrane to protect the electrodes from suspended solids in the sample, a thin **electrode** assembly to achieve a faster response and the addition of a heater for temperature control to achieve consistent detection conditions and improved anti-fouling properties.

#### Inventors

VINCENT DAVID ROBERT

#### Latest standardized assignees - inventors removed

CENSAR TECHNOLOGIES

**WATER** SECURITY & TECHNOLOGY

Family 17/25 - FAMPAT - ©Questel

#### Title

(EP1984124)

Method and apparatus for producing humanly-perceptable indicator of electrochemical properties of an output cleaning liquid

#### Images



|               |    |            |               |                                                                                     |                                                                                      |                                                                                       |                                                                                       |
|---------------|----|------------|---------------|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
|               | B2 | 2012-02-24 | JP4934683     |                                                                                     |                                                                                      |                                                                                       |                                                                                       |
| AU2007215285  | B2 | 2012-02-23 | AU2007215285  |    |    |    |    |
| CN102357480   | A  | 2012-02-22 | CN102357480   |    |    |    |    |
| AU2007215286  | B2 | 2012-02-02 | AU2007215286  |    |    |    |    |
| AU2007215284  | B2 | 2012-01-19 | AU2007215284  |    |    |    |    |
| AU2007235602  | B2 | 2012-01-19 | AU2007235602  |    |    |    |    |
| CN101384380   | B  | 2011-12-28 | CN101384380B  |    |    |    |    |
| EP1991372     | B1 | 2011-11-23 | EP1991372     |    |    |    |    |
| US8046867     | B2 | 2011-11-01 | US8046867     |    |    |    |    |
| US8025786     | B2 | 2011-09-27 | US8025786     |    |    |    |    |
| US8025787     | B2 | 2011-09-27 | US8025787     |    |    |    |    |
| US8016996     | B2 | 2011-09-13 | US8016996     |    |    |    |    |
| EP1991369     | B1 | 2011-09-07 | EP1991369     |    |    |    |    |
| US8012339     | B2 | 2011-09-06 | US8012339     |    |    |    |    |
| US8012340     | B2 | 2011-09-06 | US8012340     |    |    |    |    |
| US8007654     | B2 | 2011-08-30 | US8007654     |    |    |    |    |
| US7959785     | B2 | 2011-06-14 | US7959785     |    |    |    |    |
| US7959787     | B2 | 2011-06-14 | US7959787     |    |    |    |    |
| US7959788     | B2 | 2011-06-14 | US7959788     |    |    |    |    |
| US7959789     | B2 | 2011-06-14 | US7959789     |    |    |    |    |
| US20110132749 | A1 | 2011-06-09 | US20110132749 |   |   |   |   |
| EP1991371     | B1 | 2011-06-01 | EP1991371     |  |  |  |  |
| BRPI0707575   | A2 | 2011-05-10 | BR200707575   |  |  |  |  |
| BRPI0707585   | A2 | 2011-05-10 | BR200707585   |  |  |  |  |
| BRPI0707587   | A2 | 2011-05-10 | BR200707587   |  |  |  |  |
| BRPI0707588   | A2 | 2011-05-10 | BR200707588   |  |  |  |  |
| BRPI0707717   | A2 | 2011-05-10 | BR200707717   |  |  |  |  |
| BRPI0707720   | A2 | 2011-05-10 | BR200707720   |  |  |  |  |
| US7891046     | B2 | 2011-02-22 | US7891046     |  |  |  |  |
| CN101410192   | B  | 2010-12-08 | CN101410192B  |  |  |  |  |
| US7836543     | B2 | 2010-11-23 | US7836543     |  |  |  |  |
| CN101421053   | B  | 2010-10-13 | CN101421053B  |  |  |  |  |
| CN101600516   | A  | 2009-12-09 | CN101600516   |  |  |  |  |
| JP2009528852  | A  | 2009-08-13 | JP2009528852  |  |  |  |  |
| JP2009525818  | A  | 2009-07-16 | JP2009525818  |  |  |  |  |
| JP2009525820  | A  | 2009-07-16 | JP2009525820  |  |  |  |  |
| JP2009525821  | A  | 2009-07-16 | JP2009525821  |  |  |  |  |
| JP2009525869  | A  | 2009-07-16 | JP2009525869  |  |  |  |  |
| JP2009526133  | A  | 2009-07-16 | JP2009526133  |  |  |  |  |
| CN101421053   | A  | 2009-04-29 | CN101421053   |  |  |  |  |
| CN101421054   | A  | 2009-04-29 | CN101421054   |  |  |  |  |
| CN101410192   | A  | 2009-04-15 | CN101410192   |  |  |  |  |
| CN101394941   | A  | 2009-03-25 | CN101394941   |  |  |  |  |
| CN101384380   | A  | 2009-03-11 | CN101384380   |  |  |  |  |
| MX2008010115  | A  | 2009-01-07 | MX2008010115  |  |  |                                                                                       |  |
| MX2008010114  | A  | 2008-12-19 | MX2008010114  |  |  |                                                                                       |  |
| MX2008010190  | A  | 2008-12-18 | MX2008010190  |  |  |                                                                                       |  |
| MX2008010194  | A  | 2008-12-18 | MX2008010194  |  |  |                                                                                       |  |

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| MX2008010195  | A  | 2008-12-18 | MX2008010195  |    |    |    |    |
| EP1993743     | A1 | 2008-11-26 | EP1993743     |    |    |    |    |
| EP1991369     | A1 | 2008-11-19 | EP1991369     |    |    |    |    |
| EP1991370     | A1 | 2008-11-19 | EP1991370     |    |    |    |    |
| EP1991371     | A2 | 2008-11-19 | EP1991371     |    |    |    |    |
| EP1991372     | A2 | 2008-11-19 | EP1991372     |    |    |    |    |
| MX2008010120  | A  | 2008-11-12 | MX2008010120  |    |    |    |    |
| KR20080098510 | A  | 2008-11-10 | KR20080098510 |    |    |    |    |
| EP1984124     | A1 | 2008-10-29 | EP1984124     |    |    |    |    |
| KR20080092460 | A  | 2008-10-15 | KR20080092460 |    |    |    |    |
| KR20080092462 | A  | 2008-10-15 | KR20080092462 |    |    |    |    |
| KR20080091834 | A  | 2008-10-14 | KR20080091834 |    |    |    |    |
| KR20080091835 | A  | 2008-10-14 | KR20080091835 |    |    |    |    |
| KR20080091279 | A  | 2008-10-09 | KR20080091279 |    |    |    |    |
| US20080210572 | A1 | 2008-09-04 | US20080210572 |    |    |    |    |
| WO2007/117351 | B1 | 2008-04-17 | WO2007117351  |    |    |    |    |
| WO2007/117351 | A3 | 2008-02-14 | WO2007117351  |    |    |    |    |
| AU2007235602  | A1 | 2007-10-18 | AU2007235602  |    |    |    |    |
| WO2007/092597 | A3 | 2007-10-18 | WO200792597   |    |    |    |    |
| WO2007/117351 | A2 | 2007-10-18 | WO2007117351  |   |   |   |   |
| AU2007215284  | A1 | 2007-08-23 | AU2007215284  |  |  |  |  |
| AU2007215285  | A1 | 2007-08-23 | AU2007215285  |  |  |  |  |
| AU2007215286  | A1 | 2007-08-23 | AU2007215286  |  |  |  |  |
| AU2007215306  | A1 | 2007-08-23 | AU2007215306  |  |  |  |  |
| WO2007/095072 | A1 | 2007-08-23 | WO200795072   |  |  |  |  |
| WO2007/095073 | A1 | 2007-08-23 | WO200795073   |  |  |  |  |
| WO2007/095074 | A1 | 2007-08-23 | WO200795074   |  |  |  |  |
| WO2007/095094 | A1 | 2007-08-23 | WO200795094   |  |  |  |  |
| AU2007212248  | A1 | 2007-08-16 | AU2007212248  |  |  |  |  |
| US20070186367 | A1 | 2007-08-16 | US20070186367 |  |  |  |  |
| US20070186368 | A1 | 2007-08-16 | US20070186368 |  |  |  |  |
| US20070186369 | A1 | 2007-08-16 | US20070186369 |  |  |  |  |
| US20070186954 | A1 | 2007-08-16 | US20070186954 |  |  |  |  |
| US20070186957 | A1 | 2007-08-16 | US20070186957 |  |  |  |  |
| US20070186958 | A1 | 2007-08-16 | US20070186958 |  |  |  |  |
| US20070187261 | A1 | 2007-08-16 | US20070187261 |  |  |  |  |
| US20070187262 | A1 | 2007-08-16 | US20070187262 |  |  |  |  |
| US20070187263 | A1 | 2007-08-16 | US20070187263 |  |  |  |  |
| WO2007/092597 | A2 | 2007-08-16 | WO200792597   |  |  |  |  |

## Abstract

(EP1984124)

A surface cleaning apparatus (100, 300, 370, 380, 500) is provided. The apparatus includes a mobile body (102, 306, 381) configured to travel over a surface (125, 302), a cleaning device (110, 112, 308, 314, 375, 385) carried by the mobile body (102, 306, 381), a liquid flow path (16, 17, 18, 59, 70, 71, 160, 160A, 160B), and an electrolyzing device (10, 40, 50, 161, 162, 163, 324, 325, 326, 503, 504, 505) in the liquid flow path (16, 17, 18, 59, 70, 71, 160, 160A, 160B). An indicator (708, 714) provides a humanly-perceptible indication (720) of an electrical operating characteristic of the electrolyzing device (10, 40, 50, 161, 162, 163, 324, 325, 326, 503, 504, 505).

## Inventors

FIELD BRUCE F

GRONLUND PATRICK J

**Latest standardized assignees - inventors removed**

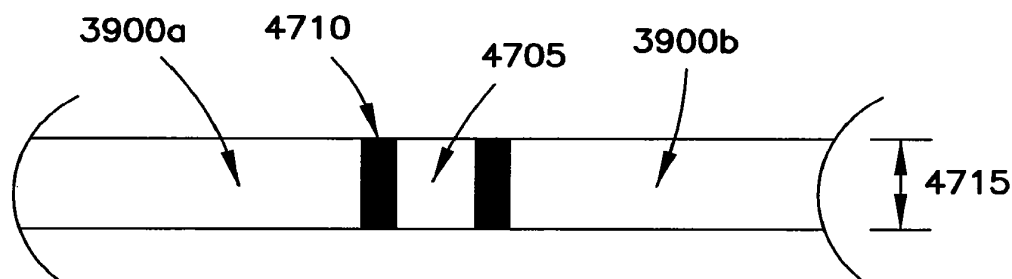
TENNANT

Family 18/25 - FAMPAT - ©Questel

**Title**

(EP2208248)

Electrochemical storage cell

**Images****Publication numbers with kind code & date**

|                                |    |            |                |
|--------------------------------|----|------------|----------------|
| <a href="#">IN321838</a>       | B  | 2019-09-27 | IN-321838      |
| <a href="#">US10381632</a>     | B2 | 2019-08-13 | US10381632     |
| <a href="#">BRPI0819550</a>    | B1 | 2019-07-16 | BR200819550    |
| <a href="#">BRPI0819585</a>    | B1 | 2019-07-02 | BR200819585    |
| <a href="#">BRPI0819537</a>    | B1 | 2019-05-14 | BR200819537    |
| <a href="#">BRPI0819523</a>    | B1 | 2019-04-30 | BR200819523    |
| <a href="#">BRPI0819521</a>    | B1 | 2019-04-16 | BR200819521    |
| <a href="#">BRPI0819583</a>    | B1 | 2019-04-02 | BR200819583    |
| <a href="#">BRPI0819530</a>    | B1 | 2019-03-19 | BR200819530    |
| <a href="#">BRPI0819583</a>    | A8 | 2019-02-12 | BR200819583    |
| <a href="#">BRPI0819583</a>    | A8 | 2019-02-12 | BRPI0819583    |
| <a href="#">IN306255</a>       | B  | 2019-01-24 | IN-306255      |
| <a href="#">US10147930</a>     | B2 | 2018-12-04 | US10147930     |
| <a href="#">EP2210295</a>      | B1 | 2018-07-04 | EP2210295      |
| <a href="#">HUE034580</a>      | T2 | 2018-02-28 | HUE034580      |
| <a href="#">EP2210311</a>      | B1 | 2018-02-07 | EP2210311      |
| <a href="#">IN201718031288</a> | A  | 2017-12-01 | IN201718031288 |
| <a href="#">PL2223375</a>      | T3 | 2017-08-31 | PL2223375      |
| <a href="#">US9741996</a>      | B2 | 2017-08-22 | US9741996      |
| <a href="#">EA027289</a>       | B1 | 2017-07-31 | EA--27289      |
| <a href="#">EA027352</a>       | B1 | 2017-07-31 | EA--27352      |
| <a href="#">ES2627441</a>      | T3 | 2017-07-28 | ES2627441      |
| <a href="#">DK2223375</a>      | T3 | 2017-06-26 | DK2223375T     |



|               |    |            |               |                                                                                     |                                                                                      |                                                                                       |                                                                                       |
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| CA2709114     | C  | 2017-04-18 | CA2709114     |    |    |    |    |
| CA2709138     | C  | 2017-03-28 | CA2709138     |    |    |    |    |
| EP2223375     | B1 | 2017-03-08 | EP2223375     |    |    |    |    |
| EP2618397     | B1 | 2017-02-08 | EP2618397     |    |    |    |    |
| CA2709117     | C  | 2016-08-09 | CA2709117     |    |    |    |    |
| CA2709111     | C  | 2016-05-10 | CA2709111     |    |    |    |    |
| CA2709115     | C  | 2016-05-10 | CA2709115     |    |    |    |    |
| CA2709122     | C  | 2016-05-10 | CA2709122     |    |    |    |    |
| CA2709161     | C  | 2016-05-10 | CA2709161     |    |    |    |    |
| EA022170      | B1 | 2015-11-30 | EA--22170     |    |    |    |    |
| JP5843814     | B2 | 2015-11-27 | JP5843814     |    |    |    |    |
| JP5843815     | B2 | 2015-11-27 | JP5843815     |    |    |    |    |
| EP2223365     | B1 | 2015-10-21 | EP2223365     |    |    |    |    |
| EP2223367     | B1 | 2015-06-24 | EP2223367     |    |    |    |    |
| BRPI0819521   | A2 | 2015-05-26 | BR200819521   |    |    |    |    |
| BRPI0819523   | A2 | 2015-05-26 | BR200819523   |    |    |    |    |
| BRPI0819530   | A2 | 2015-05-26 | BR200819530   |    |    |    |    |
| BRPI0819537   | A2 | 2015-05-26 | BR200819537   |    |    |    |    |
| BRPI0819538   | A2 | 2015-05-26 | BR200819538   |    |    |    |    |
| BRPI0819550   | A2 | 2015-05-19 | BR200819550   |   |   |   |   |
| BRPI0819570   | A2 | 2015-05-05 | BR200819570   |  |  |  |  |
| BRPI0819579   | A2 | 2015-05-05 | BR200819579   |  |  |  |  |
| BRPI0819583   | A2 | 2015-05-05 | BR200819583   |  |  |  |  |
| BRPI0819585   | A2 | 2015-05-05 | BR200819585   |  |  |  |  |
| JP5703345     | B2 | 2015-02-27 | JP5703345     |  |  |  |  |
| US8865335     | B2 | 2014-10-21 | US8865335     |  |  |  |  |
| JP5566908     | B2 | 2014-06-27 | JP5566908     |  |  |  |  |
| EA201300925   | A1 | 2014-05-30 | EA201300925   |  |  |  |  |
| EA201300926   | A1 | 2014-05-30 | EA201300926   |  |  |  |  |
| EA201300927   | A1 | 2014-05-30 | EA201300927   |  |  |  |  |
| JP5550561     | B2 | 2014-05-30 | JP5550561     |  |  |  |  |
| US20140141297 | A1 | 2014-05-22 | US20140141297 |  |  |  |  |
| US20140141315 | A1 | 2014-05-22 | US20140141315 |  |  |  |  |
| US20140141316 | A1 | 2014-05-22 | US20140141316 |  |  |  |  |
| EA019433      | B1 | 2014-03-31 | EA--19433     |  |  |  |  |
| EA019090      | B1 | 2014-01-30 | EA--19090     |  |  |  |  |
| JP2013254739  | A  | 2013-12-19 | JP2013254739  |  |  |  |  |
| JP2013243141  | A  | 2013-12-05 | JP2013243141  |  |  |  |  |
| JP2013232433  | A  | 2013-11-14 | JP2013232433  |  |  |  |  |
| EA018448      | B1 | 2013-08-30 | EA--18448     |  |  |  |  |
| EA018417      | B1 | 2013-07-30 | EA--18417     |  |  |  |  |
| EP2225793     | A4 | 2013-07-24 | EP2225793     |  |  |  |  |
| EP2618396     | A1 | 2013-07-24 | EP2618396     |  |  |  |  |
| EP2618397     | A1 | 2013-07-24 | EP2618397     |  |  |  |  |
| EP2618403     | A1 | 2013-07-24 | EP2618403     |  |  |  |  |
| EP2210295     | A4 | 2013-06-12 | EP2210295     |  |  |  |  |
| JP5279839     | B2 | 2013-05-31 | JP5279839     |  |  |  |  |
| JP5269094     | B2 | 2013-05-17 | JP5269094     |  |  |  |  |

|                   |    |            |               |                                                                                     |                                                                                      |                                                                                       |                                                                                       |
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| JP5269095         | B2 | 2013-05-17 | JP5269095     |    |    |    |    |
| EP2210294         | A4 | 2013-05-01 | EP2210294     |    |    |    |    |
| JP5237389         | B2 | 2013-04-05 | JP5237389     |    |    |    |    |
| EP2223375         | A4 | 2013-03-27 | EP2223375     |    |    |    |    |
| US8404379         | B2 | 2013-03-26 | US8404379     |    |    |    |    |
| US8399116         | B2 | 2013-03-19 | US8399116     |    |    |    |    |
| US8383257         | B2 | 2013-02-26 | US8383257     |    |    |    |    |
| JP5188582         | B2 | 2013-02-01 | JP5188582     |    |    |    |    |
| KR101224172       | B1 | 2013-01-21 | KR101224172   |    |    |    |    |
| EA017498          | B1 | 2012-12-28 | EA--17498     |    |    |    |    |
| KR101215414       | B1 | 2012-12-27 | KR101215414   |    |    |    |    |
| KR101213629       | B1 | 2012-12-20 | KR101213629   |    |    |    |    |
| KR101205885       | B1 | 2012-11-30 | KR101205885   |    |    |    |    |
| JP5132783         | B2 | 2012-11-16 | JP5132783     |    |    |    |    |
| KR101200856       | B1 | 2012-11-14 | KR101200856   |    |    |    |    |
| KR101196376       | B1 | 2012-11-05 | KR101196376   |    |    |    |    |
| EA017128          | B1 | 2012-10-30 | EA--17128     |    |    |    |    |
| EA017156          | B1 | 2012-10-30 | EA--17156     |   |   |   |   |
| KR101188322       | B1 | 2012-10-09 | KR101188322   |  |  |  |  |
| KR101172691       | B1 | 2012-08-09 | KR101172691   |  |  |  |  |
| EP2210301         | A4 | 2012-07-18 | EP2210301     |  |  |  |  |
| EP2223367         | A4 | 2012-07-18 | EP2223367     |  |  |  |  |
| KR101159157       | B1 | 2012-07-13 | KR101159157   |  |  |  |  |
| EP2210297         | A4 | 2012-07-04 | EP2210297     |  |  |  |  |
| US8202644         | B2 | 2012-06-19 | US8202644     |  |  |  |  |
| US8193770         | B2 | 2012-06-05 | US8193770     |  |  |  |  |
| KR101146662       | B1 | 2012-05-24 | KR101146662   |  |  |  |  |
| EP2208248         | A4 | 2012-03-28 | EP2208248     |  |  |  |  |
| IN4203/DELNP/2010 | A  | 2012-02-10 | IN2010DN04203 |  |  |  |  |
| IN4242/DELNP/2010 | A  | 2012-02-10 | IN2010DN04242 |  |  |  |  |
| IN4243/DELNP/2010 | A  | 2012-02-10 | IN2010DN04243 |  |  |  |  |
| IN4272/DELNP/2010 | A  | 2012-02-03 | IN2010DN04272 |  |  |  |  |
| US8092936         | B2 | 2012-01-10 | US8092936     |  |  |  |  |
| IN4204/DELNP/2010 | A  | 2011-11-11 | IN2010DN04204 |  |  |  |  |
| IN4273/DELNP/2010 | A  | 2011-11-11 | IN2010DN04273 |  |  |  |  |
| JP2011510433      | A  | 2011-03-31 | JP2011510433  |  |  |  |  |
| JP2011508942      | A  | 2011-03-17 | JP2011508942  |  |  |  |  |
| JP2011508389      | A  | 2011-03-10 | JP2011508389  |  |  |  |  |
| JP2011508390      | A  | 2011-03-10 | JP2011508390  |  |  |  |  |
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| JP2011508392      | A  | 2011-03-10 | JP2011508392  |  |  |  |  |
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| JP2011508395      | A  | 2011-03-10 | JP2011508395  |  |  |  |  |
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| EA201070706       | A1 | 2011-02-28 | EA201070706   |  |  |  |  |
| EA201070708       | A1 | 2011-02-28 | EA201070708   |  |  |  |  |
| EA201070709       | A1 | 2011-02-28 | EA201070709   |  |  |  |  |

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| EA201070710       | A1 | 2011-02-28 | EA201070710   |    |    |    |    |
| EA201070711       | A1 | 2011-02-28 | EA201070711   |    |    |    |    |
| EA201070712       | A1 | 2011-02-28 | EA201070712   |    |    |    |    |
| EA201070716       | A1 | 2011-02-28 | EA201070716   |    |    |    |    |
| EA201070717       | A1 | 2011-02-28 | EA201070717   |    |    |    |    |
| EP2210311         | A4 | 2011-01-19 | EP2210311     |    |    |    |    |
| EP2223365         | A4 | 2011-01-12 | EP2223365     |    |    |    |    |
| EA201070705       | A1 | 2010-12-30 | EA201070705   |    |    |    |    |
| EA201070707       | A1 | 2010-12-30 | EA201070707   |    |    |    |    |
| IN4350/DELNP/2010 | A  | 2010-11-19 | IN2010DN04350 |    |    |    |    |
| IN4351/DELNP/2010 | A  | 2010-11-19 | IN2010DN04351 |    |    |    |    |
| IN4307/DELNP/2010 | A  | 2010-11-12 | IN2010DN04307 |    |    |    |    |
| IN4308/DELNP/2010 | A  | 2010-11-12 | IN2010DN04308 |    |    |    |    |
| KR20100101115     | A  | 2010-09-16 | KR20100101115 |    |    |    |    |
| KR20100101116     | A  | 2010-09-16 | KR20100101116 |    |    |    |    |
| KR20100099217     | A  | 2010-09-10 | KR20100099217 |    |    |    |    |
| EP2225793         | A1 | 2010-09-08 | EP2225793     |    |    |    |    |
| KR20100098540     | A  | 2010-09-07 | KR20100098540 |   |   |   |   |
| KR20100097193     | A  | 2010-09-02 | KR20100097193 |  |  |  |  |
| EP2223365         | A1 | 2010-09-01 | EP2223365     |  |  |  |  |
| EP2223367         | A1 | 2010-09-01 | EP2223367     |  |  |  |  |
| EP2223375         | A1 | 2010-09-01 | EP2223375     |  |  |  |  |
| KR20100090295     | A  | 2010-08-13 | KR20100090295 |  |  |  |  |
| KR20100088704     | A  | 2010-08-10 | KR20100088704 |  |  |  |  |
| KR20100088705     | A  | 2010-08-10 | KR20100088705 |  |  |  |  |
| EP2210294         | A1 | 2010-07-28 | EP2210294     |  |  |  |  |
| EP2210295         | A1 | 2010-07-28 | EP2210295     |  |  |  |  |
| EP2210297         | A1 | 2010-07-28 | EP2210297     |  |  |  |  |
| EP2210301         | A1 | 2010-07-28 | EP2210301     |  |  |  |  |
| EP2210311         | A1 | 2010-07-28 | EP2210311     |  |  |  |  |
| KR20100084703     | A  | 2010-07-27 | KR20100084703 |  |  |  |  |
| KR20100084581     | A  | 2010-07-26 | KR20100084581 |  |  |  |  |
| EP2208248         | A1 | 2010-07-21 | EP2208248     |  |  |  |  |
| WO2009/079961     | A8 | 2010-06-24 | WO200979961   |  |  |  |  |
| WO2009/079962     | A8 | 2010-06-24 | WO200979962   |  |  |  |  |
| WO2009/079964     | A8 | 2010-06-24 | WO200979964   |  |  |  |  |
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| WO2009/079966     | A8 | 2010-06-24 | WO200979966   |  |  |  |  |
| WO2009/082954     | A8 | 2010-06-24 | WO200982954   |  |  |  |  |
| WO2009/082955     | A8 | 2010-06-24 | WO200982955   |  |  |  |  |
| WO2009/082956     | A8 | 2010-06-24 | WO200982956   |  |  |  |  |
| WO2009/082957     | A8 | 2010-06-24 | WO200982957   |  |  |  |  |
| WO2009/082958     | A8 | 2010-06-24 | WO200982958   |  |  |  |  |
| CA2709115         | A1 | 2009-07-09 | CA2709115     |  |  |  |  |
| CA2709117         | A1 | 2009-07-09 | CA2709117     |  |  |  |  |
| CA2709122         | A1 | 2009-07-09 | CA2709122     |  |  |  |  |
| CA2709138         | A1 | 2009-07-09 | CA2709138     |  |  |  |  |
| CA2709161         | A1 | 2009-07-09 | CA2709161     |  |  |  |  |

|               |    |            |               |                                                                                     |                                                                                      |                                                                                       |                                                                                       |
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| WO2009/082954 | A1 | 2009-07-09 | WO200982954   |    |    |    |    |
| WO2009/082955 | A1 | 2009-07-09 | WO200982955   |    |    |    |    |
| WO2009/082956 | A1 | 2009-07-09 | WO200982956   |    |    |    |    |
| WO2009/082957 | A1 | 2009-07-09 | WO200982957   |    |    |    |    |
| WO2009/082958 | A1 | 2009-07-09 | WO200982958   |    |    |    |    |
| CA2709111     | A1 | 2009-07-02 | CA2709111     |    |    |    |    |
| CA2709112     | A1 | 2009-07-02 | CA2709112     |    |    |    |    |
| CA2709114     | A1 | 2009-07-02 | CA2709114     |    |    |    |    |
| CA2709120     | A1 | 2009-07-02 | CA2709120     |    |    |    |    |
| CA2709661     | A1 | 2009-07-02 | CA2709661     |    |    |    |    |
| WO2009/079961 | A1 | 2009-07-02 | WO200979961   |    |    |    |    |
| WO2009/079962 | A1 | 2009-07-02 | WO200979962   |    |    |    |    |
| WO2009/079964 | A1 | 2009-07-02 | WO200979964   |    |    |    |    |
| WO2009/079965 | A1 | 2009-07-02 | WO200979965   |    |    |    |    |
| WO2009/079966 | A1 | 2009-07-02 | WO200979966   |    |    |    |    |
| US20090159311 | A1 | 2009-06-25 | US20090159311 |    |    |    |    |
| US20090159347 | A1 | 2009-06-25 | US20090159347 |    |    |    |    |
| US20090159354 | A1 | 2009-06-25 | US20090159354 |    |    |    |    |
| US20090162737 | A1 | 2009-06-25 | US20090162737 |    |    |    |    |
| US20090162738 | A1 | 2009-06-25 | US20090162738 |   |   |   |   |
| US20090162739 | A1 | 2009-06-25 | US20090162739 |  |  |  |  |
| US20090162740 | A1 | 2009-06-25 | US20090162740 |  |  |  |  |
| US20090162741 | A1 | 2009-06-25 | US20090162741 |  |  |  |  |
| US20090162744 | A1 | 2009-06-25 | US20090162744 |  |  |  |  |
| US20090162747 | A1 | 2009-06-25 | US20090162747 |  |  |  |  |
| CN201146250   | Y  | 2008-11-05 | CN201146250U  |  |  |  |  |

**Abstract**

(EP2208248)

An electrochemical storage cell is disclosed that comprises a **cathode** sheet, an **anode** sheet, and a separator sheet between the **cathode** and **anode** sheets. A metal foil **current** collector extends from a longitudinal edge of the **cathode** sheet. A further metal foil **current** collector extends from a longitudinal edge of the **anode** sheet. The **anode** sheet, **cathode** sheet, and separator sheet are wound in a flattened coil shape to produce a core in which the metal foil **current** collector of the **cathode** sheet extends beyond the separator sheet at one end of the core and the metal **current** collector of the **anode** sheet extends beyond the separator sheet at an opposite end of the core. Overlying layers of the metal foil **current** collector of the **cathode** sheet are compressed together and placed in electrical communication with a positive terminal of the cell while overlying layers of the metal foil **current** collector of the **anode** sheet are compressed together and placed in electrical communication with a negative terminal of the cell.

**Inventors**

HAN LEI

GU HONGJUAN

ZHENG WEIXIN

SHEN XI

**Latest standardized assignees - inventors removed**

BYD

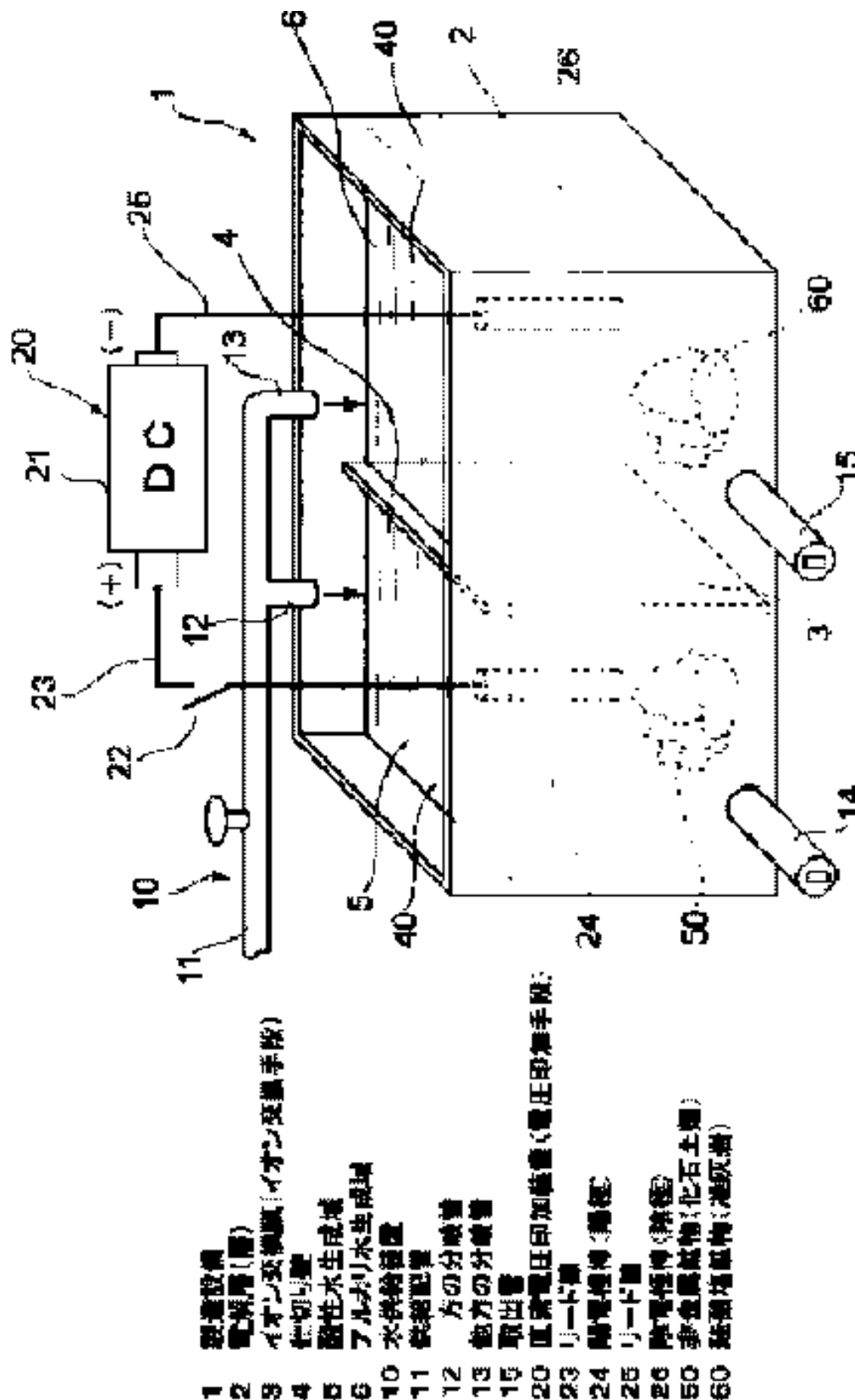
Family 19/25 - FAMPAT - ©Questel

**Title**

(JP2001334271)

Method for making acidic **water** and alkaline **water**

## Images



### Publication numbers with kind code & date

JP3535451

B2 2004-06-07

JP3535451

JP2001334271

A 2001-12-04

JP2001334271



## Abstract

(JP2001334271)

PROBLEM TO BE SOLVED: To solve the point at issue such that hypochlorous acid and chlorine gas are generated in a conventional method for making acidic water and alkaline water to exert a bad influence upon environment.

SOLUTION: An electrolytic cell 2 filled with tap water 40 is demarcated into an acidic water forming region 5 and an

alkaline **water** forming region 6 by an **ion** exchange membrane 3 and a predetermined amount of a nonmetal mineral is charged in the acidic **water** forming region 5 while a predetermined amount of a silicate mineral 60 is charged in the alkaline **water** forming region 6 and the **anode** rod 24 of a DC **voltage** applying device 20 is arranged in the acidic **water** forming region 5 and the **cathode** rod 26 of the DC **voltage** applying device 20 is arranged in the alkaline **water** forming region 6 and **voltage** is applied across the **anode** and **cathode** rods 24, 26 not only to modify tap **water** 40 to acidic **water** in the acidic **water** forming region 5 but also to modify tap **water** 40 to alkaline **water** in the alkaline **water** forming region 6.

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#### **Inventors**

HOSODA YUZO

#### **Latest standardized assignees - inventors removed**

HOSODA DENKI

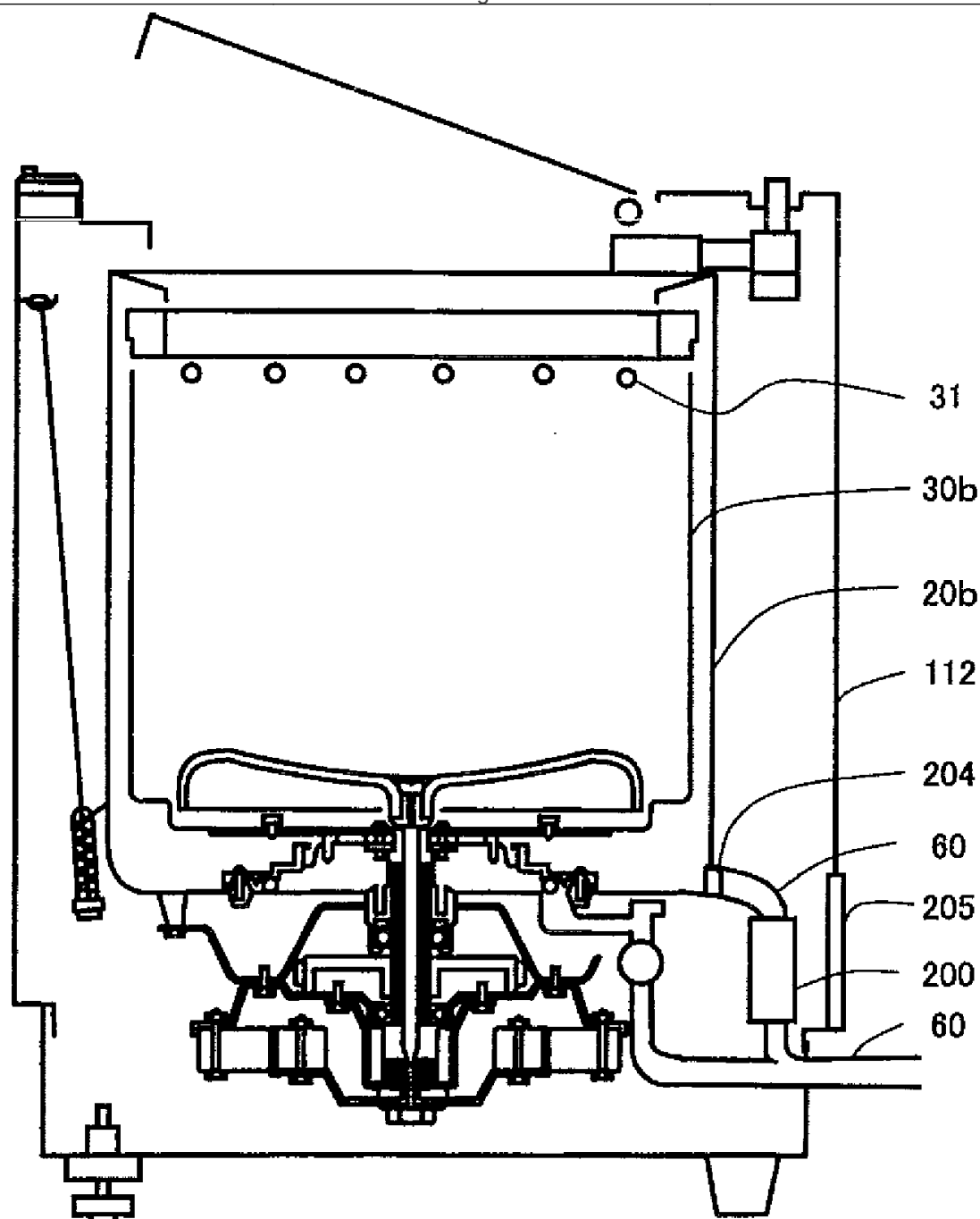
Family 20/25 - FAMPAT - ©Questel

#### **Title**

(EP2045389)

Washing machine and method of recovering metal **ion** therein

#### **Images**



#### Publication numbers with kind code & date

|                               |    |            |               |
|-------------------------------|----|------------|---------------|
| <a href="#">EP2045389</a>     | A4 | 2012-04-25 | EP2045389     |
| <a href="#">CN101495695</a>   | B  | 2011-08-03 | CN101495695B  |
| <a href="#">US20100005838</a> | A1 | 2010-01-14 | US20100005838 |
| <a href="#">CN101495695</a>   | A  | 2009-07-29 | CN101495695   |
| <a href="#">EP2045389</a>     | A1 | 2009-04-08 | EP2045389     |
| <a href="#">JP4086882</a>     | B2 | 2008-02-29 | JP4086882     |
| <a href="#">JP2008029376</a>  | A  | 2008-02-14 | JP2008029376  |
| <a href="#">WO2008/012963</a> | A1 | 2008-01-31 | WO200812963   |



#### Abstract

(EP2045389)

Provided is a washing machine operable to recover metal **ions** supplied to **water** used for laundering. The washing machine (1) comprises a metal **ion water** generation part (90) for applying the metal **ions** to **water** and a metal **ion** recovery unit (200) disposed so as to contact the **water** with the metal **ions** applied by the metal **ion water** generation part (90), for recovering the metal **ions** in the **water**. In a method for recovering the metal **ions** in the washing machine (1), the metal **ion** recovery

unit (200) is disposed, in the washing machine (1) operable to apply the metal **ions** to a fabric structure, so as to contact the **water** used for laundering and recovers the metal **ions** in the **water**.

**Inventors**

IKEMIZU MUGIHEI

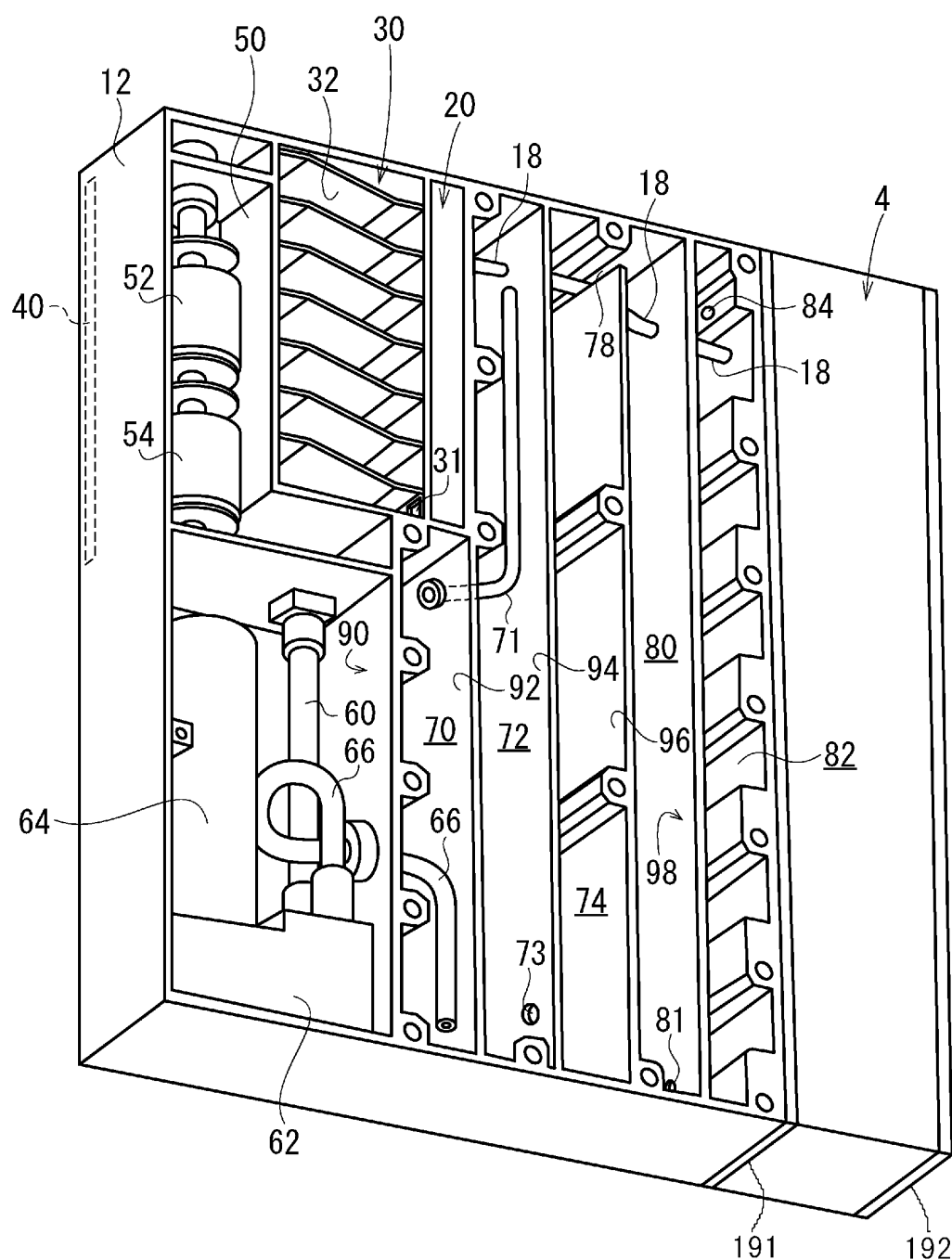
**Latest standardized assignees - inventors removed**

SHARP

Family 21/25 - FAMPAT - ©Questel

**Title**

(WO2006100716)

**Water** treatment apparatus for fuel cell**Images****Publication numbers with kind code & date**

KR101325841

B1 2013-11-05 KR101325841



|               |    |            |               |                                                                                   |                                                                                    |                                                                                     |                                                                                     |
|---------------|----|------------|---------------|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| CN100555728   | C  | 2009-10-28 | CN100555728C  |  |  |  |  |
| CN101151759   | A  | 2008-03-26 | CN101151759   |  |  |  |  |
| KR20070111504 | A  | 2007-11-21 | KR20070111504 |  |  |  |  |
| WO2006/100716 | A1 | 2006-09-28 | WO2006100716  |                                                                                   |                                                                                    |                                                                                     |                                                                                     |

**Abstract**

(WO2006/100716)

A **water** treatment apparatus for fuel cell involving treating of any **water** recovered from fuel cell by means of an electric deionization unit, which **water** treatment apparatus is improved so as to satisfactorily remove fluorine from **water** flowing in the electric deionization unit, being compact and of a unified body. Waste **water** from the negative **electrode** compartment of electric deionization unit (4) is passed through transfer **pipe** (18) into air wash compartment (20), and simultaneously air is blown into the air wash compartment (20) to thereby carry out air washing. The air having undergone the air washing is blown into a lower zone of decarbonation compartment (30). In the compartment (30), the **water** recovered from fuel cell is brought into contact with this air to thereby effect decarbonation. Thereafter, the **water** is sequentially passed by means of pump (62) through defluorination compartments (70,72,74) and heavy metal removing compartments (80,82), and fed into the electric deionization unit (4).

**Inventors**

MIWA MASAYUKI

MISUMI YOSHITERU

**Latest standardized assignees - inventors removed**KURITA **WATER** INDUSTRIES

Family 22/25 - FAMPAT - ©Questel

**Title**

(EP1986959)

Process for producing a disinfectant by electrochemical activation (eca) of **water****Images**

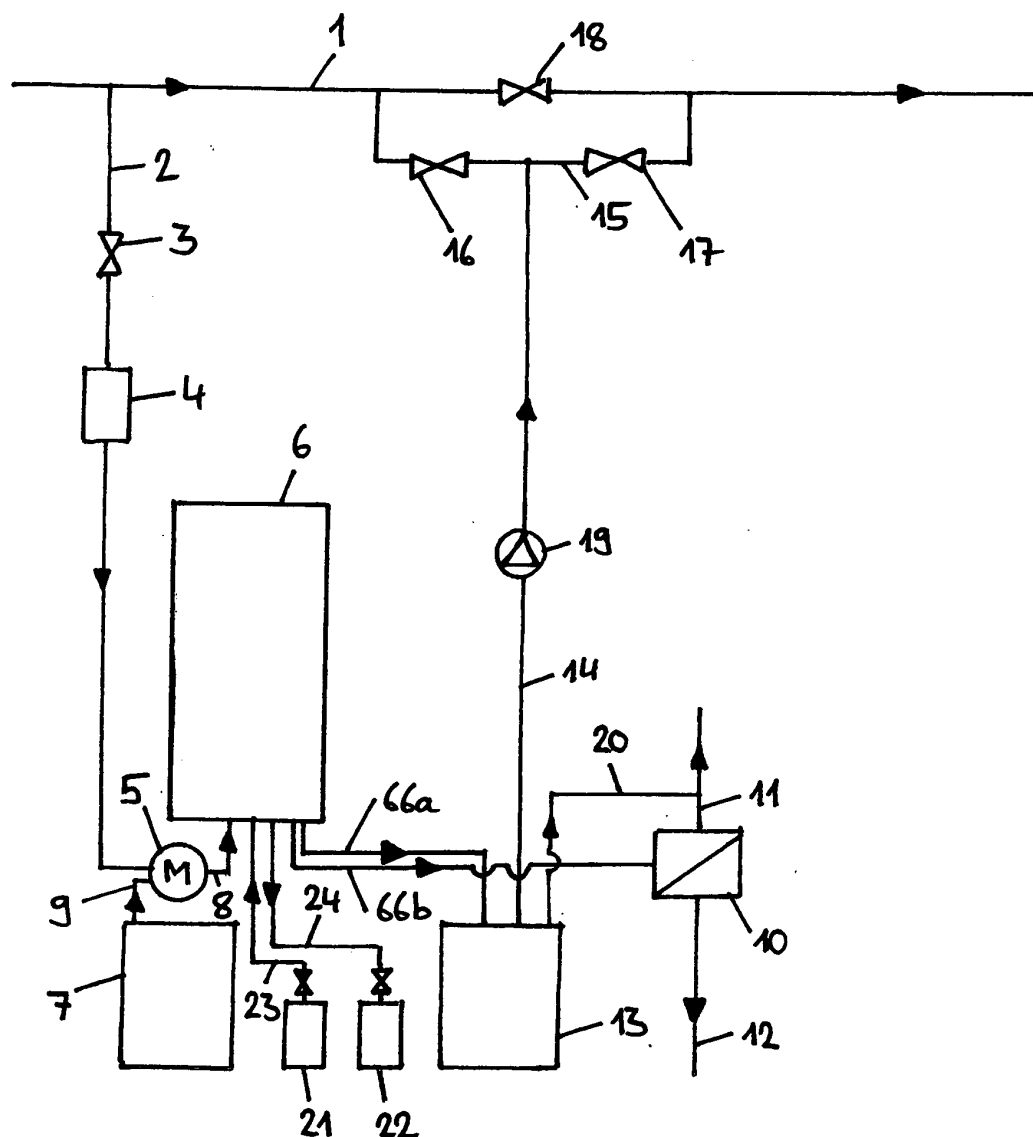


Fig. 1

## Publication numbers with kind code &amp; date

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|-----------------------------------|----|------------|----------------|
| <a href="#">CN101426734</a>       | B  | 2012-07-04 | CN101426734B   |
| <a href="#">DE502007005463</a>    | D1 | 2010-12-09 | DE502007005463 |
| <a href="#">AT486046</a>          | T  | 2010-11-15 | ATE486046      |
| <a href="#">EP1986959</a>         | B1 | 2010-10-27 | EP1986959      |
| <a href="#">CN101426734</a>       | A  | 2009-05-06 | CN101426734    |
| <a href="#">IN3644/KOLNP/2008</a> | A  | 2009-02-20 | IN2008KN03644  |
| <a href="#">US20090008268</a>     | A1 | 2009-01-08 | US20090008268  |
| <a href="#">EP1986959</a>         | A2 | 2008-11-05 | EP1986959      |
| <a href="#">WO2007/093395</a>     | A3 | 2008-02-21 | WO200793395    |
| <a href="#">DE102006007931</a>    | A1 | 2007-08-30 | DE102006007931 |
| <a href="#">WO2007/093395</a>     | A2 | 2007-08-23 | WO200793395    |



## Abstract

(EP1986959)

A process is proposed for producing a disinfectant by electrochemical activation (ECA) of **water**, by adding to the **water** to be disinfected an electrolyte solution, in particular a sodium chloride or potassium chloride solution, and subjecting the electrolyte-solution-charged **water** in the form of a dilute **water**/electrolyte solution to an electric **current** in an electrolysis

reactor having a **cathode** space having a **cathode** and also an **anode** space spatially separated from the **cathode** space and having an **anode**, by applying direct **current** to the electrodes, in order to put the **water**/electrolyte solution into a metastable state suitable for disinfection. In order to ensure reliable disinfectant action of the electrochemically activated **water**, with high reproducibility, the invention provides that the pH of the dilute **water**/electrolyte solution in the **anode** space of the reactor is controlled to a value between 2.5 and 3.5, in particular to a value in the region of 3, in such a manner that the potential of the anodic oxidation is controlled (potential-controlled anodic oxidation, PAO). The invention further relates to a disinfectant produced in such a manner and also to use thereof.

#### Inventors

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#### Latest standardized assignees - inventors removed

ACTIDES

Family 23/25 - FAMPAT - ©Questel

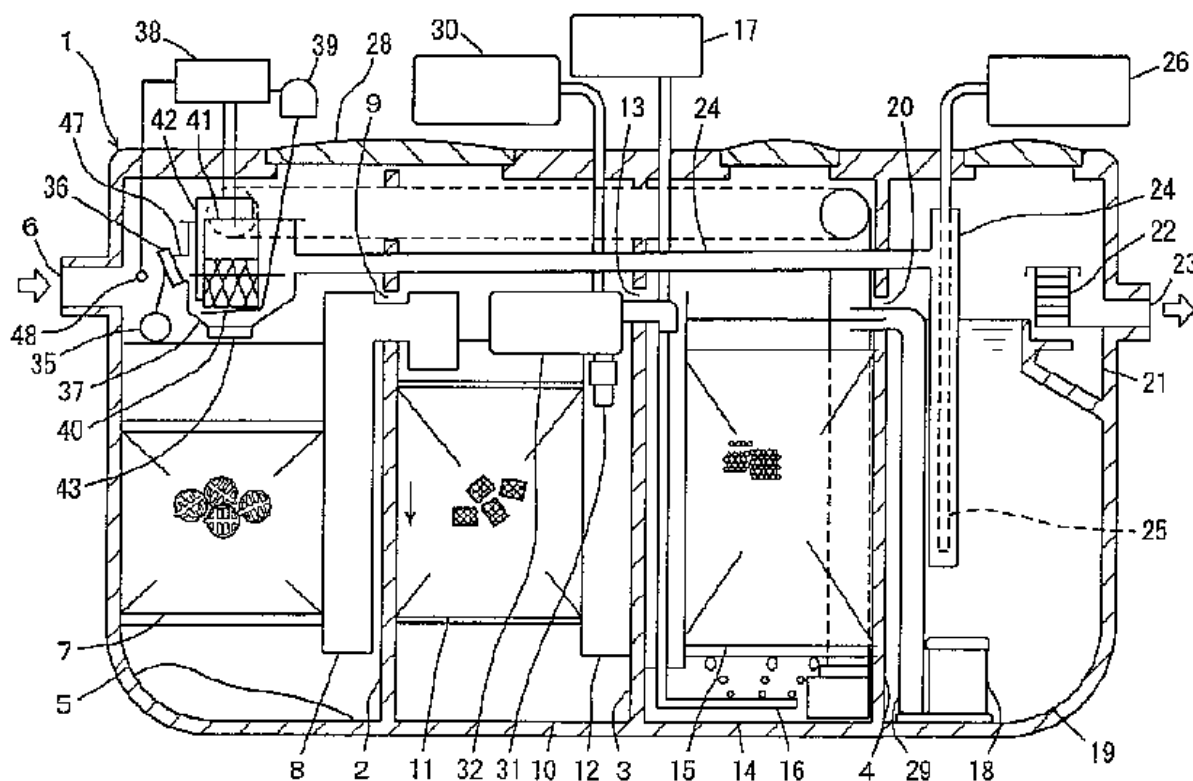
#### Title

(DE10040416)

Waste **water** treatment plant removes phosphor compounds by coagulation

#### Images

**FIG. 1**



#### Publication numbers with kind code & date

|                               |    |            |               |
|-------------------------------|----|------------|---------------|
| <a href="#">TWI229657</a>     | B  | 2005-03-21 | TWI229657     |
| <a href="#">CN1178868</a>     | C  | 2004-12-08 | CN1178868C    |
| <a href="#">KR100404947</a>   | B1 | 2003-11-10 | KR100404947   |
| <a href="#">JP2001259642</a>  | A  | 2001-09-25 | JP2001259642  |
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| <a href="#">KR20010049935</a> | A  | 2001-06-15 | KR20010049935 |



[DE10040416](#)

A1 2001-03-15 DE10040416

[CN1286225](#)

A 2001-03-07 CN1286225

**Abstract**

(DE10040416)

A waste **water** treatment assembly incorporates a coagulation unit which removes phosphorous components as a poorly soluble metal salt. The **water** treatment assembly combines conventional treatment stages with the coagulated removal of phosphor compounds. The assembly consists of a tank (1) having a first compartment (5) with an anaerobic filter, a second compartment (10) with anaerobic filter, and a contact aeration compartment (14). The unit further has a compartment (19) for treated **water**, a disinfecting section (21), an electrolysis bath (37) with electrodes (41, 42) and a manhole cover (28). The electrodes (41, 42) break down progressively surrendering metal **ions** to the first compartment (5). The electrodes (41, 42) are fixed to the manhole cover (28).

**Inventors**

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SANYO ELECTRIC

Family 24/25 - FAMPAT - ©Questel

**Title**

(EP1727406)

Plasma generator

**Images**



|               |    |            |              |
|---------------|----|------------|--------------|
| EP1727406     | A4 | 2007-04-18 | EP1727406    |
| CN1934914     | A  | 2007-03-21 | CN1934914    |
| EP1727406     | A1 | 2006-11-29 | EP1727406    |
| JP2005267909  | A  | 2005-09-29 | JP2005267909 |
| WO2005/089031 | A1 | 2005-09-22 | WO200589031  |



## Abstract

(EP1727406)

A plasma generator capable of performing intermittent operation of repeating a sequence operation including start, sustaining, and stop of a **cathode** arc plasma for a long time. The plasma generator for forming a thin film comprises a **cathode** (4) for supplying constituent particles of an arc plasma and a trigger-and-**anode** (6) for starting and sustaining the arc plasma. The **cathode** surface (4a) of the **cathode** (4) is flat or finely irregular, and the **anode** surface (6c) of the trigger-and-**anode** (6) brought into contact with the **cathode** surface (4a) is flat. The **anode** surface (6c) is so arranged as to be brought into contact with the whole **cathode** surface (4a) when a plasma is started. The contact point between a fine projection end (4b) of the **cathode** surface (4a) and the **anode** surface (6c) is made a plasma emission point. When the projection is consumed by plasma emission, another projection end which can be brought into contact with the **anode** surface (6c) is used as another plasma emission point, thus enabling intermittent operation of persistently repeating the sequence operation. Consequently, a stable plasma can be produced for a long time.

## Inventors

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## Latest standardized assignees - inventors removed

FERROTEC

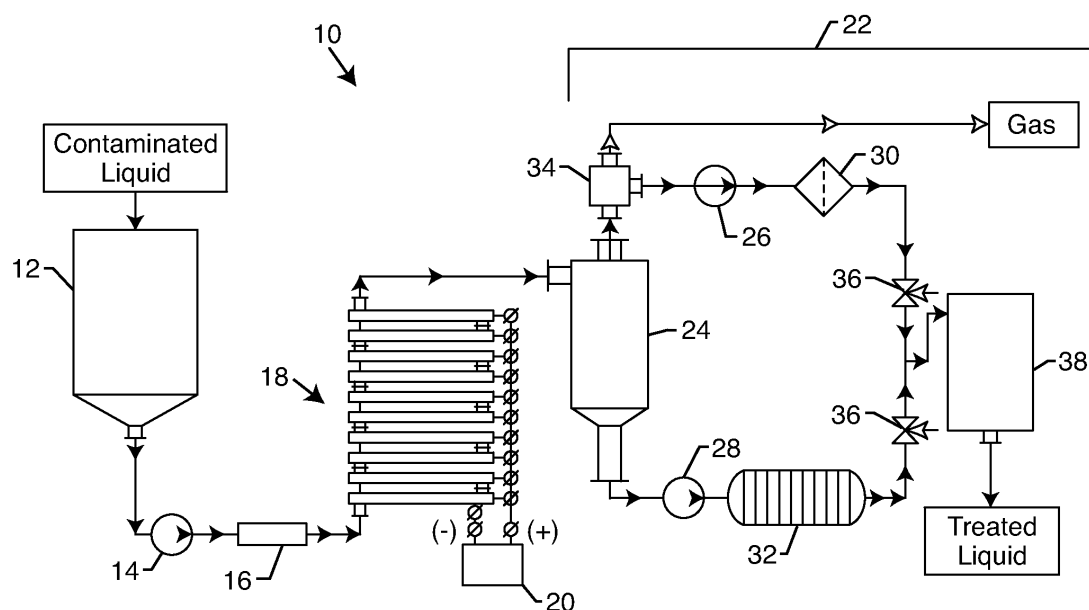
Family 25/25 - FAMPAT - ©Questel

## Title

(WO201179276)

High-throughput cavitation and electrocoagulation apparatus

## Images



## Publication numbers with kind code & date

|               |    |            |             |
|---------------|----|------------|-------------|
| US8673129     | B2 | 2014-03-18 | US8673129   |
| WO2011/079276 | A1 | 2011-06-30 | WO201179276 |



[US20110147231](#)

A1 2011-06-23 US20110147231

**Abstract**

(WO2011/079276)

The invention relates to a cavitation and electrocoagulation reactor comprising a hollow cylindrical **cathode** having a cylindrical **anode** coaxially disposed therein to form an annular interelectrode gap between the contact surfaces. An inlet sleeve and an outlet sleeve disposed in the respective inlet and outlet of the **cathode** and abutting against opposite ends of the **anode** seal the interelectrode gap from the respective inlet and outlet of the **cathode**. A set of channels disposed in the wall of the inlet sleeve connect the inlet to the interelectrode gap. Similarly, a set of openings disposed in the outlet sleeve connect the interelectrode gap to the **cathode** outlet. An electrical source has first and second terminals respectively connected to the **anode** and the **cathode**. The method for removing contaminants from a contaminated fluid flow involves the simultaneous application of hydrodynamic cavitation and electrocoagulation to the contaminated fluid flow.

**Inventors**

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CAVITATION TECHNOLOGIES